REGISTRATION FORM

PURSUANT OF PART 10, ENVIRONMENTAL ASSESSMENT

SECTION 49 OF THE ENVIRONMENTAL ASSESSMENT ACT

Name of Undertaking:

Forest Management Districts 10,11,12, and 13
(Planning Zone 5) Five Year Operating Plan 2016-2020

Proponent:

(i) Department of Natural Resources
Forestry Services Branch

(ii) Chief Executive Officer

Mr. Jim Evans
Forestry Services Branch
(709) 637-2269

(iii) Principal Contact Person

Mr. Ivan Downton
Forest Ecosystem Management Director
(709) 637-2284

The Undertaking:

(i) Nature of Undertaking

To conduct forestry activities (harvesting, silviculture and road construction) from 2016 to 2020.

(ii) Purpose/Rationale/Need for Undertaking

This undertaking will enable the Forest Services Branch to harvest approximately 420 000 m3 of timber, construct approximately 80 kilometers of primary forest access road and complete silviculture activities in District 10; and harvest approximately 820 000 m3 of timber, construct approximately 280 kilometers of primary forest access road and complete silviculture activities in District 11; and harvest approximately 1 400 000 m3 of timber, construct approximately 140 kilometers of primary forest access road and complete silviculture activities in District 12; and harvest approximately

150 000 m3 of timber, construct approximately 12 kilometers of primary forest access road and complete silviculture activities in District 13;

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

Forest Management Districts 10,11,12 and 13 encompass most of Central Newfoundland. They extend from Victoria Lake in the west to the Bay D'Espoir highway in the east and from Island Pond in the south to North and South Twin Lakes in the north. The districts share and overlap common eco-region characteristics and for forest management purposes have been combined to form Planning Zone 5. The overview and operational maps in the plan outline the general and exact locations of the zone.

(ii) Physical Features

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

(iii) Operation

Commercial harvesting will be carried out manually and with shortwood harvesters and forwarders and domestic harvesting will be done by chainsaw with extraction be snowmobile and ATV. Roads will be constructed using excavators and/or bulldozers and silviculture will be carried out using brushsaws, pottiputkis, 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 2020

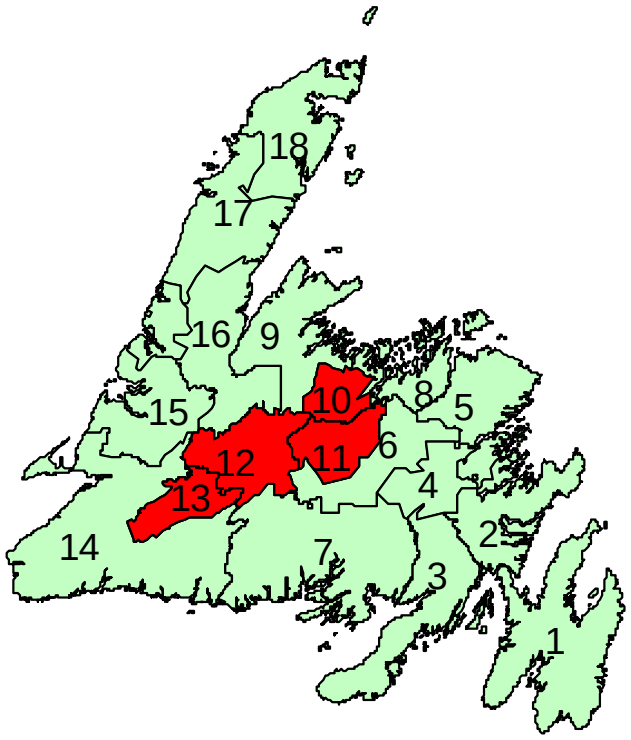
(iv)Occupants

	Loggers, equipment operators, truckers, sawmillers, silviculture workers and domestic cutters.
Approval of the Undertaking:	Commercial and domestic cutting permits as well as operating permits will be required from the District Forest Management Offices at St. Georges, Springdale, and Bishops Falls.
Schedule:	This plan is scheduled to commence on January 1, 2016 and end on December 31, 2020.

Nov 27, 2015
Date

Ivan Downton
Chief Executive Officer

Crown Five Year Operating Plan
Forest Management Districts 10, 11, 12 and 13
2016-2020



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INTRODUCTION

On December 16, 2008, the passing of Bill 75 resulted in the expropriation and return to crown, timber lands associated with Forest Management Districts 10, 11, 12 and 13 previously vested to Abitibi-Bowater. With the return of these timber lands to the crown, it was the Forestry Services Branch position that the management of these lands would be consistent with the strategies and philosophies in effect in all other crown managed districts in the province.
This is the second five year operating plan since that time and covers the period January 1, 2016 to December 31, 2020.

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

Another major change to the planning process is the creation of eight planning zones on the island which are based primarily on ecoregion composition. Districts 10, 11, 12 and 13 are adjacent and share common ecoregion characteristics and collectively form Planning Zone Five. The requirement for submission to the Forestry Services Branch and for environmental assessment is one five year operating plan for each owner in each zone. The past requirement was one five year operating plan by each owner in each district. This zone is comprised entirely of crown land so there will be only one submission by the crown. Throughout this five year plan, references will be made to Districts 10, 11, 12 and 13 individually but when combined they will

collectively be referred to as Planning Zone Five or the zone. The planning team for this zone is located in Grand Falls-Winsor. Planning team format and structure will be discussed in a later section.

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

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

Section 1 Description of the Land Base

1.1General

1.1.1 Location

Planning Zone Five encompasses Forest Management Districts 10, 11, 12 and 13 (Figure 1). It is located in central Newfoundland and extends from Victoria Lake in the west to the Bay D'Espoir highway in the east and from Island Pond in the south to North and South Twin Lakes in the north. Major towns located within the zone are Bishop's Falls, Grand Falls-Windsor, Badger, Millertown and Buchans. Districts 10 and 11 are administered from Bishop's Falls, District 12 from Springdale, and District 13 from St. Georges.

1.1.2 History

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

One of the earliest commercial uses of the forest in Central Newfoundland was to supply materials for the construction of the railway in the late 1800's. This combined with the granting of the Reid Lots opened up a large portion of previously inaccessible area to commercial activity. It resulted in an increase in the number and size of sawmills. Paper production started in 1909 with the opening of a mill at Grand Falls by the Anglo-Newfoundland Development (AND) Company. In the first half of the 1900's exports of material for pulpwood and mine pit-props were also common. Once the paper mill was firmly established domestic cutting in the zone was limited to cutovers, birch and burnt timber. Commercial sawmill activity was also limited. In the early 1960's, the AND Company merged with the Price Brothers and Company Limited to form a new company called Price Pulp and Paper Limited. This company operated under various

names until the closure of Abitibi-Bowater Inc. in 2009. Some of the reasons for closure were high energy and operating costs. The land area has since been expropriated and managed by the Crown.

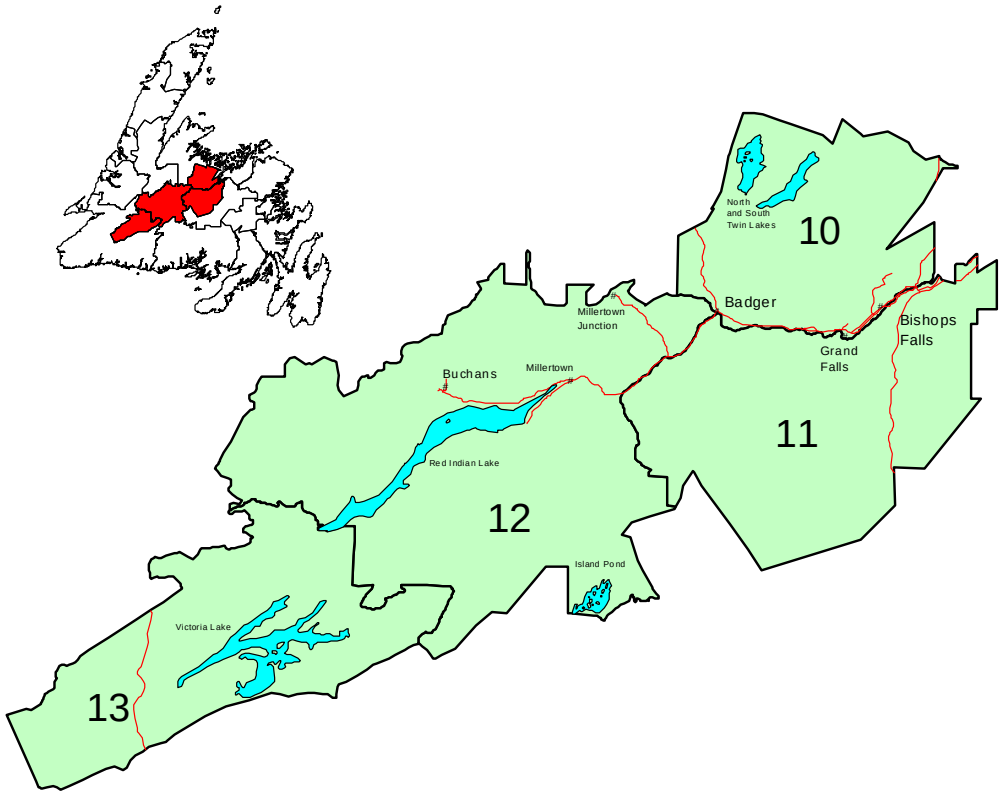

Figure 1 Location of Planning Zone 5

1.1.3 Ownership

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

1.2 Physical

1.2.1Topography and Hydrology

The central portion of the zone comprises the majority of area and is gently undulating with slopes seldom exceeding 10 percent. In contrast, the terrain is very rough and hilly in the northern portion of District 10. The Gaff Topsails and Buchans Plateau occur north of Red Indian Lake in District 12 and consists mainly of highland areas and windswept barrens. The southern and south western portion of the zone consists of rolling hills that grow steeper as one moves farther south. Elevation ranges from 0 at the coast to 610 m on the Buchans Plateau. Most of the zone is forested and interspersed with scrub, barren, and treed, wet, basin and domed bogs.

Generally the most productive forest occurs on the more undulating terrain. The areas with the highest productivity occur in the river valleys. Forest productivity decreases beyond 400 metres culminating in rock and soil barrens at the highest elevations.

The more prominent highland areas in the zone include Hodges Hills in the northeast, Buchans Plateau and Gaff Topsails in north central and the eastern extent of the Annieopsquotch range in the south west.

The zone is dominated by three major river basins; the Exploits, Victoria and Lloyds River systems. These rivers originate in the interior areas and drain large watersheds. Red Indian Lake is of extreme importance as a reservoir to allow flow control on the Exploits River for the generation of hydroelectricity.

1.2.2 Geology

In the majority of the zone, the underlying bedrock is composed of sedimentary and metamorphic shale, schist and sandstone dating from the Paleozoic era, with intrusions of harder

granite and diorite. The area has been heavily glaciated and stony till with a sandy loam-to-loam texture covers the bedrock in most locations. In the northern section near Mark's Lake, Frozen Ocean Lake and Lewis Lake treeless granite outcrops occur on the steep terrain. There are a number of steep isolated rock hills or monadnocks located at Hodges Hills, Hungry Hill and Harpoon Hill which rise sharply above the surrounding terrain.

Glacial activity has played a prominent role in shaping landscape features. Most of the central area is covered with bedrock derived till with lesser areas of outwash terraces and moraine deposits. There is a local network of outwash terraces composed of well-sorted sands and gravels, along a narrow band of an earlier drainage channel of Stoney Brook. Eskers and kame terraces, composed of coarse-grained materials that have a limited moisture holding capacity are common. There are also some local moraine deposits below 150 meters.

In the Buchans Plateau area north of Red Indian Lake there are three major types of bedrock: (1) medium to coarse grained granite to the north, (2) volcanic rock immediately north of Red Indian Lake from Buchans Junction to the Shanadithit lowlands, and (3) red sandstone, conglomerate and shale in the Shanadithit lowlands. The Buchans area is covered with a thick deposit of till which is generally drumlin shaped in the direction of ice movement. Most of the area is covered by upland barrens which consist of extensive areas of bog-soil-rock complexes above 244 meters elevation. These uplands can be divided based mainly on elevation; the upper consisting of bog and exposed rock with thin deposits of till and the lower composed of a bog-barren complex with a minor component of exposed rock.

In the southwest portion of the zone, the northerly extension of the Annieopsquotch range consists mainly of treeless granite outcrops. There is an area between this mountainous region and Red Indian Lake, which is underlain by softer, less erosion-resistant sandstone, shale and conglomerate. Surface deposits in this location consist of medium textured glacial till, lacustrine and glacial-fluvial materials. Some material for the description of geologic features was taken from Batterson, M. J, 1991, 1999a and 1999b.

1.2.3 Soils

For most of the zone soil profiles developed in the till are chiefly orthic and humo-feric podzols on the well-drained upland sites, and gleysols and peats on the low-lying sites. The bogs are dominated by organic soils. The better-drained, more permeable soils, which offer better machine mobility and make better road construction material, are usually associated with poorer tree growth. The heavier, finer textured soils, which have greater water retention capabilities and poor vehicle mobility and make poor road building material, are usually associated with the best tree growth. These heavier soils form an almost continuous east- west strip along the river basins. There are some minor areas of more permeable soils within this area; however, they do not make up a significant portion.

There is little soil profile development in the Buchans Plateau which limits forest productivity. An escarpment along the northern shore of Red Indian Lake has surface deposits of glacial till with glacial-fluvial materials at the mouth of major brooks and streams. Forest growth is good along these sheltered slopes, although some areas are limited due to wet conditions. Soils are ferro-humic podzols which are dark soils with high organic content that usually occur on humid sites.

1.2.4 Climate

The eastern portion of the zone experiences warm summer temperatures and its location east of the Long Range Mountains makes it one of the driest on the island. This area experiences the least wind and fog due to the effects of the cold northeast winds off the Labrador Current. The area has high summer temperatures, low summer precipitation and prolonged dry periods which makes it very susceptible to fire.

The climate for the central and western portion of the zone is more moderate with lower summer temperatures and higher precipitation than in the east. It still has dry, warm summers relative to the rest of the island making fire occurrence more common.

The climate for the Buchans Plateau area is notable for its short growing season and permanent snow cover throughout the winter. Heavy drifting in exposed areas is common. With the exception of a more moderate summer, climate is similar to the extreme southern boundaries of the zone.

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 Five, 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.

Figure 2 depicts Planning Zone Five relative to Damman's ecoregion classification system. The Central Newfoundland Forest Ecoregion encompasses the majority of the area in the zone and occupies the more productive sites. The Maritime Barrens and Long Range Barrens Ecoregions occur on the north-central, south western peripheries and are less important in terms of forest productivity.

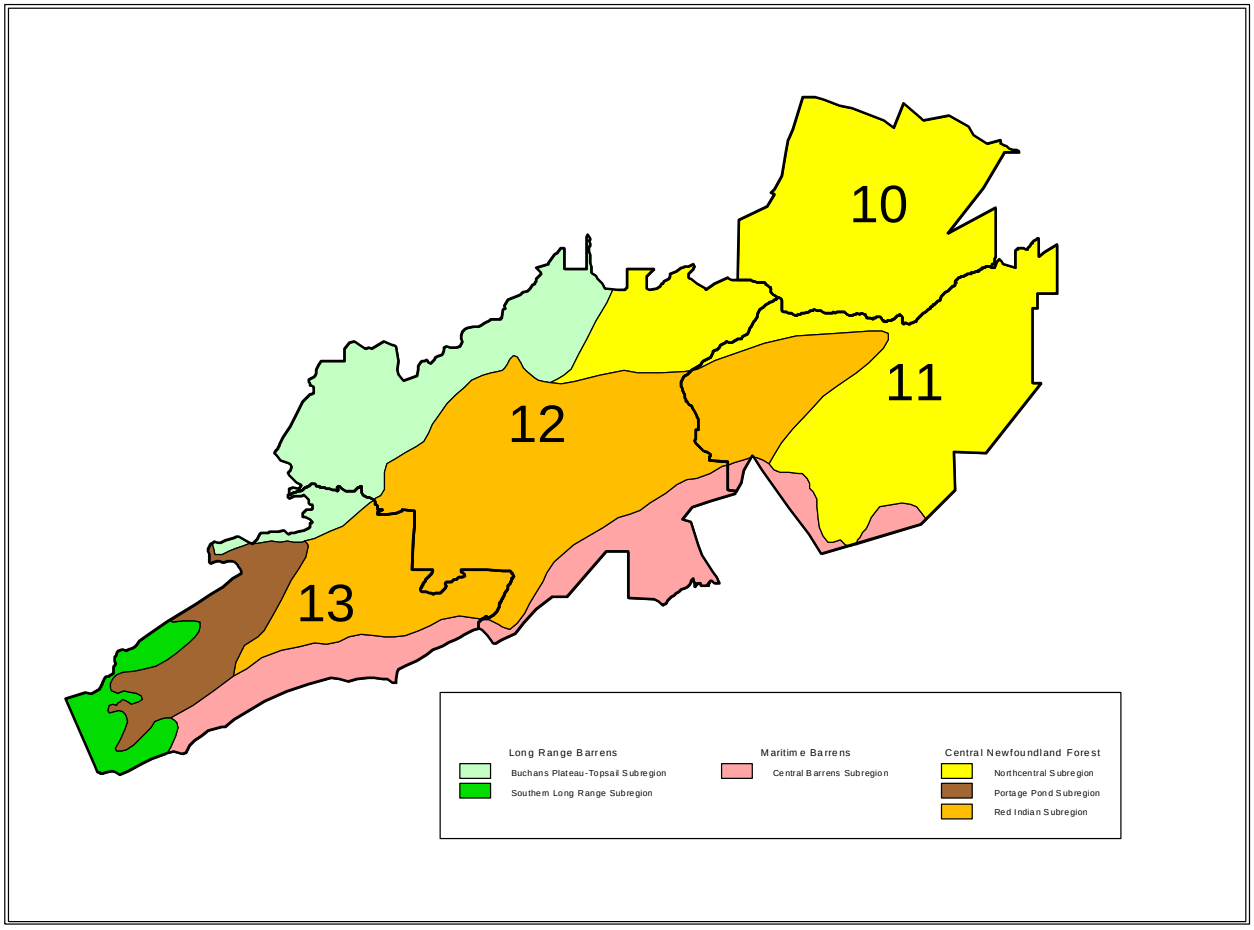

Figure 2 Ecoregions and subregions of Planning Zone 5

Table 1 depicts the percentage of the ecoregions and subregions that are represented in the zone. It describes each ecoregion and subregion as a percentage of the total in the province as well as the relative importance within each district and in the zone. For example, District 12 contains 59 percent of the Red Indian Lake Subregion of the Central Newfoundland Forest Ecoregion in the province while the whole zone encompasses all of this subregion. As well, 47 percent of district 12 and 31 percent of the zone is located within this subregion. The following is a detailed description (from Meades, 1990) of each ecoregion and subregion in the zone.

Table 1. Percentage of ecoregions and subregions in Planning Zone 5.

Name of Ecoregion and Subregion	Total Area in Province (ha)	Percentage of Total Area in Districts					Relative Percentage of Ecoregion and Subregion in Districts				
		10	11	12	13	Total	10	11	12	13	Combined
Long Range Barrens											
Buchans Plateau - Topsail Subregion	369811	0	0	36	4	40	0	0	27	5	12
Southern Long Range Subregion	599815	0	0	0	6	6	0	0	0	13	3
Central Newfoundland Forest											
Portage Pond Subregion	149319	0	0	0	44	44	0	0	0	24	5
Northcentral Subregion	2310742	9	9	3	0	21	100	70	14	0	38
Red Indian Subregion	393911	0	18	59	23	100	0	24	47	33	31
Maritime Barrens											
Central Barrens Subregion	1514392	0	1	4	5	10	0	7	12	25	11

1.3.2.1 Central Newfoundland Forest Ecoregion

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

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

Hylocomium-balsam fir is the zonal forest type and is dominant in areas not disturbed by fire. *Kalmia*-black spruce and *Pleurosium*-balsam fir forests are also common. The *Kalmia*-black spruce-lichen forests, which occur on outwash sands and gravels, are unique to this ecoregion. Red pine also occurs but is restricted to extremely dry sites. This ecoregion comprises 74 percent of the zone in the Portage Pond, North Central and Red Indian Lake subregions.

1.3.2.1.1 North Central Subregion

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

1.3.2.1.2 Red Indian Lake Subregion

The entire Red Indian Lake Subregion is located in Planning Zone Five. The landscape is characterized by dense forest, bogs, and rolling hills. It is distinguished from the rest of the Central Newfoundland Ecoregion by having the coolest summers, highest precipitation and shortest growing season. Despite this fact, there is still a high incidence of wildfire relative to other subregions of the province.

1.3.2.1.3 Portage Pond Subregion

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

1.3.2.2 Long Range Barrens Ecoregion

This ecoregion comprises the highlands extending from the southwest coast to the northern part of the Northern Peninsula. It consists of three distinct units, the Southern Long Range, the Buchan's Plateau-Topsails, and the Northern Long Range subregions. The subregions are separated by areas of more or less continuous forest with the former two occurring in the zone. Fire is of little importance and has played no role in the formation of these barrens. There are large areas of exposed bedrock in this ecoregion which are acidic in nature.

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

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

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

<u>1.3.2.2.1 Buchans Plateau - Topsail Subregion</u>

The Buchan's Plateau-Topsails Subregion lies between Grand Lake and Red Indian Lake and its southern edge extends into Districts 12 and 13. Most of the subregion is barren. Dwarf shrub heaths, shallow patterned peatlands, and areas with low krummholtz dominate the landscape.

1.3.2.2.2 Southern Long Range Subregion

The Southern Long Range Subregion is located on the western portion of District 13 and covers the upper reaches of the river valleys and the higher terrain. In these river valleys, more of the southern plant species are present particularly yellow birch. Speckled alder thickets occur on alluvial soils.

1.3.2.3 Maritime Barrens Ecoregion

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

1.3.2.3.1 Central Barrens Subregion

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

and bogs are slightly raised or domed. This subregion occurs on the southern extremes of Districts 11, 12, and 13.

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 Five. For the most part this section will be descriptive and explanatory in nature. Specific examples of strategies and linkages to the Provincial Sustainable Forest Management Strategy will be detailed in subsequent sections.

1.4.1.1 Productivity

Productivity is the accrual of matter and energy in biomass. In simple terms, primary productivity is the sum total of all biomass produced through photosynthesis. Secondary productivity occurs when this "primary" biomass is ingested and is added to that organism's biomass. Since secondary productivity is directly dependant on primary productivity, it is this primary productivity component that drives the system.

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

Overall, the landscape in Planning Zone Five has approximately 44 percent productive forest. As well, the relative proportion of site types is 17 percent good, 65 percent medium and 18 percent poor with a mean annual increment (MAI) of 2.6, 1.7, and, 0.8 m3/ha/yr respectively. The

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

The more productive areas occur in the lowlands and gently rolling uplands of the zone with the most productive being in the river valleys. These areas have deeper soils and less exposed bedrock. The landscape patterns are more consistent and the growing season is longer. In the Buchans Plateau section of District 12 and the south central and south west portion of District 12 and 13 the soils are shallower with bedrock at or near the surface. The terrain is much rougher and the growing season is shorter.

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

1.4.1.2 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.

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

There are four main driving forces that cause disturbance in the boreal forest. As stated in section 1.5.5, harvesting accounts for the majority of disturbance in the zone and occurs on a regular and consistent basis. Fire and insect damage are the other two major disturbances and occur on a more irregular or cyclic basis. With the exception of a major windstorm, wind throw usually occurs after a stand is weakened by some other agent like insects. For this reason successional patterns after insect damage and wind throw will be discussed together. The following is a brief synopsis of successional patterns after each major disturbance type by forest type and site type.

1.4.1.4.1 Harvesting

Regeneration patterns in the black spruce type after harvesting is mainly back to black spruce, the component of which increases as the sites get better. There is substantial regeneration failure in this forest type; NSR rates increase from a low of near 10 percent on good sites to a high of approximately 50 percent on poor sites. These sites would be candidates for planting with white, black or Norway spruce.

In the balsam fir types, regeneration success back to balsam fir is much higher averaging 65 percent. Regeneration rates to balsam fir are consistent on all site types. Regeneration failure is low at 10 percent.

Regeneration pattern in the mixed wood types is generally to balsam fir or to mixed wood that is dominated by balsam fir. There is also a component of white spruce regeneration after harvest on these mixed wood types. There is a higher component of white birch regeneration after harvesting in types that had a higher percentage of hardwood before harvest. As well, the better the site class the more hardwood regeneration. Regeneration failure on the mixed wood types is variable across site types and ecoregions depending on local conditions but averages 15 percent and is higher as the site gets poorer

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

1.4.1.4.2 Fire

On the black spruce types regeneration is usually back to black spruce with a minor component of balsam fir. More fir regenerates after fire on the better sites. Regeneration failure on the black spruce types is low on the better sites averaging 10 percent but increases to 45 percent as the sites get poorer. Regeneration patterns after fire on the balsam fir types occurs in the same pattern as in black spruce. On the mixed wood types regeneration is variable. The softwood hardwood sites regenerate to fir and mixed wood while the hardwood softwood sites tend to have a higher component of black spruce and trembling aspen. The component of hardwood in the regeneration increases as the sites get better. Regeneration failure on the mixed wood forest types averages 10 percent and decreases as the component of hardwood in the original stand increases. Regeneration on the hardwood types is generally mixed with equal components of black spruce, balsam fir, white birch and trembling aspen. The hardwood component can be dominated by aspen if it was present in the original stand.

1.4.1.4.3 Insect

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

Mature balsam fir types usually regenerate to balsam fir with a component of black spruce and mixed wood on the poorer sites. Disturbance by insects in young balsam fir stands can cause succession to white spruce. In black spruce stands regeneration is usually consistently back to black spruce across site types with a lesser component of balsam fir that increases as the sites improve. Regeneration patterns in mixed wood types usually depend on the type of mixture. If black spruce is a component then it will persist and form part of the new stand. Otherwise balsam fir and balsam fir/hardwood mixtures regenerate after insect attack. Black spruce is also a component in stands with higher hardwood content. Regeneration patterns in the hardwood types are variable and can regenerate with equal components of black spruce, balsam fir, white birch and trembling aspen. Regeneration failure occurs approximately 10 percent of the time but can be significantly higher if pure stands of immature balsam fir are killed.

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

1.5.1 Land Classification

Table 2 displays the land classification broken down by district for Planning Zone 5. The total mapped land area in the zone is approximately 1.14 million hectares. There are approximately 37 000 and 2 000 ha not mapped in Districts 12 and 13 respectively. The following discussion will focus on the mapped area.

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 44 percent of the zone. Relative productivity is highest in districts 10 and 11. This is mainly due to the high proportion of area in the bog, barren, and scrub category on the peripheries of Districts 12 and 13. The higher the percentage of productive forest generally means that the forest is more contiguous and not as fragmented by bog, scrub and water. This has implications for harvesting and road building costs which are generally higher when the forest is more fragmented. The Forestry Services Branch is now classifying forest scrub by site, height and density class as new inventories are completed. This

Table 2 Land classification by district and area for Planning Zone 5.

Land Class	District				Total
	10	11	12	13	
disturbed	7921	9088	16323	3733	37065
0-20 years	28858	53436	22901	18183	123378
21-40 years	29873	37624	25463	8540	101500
41-60 years	5971	20719	18927	14732	60349
61-80 years	6342	11120	25951	1929	45342
81-100 years	25709	17830	40086	9915	93540
101-120 years	3785	0	8320	6236	18341
120+ years	1918	0	10420	8112	20450
Total Productive	110377	149817	168391	71380	499965
softwood scrub	28700	61588	90502	55278	236068
hardwood scrub	2359	5458	5189	502	13508
Total Non-Productive	31059	67046	95691	55780	249576
rock barren	192	1926	3608	8513	14239
soil barren	642	4727	14783	13435	33587
bog	33132	46962	76977	36036	193107
cleared land	578	190	355	165	1288
agriculture land	627	8	55	0	690
residential	1285	28	195	0	1508
right of ways	842	867	485	226	2420
miscellaneous	567	1929	1504	723	4723
Total Non Forested	37865	56637	97962	59098	251562
Fresh Water	21943	23312	48077	44011	137343
Total All Classes	201244	296812	410121	230269	1138446

information will be invaluable in determining which scrub areas are marginally productive or can meet some other non-timber objective.

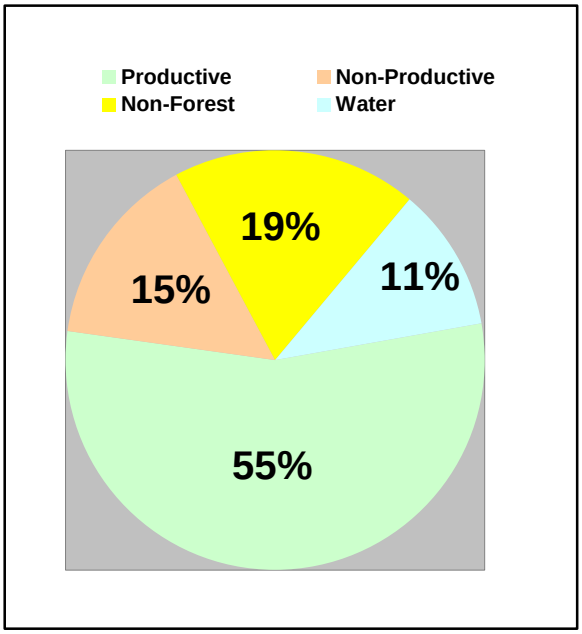

Figure 3 Land class breakdown for District 10

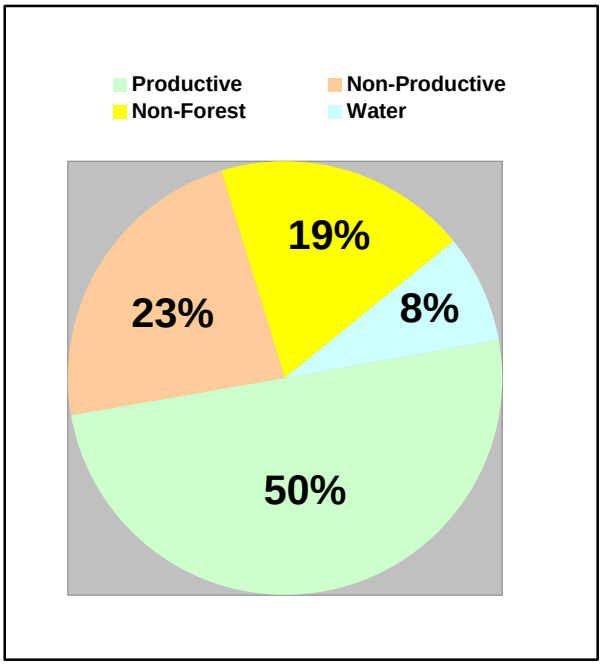

Figure 4 Land class breakdown for District 11

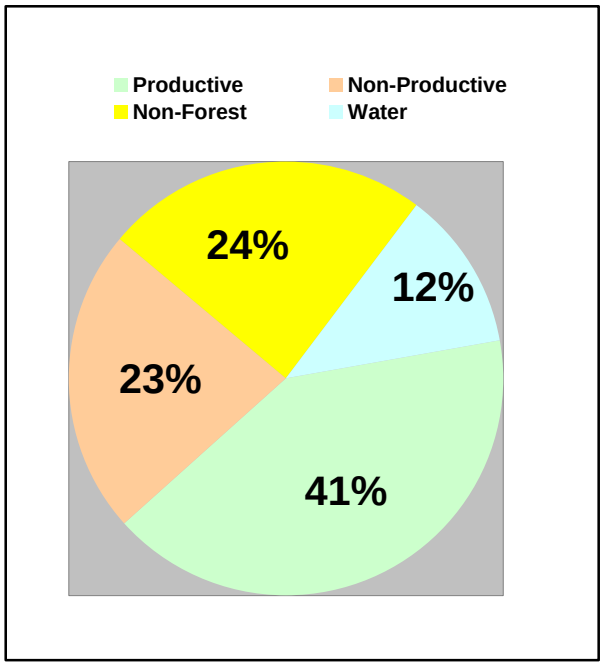

Figure 5 Land class breakdown for District 12

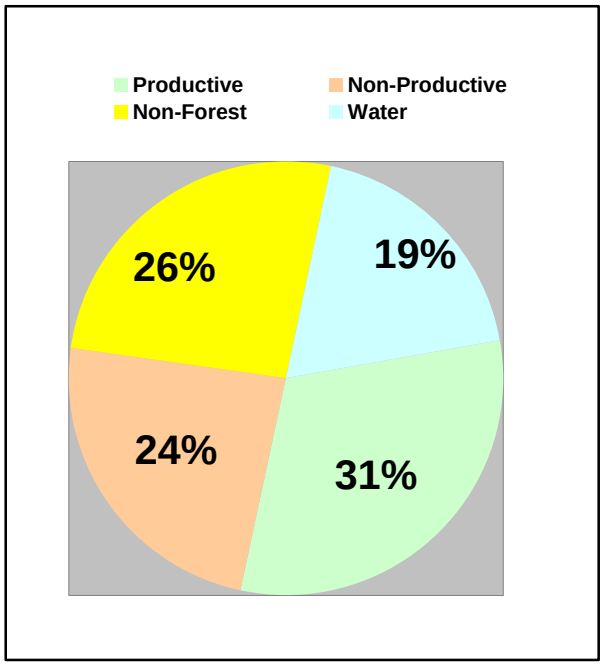

Figure 6 Land class breakdown for District 13

1.5.2 Age Class

Individual tree ages in a stand can all be the same after fire or planting but in most cases the ages vary. Foresters describe forest stand age in terms of age classes which generally encompass 20 years. The age classes present in the zone are described as regenerating (age class 1, 0-20 years), immature (age class 2, 21-40 years), semi-mature (age class 3, 41-60 years), mature (age class 4, 61-80 years), and over mature (age class 5, 81-100 years), (age class 6, 100-120 years), (age class 7, 120+ years). The age class distribution in each district for the entire productive forest is shown in Figures 7, 8, 9, and 10. In general terms, the more balanced the age class distribution in a district, the higher the potential even flow sustained yield of timber can be since continuous timber supply is limited by the age class with the lowest area. The age class structure for Districts 10 is typical of the rest of the island with an abundance of area in the young and old age classes and a dip in the intermediate age classes. District 11 is skewed toward the younger age classes while in District 12 and a lesser extent Districts 13, the age class structure is more balanced. Strategies to rectify any age class imbalances or impacts on wood supply are employed during the timber supply analysis.

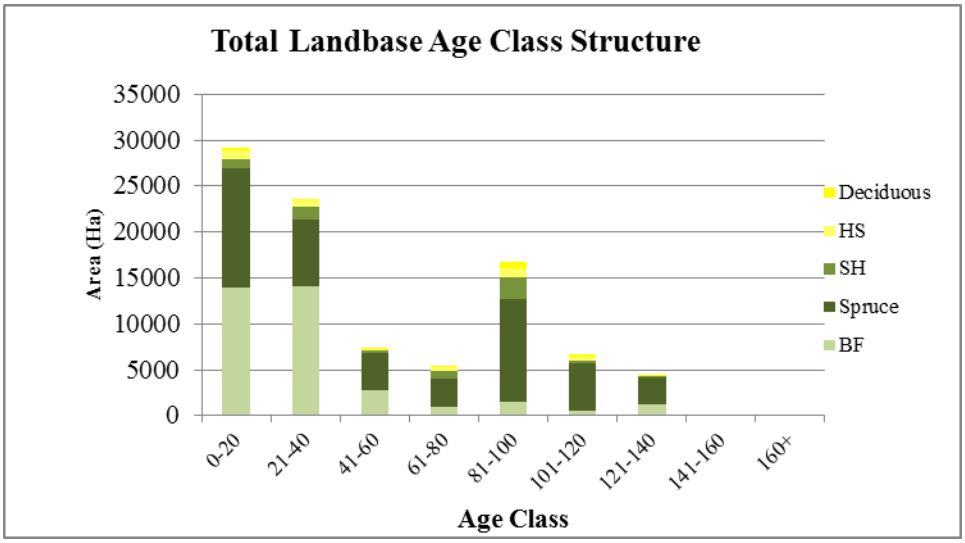

Figure 7 Age class distribution for District 10

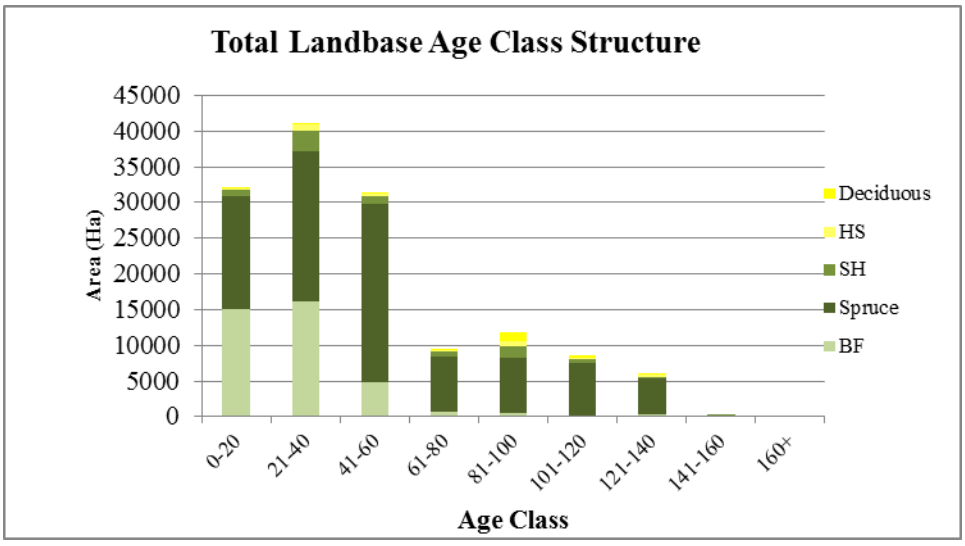

Figure 8 Age class distribution for District 11

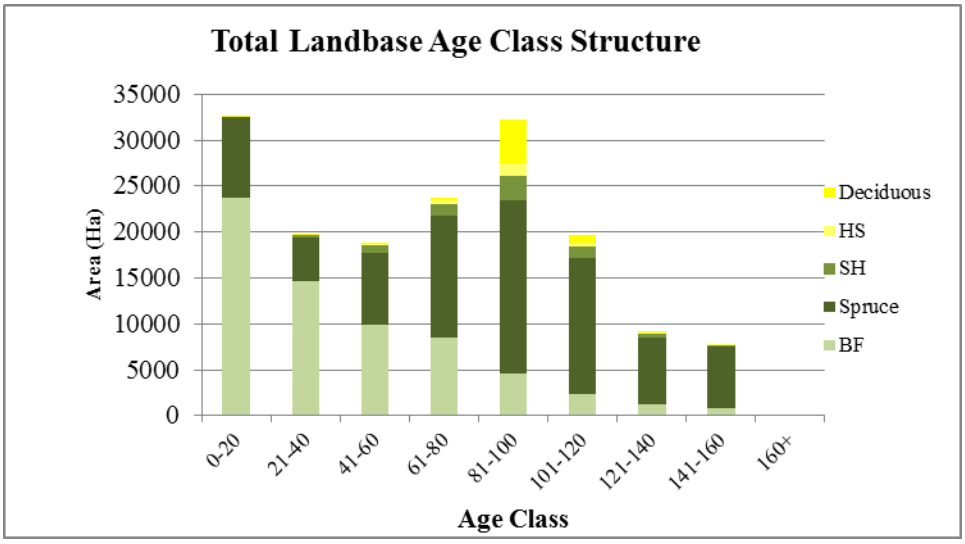

Figure 9 Age class distribution for District 12

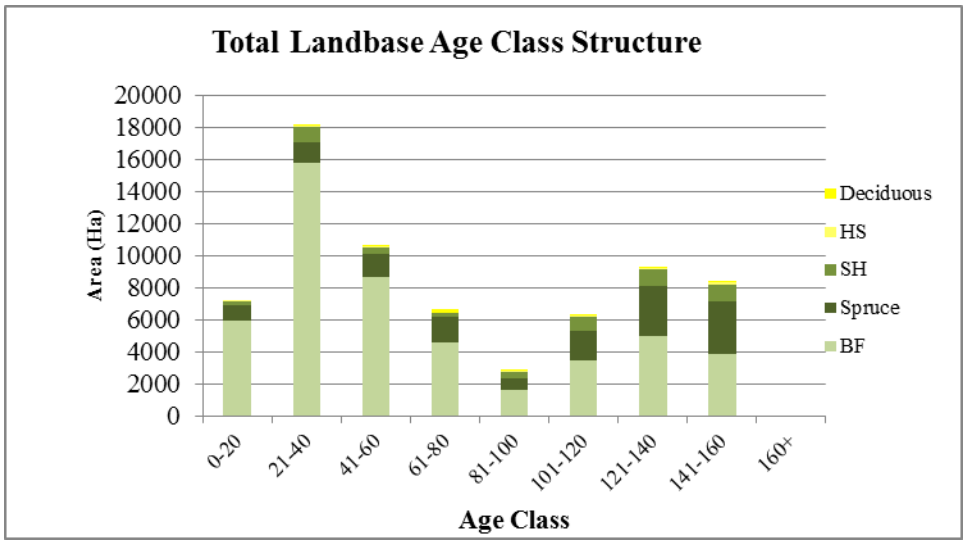

Figure 10 Age class distribution for District 13

1.5.3 Site Class

The productive forest in the zone is further sub-divided along a gradient of productivity ranging from poor to good site class. The site class is determined through air photo interpretation supplemented with field checks and is based primarily on the sites ability to produce timber. Site capability is determined on a number of factors including soil fertility, moisture regime and geographic (slope) position. In the zone, medium site types are most abundant accounting for approximately two-thirds of the productive area. The distribution of area by site class for each district is shown in Figures 11, 12, 13 and 14. On average, good sites are capable of producing 2.6 m3/ha/yr, medium sites 1.7 m3/ha/yr, and poor sites 0.8 m3/ha/yr.

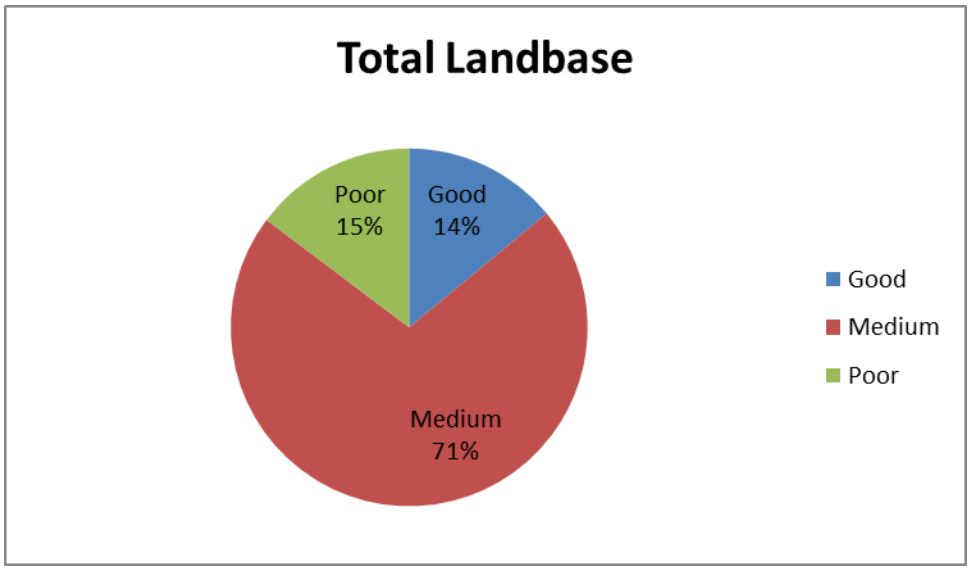

Figure 11 Site class breakdown for District 10

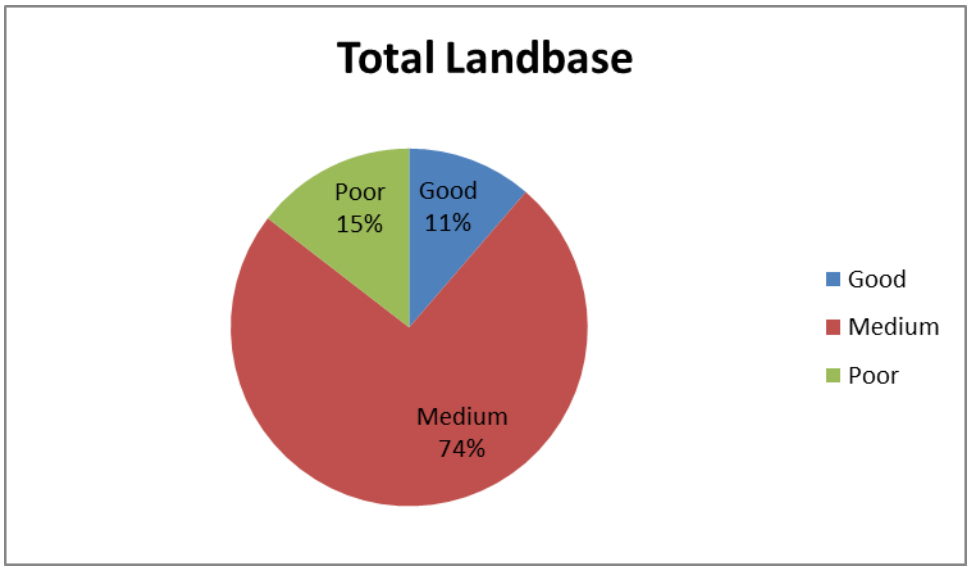

Figure 12 Site class breakdown for District 11

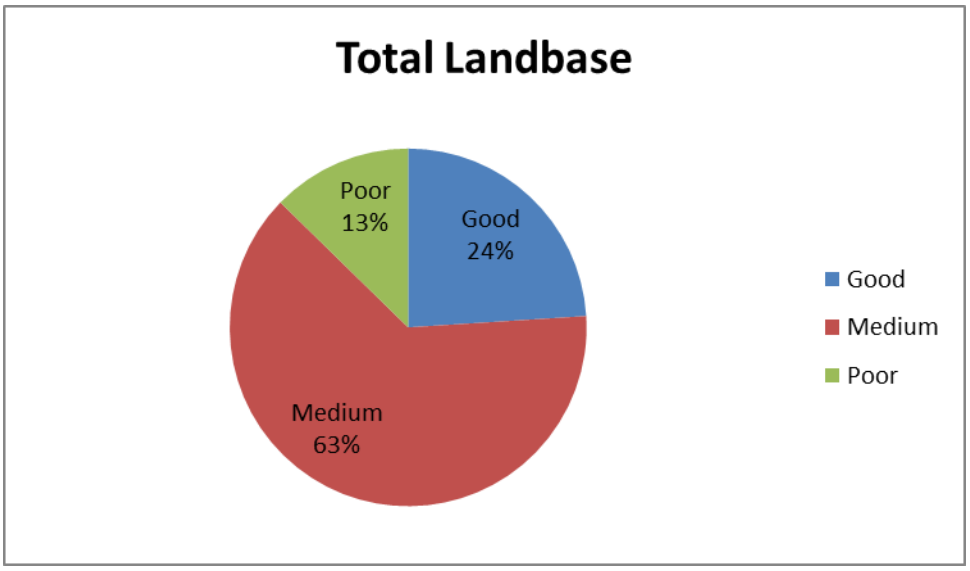

Figure 13 Site class breakdown for District 12

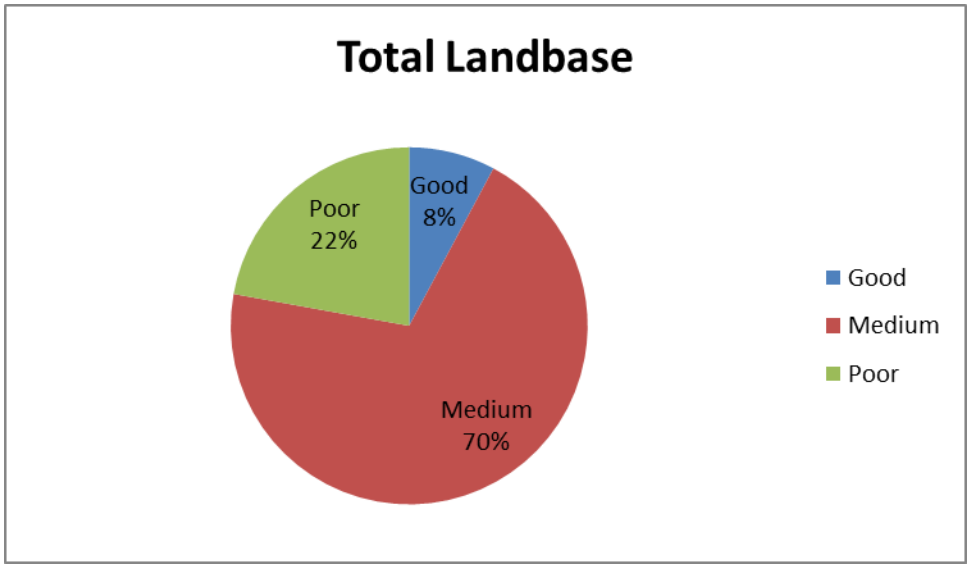

Figure 14 Site class breakdown for District 13

1.5.4 Species and Working Group

Working group describes the dominant tree species present in a forest stand. This species may occupy 100 percent of crown closure of a stand or may be present in association with other species. The working group designation describes the stand in general terms based on the

prevalent species whereby species composition describes specifically, the relative proportion of each individual tree species that make up a stand.

In the zone, the softwood working groups dominate accounting for over 75 percent of the productive forest. With the exception of District 13, black spruce is the most prolific working group in the zone followed by balsam fir (Figures 15, 16, 17, and 18). The black spruce working group can occur as pure stands or in association with balsam fir, white spruce, white birch, trembling aspen or larch in varying species compositions Balsam fir can occur in pure stands or in association with one or more of the species listed above. The softwood hardwood

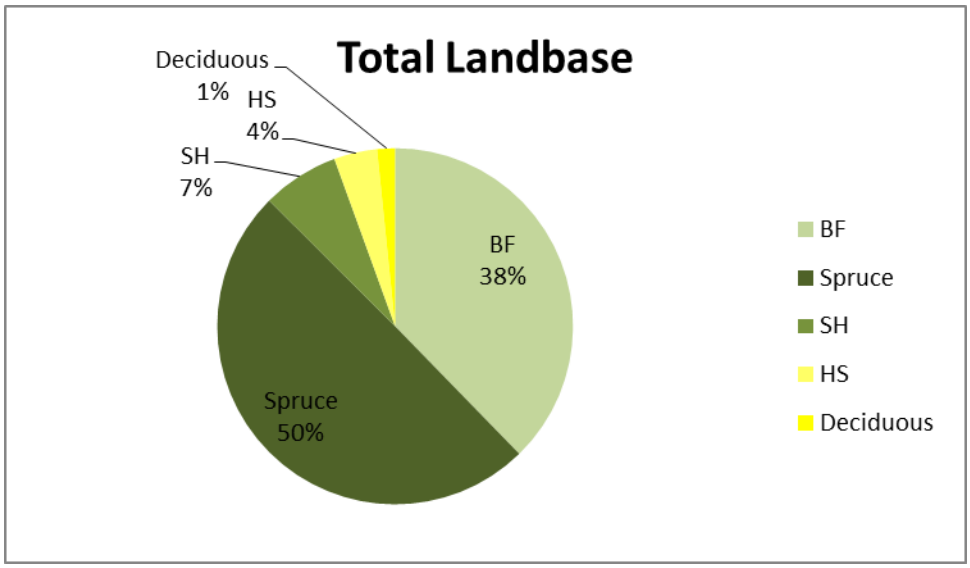

Figure 15 Working group breakdown for District 10

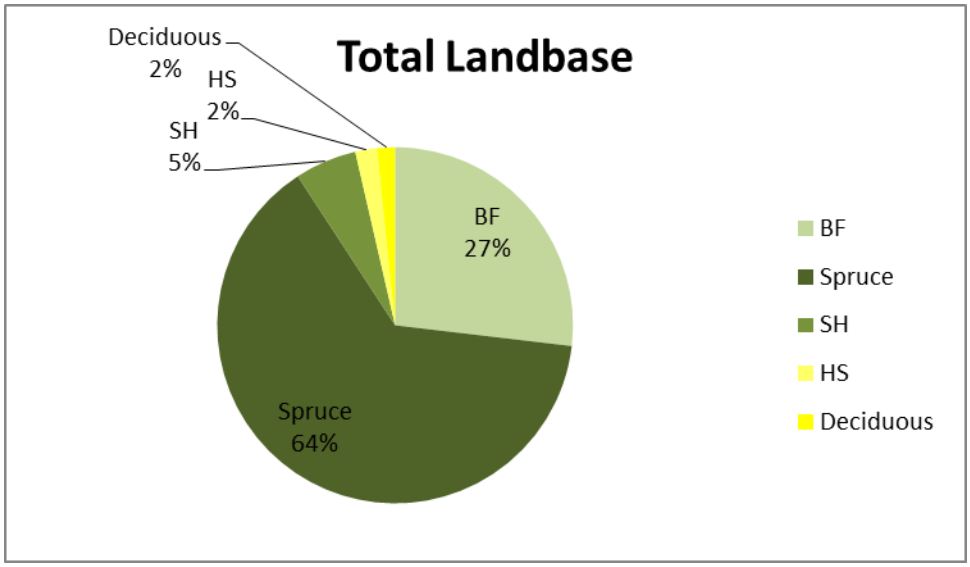

Figure 16 Working group breakdown for District 11

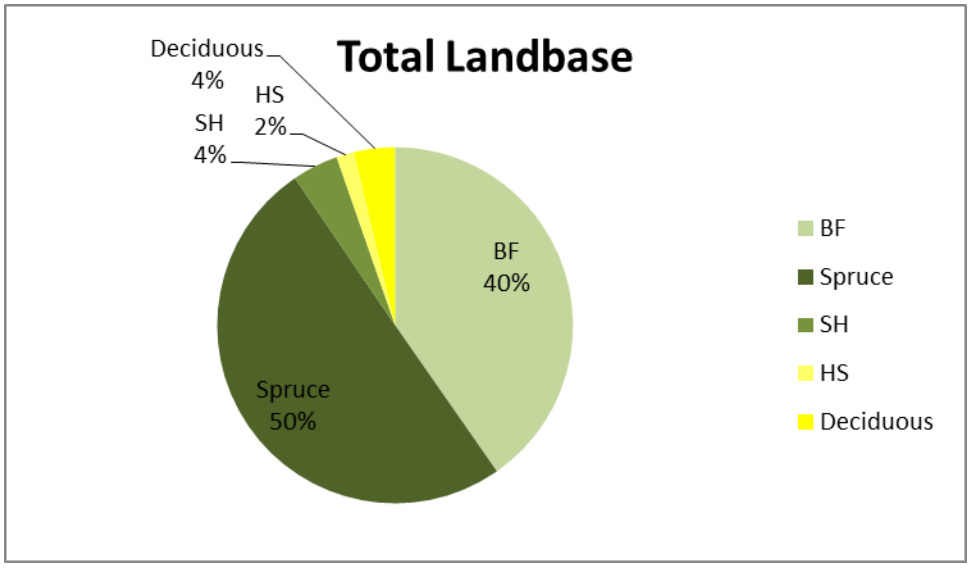

Figure 17 Working group breakdown for District 12

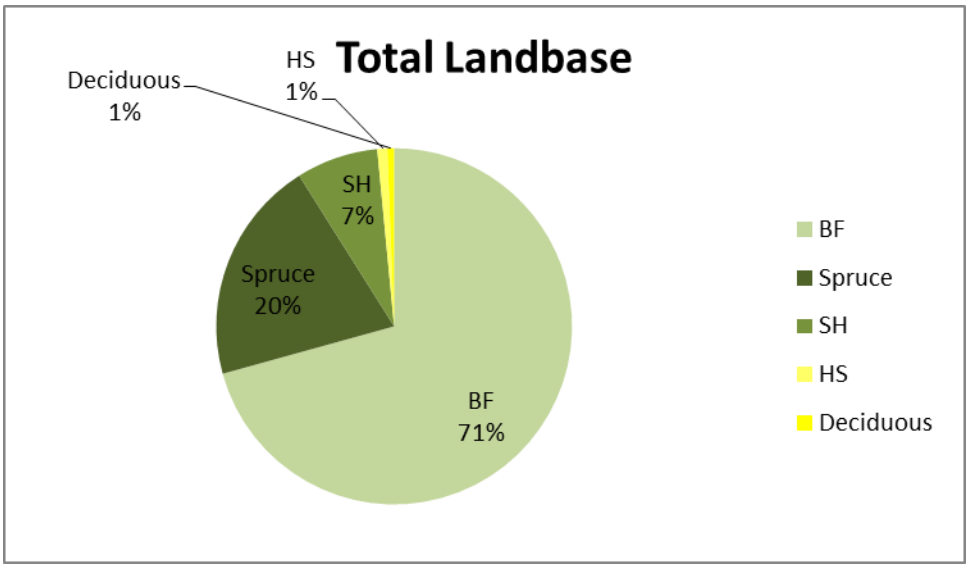

Figure 18 Working group breakdown for District 13

working group occurs as varying mixtures of fir, spruce, and birch. The hardwood softwood, white birch, and white spruce working groups occupy a small portion of the productive forest in each district. Approximately six percent of the productive forest is classed as disturbed. Disturbances include harvesting, which accounts for most of the total, insect damage, fire and wind throw.

1.5.5 Forest Disturbances

In the past 20-25 years approximately 112 500 ha have been disturbed by some means on crown land in the zone. Harvesting has accounted for a large portion of this disturbance at approximately 65 500 ha. Fire is the second most important disturbance type and has accounted for nearly 28 000 ha. Insect damage has occurred on over 15 000 ha with 4 percent in light (0-25 percent mortality), 4 percent in moderate (26-50 percent mortality), 4 percent in severe (51 -75 percent mortality) and 88 percent in extreme (76+percent mortality). Most of the insect damage occurred in District 13 which has a high proportion of balsam fir. There has been over 4 300 ha

of mortality due to blow down which has occurred as scattered pockets throughout the zone. This usually occurs after another disturbance (like insect damage) has weakened a stand. It should be noted that these areas are not mutually exclusive and there is overlap between disturbances. (ie. insects may have killed a stand, followed by salvage harvesting and then perhaps fire).

As stated, high summer temperatures, low summer precipitation and prolonged dry spells make the zone susceptible to fire. There has been a cyclical fire history in Districts 10, 11, and the central portion of 12. There was major fire activity in 1986 which resulted in a significant loss of timber in these areas. In recent years, loss has been minimal due to weather conditions, fire prevention activities and enhanced fire suppression capability. However, a major fire can occur in any year depending on weather conditions.

The main forest insects which have affected forests in western portion of the zone, mainly in District 13, are the hemlock looper and the spruce budworm. There was a major infestation in the mid-late 1980's that resulted in significant mortality and subsequent blowdown. At that time the window for harvesting insect damaged timber was wider and a large portion of timber was salvaged. Balsam woolly adelgid also impacts growth of balsam fir forests in Districts 10 and 11.

A chemical spray program was initiated in 1969, to aid in the control of the hemlock looper. Since then, the aerial application of insecticides has been used regularly as a management tool to control insect pests of balsam fir. In more recent years chemical insecticide use has been dropped in favour of the biologically insecticide bacillus thurengiensis (bT), a naturally occurring, biological control agent. Despite the use of insecticides, the hemlock looper and the spruce budworm continue to pose a significant threat to the balsam fir forests in the western portion of the zone and new infestations are likely to develop over the next 20 years.

Section 2 Past Activities

2.1 District 10

2.1.1 Harvesting

2.1.1.1 Commercial

Table 3 summarizes the commercial harvest in District 10 for 2011-2015. Commercial and domestic harvest was below the AAC for the period.

Table 3 Summary of commercial harvest in District 10 by Crown for 2011 to 2015

District: 10		Core				Operational (Available)				Non-AAC Wood	
		AAC	*Commercial*	*Deviation*	**Total**	AAC	*Commercial*	*Deviation*	**Total**	*Operational*	*Regulatory*
Swd	2011-2015		121896				2007				
	Sub-total										
		Core				**Operational (Available)**				**Non-AAC Wood**	
		AAC	Commercial	*Deviation*	**Total**	AAC	Commercial	*Deviation*	**Total**	Operational	Regulatory
Hwd	2011-2015		111318							0	
	Sub-total										
District Total											

2.1.1.2 Domestic

Table 4 summarizes the domestic harvest in District 10 by Crown for 2011 to 2015

Table 4 Summary of domestic harvest in District 10 by Crown for 2011 to 2015

District: 10		Core				Operational (Available)				Non-AAC Wood	
		AAC	*Domestic*	*Deviation*	**Total**	AAC	*Domestic*	*Deviation*	**Total**	*Operational*	*Regulatory*
Swd	2011-2015		8256				2064			3440	
	Sub-total										
		Core				**Operational (Available)**				**Non-AAC Wood**	
		AAC	Domestic	*Deviation*	**Total**	AAC	Domestic	*Deviation*	**Total**	Operational	Regulatory
Hwd	2011-2015		3142							17806	
	Sub-total										
District Total											

2.1.2 Silviculture

Table 5 summarizes the completed silviculture treatments for the past planning period.

Table 5 Summary of silviculture treatments on crown land in District 10 from 2011 to 2015

Treatment Type	Area (ha)	
	Proposed	Treated
Pre Commercial Thinning		
Site Preparation	260	245
Planting	4330	3620
Herbicide		
Commercial Thinning		
Cone Collection		

2.1.3 Road Construction

Table 6 summarizes forest access road construction in District 10 and 11 for the period 2011-2015.

Table 6 Summary of access roads constructed in District 10 and 11 from 2011 to 2015

Roads	
Proposed	Constructed (km)
212.23	118.86

2.1.4 Natural Disturbance

2.1.4.1 Fire

District 10 has had a very infrequent fire history due to its relatively long winters and abundant precipitation. There were no significant fires during the last planning period.

2.1.4.2 Insect

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

2.2 District 11

2.2.1 Harvesting

2.2.1.1 Commercial

Table 7 summarizes the commercial harvest in District 11 for 2011-2015. Commercial and domestic harvest was below the AAC for the period.

Table 7 Summary of commercial harvest in District 11 by Crown for 2011 to 2015

District: 11		**Core**				**Operational (Available)**				**Non-AAC Wood**	
		AAC	*Commercial*	*Deviation*	**Total**	AAC	*Commercial*	*Deviation*	**Total**	*Operational*	*Regulatory*
Swd	2011-2015		203659				693				
	Sub-total										
		Core				**Operational (Available)**				**Non-AAC Wood**	
		AAC	Commercial	*Deviation*	**Total**	AAC	Commercial	*Deviation*	**Total**	Operational	Regulatory
Hwd	2011-2015		11566								
	Sub-total										

2.1.2.2 Domestic

Table 8 summarizes the domestic harvest in District 11 by Crown for 2011 to 2015

Table 8 Summary of domestic harvest in District 11 by Crown for 2011 to 2015

District: 11		Core				Operational (Available)				Non-AAC Wood	
		AAC	*Domestic*	*Deviation*	**Total**	AAC	*Domestic*	*Deviation*	**Total**	*Operational*	*Regulatory*
Swd	2011-2015		2987				746			4979	
	Sub-total										
		Core				**Operational (Available)**				**Non-AAC Wood**	
		AAC	Domestic	*Deviation*	**Total**	AAC	Domestic	*Deviation*	**Total**	Operational	Regulatory
Hwd	2011-2015		7555							42812	
	Sub-total										

2.2.2 Silviculture

Table 9 summarizes the completed silviculture treatments for the past planning period.

Table 9 Summary of silviculture treatments on crown land in District 11 from 2011 to 2015

Treatment Type	Area (ha)	
	Proposed	Treated
Pre Commercial Thinning		421
Site Preparation		
Planting	3295	5587
Commercial Thinning	100	79
Cone Collection	0	2600 litres

Treatment Type	Area (ha)	
	Proposed	Treated

Pre Commercial Thinning		
Site Preparation	2,458	3,342
Planting	4390	3683
Herbicide	158	84
Commercial Thinning		
Cone Collection		

2.2.3 Road Construction

Table 10 summarizes forest access road construction in District 10 and 11for the period 2011-2015.

Table 10 Summary of access roads constructed in District 10 and 11from 2011 to 2015

Roads	
Proposed	Constructed (km)
212.23	118.86

2.2.4 Natural Disturbance

2.2.4.1 Fire

District 11 has had a very infrequent fire history due to its relatively long winters and abundant precipitation. There were no significant fires during the last planning period.

2.2.4.2. Insect

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

2.3 District 12

2.3.1 Harvesting

2.3.1.1 Commercial

Table11 summarizes the commercial harvest in District 12 for 2011-2015. Commercial and domestic harvest was below the AAC for the period.

Table 11 Summary of commercial harvest in District 12 by Crown for 2011 to 2015

District:		Core				Operational (Available)				Non-AAC Wood	
		AAC	*Commercial*	*Deviation*	**Total**	AAC	*Commercial*	*Deviation*	**Total**	*Operational*	*Regulatory*
Swd		923195	494855	428340	***494855***		0			0	
	Sub-total										
		Core				**Operational (Available)**				**Non-AAC Wood**	
		AAC	Commercial	*Deviation*	**Total**	AAC	Commercial	*Deviation*	**Total**	Operational	Regulatory
Hwd		19935	2937	16998	***2937***		0			0	
	Sub-total										
	District Total										

2.3.2.2 Domestic

Table 12 summarizes the domestic harvest in District 12 by Crown for 2011 to 2015

District:			Core					Operational (Available)				Non-AAC Wood	
			AAC	*Domestic*	*Deviation*	**Total**	AAC	*Domestic*	*Deviation*	**Total**	*Operational*	*Regulatory*
Swd												
				5466				8882				
	Sub-total											
			Core					**Operational (Available)**			**Non-AAC Wood**	
			AAC	Domestic	*Deviation*	**Total**	AAC	Domestic	*Deviation*	**Total**	Operational	Regulatory
Hwd												
				0				0				
	Sub-total											
District Total												

2.3.2 Silviculture

Table 13 summarizes the completed silviculture treatments for the past planning period.

Table 13 Summary of silviculture treatments on crown land in District 12 from 2011 to 2015

Treatment Type	Area (ha)	
	Proposed	Treated
Pre Commercial Thinning		0
Site Preparation		1296
Planting		2908
Commercial Thinning		0
Cone Collection		0

2.3.3 Road Construction

Table 14 summarizes forest access road construction in District 12 for the period 2011-2015.

Table 14 Summary of road construction in District 12 for the period 2011-2015.

Roads	
Proposed	Constructed (km)
70.7	50.01

2.3.4 Natural Disturbance

2.3.4.1 Fire

District 12 has had a very infrequent fire history due to its relatively long winters and abundant precipitation. Over the past planning period there were no significant fires.

2.3.4.2. Insect

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

2.4 District 13

2.4.1 Harvesting

2.4.1.1 Commercial

There was no commercial harvest in District 13 for 2011-2015

2.4.2.2 Domestic

There was 1078 m3 of softwood and 1075 m3 of hardwood harvested for domestic purposes in District 13 by Crown for 2011 to 2015

2.4.2 Silviculture

There was no completed silviculture treatments in District 13 from 2011 to 2015

2.4.3 Road Construction

There were no forest access roads constructed in District 13 and 11for the period 2011-2015.

2.4.4 Natural Disturbance

2.4.4.1 Fire

District 13 has had a very infrequent fire history due to its relatively long winters and abundant precipitation. There were no significant fires during the last planning period.

2.4.4.2. Insect

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

Section 3 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. Figure 8 illustrates this age class imbalance.

The insufficient amount of intermediate age forest on the island is one of the most important factors influencing AAC's therefore it is the basis for many of our forest management strategies. Essentially a matrix of measures is employed which is designed to fill the gap in the age structure. These range from an aggressive forest protection program to keep the mature and over-mature stands alive as long as possible so that they can be harvested before they collapse naturally, harvesting programs that attempt to exclusively target the oldest stands first in order to minimize the harvesting pressure on the naturally weak intermediate age classes, and thinning of the regenerating forest so that it becomes operable at an earlier age.

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

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

3.4 Timber Supply Analysis

In 2003, the Forest 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 than1% of the productive forest land base is influenced by harvesting operations.

3.4.2.1.1 No-Cut Buffer Zones

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

3.4.2.1.2 Protected Areas

All established and proposed protected areas under the Natural Areas Systems Plan are removed from the AAC calculations.

3.4.2.2 Timber Related

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

3.4.2.2.1 Insect/Fire/Disease Losses

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

3.4.2.2.2 Logging Losses

Surveys of recent harvested areas are conducted each summer throughout the province to determine the quantity and quality of fiber remaining. The estimates of loss from these surveys are used to reduce the AAC.

3.4.2.2.3 Operational Constraints

Areas that are inaccessible (surrounded by bogs or hills), timber on steep slopes, and low volume stands are removed from the class 1 AAC calculation up front. Also, significant adjustments are applied to the provincial forest inventory for stands deemed operable in the timber analysis but left unharvested within operating areas. The reasons for this are linked to the character of Newfoundland's forests; low volume, steep slopes, rough terrain, and excessively wet ground conditions etc.

Again, all these timber and non-timber related issues are applied directly in the AAC calculation to ensure harvest levels do not exceed the sustainable level. With the introduction of new values and the broader application of current values, the pressure on future AAC's will continue to increase. These factors and their impacts on timber supply will be further discussed in section 3.5.

3.4.3 Growth Forecasting

A key requirement for forecasting future wood supply is an understanding of how forest stands grow and develop through time. That is, as a forest stand develops, how much merchantable (i.e. harvestable) volume does it carry at any given point? These yield forecasts (referred to as yield

curves) are required for each type of forest stand (called a stratum) comprising the forest under consideration. In Newfoundland there are dozens of distinct forest strata for which separate yield curves are required. These are defined by the tree species in question (e.g., balsam fir, black spruce), the site quality (e.g., good, medium, poor), the geographic region (e.g., the Northern Peninsula, Western Newfoundland) and other factors likely to affect yield.

Yield curves are a key element in a wood supply analysis. In fact, the validity, or "usefulness", of the wood supply analysis is determined by the truth, or "correctness", of the yield forecasts. While there is no way of predicting with certainty how stands will actually grow in the future, care must be taken to ensure that the yield projections used are realistic and reasonable. Respecting the sensitivity and importance of these forecasts, the Forest Services Branch (FSB) has directed a large portion of its resources and time into developing realistic yield curves. Two growth models were used, one for projecting stand development under natural conditions and the other for projecting growth under managed (i.e., silviculturally enhanced) conditions. Tree and stand development data generated from the FSB's forest inventory program were used to make stand growth predictions. These projections were then checked against empirical data from thousands of temporary plots established throughout the island. If the projections varied from the real life evidence, the curves were adjusted to make them more accurate.

In this analysis, yield curves were developed on an ecoregion basis. As well, special yield curve sets were developed for defined geographic areas with demonstrated uniqueness. These included areas where chronic insect activity is ongoing and areas that have unique growth characteristics.

3.4.4 Management Strategies

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

3.4.4.1 Harvest Flow Constraints

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

3.4.4.2 Spatial Analysis

A major improvement in this wood supply analysis is the introduction of manual harvest scheduling. In 2001, the harvest scheduling was an automated process where the software picked the stands to be harvested over the 25 years based on user supplied criteria. While, the 2001 approach was an improvement over previous wood supply analysis where no harvest scheduling was done, the software used cannot realistically know all the operational restrictions within a forest management district. In the manual process, the on the ground conditions that restrict harvesting are accounted for when a spatial harvest schedule is defined. The proposed harvest schedule is then played back through the modeling software to see if it is sustainable and see if non-timber objectives are met. In most case, this harvest schedule has to go through several cycles before an acceptable harvest schedule could be found. The spatial arrangement of areas for timber harvesting is especially challenging in this province because of the natural fragmentation of our forests. This model provided forest planners with the ability to mimic realistic timber harvest schedules based on current practices and to identify other forest stands that are not as accessible for harvesting.

Manual harvest scheduling has several major benefits. First, it fosters the long term sustainability of our AAC's by mimicking current harvest practices and accounting for actual on the ground conditions that delay or restrict the harvesting of stands. These restrictions, which

were previously unaccounted for, have made our past AAC's higher than was realistically sustainable. Secondly, the mapped 25 year harvest schedules build credibility into the forest management process. A common misconception is that the province is running out of wood and soon will not be able to support existing forest industries. Every stand that will be harvested over the next 25 years must already be in the second (20-40 years old) or third (41-60) age class and can be easily identified and highlighted on the harvest schedule maps. Being able to see the wood that will be harvested in the future will help reassure people that the resource is being used in a responsible manner. Next, harvest scheduling will help integrate the management of other forest resource values into timber management planning. All forest values can be tied directly to discreet forest areas, and these forest areas can be the link that allows the many different forest values to be managed simultaneously. The forested areas needed for each resource can be mapped and potential conflicts can be addressed before they become an issue. Finally, the harvest schedule maps developed for the wood supply analysis can be a starting point for the 5 year planning process, especially the first two periods. The harvest schedule maps, if done correctly, can help reduce the work of the 5 year planning process. One point to note is that harvest scheduling is only done for the class 1 land base. The class 3 AAC, for the most part, is opportunistic at best and is harvested only if extra effort is applied. It is not scheduled because of the uncertainty of obtaining extra funding for access and harvesting.

3.4.4.3 Planning Horizons

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

3.4.4.4 Operable Growing Stock Buffer

The province imposed an operable growing stock constraint in the analysis to ensure the sustainability of calculated timber supplies. The constraint imposes a condition that in any period there must be a minimum operable growing stock of two times the harvest level on the landscape. In other words, for every hectare that is harvested another harvestable hectare must exist on the landscape. The requirement for a growing stock buffer is based on a number of factors. First, several of our non-timber objectives are not explicitly accounted for in our planning process and therefore will require a growing stock buffer to achieve them. Second, we are unable to follow optimum harvest schedules explicitly due to operational restrictions on harvesting. Third, the province is not willing to assume high risk with the sustainability of the timber supply. For these reasons a growing stock constraint of two times was used. This constraint was used in concert with harvest scheduling to help map out a reasonable harvest for the next 25 years.

3.4.4.5 Old Forest Targets

Consistent with our ecosystem policy, the province introduced into the analysis an old forest target that at least 15 percent of forests be older than 80 years. While this is a minimum target, actual results are usually higher. In fact, over the next 25 years there is an average of 24, 18, 39, and 36 percent of 81+ timber left on the landscape for Districts 10, 11, 12, and 13 respectively. There is approximately one percent of the productive landbase disturbed by harvesting each year. This initiative was designed to provide a coarse filter approach to maintaining representative forest structure. It ensures the presence of certain amounts of old forest across the landscape into the future. With advances in modeling, this target can now be tracked across a district rather than a single ownership. This has resulted in this strategy being less restrictive than the last analysis. As well, the site class distribution of the older forest reserve is being examined in an attempt to make it representative of each ecoregion and subregion.

3.4.4.6 Operability Limits

Operability limits are the time windows in which forest management actions such as harvesting

can be undertaken within forest stands. Stand growth development as measured in stand merchantable timber volume and individual piece size of trees determine a stands readiness for harvest. In some young stands, one can have acceptable harvest volumes, but still have trees that are too small to harvest. In the 2011 wood supply analysis both stand volume and tree size were used to determine the earliest age when a stand could be initially harvested. In addition to determining the absolute earliest age a stand can be harvested, it was recognized that not all stands on the same site develop exactly the at the same rate. A small portion of a stand will develop faster; a small portion will lag behind; with the bulk of the stand type representing the average condition. Therefore, the first operability limit was staggered by 5 year intervals with the 10 percent, 30 percent, and 60 percent assigned to each availability class listed above respectively. The ending operability limits or the last age in which a stand can be harvested before it becomes too old to harvest is solely determined on a minimum stand volume of between 60 to 80 m3/ha, after which that stand does not have enough volume to make it economical to harvest. It should be noted that while the operability limits define the extreme end points of when stands can be harvested, very few stands are ever harvested at these extreme points. In order to meet other non-timber objectives and in order to maximize the total volume of wood harvested the model schedules stands to harvest somewhere inside the operability limit window.

3.4.4.7 Silviculture

Silviculture is one of the main forest management tools available to forest managers when they are analyzing the many different future forests that are generated using the wood supply modelling software. The silvicultural actions use in the 2006 analysis include; 1) precommercial thinning of balsam fir, black spruce, and softwood hardwood stands, 2) full plant of any areas that do not regenerate naturally with either white spruce, black spruce, or Norway spruce, and 3) gap planting of either black spruce or balsam fir stands with either white spruce or black spruce. Gap plant is the filling of "holes" within stands that have inadequate natural regeneration of either balsam fir or black spruce. . The thinning levels (ha) for districts 10, 11, 12, and 13 used in

the analysis were 25, 25, 50 and 25 ha respectively. The planting levels (ha) for districts 10, 11, 12, and 13 used in the analysis were 300, 500, 600 and 25 ha respectively.

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 10, 11, 12 and 13 were 15, 15, 9, and 18 percent respectively.

3.6 Results

The results of the timber supply analysis for districts 10-13 is shown in Table 15.

Table 15 Annual Allowable Cut results for Districts 10, 11, 12, and 13 for 2011-2016.

	Class 1 Softwood (m3)	Class 3 Softwood (m3)	Hardwood (m3)
District 10	77 000	2 800	3 900
District 11	155 100	5 400	3 600
District 12	184 500	7 000	3 900
District 13	25 400	4 000	900

Section 4 Values

Guiding Principles of Sustainability

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

Environmental sustainability looks directly at ecosystem health, both now and in the long run. It ensures the needs of the present are met without compromising the ability of future generations to meet their needs Ecosystem health is determined by such factors as ecosystem integrity, biodiversity, productive capacity, and resiliency as previously discussed. The five year operating plan must ensure that these factors are intact or there would be very few values left to manage.

Economic sustainability demands that forest resources be managed and distributed efficiently and equitably among the stakeholders, within the capacity and limits of the forest ecosystem. Economic development is a high priority for many of the residents Newfoundland and Labrador. However, economic development should not proceed without the incorporation of the other factors into the decision making process.

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

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

Cultural sustainability is attained by applying Newfoundland and Labrador's culture to the planning process. A forest management strategy cannot be successful without allowances within the strategy for traditional access and use of the land. For generations, many of Newfoundland and Labrador's public has had free range in our pristine wilderness, a fact that can not be ignored when planning for the zone.

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

4.1 Value Structure

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

Many of the values in the zone were identified by this or previous planning teams. Presentations of pertinent information on each value by knowledgeable individuals or groups provided stakeholders with relevant information to make informed decisions. Other values, while not specifically outlined by the planning team, are also identified and discussed to provide a more complete description of the range of values found in the zone. The following represents a framework for characterizing values in a clear and consistent manner. This approach consists of three components:

Characterization

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

Critical Elements

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

Guiding Principles

A guiding principle is defined as "a fixed or predetermined policy or mode of action". These 'modes of action' would be implemented in the five year plan in the form of:

1. policies that should be in place to protect or enhance the resource value;

2. methods for negotiation or inclusion of other stakeholders in resolving potential conflicts;

3. special management provisions/strategies - such as buffer zone consideration, temporal operating periods, modified harvesting, or a best management policy; and/or

4. models and/or forecasting strategies to determine economic contribution, biodiversity impact, or community sustainability

Each individual value was discussed both at the strategic and operational level. Strategic level information (characterization, critical elements, and guiding principles) are the focus of discussion in this section. They provide a mechanism to resolve conflicts that might arise throughout or after the five year planning process. Where possible, the physical location of the value on the landscape (operational level) was also identified during the discussion of each value. This will help facilitate the preparation of later sections of this plan by identifying potential areas of conflicting use early into the process.

In many instances, the Environmental Protection Guidelines (EPG's) **(**Appendix 1**)** form the guiding principles for a value. Quite often the spatial extent or location of all values is not known (eg., raptor nests). Specific guidelines are still listed in order to provide a direction or course of action when and if these values are encountered.

4.1.1 Biotic Values

4.1.1.1 Big Game

4.1.1.1.1 Moose

Characterization:

Moose are not native to the island. A pair was introduced to Gander Bay in 1878 and two pairs were introduced to Howley in 1904 (Northcott, 1980). Today, moose are distributed throughout the island and the population is estimated to be about 125,000 - 140,000.

Currently, moose are managed on an area/quota system in the province. The island is divided into management areas and license quotas are set annually for each area. Quotas are set based upon the management objective for each area (i.e., whether it is desired that the population increase, decrease or stabilize). Generally, if an area has too high of a moose population, managers will increase quotas to bring down the population in order to prevent damage to the habitat. However, if the habitat is in good condition, and the area could support more animals, future quotas may be increased. All or portions of moose management areas 11-13 and 15-22 are located within the zone.

Critical Elements:

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

4.1.1.1.2 Caribou

Characterization:

Caribou is the only native ungulate species on the island (Northcott, 1980). Prior to the railway being built in 1898 there was a healthy population on the island but by 1930 the population had declined to about 2,000 animals (Murphy and Minty 1993). Between 1980 and 2000 the number of caribou has increased considerably on the island with a population estimated at 70,000+ animals. In the past few years however populations have declined significantly with Planning Zone Five being no exception. All or portions of caribou management areas 61, 62, 63, 66, 67 and 68 are located in the zone.

Critical Elements:

Recent studies and anecdotal information has indicated that the harvesting restriction zone around caribou calving zones may be significantly larger than first thought. It has also been shown that as roads are constructed and access is improved into remote areas, there is generally an increase in the number of animals which are killed due to road-kill and 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.). All or portions of black bear management areas 11-13 and 15-22 are located within the zone.

Critical Elements:

- den sites for winter hibernation;
- forest cover

Guiding Principles:

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

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

Moose

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

Caribou

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

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

Bear

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

4.1.1.2 Furbearers

Characterization:

A number of furbearers occur in the zone the more prominent of which include lynx, red fox, beaver, otter, muskrat, short-tailed weasel, red squirrel, mink, coyote, and pine marten (will be discussed in more detail in next section). Of these, red squirrel, mink and coyote are not native.

Critical Elements:

- water quality maintenance;
- riparian buffer zones along aquatic areas;
- maintaining a mosaic of forest age and development classes
- snags and coarse woody debris (denning, nesting sites, etc.)

Guiding Principles:

Fur Bearer Management Strategy:

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

Environmental Protection Guidelines:

To protect beaver habitat, all hardwoods within 30 metres of a waterbody occupied by beaver are to be left standing during harvesting operations.

4.1.1.3 Species of Interest

4.1.1.3.1 American Marten

Characterization:

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

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

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

Critical Elements:

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

Guiding Principles:

Critical marten habitat has been identified. The development and evolution of the marten habitat suitability model in recent years has been a useful tool in identifying potential marten habitat and evaluating potential impacts of harvesting on this habitat and resultant changes to population levels. Continued development and refinement of this model will provide a more reliable means of evaluating impacts of harvesting on marten habitat in the future.

Early indications from Brian Hearn's work with the harvest schedule indicate that there is abundant suitable habitat in districts tested and that the amount will increase over the next 10 years, even if the full harvest schedule is implemented. Work is now underway to extend this analysis to 20 years. Anecdotal evidence also seems to suggest that snaring and trapping may be the main impediments to marten recovery. Maintenance of appropriate forest habitat is also integral to the long-term recovery of this species. More testing of the model needs to be undertaken especially on the distribution of suitable habitat and on the occupancy of this habitat.

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

harvesting prescriptions as required. The development and evolution of the marten habitat suitability model in recent years has been a useful tool in identifying potential marten habitat and evaluating potential impacts of harvesting on this habitat and resultant changes to population levels. Continued development and refinement of this model will provide a more reliable means of evaluating impacts of harvesting on marten habitat in the future.

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

4.1.1.3.2 Rare Plants

Characterization:

Approximately 300 plant species, or about a quarter of all plant species on the island of Newfoundland, are considered to be rare and are found in 20 or fewer locations. Rare plants are often found in habitat types that are themselves rare or at least fairly restricted. While the limestone barrens of the Great Northern Peninsula are the best-known rare plant habitat, other habitats with high rare plant diversity exist in central Newfoundland and other areas of the island.

Most of the rare plant species throughout Newfoundland are inhabitants of fairly open habitats, such as river gravels, salt marshes, wetlands, aquatic habitats and barrens; all areas where no forestry operations are practiced. In Forest Management Districts 10, 11, 12 and 13 the greatest concentration of rare plants can be found in the flood plain of the Exploits River between Badger and Bishops Falls. The rare species occupy a variety of mostly open habitats, including gravelly and rocky shorelines and aquatic habitats in backwaters and ponds adjacent to the river. There are only two other areas where two or more rare plant species occur in close proximity, at Lloyds River, approximately 7 km upstream of its mouth (District 13), and at Quarry on the former rail bed (border of Districts 12 and 16).

There are several rare plants that prefer or tolerate the partial shading found in forests. In Districts 10-13, some of these plants occur scattered throughout the forested area and they often occur alone, rather than in groups of several rare species. Unlike in Western Newfoundland, where rare forest species are more likely to be found in moist sites with nutrient rich or calcium influenced soils, most of the rare forest plants of Districts 10-13 are found in mesic or dry forests, often on sandy or rocky terrain. Some of these species are commonly associated with open forests, burned over areas or forest gaps and clearings, but can also occur in more closed forests under consideration for harvesting. Rare forest plant species in Districts 10-13 include:

- Teaberry, checkerberry - *Gaultheria procumbens* (dry, coniferous forest)
- Prince's pine, pipsissewa - *Chimaphila umbellata* (woods, dry or mesic, often with feathermoss understory)
- Red pine - *Pinus resinosa* (sandy soil)
- Carex foenea (dry to mesic forest, often in clearings)
- Carex adusta (sandy burned over and open areas)
- Dryopteris fragrans (cliffs, talus slopes, rocky woods)

Of these species, teaberry is of the greatest concern as there are only 4 known locations in Newfoundland. One of these locations is at Badger, and the other is located between Badger and Millertown (Districts 10 and 12).

Critical Elements:

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

Guiding Principles:

- To ensure that rare and endangered plant species present in the 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.

4.1.1.3.3 Waterfowl

Characterization:

In District 10 there are two wetland sites located at Little Rushy Pond and Corduroy Brook which are within the Town of Grand-Falls Windsor Municipal Planning Area and have been identified by the Town as being significant wetland sites. In 1998, the Town signed a Stewardship Agreement with the provincial government to protect and conserve these areas. A third wetland in the Red Cliff area is also considered important for waterfowl but is not officially designated.

The provincial Wildlife Division has also designated a number of sensitive areas within Districts 12 and 13 at Victoria Steadies on the Victoria River.

Critical Elements:

- maintenance of habitat
- disturbance of waterfowl during the brood rearing, breeding, and staging period

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.

4.1.1.3.4 Other Species

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

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

Human activity on the land has the potential to alter water quality and water quantity. Commercial forest harvesting is the predominant activity and occurs throughout the zone. Hydroelectric development has resulted in several river diversions. There is a vast array of roads associated with the harvesting and traditional access routes as well as newly constructed roads which dissect the unit. .

Critical Elements:

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

Guiding Principles:

There are numerous protective measures listed in the EPG's under the broad categories of road construction, stream crossings, road abandonment, fuel oil handling and storage, support services and structures, harvesting, silviculture, and protected water supply areas. The EPG's are listed in their entirety in Appendix 1 and specific guidelines under the above sections can be found there. The FSB is currently pursuing an environmental management system and have developed standard operating procedures which are used provincially

4.1.2 Human Values

4.1.2.1 Timber Resource

Characterization:

One of the major resource values of the forest ecosystem is the harvesting of timber to provide forest products. The market value of forest products harvested and employment levels in Zone Five is unknown at this time because since the re-development of the forest industry following the closure of Abitibi-Bowater's Grand Falls Windsor newsprint mill is ongoing. There is potential however, to provide a significant 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. The zone supports an annual allowable cut (AAC) of both softwood and hardwood of 83 700, 164 100, 195 400 m3 and 30 300 m3 in Districts 10, 11, 12, and 13 respectively.

Commercial logging contractors are allocated the majority of the annual allowable cut in the zone. Commercial harvesting and sawmilling activity provides many jobs in harvesting, sawmilling, trucking, pulp and paper manufacturing and related spin off industries for local residents. There has been a call for expressions of interest to develop a commercial industry in the zone; this process is ongoing.

Domestic harvesting still provides fuelwood to heat many homes and sawlog material for residential house construction in the zone. In fact, the easy access to domestic sawlogs and lumber is one of the reasons why this province has the highest rate of home ownership in the country.

The change in management philosophy will see a more structured approach to domestic harvesting in each district. Harvesting will be conducted in specific domestic cutting areas via a crown domestic cutting permit that is required and issued by each district. Unless otherwise specified; domestic cutting will be limited to these designated cutting areas. The permit will also specify the volume and species that can be harvested, utilization standards, and other relevant conditions. While some domestic cutting

areas are designated for hardwood only, the majority of areas will allow the harvest of all hardwood and softwood species.

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.

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. The vast majority of commercial agricultural activity is located in the Agriculture Development Area at Wooddale in District 10. 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 significant mining presence throughout the zone. Major base metal mines and deposits are located at Buchans Mine, Duck Pond, Buchans Lundberg, Point Leamington Boomerang, Bobby's Pond, Denny's Pond and Tulks Hill. Gold is also found at Valentine Lake. The original and current resource value is in excess of $18 billion. The GDP contribution of the mining industry in 2006 was 11.7% of the provincial total and employment in 2008 was 1.7% of the provincial total or 3 800 person years (from presentation by Ken Andrews to the planning team in 2010) There are also a number of active aggregate and quarry leases located throughout the zone. These are usually for very small areas which can be rehabilitated; thereby, minimizing their impact upon the forest ecosystem. Exploration activities continue to form a large portion of the activities in the zone. There is exploration for gold at Little Rattling Brook and the Huxter-Brady Property as well as zinc lead and copper at other locations in the zone (from presentation by Golden Dory Resources to the planning team in 2010)

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 can not be feasibly extracted using conventional means then timber shall be piled so that it may be extracted during winter months by snowmobiles.
- Mineral exploration that proposes to explore or develop within a silviculturally treated area must be undertaken with minimal disturbance and provide compensation as required
- Mineral exploration and/or development on mineral licenses within the zone will not be impeded. Specific proposed harvesting activities are identified in the annual operating plan.
- Quarry permits are required for aggregate material taken outside of the road ROW for purposes of road construction
- 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.

Archaeological surveys have been carried out in several areas within the zone over the years, however many areas still remain to be surveyed. To date there are many archaeological sites within the zone which are protected under the Historic Resources Act. Most notably is the evidence of the Beothuk along the Exploits River. There is potential for other historic resources to be found in the zone.

Archaeology projects provide many seasonal jobs and many of these people are successful in obtaining employment in archaeology and conservation for longer periods of time. By calling for archaeological impact assessments on projects which have potential to negatively impact historic resources the PAO is providing jobs for consulting archaeologists in the province. New businesses are created as a result of archaeological projects. These businesses include bed and breakfasts, boat tours, restaurants and gift shops.

Critical elements:

Major threats to historic resources are projects involving activities which disturb soil layers and/or provide unintended public access to the archaeological resources. Forestry activities such as construction of access roads and bridges, harvesting, mechanical site preparation and regeneration have the potential to destroy historic resources.

While forestry activities can have adverse impacts on historic resources there are also beneficial effects. Where impact assessments are carried out and new sites found, it adds to our understanding of Newfoundland and Labrador's heritage. When archaeological sites are discovered through impact assessments these resources are protected from damage or destruction and preserved.

Guiding Principles:

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

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

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

4.1.2.5 Newfoundland T'Railway

Characterization:

A large section of the Newfoundland and Labrador T'Railway Provincial Park lies in the zone and has an impact on forestry operations. The former CNR right of way, which varies from 25 to 100 feet each side of the center line, is the main route for the T'Railway with some minor deviations. It provides for an all season, multi-use recreation corridor developed and managed with Parks and Natural Areas Division in conjunction with the T'Railway Council to maximize adventure tourism and recreational opportunities.

The T'Railway is protected for the present and future enjoyment of the public as part of the system of provincially designated parks and natural areas. The *Provincial Parks A*ct 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.

There are three existing protected areas within the Zone 5 planning area: King George IV Ecological Reserve and, two areas which lie adjacent to each other, Little Grand Lake Ecological Reserve and Little Grand Lake Wildlife Reserve. There are also some areas being considered through the Natural Areas System Planning process as study areas for future protected areas. At the time of the forest management planning process for Zone 5, these areas have not yet been finalized or released for public review.

Critical Elements:

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

Guiding Principles:

- the type of activities encouraged or permitted within the different protected areas in the province depends entirely on the type of protected area and the reasons for its establishment
- generally all non-consumptive activities are permitted; educational activities and scientific research within protected areas generally require a permit and are encouraged
- in most protected areas, new development is prohibited, such as mining activity, hydroelectric projects, forestry activity, agriculture activity, roads and trails and cabins and new structures; legislation for Wildlife and Crown Reserves is generally more flexible than the other Acts.
- a 500 m no roads buffer is to be maintained around all existing and proposed protected areas to reduce access and resulting damage from motorized vehicles
- where forestry operations are within one kilometre of provisional and ecological reserves, wilderness reserves or provincial parks, modified operations may be necessary and any amendments to the forest plan within that buffer should be brought to the attention of the managing agency

4.1.2.7 Outfitting

Characterization:

The outfitting industry has been an integral component of the tourism industry in Central Newfoundland since the early 1900's. This region has always been a popular hunting and fishing destination because of

the pristine environment and abundance of fish and wildlife species. There are many outfitters operating within the boundaries of the zone that operate and maintain main and/or line camps. These operations provide seasonal employment for many local individuals.

An economic impact study conducted in 1995 by the Department of Industry, Trade and Technology suggests that each big game license has a net economic impact of $6864. By approximating this value at $7500 for 2010, it can be seen that big game alone has a significant impact on the local economy. The many trout and salmon destinations in the zone also make fishing an important economic contributor.

Over the past 10 years, a significant number of traditional hunting and fishing facilities have diversified into the non-consumptive areas of the tourism industry. Such activities include but are not limited to: snowmobiling, dog sledding, kayaking, canoeing, nature viewing, hiking, and wildlife photography. The ability to diversify has positively impacted the viability of outfitting operations and as such, increasing numbers of operators are considering these opportunities. Diversification can lengthen seasons of operation, increase and lengthen employment, and reduce dependency on a single sector of the tourism industry. Pristine wilderness settings are necessary for many of these types of diversification.

Critical Elements:

Remote outfitting camps are dependent on their remoteness. Forest access roads inevitably impact the ability of a camp to maintain its remote status. Increasing accessibility through increased access roads can also lead to increased hunting and fishing pressures in a given area. This can in turn lead to decreased success rates of tourists. This is of particular concern since Newfoundland is often the hunting destination of choice due to success rates upwards of 80 percent. An increase in access roads also tends to lead to increased cottage development that in turn can have an impact on both remoteness and game availability.

Removal of large areas of forest has the immediate effect of destroying big game habitat, particularly winter cover, although this impact has been poorly studied (particularly in remote areas). Forest

harvesting also has the ability to impact negatively upon travel corridors, bear denning areas, and caribou feeding and calving areas.

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

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

Guiding Principles:

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

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

4.1.2.8 Recreation

Characterization:

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

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

Critical Elements:

Wilderness

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

***A**ccessibility*

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

Viewscapes

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

Guiding Principles:

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

Wilderness

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

Limiting Accessibility

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

***V**iewscape*

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

4.1.2.9 Tourism

Characterization:

The tourism industry in Newfoundland and Labrador is based on our natural and cultural resources. Protection of these resources is critical for the industry to survive and grow**.** Newfoundland and Labrador currently have the resources to compete internationally with tourist destinations; however, competition for the international traveler is high in the tourism marketplace. The tourism industry in Newfoundland and Labrador has experienced significant growth since 1997. Tourism contributes approximately $800 million annually to the provincial economy and provides 15,000 person years of employment (presentation by Derek Stewart to the planning team, 2010). Government tax revenue from tourism in 1998 was estimated to be $105 million and continues to increase. The worldwide growth of tourism at rate of 41 percent, the national growth of 25 percent and the provincial growth of 33 percent indicates tourism is Newfoundland and Labrador's best opportunity for economic diversification and growth.

There are many excellent tourist destinations in the zone. The Catamaran, Beothuck and Mary March Parks, the wildlife museum at Millertown, and the salmon viewing ladder in Grand Falls are just a few examples of the more formal and prominent tourist attractions. Many tourists also come for the outdoor recreational opportunities or to partake of the excellent scenery.

Critical Elements:

- viewscape
- accessibility
- wilderness ambiance
- remoteness

Guiding Principles:

Work with 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.

Section 5 Mitigations

Domestic cutting has been raised as an issue throughout the zone. Prior to development of this plan, domestic cutting was limited to hardwoods and burnt timber by the former land tenure holder. For the next five years in each district in the zone domestic harvesting will be conducted in designated cutting areas strategically located near towns, communities and cabin areas. While some areas will be for hardwood only, the majority of domestic cutting blocks will be for all softwood and hardwood species. 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.

Site specific mitigations arising from concerns identified during the planning process and from other regulatory agencies are identified on the summary sheets accompanying each operating area in Appendices 3, 4, 5 and 6 for Districts 10, 11, 12 and 13 respectively. As well, guiding principles which outline procedures to follow should an unforeseen conflict arise have been identified for each value in Section 4. Highlights of the mitigative measures that arose as a result of planning team meetings and local concerns for each district are listed below in the attached table. More specific details by individual operating area can be found on the map cover sheets.

FMD	Stakeholder	Contact	Attended Process	ISSUES RAISED DURING PLANNING PROCESS	MITIGATION
10	Twin Lake Outfitters	Craig Pelley	No	Meeting on April 24, 2015. Only concern was the road work being completed near trouble pond. He is not opposed to forestry activities, but has a concern with respect to access into his hunting area.	Advised to contact the office yearly to review AOP and any implications it may have on his area.
10	Hideaway Lodge	Robert Folkes	Yes	Meeting on April 24, 2015. They have no concerns with respect to forestry operations. The only issue is access near their spike camp. We reviewed the maps that are relative to that area, and given the terrain and poor fibre the likelihood of that being harvested would be slim.	We agreed that if this area were to initiate commercial activity we would move the road farther to the west to avoid access to “big bull bog”. Agreed to meet yearly to review AOP and any activity related to this area.
10	Riverfront Chalets	Paul Rose	Yes	Meeting on April 27, 2015. Paul has been heavily involved with the planning process in previous years. He is not opposed to forestry operations, and agreed that the tourism viewscape and timing restrictions near the exploits has worked in the past. HE would like to see them move forward in the future with the same plan,	Paul will visit the office yearly to review the AOP and any implications it has on his area of concern.

11	NL outfitters	Reg Robinson	No	Contacted on April 28 2015…no immediate concerns other than setting spring bear bate, but not opposed to operations.	Would like to come in yearly to discuss annual plans, primarily to see commercial areas that a scheduled to harvest.
11	Sandy Lake Lodge	Dick Fevans	No	Spoke to on April 28 2015- has no issue with proposals, no issue with commercial harvesting unless it is on his door step.	He is out of town but will review information online and inquire if he has any questions. No immediate concerns at this point. Agreed to review plan online and let us know yearly if he has any questions or concerns.
11	Pepper Mountain Lodge	Jim Brown	No	Spoke on April 21 2015….No immediate concerns.	Explained that he was involved with planning meetings before and understands the process. Will contact the office if he has any concerns moving forward.
11	Beaver Mountain Camps	Paul Toms	No	Contacted but has no immediate concerns;	He will remain in contact with local office.
12	Millertown		Yes	Creating a fire break around the community	Domestic Cutting Operating Area engulfs the town and will allow for the cutting of the fire break as requested by the Town Council.
12	Badger Area	Domestic Woodcutters	No	Access to more Domestic Firewood allowing all species to be harvested	Domestic Cutting Operating Areas adjacent to Town Of Badger and in the Millertown Junction area will provide access to softwood fuelwood.
12	Lake Douglas Outfitters	Sheldon Brown	No		Has just changed ownership, will be contacting new owner.
12	Snowshoe Lake Hunting & Fishing	Ron Hicks	Yes	General concern about timber harvesting	Mr. Hicks was provided map of proposed harvest areas on June 17. We will consult as soon as he contacts office.
12	Victoria Outfitters & Lodge	Dave Evans	Yes	Concerns about developing access near lodge and managing established bear bait stations.	Meet with Mr. Evans and provided detailed map of harvest areas in vicinity of his lodge. Mr. Evans will provide comment at a later date. Forestry Services Branch is committed to decommissioning roads as requested by M. Evans in previous plans.

12	Moose Head Lodge	Reg White	No		Due to recent family event has not been contacted yet but will be shortly
12	Red Indian Lake Outfitting	Fred Thorne	No	Contacted (June 5) No concerns	No mitigation required.
13	Burgeo Road Outfitters	Dwayne O'Quinn	No	Contacted via Telephone….No Concerns identified	No mitigation required.
13	Abadak Wilderness Adventures	Ivan White	No	Contacted via Telephone….No Concerns identified	No mitigation required.
13/14	Sandy Pond Outfitters	Chris Marchand	No	Contacted via Telephone….No Concerns identified…. While base camp is in D13 operation is fly-in to Mica Pond/Sandy Pond in D14. An overview map was emailed to cmarchand@ramar.ca	No mitigation required.
13	Moose Lodge	Leonard McCarthy	No	Contacted via Telephone….No Concerns identified…. Overview map was emailed to roofing5star@gmail.com.	No mitigation required.
13	Notch Lake Outfitting	Randy Parsons	No	Contacted via Telephone….No Concerns identified	No mitigations required.
13	Spruce Pond Hunting	Damon Lodge	No	Contacted via Telephone….No Concerns identified… Operation is fly-in. An overview map sent to info@sprucepondhunting.com. .	No mitigation required.

ALL DISTRICTS					
	ERMA	Si Thompson	Yes	Member of Environmental Resource Management Association (ERMA), and is concerned about the buffers left of various rivers. In many cases, the trees become unstable and get blown down into the streams causing obstructions to fish passage.	There have been studies completed in the past regarding Riparian Management, with actual trials completed to remove the larger more susceptible trees before they get blown down. A document has been prepared on these trials and will be posted to the five-year planning development website for members to review. At this point, there has not been any decision to have this conducted on a large scale basis.
	Parks & Natural Areas	Jeri Graham	No	In FMD 10, requesting "leave area" outside boundary of NASP because of idea of creating large clearcuts. In FMD 12, requesting not to harvest inside an area that Parks deems important but not included in NASP.	Meetings held in Corner Brook on April 1 and May 1, 2015. It was discussed at both meetings that due to topography in that area of FMD 10, large clearcuts where everything is removed is nearly impossible. FSB does recognize the importance of the NASP and the current process underway to establish areas. Mutual agreements established under this process will be maintained.
	Wildlife Division	Kirsten Miller	No	Caribou: New data received from merge with SDSS and now all data sets are combined to create a larger layer than previously identified. Pine Marten: New guidelines being developed, but only partially completed. Modified stategy recommended by WD	Meetings held in Corner Brook on April 1 and May 1, 2015, where new caribou data was presented. Various emails and correspondence regarding the new Caribou Data…..Wildlife sent pre-adm review document on June 5 for caribou data. Document was reviewed and FSB comments sent back on June 17. No discussion with WD on revised strategy FSB Resolution is to follow the 10 year Provincial Sustainable Forest Management Strategy published last fall, which outlines a large intact forest that is removed from commercial harvest

					activity for the next 10 year period. This large intact forest takes into account habitat requirements for various species including Caribou and Marten. However; FSB will continue to work with Wildlife Division as more data becomes available for Caribou and Marten species.
	Tourism	Paul Taylor	No	A review of outfitters / tourism groups in the Zone was completed. FSB was requested to contact known outfitters in the area. Paul would review any other potential tourism groups and let FSB know if they should be contacted. As indicated in this table above, FSB did engage known local outfitters and tourism groups.	Meeting held in Corner Brook on April 1, 2015. Districts meeting with respective outfitters to discuss plans and identify areas of concerns as indicated in this table above.

Section 6. Public Consultation

In recent years, there has been a shift from single resource management to a more comprehensive technique of forest ecosystem management. In its attempt to provide the greatest good for the greatest number of people for the greatest period of time, 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.” Sustainable development, or in this case “sustainable forests”, not only takes into account the social, cultural, economic, and environmental benefits of the present, but those of future generations also.

The Forestry Act of 1990 outlines its approach as providing a "continuous supply of timber in a manner that is consistent with other resource management objectives, sound environmental practices, and the principle of sustainable development."

In the 1995 Environmental Preview Report the Newfoundland Forest Service has proposed an adaptive management planning process. This process 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 to 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 all the stakeholders involved, and it 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.

6.1 Planning Framework

In previous planning processes planning teams were established for each district; a strategy document was prepared for the entire district and separate five year operating plans were prepared for each owner within the district. For this plan there was one planning team and planning process and one five year operating plan submitted for Planning Zone 5 with all meetings held at Grand Falls-Windsor.

6.2 Planning Team Participation

An initial advertisement was placed in local and regional newspapers, informal invitations were sent to community leaders in the zone, and an extensive email to interest groups and individuals was done to inform potential participants of initial meetings in Grand Falls- Windsor. A press release was done by FAA a few weeks before the initial meeting and a media advisory alert was done on the day of the initial meeting.

The initial public meeting on January 14, 2015 was designed to explain the planning framework, review and approve the ground rules for participation, and to form the new planning team for the zone. The turnout at this meeting was good with over 40 stakeholders attending. Approximately 30 of these attendees indicated that they wanted to sit on the planning team. A list of these members and their affiliations is shown in Appendix 2. Planning team membership was not restricted to those listed and was open to anyone who wanted to join the process at any time.

There were 6 planning team meetings held with the planning team. Unlike the last planning process, this time around an effort was made to:

1. Present the team with the proposed operating areas early in the process to ensure stakeholders had ample time to evaluate and comment on any concerns with the proposals. The draft proposal operating areas were presented at the third meeting held on February 11.

2. Keep the subject matter of the presentations to topics of direct relevance and interest to the team members. Most of the stakeholders in attendance have been through several iterations of the planning process and are quite familiar and educated on most forest

management related topics. For this reason, the number of presentations was reduced considerably from the last planning process.

A draft plan was sent to various government departments for an ADM review in July. There was one subsequent meeting with wildlife division to resolve conflicts that arose. Mitigations for all parties resulting from the ADM review are presented in Appendix 3.

Changes to harvest areas or processes to follow to resolve conflicts, where possible, were ongoing throughout the planning process and are reflected in the final operating areas presented in this plan. These changes or modifications to areas or processes that were established will be discussed in later sections.

Section 7 Management Objectives and Strategies

7.1 Harvesting

The forest in the zone is part of the boreal forest which is characterized by stand-replacing natural disturbances result in the formation of relatively even aged stands. The clearcut silvicultural system most closely emulates this natural disturbance pattern. The size, shape, arrangement and juxtaposition of clear cut areas vary across the landscape depending on localized topography and terrain conditions. A modification of the clearcut system takes place in domestic areas where the cuts are relatively small and dispersed resulting in the creation of a range of age and development classes.

7.1.1 Commercial

Section 3 outlines the general approach for the timber supply analysis and outlines the specific results for all districts in the zone. The model used to calculate the annual allowable cut is a spatial optimization model which outlines a specific course and timing of actions. The harvest schedule outlines the specific forest strata to be harvested and the timing of such harvest. The districts must follow this schedule as closely as possible in order to maintain the validity of the AAC.

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

Specific commercial strategies are:

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

7.1.2 Domestic

The harvest of domestic fuelwood and sawlogs occurs from designated domestic cutting blocks and cutover, landing and roadside clean up. For the designated cutting blocks, the harvest scheduling and priorities apply, however it may not always be practical to follow. Domestic cutting blocks are generally established near communities where there are concentrations of timber eligible for harvest. Mixed within these blocks may be timber that normally would not be scheduled for harvest in the planning period. Ideally, each individual domestic cutter would be issued their own cutting block which would ensure harvest of optimal stands. This is not practical however and domestic cutters are allowed to cut anywhere within the designated area provided that immature timber is not harvested. For this reason, the optimal harvest schedule may not always be followed in domestic areas which is why the AAC adjustment (spatial net down) is higher than in commercial areas. Utilization of cutover residue, dead timber and scrub areas that are not part of the timber supply analysis help make up for this difference.

Specific domestic strategies are:

- target low volume stands that have poor commercial harvest chance
- encourage use of poor quality hardwood (birch, larch and aspen). In areas where there are future softwood commercial operations, domestic harvesting is limited to non-commercial hardwoods
- target dead, burnt and insect damaged stands that are beyond commercial salvage

- target alienation class 3 lands that have low commercial potential
- in areas of high domestic demand, limit volume allocation in designated cutting areas and encourage alternate sources (cutovers, landings, scrub etc)
- monitor stands harvested in domestic cutting areas for compliance to the harvest schedule and change areas available for harvest to reflect this schedule

7.2 Silviculture

Section 1.4.1.4 describes the regeneration patterns of the major tree species by each disturbance type and generally by ecoregion. On average, there is a 20 percent regeneration failure rate (NSR) across all disturbance and site types. Areas that do not regenerate naturally are renewed by some combination of site preparation and planting or gap planting. Areas that adequately regenerate are left to develop naturally. In the case of balsam fir which is a prolific regenerator and usually forms an overstocked stand, some form of thinning is usually applied to improve the growth and development characteristics of the regenerating stand. There is concern about the type (species) of regeneration because of the presence of balsam woolly adelgid in parts of the zone. This insect causes growth loss and impacts the form and quality of balsam fir trees. In adelgid infested areas, regeneration to balsam fir may not necessarily be acceptable depending on the severity of attack. In other areas, the presence of kalmia causes problems because of its allelopathic effect on natural and artificial black spruce regeneration. Prescriptions to treat these problems will be presented in sections to follow.

7.2.1 Forest Renewal

Since maintenance of the forestry landbase is crucial, forest renewal treatments are the most important silviculture technique in the zone. Forest renewal silvicultural treatments are designed to ensure that a new forest is established after disturbances caused by harvesting, insect, wind or fire. In most regions of the province these prescriptions normally involve some form of treatment to prepare the site to accept planted seedlings. There is usually some form of mechanical site preparation before a site is planted to reduce the thickness of the duff layer and in some cases remove or disturb kalmia that is present. Prescribed burning is also used to sanitize some sites where adelgid is present. This treatment reduces the slash loading and duff thickness to prepare the site for planting and kills any balsam fir which could

potentially perpetuate the adelgid problem. Full or gap planting is done to ensure stocking of desired species is at acceptable levels.

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

When there is complete regeneration failure requiring full planting, the site is prepared if necessary, and planted with black or white spruce and to a lesser extent, Norway spruce. In cases where adelgid has been a problem, balsam fir regeneration is sometimes ignored and the site is planted with spruce seedlings. In instances where there is partial regeneration failure and the site does not have enough stocking of desired species, the area can be gap planted to increase the seedling density to acceptable stocking standards. On adelgid sites partially regenerated to balsam fir, planting is done through the existing regeneration to obtain a sufficient stocking level of an adelgid resistance species. Gap planting is done with spruce seedlings, and, coupled with the natural regeneration already present on site, result in a mixed softwood forest.

Where possible, seedlings are grown with seed from local sources. Seed orchards have been established at Pynns Brook and Wooddale to produce seed from plus trees collected throughout the province. Plus trees are normally selected because they have superior growth and physiological characteristics. It is hoped that once the orchard is in full production, the majority of the planting stock will be grown from this source. The ultimate goal is to plant seedlings that have superior growth characteristics and thus increase yield and maintain genetic diversity.

Exotic species have been planted in trials at some locations in the zone, however, it is not anticipated that they will form any substantive proportion of the planting program in the future.

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

7.2.2 Forest Improvement

Forest improvement prescriptions are designed to treat existing, established forest stands in an attempt to enhance development. These treatments usually involve thinning overstocked balsam fir stands at either a young age 10 -15 years (precommercial thinning) or an intermediate age 25 - 35 years (commercial and diameter limit thinning). In areas that have high moose browsing potential, the precommercial thinning age is increased to 20 – 25 years so that the crop trees are tall enough to be out of reach of moose.

Precommercial thinning reduces density levels in overstocked stands in order to maximize volume increment and operability (piece size) in the shortest period of time. Trees removed are not of merchantable size and are left behind to return the nutrients to the site. In the zone, balsam fir is usually thinned to favour any spruce that may be in the stand. This prescription results in a mixed softwood stand (depending on the original density of spruce) which is more diverse and less susceptible to insect infestation. As well, any hardwood species that are not in direct competition with spruce or fir are left to increase the biodiversity of the stand.

Commercial and diameter limit thinning is occasionally done in older balsam fir stands (either natural or previously thinned) and is designed to capture any mortality that would normally occur in the stand through self thinning. The trees from commercial thinning operations are extracted and utilized. The remaining trees are left to grow, free from competition and are harvested when mature. By salvaging this eminent mortality a higher yield can be obtained in these stands. As with precommercial thinning, spruce and hardwoods are left where possible to increase the stand diversity. Surveys conducted on precommercially thinned areas many years after treatment have shown that a very large portion of the plots in the treated areas contain hardwoods.

Both types of thinning will produce large diameter stems in a shorter time period which should increase the percentage of merchantable volume that is suitable for sawlog material and decrease the harvest cost. Commercial thinning has yet to be done in the zone and diameter limit thinning has been done sparingly, however, recent indications of root rot and blowdown in thinned stands may increase their importance.

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

Specific silviculture stratagies are:

- ensure regeneration of areas disturbed by harvest, insect, wind and fire to prevent loss of productive land base
- use thinning techniques in young stands to promote enhanced stand development, reduce rotation age, and increase the percentage of sawlogs
- leave hardwoods, where possible, in pre-commercially thinned areas to increase stand diversity
- where possible, promote species mixes particularly with spruce and hardwoods to reduce susceptibility to insect attack and increase biological diversity
- where possible, use seedlings grown from local seed sources to protect genetic diversity
- ensure levels of planting and thinning used in the wood supply analysis are achieved
- work towards pre harvest planning to identify areas with potential silviculture problems so that optimal prescriptions can be promptly employed

7.3 Access Roads

Timely access to harvesting areas is the key to successful implementation of harvesting plans. Roads also provide access for other recreational and commercial values such as hunting, fishing, skiing, berry picking, hiking and mineral exploration. Roads can also have a negative impact both from an environmental perspective (loss of productive land base, sedimentation, habitat fragmentation etc.) and other value perspective (eg. access near remote outfitting lodges).

As a general principle from both an environmental and a cost perspective, the minimal amount of road will be built to effectively harvest available timber. Roads will be constructed to specifications that minimize right-of-way and running surface width but still access the timber in a safe and effective manner. Forwarding distances will be maximized to minimize the amount of road constructed. These

principles ensure that the minimum amount of road will be built which effectively reduces the loss of productive forest land base while also minimizing the amount of environmental disturbance.

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

In many instances forest access roads "open up" new areas which are then subject to cabin development (often illegal). They also provide access to remote areas where outfitting businesses operate. This generally leads to competition for hunting areas between local and "sport" hunters and may detract from the "remote" designation of the lodge. In such instances cabin development should be controlled to limit local access. Road decommissioning may also be considered, depending on cost and mitigation of conflicting uses for that road. It is recognized that roads built for forestry activities are used by other stakeholders. Any road or bridge decommissioning should be discussed by the planning team to determine impacts and formulate alternatives (cost sharing to replace an old bridge etc.).

The nature of the current wood supply, particularly on class 3 areas, is that harvestable areas or stands are becoming smaller and more remote and scattered. Achievement of the allocated harvest is contingent on accessing these areas and stands; therefore more roads are needed to access this timber.
The crown has inherited a large road infrastructure in the zone. It is not reasonable to expect this infrastructure to be maintained in perpetuity. Much of the infrastructure has already deteriorated and will become a public safety issue/liability if not addressed. Road and bridge maintenance and/or decommissioning is an issue and needs to be addressed on a case by case basis.

Specific roads strategies are:

- build winter roads to access sensitive and wet areas
- minimize amount of road built by maximizing forwarding distances
- use minimum road standard to safely and effectively match the logging chance
- work with appropriate agencies (crown lands) to control cabin development
- consider road decommissioning on roads near remote outfitting lodges and other areas of concern where requested and where feasibly possible

- determine impacts and explore alternatives (cost sharing) in areas where road and bridge decommissioning impacts other stakeholders
- explore all avenues to secure funding for road construction and encourage operators to build their own roads in exchange for royalty reductions

7.4 Forest Protection

7.4.1 Insects and Disease

As indicated in section 1.5.5, insects have been a major natural disturbance factor in the zone. Balsam fir is susceptible to most of the major insects including spruce budworm, hemlock looper, and balsam woolly adelgid. In the past, severe mortality has occurred in District 13 resulting in massive salvage efforts. In recent years, quality standards at local pulp mills have changed to require a timely supply of fresh, green timber. As a result, the window to salvage insect damaged timber is now one to two years after mortality. On a positive note, access to most areas has increased and improved allowing for quicker reaction to salvage insect mortality.

In recent years, the hemlock looper and spruce budworm have not been a problem in the zone However, populations of these insects are closely monitored and treatment is employed where warranted. The adelgid problem is worsening in District 10 and 11. Alternative silviculture prescriptions (centered on minimizing fir regeneration in susceptible areas) are being employed to minimize the impact of this insect.

As outlined in the harvesting and timber supply analysis sections, the timber supply is based on following a rigid predetermined harvest schedule and minimizing inventory deductions (of which insect damage is a portion). In the event of a major insect infestation, salvage efforts may change harvest priorities and thus the optimal harvest schedule may not be followed. If insect damaged stands cannot be harvested in a timely manner, an additional harvest in the form of unsalvaged mortality may occur resulting in inventory deductions that are higher than anticipated. In both eventualities, deviations from harvest schedules and inventory adjustment levels will have to be closely monitored to ensure that the validity of the AAC is not compromised. Yield curves are adjusted in areas that have been chronically attacked by insects to account for growth loss.

Specific insect and disease strategies are:

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

7.4.2 Fire

As outlined in previous sections, there has been a cyclic fire history in the zone resulting in significant losses from major fires. A fire in an unusually dry year can have devastating effects on the forest and can exacerbate an already tight wood supply situation. The zone can minimize the risk of a serious fire by maintaining a highly trained, efficient and effective fire control program and by minimizing the risk in forest stands through maintenance of forest health and vigour.

Specific fire strategies are:

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

7.4.3 Windthrow

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

Specific windthrow strategies are:

- avoid thinning in areas with high wind damage potential (hilltops on high elevations etc.)
- maintain forest in healthy vigorous condition through silvicultural treatments and protection from insects

- design cut blocks to follow contours and natural boundaries to minimize risk of windthrow to residual forest

7.5 Information and Education

Information and education is one of the key elements to providing for more active and effective participation in the planning process at all levels. Through interaction with various user groups and the general public a better understanding of each others values and positions is gained. The more we know about each others values and where these values are located on the landscape the better the ability to mitigate any potential impacts of harvesting on these values. For example, learning where a cabin is located can help planners when selecting areas for harvest and provide a contact to discuss impacts and mitigations.

Many comments were made during the planning team meetings about the good exchange of information and ideas that occurred. It is through such forums that information can be shared which will provide a basis for more effective and informed participation in such processes. Other such vehicles for information and education which may be pursued are:

Specific information and education strategies are:

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

Section 8 Proposed Activities

8.1 District 10

8.1.1 Harvesting

In District 10 he majority of the harvest is scheduled for commercial purposes. This is due to nature of the landbase which was originally designated for industrial purposes. In most other traditional crown districts the landbase is located near the coast where there are many communities and the domestic demand is high. In District 10 there are few communities and the domestic demand is lower. There is sufficient domestic timber allocated to meet the demand.

The AAC for district 10 will not be exceeded in this planning period

8.1.1.1 Commercial

The timber scheduled for commercial harvest in the district is overmature with some small pockets of mature dispersed throughout. This proposed harvest approximates the harvest schedule that was used to determine the AAC in Section 3. The allocated operating area and associated harvest volumes represent as much as two times the actual proposed harvest (Table 16). 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 17 outlines the proposed domestic harvest Harvesting will occur in designated domestic cutting areas and is generally conducted on a small patch cut system. All domestic cutting is done under permit which has conditions attached that outline the species, volume, location and utilization standards to be employed. Most cutting occurs in fall and winter with extraction by snowmobile or ATV. Domestic permit allocation is 23 m3. In remote parts of the district not covered by any operating areas, domestic permits may be issued to remote cabin owners for firewood to heat their cabins as requested.

Table 16 Proposed commercial harvest in District 10 for 2016-2020

Operating Area					Volume Harvested (m^3)							
					Softwood				Hardwood			
Number	Name	Tenure	Area (ha)	Number of Permits	Core	Operational Constrainted	Sub-total	Non AAC wood	Core	Operational Constrainted	Sub-total	Non AAC Wood
CC10047	Northern Arm Brook	Crown			9,315				50			
CC10048	Long Pond	Crown			2,863				50			
CC10050	Askel Lake West	Crown			9,918				200			
CC10051	Trout Lake West	Crown			9,431				200			
CC10052	Long Pond West 1	Crown			17,814				4000			
CC10053	Long Pond West	Crown			29,316				500			
CC10054	Seal Bay River East	Crown			17,400				500			
CC10055	Crooked Bog	Crown			334				*			
CC10056	Otter Pond	Crown			41,067				2500			
CC10058	Moose Pond	Crown			13,611				1000			
CC10059	Rocky Pond North	Crown			40,736				500			
CC10060	Badger Southeast	Crown			16,447				*			
CC10061	Middleton East	Crown			12,685				200			
CC10063	Rocky Pond South	Crown			80,470				500			
CC10066	Aspen Brook West	Crown			18,917				100			
CC10067	Seabright Pond	Crown			33,475				1000			
CC10068	Seal Bay River West	Crown			75,006				500			
CC10069	North Twin North	Crown			146,408				500			
CC10070	North Twin West 1	Crown			52,575				200			
CC10071	North Twin West 2	Crown			50,359				200			
CC10072	Lewis Lake	Crown			28,760				500			
CC10073	Four Mile Lake	Crown			16,521				2500			
CC10074	North Twin North 2	Crown			90,501				500			
CC10075	Lewis Lake West	Crown			48,269				300			
CC10076	Nanny Bag	Crown			5,556				100			
CC10077	Mud Lake	Crown			11,669				2500			
CC10078	New Bay River	Crown			51,497				1000			
CC10079	Pynn's Brook	Crown			14,502				100			
CC10081	Cassandra Pond	Crown			70,478				2500			
CC10082	Aspen Brook West 2	Crown			13,446				200			
CC10083	Frozen Ocean North	Crown			4,022				50			
CC10084	Frozen Ocean South 1	Crown			13,429				100			
CC10085	Frozen Ocean South 2	Crown			10,753				100			
CC10086	Northern Arm Brook 2	Crown			9,350				50			
Total			**0**	**0**	**1,066,899**	**0**	**0**	**0**	**23,200**	**0**	**0**	**0**

Table 17 Proposed domestic harvest in District 10 for 2016 to 2020

District:				Softwood Volume m^3					Hardwood Volume m^3				
				Core	Operational Constrained	Sub-total	Non AAC wood		Core	Operational constrained	Sub-total	Non AAC Wood	
Operating Area	Name	Tenure	Area				Operational	Regulatory				Operational	Regulatory
5_2016_2020_CC10501 (H)	Peter's Pond - Peterview Ridge	Crown	4,100	0	0	0	0		500			2,600	
5_2016_2020_CC10502 (H & S)	Northern Arm lake	Crown	7,500	1,600	400	2,000	700		400			1,800	
5_2016_2020_CC10503 (H)	Aspen Brook East - Leech Brook West	Crown	7,500	0	0	0	0		350			1,800	
5_2016_2020_CC10504 (H & S)	Powderhorn Lake	Crown	9,900	1,400	350	1,750	600		300			1,600	
5_2016_2020_CC10505 (H)	Frozen Ocean	Crown	7,200	0	0	0	0		100			600	
5_2016_2020_CC10506 (H)	New Bay Lake East - Rowsell's Lake	Crown	6,600	0	0	0	0		80			500	
5_2016_2020_CC10507 (H & S)	Bishop's Falls	Crown	5,300	4,400	1,100	5,500	1,800		880			5,000	
5_2016_2020_CC10509a (H)	Nanny Bag Lake - Four Mile Lake	Crown	4,100	0	0	0	0		20			100	
5_2016_2020_CC10509b (H)	Nanny Bag Lake - Four Mile Lake	Crown	300	0	0	0	0		60			300	
5_2016_2020_CC10510 (H & S)	Grand Falls-Windsor - Leech Brook	Crown	11,400	3,000	750	3,750	1,200		600			3,400	
5_2016_2020_CC10511 (H)	Aspen Brook West - Junction Brook East	Crown	4,000	0	0	0	0		300			1,600	
5_2016_2020_CC10512 (H)	South Twin Lake - Mary Ann Lake	Crown	5,300	0	0	0	0		50			300	
Total			**73,200**	**10,400**	**2,600**	**13,000**	**4,300**		**3,640**			**19,600**	

8.1.2 Silviculture

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

There are two silviculture prescriptions scheduled; planting/gap planting including site preparation (mechanical, prescribed burning and/or herbicide), where required, and thinning (pre-commercial/diameter limit and commercial). Planting is designed to return a site to a minimum stocking level with the desired species, mainly spruce. Full planting is required where there is complete natural regeneration failure and gap planting when a site has some desired regeneration but not enough to meet minimum stocking standards. Pre-commercial thinning is conducted on regenerating stands (0 - 25 years) to reduce the high density and concentrate the growth on the remaining crop trees thus reducing the time to harvest. Diameter limit /commercial thinning is carried out on immature stands (25-40 years) and is designed to produce a sawlog crop while salvaging any trees thinned as pulpwood or fuelwood.

Each district in the zone has unique silviculture challenges. In Districts 10, 11 and 12 these challenges include sites transitioning to alders or kalmia post harvest; and limited pre commercial thinning opportunity because stands have passed the treatment window. In District 13 challenges include more fir regeneration than spruce making the forest more susceptible to insect outbreaks, and logistical concerns due to remoteness when applying silviculture treatments.

These districts all share the common challenge of having to contend with the growing problem associated with balsam woolly adelgid. The range and severity of this insect is increasing within the province and it continues to target balsam fir trees by severely reducing both growth rates and productivity of certain sites to the point where commercial viability is questionable. The silviculture program over the next five year period will help mitigate the impacts of this insect on sites dominated by

balsam fir. As the problem with this insect is still relatively new in these districts and the extent of affected areas and rate of spread is still unknown, it is extremely difficult to identify specific areas for management at this time.

Potential silvicultural treatment areas need to undergo reconnaissance and / or intensive surveys to determine the regeneration level and severity adelgid attack. Such surveys will be conducted during this five year period but until they are completed, specific locations and treatment amounts cannot be identified. Silviculture prescriptions have been developed however, for implementation on specific site conditions. These prescriptions are described below.

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

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

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

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

There have been problems in some parts of District 11 and12 with sites transitioning to alders after harvest. A treatment employing mulching, herbicide and planting in successive years has been conducted to try and reclaim some of these highly productive sites. The effectiveness of this treatment is still being evaluated; however it has been discontinued due to high cost. Since there is a known regeneration problem on these sites, planting with white spruce immediately after harvest is employed to allow the seedlings to "get the jump" on the alders.

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

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

8.1.3 Primary Access Roads and Bridges

Table 18 outlines the forest access roads scheduled to be constructed in District 10 in the next five years to access timber for commercial purposes. All roads will be built to the specifications of the Class C-2 standard and all pertinent EPG's will be followed. In addition, secondary, operational and winter access roads and upgrading of existing road will be required and will be submitted in the annual operating plan prior to the year that they are planned to be built. As well, referrals will be sent to all relevant agencies (including DFO and Water Resources Division) before any construction is initiated.

8.1.4 Activities in Protected Water Supply Areas

In operating areas where operations are scheduled to occur in protected water supply areas (PWSA), there are wider buffers established inside these PWSA and the pertinent EPG's will be attached to any commercial or domestic permits issued for these areas. There will be continuous monitoring inside these areas and buffers will be flagged to ensure compliance with the guidelines. In addition, approval under the Water Resources Act must be obtained annually by the Forestry and Agrifoods Agency before any commercial or domestic harvesting commences inside the PWSA.

8.1.5 Environmental Protection

8.1.5.1 Fire

Wildfire has not been prevalent in the district in the past number of years and as a result there have been little merchantable volume lost. There have been major fires in the past however, so the district must remain vigilant in its fire suppression program to ensure any future losses are minimized.

Table 18 Summary of primary access road construction in District 10 for 2016-2020

Operating Area		Construction/ Reconstruction	Length (km)	Water	
Name	Number			Culvert	Bridge
Long Pond	CC-10048	R	1.88		
Long Pond	CC-10048	C	0.90		
Askel lake West	CC-10050	C	1.85		1
Trout Lake West	CC-10051	C	2.80	1	
Seal Bay River East	CC-10054	C	0.68		
Otter pond	CC-10056	R	8.17	6	
Otter pond	CC-10056	R	2.43		
Middleton Lake West	CC-10057	R	3.85	1	1
Middleton Lake West	CC-10057	R	3.70		
Middleton Lake West	CC-10057	R	0.83		
Moose Pond	CC-10058	R	4.95	3	1
Moose Pond	CC-10058	R	1.83		
Main Rocky Pond North	CC-10059	C	1.50		
Middleton East	CC-10061	R	8.35		
Rocky Pond South	CC-10063	C	1.00	1	
Rocky Pond South	CC-10063	C	8.50		
Aspen Brook West 1	CC-10066	C	1.50		1
Seabright's Pond	CC-10067	C	1.30		2
Seabrights Pond	CC-10067	C	2.70	1	
Seabrights Pond	CC-10067	C	2.05		3
Seabrights Pond	CC-10067	C	0.93		
Seabrights Pond	CC-10067	C	0.80	1	
Seal bay River West	CC-10068	C	5.20	2	
North Twin West 2	CC-10071	C	3.70		1
Lewis Lake	CC-10072	C	4.00	2	1
Lewis Lake	CC-10072	C	2.90	1	1
North Twin North 2	CC-10074	C	4.00	1	1
North Twin North 2	CC-10074	C	2.40		
North Twin North 2	CC-10074	C	1.50		1
Lewis Lake West	CC-10075	C	4.25		
Lewis Lake West	CC-10075	C	2.12		1
Lewis Lake West	CC-10075	C	1.80	1	1
Nanny Bag	CC-10076	C	0.50		
Nanny Bag	CC-10076	R	4.84		
Mud Lake	CC-10077	R	4.30	1	
New Bay River	CC-10078	R	3.60		
New Bay River	CC-10078	R	3.65		
Pynn's Brook	CC-10079	C	2.00		
Pynn's Brook	CC-10079	R	2.55	2	
Monica Lake	CC-10080	C	7.90		
Cassandra Pond	CC-10081	C	2.50		
Cassandra Pond	CC-10081	C	2.20		
Cassandra Pond	CC-10081	R	4.60	3	1
Aspen Brook West 2	CC-10082	R	0.85	1	
Frozen Ocean North	CC-10083	R	5.30	1	2
Frozen Ocean North	CC-10083	R	1.30	2	
Frozen Ocean South	CC-10084	R	11.00	2	2
Frozen Ocean South 2	CC-10085	C	2.50		
Northern Arm Brook 2	CC-10086	R	5.00		
Northern Arm Brook 2	CC-10086	C	2.00		
		Sub-total	**160.95**	**33**	**21**

There are fire crews and equipment stationed at Gander, Bishop's Falls and Millertown in the fire season whose direct responsibility is fire protection. In addition, support, equipment and manpower at both the regional and provincial level is available should the need arise. There are air tankers stationed at Deer Lake and Gander and helicopters in Gander that are available for initial attack.

8.1.5.2 Insect and Disease

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

8.1.5.3 General Environment

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

8.1.6 Surveys

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

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

8.1.7 Information and Education

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

8.2 District 11

8.2.1 Harvesting

In District 11 the majority of the harvest is scheduled for commercial purposes. This is due to nature of the landbase which was originally designated for industrial purposes. In most other traditional crown districts the landbase is located near the coast where there are many communities and the domestic demand is high. In District 11 there are few communities and the domestic demand is lower. There is sufficient domestic timber allocated to meet the demand.

The AAC for district 11 will not be exceeded in this planning period.

8.2.1.1 Commercial

The timber scheduled for commercial harvest in the district is overmature with some small pockets of mature dispersed throughout. This proposed harvest approximates the harvest schedule that was used to determine the AAC in Section 3. The allocated operating area and associated harvest volumes represent as much as two times the actual proposed harvest (Table 19). The purpose of including more

Table 19 Proposed commercial harvest in District 11 for 2016 to 2020

Operating Area					Volume Harvested (m^3)							
					Softwood				Hardwood			
Number	Name	Tenure	Area (ha)	Number of Permits	Core	Operational Constrained	Sub-total	Non AAC wood	Core	Operational Constrained	Sub-total	Non AAC Wood
CC11043	Diversion Lake	Crown			27,980				50			
CC11044	West Lake - Sandy Brook	Crown			4,462				25			
CC11045	Lemottes East	Crown			4,631				50			
CC11046	North Great Rattling Brook	Crown			11,180				50			
CC11047	Tom Joe Brook	Crown			7,031				50			
CC11048	Sandy Lake North	Crown			32,033				50			
CC11049	Rocky Pond	Crown			1,011				0			
CC11050	North Great Ratttling	Crown			43,369				1500			
CC11051	Beaver Pond	Crown			41,793				50			
CC11052	South Great Rattling	Crown			41,695				250			
CC11053	Kennedys Pond	Crown			18,356				100			
CC11054	Nugents Pond 1	Crown			14,144				200			
CC11055	Luffs Pond 2	Crown			29,459				500			
CC11056	Luffs Pond 1	Crown			61,750				1000			
CC11057	Great Rattling West 1	Crown			17,681				250			
CC11058	Budgels Pond	Crown			10,870				0			
CC11059	Hayne's Lake	Crown			130,036				4000			
CC11060	Canning's Lake	Crown			53,808				2500			
CC11061	Rushy Pond	Crown			31,765				500			
CC11062	Great Rattling West 2	Crown			13,626				250			
CC11063	Tote Lake	Crown			23,313				250			
CC11064	Arthur's Lake	Crown			7,633				25			
CC11065	Sunday Pond Road	Crown			24,986				500			
CC11066	Miguel Lake	Crown			15,500				250			
CC11067	Great Rattling	Crown			63,620				1500			
CC11068	Sepepet Block 1	Crown			19,521				100			
CC11069	Sepepet Block 2	Crown			21,119				100			
CC11070	Trappers	Crown			17,864				100			
CC11071	Golden Gullies	Crown			2,758				50			
CC11073	Pistol Lake 1	Crown			4,813				50			
CC11074	Coronation Lake	Crown			208,488				4000			
CC11075	Luffs Pond 3	Crown			8,408				250			
CC11076	Jumpers Brook	Crown			18,246				200			
CC11077	Rattling Brook	Crown			9,240				50			
CC11078	Diversion Lake North	Crown			56,126				2500			
CC11079	Noel Paul	Crown			10,018				500			
CC11080	West Lake	Crown			121,082				5000			
CC11081	Paradise Lake Burn	Crown			46,561				250			
CC11082	Norris Arm	Crown			26,589				250			
CC11083	Noel Paul's Brook	Crown			16,600				250			
CC11084	Tote Lake South	Crown			36,873				250			
CC11085	Stoney Lake East 1	Crown			40,417				1500			
CC11086	Stoney Lake East 1	Crown			74,665				500			
CC11087	Stoney Lake South 2	Crown			51,212				500			
CC11088	Noel Paul 3	Crown			48,908				500			
CC11089	Coronation Brook	Crown			204,888				5000			
CC11090	Lemottes Lake	Crown			12,810				500			
CC11091	West Stony Brook	Crown			106,858				1000			
CC11092	Paradise Lake South	Crown			11,069				100			
CC11093	Caribou Lake	Crown			4,989				50			
CC11094	Little Rattling	Crown			92,761				1500			
CC11095	Mill Pond	Crown			5,217				100			
CC11096	Shoulder Blade Lake West	Crown			79,333				1500			
CC11097	Stoney Brook South	Crown			9,753				100			
CC11098	West Lake South	Crown			71,586				4000			
Total			**0**	**0**	**2,170,506**	**0**	**0**	**0**	**44,650**	**0**	**0**	

volume than is actually proposed is to allow for operational flexibility and inventory deviations within operating areas without having to constantly amend the plan.

8.2.1.2 Domestic

Table 20 outlines the proposed domestic harvest Harvesting will occur in designated domestic cutting areas and is generally conducted on a small patch cut system. All domestic cutting is done under permit which has conditions attached that outline the species, volume, location and utilization standards to be employed. Most cutting occurs in fall and winter with extraction by snowmobile or ATV. Domestic permit allocation is 23 m3. In remote parts of the district not covered by any operating areas, domestic permits may be issued to remote cabin owners for firewood to heat their cabins as requested.

Table 20 Proposed domestic harvest in District 11 for 2016 to 2020

District:				Softwood Volume m^3					Hardwood Volume m^3				
Operating Area	Name	Tenure	Area	Core	Operational Constrained	Sub-total	Non AAC wood Operational	Non AAC wood Regulatory	Core	Operational constrained	Sub-total	Non AAC Wood Operational	Non AAC Wood Regulatory
5_2016_2020_CC11501	West Lake – Sandy Brook	Crown	8,000	0	0	0	0		400			2,300	
5_2016_2020_CC11502 (H & S)	Lemotte's Lake – Stoney Brook	Crown	4,000	1,800	450	2,250	800		400			2,200	
5_2016_2020_CC11503	Jumper's Brook East - Rattling Brook	Crown	6,600	0	0	0	0		250			1,400	
5_2016_2020_CC11504	Miguel Lake South	Crown	5,900	0	0	0	0		60			350	
5_2016_2020_CC11505	Beaton's Lake	Crown	8,000	0	0	0	0		20			80	
5_2016_2020_CC11506 (H & S)	Amy's Lake	Crown	5,900	40	10	50	14		20			100	
5_2016_2020_CC11507	Pamehac Lake	Crown	5,400	0	0	0	0		100			550	
5_2016_2020_CC11508	Middle Brook – Exploits River	Crown	6,100	0	0	0	0		100			600	
5_2016_2020_CC11509	Five Mile Lake	Crown	4,000	0	0	0	0		100			450	
5_2016_2020_CC11510	Cripple Back Lake	Crown	4,300	0	0	0	0		100			700	
5_2016_2020_CC11511	Crystal Lake – Chipper Road	Crown	6,000	0	0	0	0		200			1,000	
5_2016_2020_CC11512	Paradise Lake	Crown	460	0	0	0	0		200			1,300	
5_2016_2020_CC11513	Martin Lake – Hayne's Lake	Crown	7,000	0	0	0	0		600			3,300	
5_2016_2020_CC11514 (H & S)	South Side Road	Crown	5,500	1,700	450	2,150	700		0			0	
5_2016_2020_CC11515	Jumper's Brook West – Camp 6	Crown	6,900	0	0	0	0		700			4,000	
5_2016_2020_CC11516	Tote Brook – Burnt Lake	Crown	4,100	0	0	0	0		180			1,000	
5_2016_2020_CC11517	Sepepet - Sandy Lake	Crown	10,700	0	0	0	0		40			250	
5_2016_2020_CC11518 (H & S)	Big Dick - Snoopy	Crown	11,700	40	10	50	16		10			50	
Totals			**110,560**	**3,580**	**920**	**4,500**	**1,530**		**3,480**			**19,630**	

8.2.2 Silviculture

Balsam fir is highly susceptible to insect and disease attack and has less desirable fibre quality and properties than spruce for papermaking and lumber production. Since spruce is the more desirable

species at this time, more aggressive approaches to maintaining and enhancing spruce content on sites will be employed in the next five years.

There are two silviculture prescriptions scheduled; planting/gap planting including site preparation (mechanical, prescribed burning and/or herbicide), where required, and thinning (pre-commercial/diameter limit and commercial). Planting is designed to return a site to a minimum stocking level with the desired species, mainly spruce. Full planting is required where there is complete natural regeneration failure and gap planting when a site has some desired regeneration but not enough to meet minimum stocking standards. Pre-commercial thinning is conducted on regenerating stands (0 - 25 years) to reduce the high density and concentrate the growth on the remaining crop trees thus reducing the time to harvest. Diameter limit /commercial thinning is carried out on immature stands (25-40 years) and is designed to produce a sawlog crop while salvaging any trees thinned as pulpwood or fuelwood.

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2	light	node swelling indistinct, apparent only at close examination
3	light to moderate	node swelling distinct, some stunting or distortion present
4	moderate	distortion prominent, branch tip inhibited, thinly foliated
5	moderate to severe	as in moderate but terminals and some branches bare from tips up to 30 cm or up to one half the length of short branches
6	severe	as in moderate but terminals and some branches bare for more than 30 cm or more than one half the length of short branches
7	dead trees	inner bark brown at breast height and symptoms or signs of adelgid attack present

If balsam woolly adelgid damage is less than Code 3 in adjacent stands then balsam fir will be considered an acceptable regeneration species. If balsam woolly adelgid damage is greater than Code 2

in adjacent stands then balsam fir will not be considered an acceptable regeneration species. Sites not meeting required stocking levels will be either full planted or gap planted with spruce, as required, to bring them up to minimum stocking levels.

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

There have been problems in some parts of District 11 and12 with sites transitioning to alders after harvest. A treatment employing mulching, herbicide and planting in successive years has been conducted to try and reclaim some of these highly productive sites. The effectiveness of this treatment is still being evaluated; however it has been discontinued due to high cost. Since there is a known regeneration problem on these sites, planting with white spruce immediately after harvest is employed to allow the seedlings to "get the jump" on the alders.

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

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

8.2.3 Primary Access Roads and Bridges

Table 21 outlines the forest access roads scheduled to be constructed in District 11 in the next five years to access timber for commercial purposes. All roads will be built to the specifications of the Class C-2 standard and all pertinent EPG's will be followed. In addition, secondary, operational and winter access roads and upgrading of existing road will be required and will be submitted in the annual operating plan prior to the year that they are planned to be built. As well, referrals will be sent to all relevant agencies (including DFO and Water Resources Division) before any construction is initiated.

8.2.4 Activities in Protected Water Supply Areas

In operating areas where operations are scheduled to occur in protected water supply areas (PWSA), there are wider buffers established inside these PWSA and the pertinent EPG's will be attached to any commercial or domestic permits issued for these areas. There will be continuous monitoring inside these areas and buffers will be flagged to ensure compliance with the guidelines. In addition, approval under the Water Resources Act must be obtained annually by the Forestry and Agrifoods Agency before any commercial or domestic harvesting commences inside the PWSA.

8.2.5 Environmental Protection

8.2.5.1 Fire

Wildfire has not been prevalent in the district in the past number of years and as a result there have been little merchantable volume lost. There have been major fires in the past however, so the district must remain vigilant in its fire suppression program to ensure any future losses are minimized.

There are fire crews and equipment stationed at Gander, Bishop's Falls and Millertown in the fire season whose direct responsibility is fire protection. In addition, support, equipment and manpower at both the

Table 21 Summary of primary access road construction in District 11 for 2016-2020

Operating Area		Construction/ Reconstruction	Length (km)	Water Crossings	
Name	Number			Culvert	Bridge
Diversion Lake	CC-11043	C	4.40	2	
Diversion Lake	CC-11043	C	4.21	1	
Diversion Lake	CC-11043	C	0.30		
Diversion Lake	CC-11043	C	1.20		
West Lake- Sandy Brook	CC-11044	C	0.78		
Lemottes East	CC-11045	C	0.50		
North Great Rattling Brook	CC-11046	C	1.30		
Tom Joe Brook	CC-11047	C	4.30	2	
Sandy Lake North	CC-11048	C	2.40	1	
Beaver Pond	CC-11051	C	3.26		
Beaver Pond	CC-11051	C	4.94		1
South Great Rattling	CC-11052	C	9.15		
South Great Rattling	CC-11052	C	1.46		
South Great Rattling	CC-11052	C	1.23		
South Great Rattling	CC-11052	C	3.85		
Kennedys Pond	CC-11053	C	1.10		1
Haynes Lake (A)	CC-11059	C	2.50		
Haynes Lake (B)	CC-11059	C	0.70		
Haynes Lake (C)	CC-11059	C	4.00		1
Haynes Lake (D)	CC-11059	C	1.90		
Haynes Lake (E)	CC-11059	C	5.40		
Cannings Lake	CC-11060	C	5.09		1
Cannings Lake	CC-11060	C	3.93		
Rushy Pond	CC-11061	C	1.70		
Tote Lake	CC-11063	R	5.62		1
Tote Lake	CC-11063	R	1.05	1	
Tote Lake	CC-11063	R	0.90		
Aurthur lake	CC-11064	C	1.05		
Great Rattling	CC-11067	C	3.55	1	
Great Rattling	CC-11067	C	1.35	1	
Sepeppet Block 1	CC-11068	C	2.45		1
Sepeppet Block 1	CC-11068	C	0.70		
Sepeppet Block 1	CC-11068	C	1.63	2	
Sepeppet Block 1	CC-11068	C	0.40		
Sepeppet Block 1	CC-11068	C	1.60		
Sepeppet Block 2	CC-11069	C	3.10	1	
Sepeppet Block 2	CC-11069	C	0.80		
Sepeppet Block 2	CC-11069	C	0.33		
Sepeppet Block 2	CC-11069	R	2.30		1
Sepeppet Block 2	CC-11069	C	1.90		
Trappers	CC-11070	C	4.33	2	
Pistol Lake 1	CC-11073	R	1.22		
Pistol Lake 1	CC-11073	C	1.80		
Coronation Lake	CC-11074	C	3.30	2	1
Coronation Lake	CC-11074	C	5.60	1	2
Jumpers Brook	CC-11076	C	0.60		
Diversion Lake North	CC-11078	C	0.33		
Diversion Lake North	CC-11078	C	4.73		1
Noel Paul	CC-11079	C	1.10		
Noel Paul	CC-11079	C	0.80		

West Lake	CC-11080	C	2.43		
West Lake	CC-11080	C	5.00	1	1
West Lake	CC-11080	C	1.38		
West Lake	CC-11080	C	8.65	2	1
West Lake	CC-11080	C	7.90		
Norris Arm	CC-11082	C	2.50		
Norris Arm	CC-11082	C	3.40	1	1
Tote Lake South	CC-11084	C	2.20		
Stony Lake East 1	CC-11085	C	3.10		
Stony Lake East 1	CC-11085	C	1.40	1	
Stony Lake East 2	CC-11086	C	3.90	2	
Stony Lake East 2	CC-11086	C	2.90		
Stony Lake East 2	CC-11086	C	0.94		
Stony Lake South 2	CC-11087	C	2.80	1	
Stony Lake South 2	CC-11087	R	4.75	1	
Noel Paul 3	CC-11088	C	2.20	3	
Noel Paul 3	CC-11088	C	2.25	1	
Coronation Brook	CC-11089	C	9.63	2	3
Coronation Brook	CC-11089	C	5.80	4	2
Lemottes Lake	CC-11090	C	2.49	2	
Lemottes lake	CC-11090	C	1.09		
West Stony Brook	CC-11091	C	5.10	1	
West Stony Brook	CC-11091	C	2.01		1
West Stony Brook	CC-11091	C	2.05		
Caribou Lake	CC-11093	R	6.43	1	1
Caribou Lake	CC-11093	C	1.50		
Little Rattling	CC-11094	C	8.10		3
Mill Pond	CC-11095	R	7.80	2	1
Mill Pond	CC-11095	C	3.42		
Mill Pond	CC-11095	C	0.45		
Shoulder Blade West	CC-11096	C	2.95		
Shoulder Blade West	CC-11096	C	4.00		1
Stoney Brook South	CC-11097	C	1.90		1
Stoney Brook South	CC-11097	C	1.02	1	
Stoney Brook South	CC-11097	C	6.35		1
West Lake South	CC-11098	C	14.00	2	1
		Sub-total	**265.91**	**45**	**29**

regional and provincial level is available should the need arise. There are air tankers stationed at Deer Lake and Gander and helicopters in Gander that are available for initial attack.

8.2.5.2 Insect and Disease

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

8.2.5.3 General Environment

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

8.2.6 Surveys

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

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

8.2.7 Information and Education

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

8.3 District 12

8.3.1 Harvesting

In District 12 the majority of the harvest is scheduled for commercial purposes. This is due to nature of the landbase which was originally designated for industrial purposes. In most other traditional crown districts the landbase is located near the coast where there are many communities and the domestic demand is high. In District 12 there are few communities and the domestic demand is lower. There is sufficient domestic timber allocated to meet the demand.

The AAC for district 12 will not be exceeded in this planning period.

8.3.1.1 Commercial

The timber scheduled for commercial harvest in the district is overmature with some small pockets of mature dispersed throughout. This proposed harvest approximates the harvest schedule that was used to determine the AAC in Section 3. The allocated operating area and associated harvest volumes represent as much as two times the actual proposed harvest (Table 22). 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.

8.3.1.2 Domestic

Table 23 outlines the proposed domestic harvest Harvesting will occur in designated domestic cutting areas and is generally conducted on a small patch cut system. All domestic cutting is done under permit which has conditions attached that outline the species, volume, location and utilization standards to be employed. Most cutting occurs in fall and winter with extraction by snowmobile or ATV. Domestic permit allocation is 23 m3. In remote parts of the district not covered by any operating areas, domestic permits may be issued to remote cabin owners for firewood to heat their cabins as requested.

Table 22 Proposed commercial harvest in District 12 for 2016 to 2020

District:			Softwood Volume m^3					Hardwood Volume m^3				
						Non AAC wood					Non AAC Wood	
Operating Area	Name	Area (ha)	Core (m^3)	Operational Constrainted	Sub-total	Operational	Regulatory	Core	Operational Constrainted	Sub-total	Operational	Regulatory
C-12-01	Millertown Junction	1,229	121,757					500			500	
C-12-02	Little Red Indian Pond	169	21,627					0			200	
C-12-03	Exploits	71	9,569					200			200	
C-12-04	Moosehead	119	17,758					2,000			250	
C-12-07	Exploits River North	159	21,233					200			200	
C-12-08	Valley Brook	30	8,179					200			200	
C-12-09	Harpoon West	524	66,095					5,000			1,000	
C-12-10	Harpoon East	315	53,588					6,000			1,000	
C-12-11	Bobby's Pond	660	95,833					500			500	
C-12-12	Island Pond	734	101,907					7,000			500	
C-12-13	Denny's Pond	591	72,562					7,000			1,000	
C-12-14	Lost Pond	447	64,397					500			200	
C-12-15	Kelly's Pond	1,236	130,801					500			200	
C-12-16	Lake Douglas	2,277	341,896					500			100	
C-12-17	Gill's Valley East	3,004	411,683					500			500	
C-12-18	Gill's Valley West	707	81,649					500			500	
C-12-19	Duck Pond Road	247	27,642					500			200	
C-12-20	Duck Pond Road East	944	107,093					500			200	
C-12-30	Noel Paul South	1,251	98,908					200			100	
C-12-31	Carter Lake	500	146,397					200			100	
C-12-24	Denny's Pond South	580	69,359					3,000			500	
Sub-Totals		**15,794**	**2,069,933**					**35,500**			**8150**	

Table 23 Proposed domestic harvest in District 12 for 2016 to 2020

District:				Softwood Volume m^3					Hardwood Volume m^3				
Operating Area	Name	Tenure	Area (ha)	Core	Operational Constrainted	Sub-total	Non AAC wood Operational	Regulatory	Core	Operational Constrainted	Sub-total	Non AAC Wood Operational	Regulatory
C-12-501	Badger Track*		na	55								350	
C-12-502	Badger Burn*		na	810			1215						
C-12-503	Little Red Indian		na									648	
C-12-504	Joe Glodes		na									1053	
C-12-505	Warford's Ridge		na									648	
C-12-506	Buchans Junction*		na	55								350	
C-12-507	Buchans*		na	3990								627	
C-12-508	Skidder Brook		na									810	
C-12-509	Star Lake		na									405	
C-12-510	Millertown		na	825								1750	
C-12-511	Sutherlands		na									81	
C-12-512	Burnt Pond		na									405	
C-12-513	Selby's Pond		na									405	
C-12-514	Harbour Round		na									81	
C-12-515	Costigan		na									81	
C-12-516	Quinn Lake		na									405	
C-12-517	Snowshoe Lake		na									81	
C-12-518	Rogerson		na									81	
C-12-519	Lake Ambrose		na									243	
C-12-520	303 Pond		na									810	
C-12-521	Noel Paul		na									405	
Sub-Total				**5735**								**9719**	
Totals													

8.3.2 Silviculture

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

There are two silviculture prescriptions scheduled; planting/gap planting including site preparation (mechanical, prescribed burning and/or herbicide), where required, and thinning (pre-commercial/diameter limit and commercial). Planting is designed to return a site to a minimum stocking level with the desired species, mainly spruce. Full planting is required where there is complete natural regeneration failure and gap planting when a site has some desired regeneration but not enough to meet minimum stocking standards. Pre-commercial thinning is conducted on regenerating stands (0 - 25 years) to reduce the high density and concentrate the growth on the remaining crop trees thus reducing

the time to harvest. Diameter limit /commercial thinning is carried out on immature stands (25-40 years) and is designed to produce a sawlog crop while salvaging any trees thinned as pulpwood or fuelwood.

Each district in the zone has unique silviculture challenges. In Districts 10, 11 and 12 these challenges include sites transitioning to alders or kalmia post harvest; and limited pre commercial thinning opportunity because stands have passed the treatment window. In District 13 challenges include more fir regeneration than spruce making the forest more susceptible to insect outbreaks, and logistical concerns due to remoteness when applying silviculture treatments.

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

Potential silvicultural treatment areas need to undergo reconnaissance and / or intensive surveys to determine the regeneration level and severity adelgid attack. Such surveys will be conducted during this five year period but until they are completed, specific locations and treatment amounts cannot be identified. Silviculture prescriptions have been developed however, for implementation on specific site conditions. These prescriptions are described below.

Areas that are scheduled for commercial harvest or have been harvested are identified on the operating area maps and are candidates for planting or gap planting to black, white or Norway spruce. These areas will undergo reconnaissance and or intensive regeneration surveys to determine the need for planting

and the presence of adelgid. Adelgid damage evaluation will be based on damage class as described below.

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

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

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

There have been problems in some parts of District 11 and12 with sites transitioning to alders after harvest. A treatment employing mulching, herbicide and planting in successive years has been

conducted to try and reclaim some of these highly productive sites. The effectiveness of this treatment is still being evaluated; however it has been discontinued due to high cost. Since there is a known regeneration problem on these sites, planting with white spruce immediately after harvest is employed to allow the seedlings to "get the jump" on the alders.

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

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

8.3.3 Primary Access Roads and Bridges

There are 141 km of primary forest access roads scheduled to be constructed in District 12 in the next five years (Table 24) to access timber for commercial purposes. All roads will be built to the specifications of the Class C-2 standard and all pertinent EPG's will be followed. In addition, secondary, operational and winter access roads and upgrading of existing road will be required and will be submitted in the annual operating plan prior to the year that they are planned to be built. As well, referrals will be sent to all relevant agencies (including DFO and Water Resources Division) before any construction is initiated.

8.3.4 Activities in Protected Water Supply Areas

In operating areas where operations are scheduled to occur in protected water supply areas (PWSA), there are wider buffers established inside these PWSA and the pertinent EPG's will be attached to any commercial or domestic permits issued for these areas. There will be continuous monitoring inside these areas and buffers will be flagged to ensure compliance with the guidelines. In addition, approval under the Water Resources Act must be obtained annually by the Forestry and Agrifoods Agency before any commercial or domestic harvesting commences inside the PWSA.

8.3.5 Environmental Protection

8.3.5.1 Fire

Wildfire has not been prevalent in the district in the past number of years and as a result there have been little merchantable volume lost. There have been major fires in the past however, so the district must remain vigilant in its fire suppression program to ensure any future losses are minimized

There are fire crews and equipment stationed at Gander, Bishop's Falls and Millertown in the fire season whose direct responsibility is fire protection. In addition, support, equipment and manpower at both the regional and provincial level is available should the need arise. There are air tankers stationed at Deer Lake and Gander and helicopters in Gander that are available for initial attack.

8.3.5.2 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.

Table 24 Summary of primary access road construction in District 12 for 2016-2020

Operating Area		Construction/ Reconstruction	Length (km)	Water Crossings	
Name	Number			Culvert	Bridge
Millertown Junction	C-12-01	Construction	9.96	5	
Little Red Indian Pond	C-12-02	Construction	1.00	0	
Exploits	C-12-03	na	0.00		
Moosehead	C-12-04	na	0.00		
Exploits River North	C-12-07	Construction	2.00	0	
Valley Brook	C-12-08	na	0.00		
Harpoon West	C-12-09	Construction	5.78	0	
Harpoon East	C-12-10	Construction	5.34	1	1
Bobby's Pond	C-12-11	Construction	10.02	0	
Island Pond	C-12-12	Construction	14.53	2	
Denny's Pond	C-12-13	Construction	12.90	4	
Lost Pond	C-12-14	na	0.00		
Kelly's Pond	C-12-15	Construction	5.09	2	
Lake Douglas	C-12-16	Construction	12.23	1	
Gill's Valley East	C-12-17	Construction	33.54	3	
Gill's Valley West	C-12-18	Construction	2.80	1	
Duck Rond Road	C-12-19	Construction	4.22		2
Duck Pond Road East	C-12-20	Construction	4.81	1	
Denny's Pond South	C-12-24	na	0.00		
Carter Lake	C-12-31	Construction	10.80	1	
Noel Paul South	C-12-30	Construction	5.85	0	
		Sub-total	**140.87**		

8.3.5.3 General Environment

The environmental protection guidelines form the basis for protecting the environment from the effects of forest activities. Commercial forest activities can have a significant environmental impact if not

conducted properly. The guidelines are designed to provide site specific measured to ensure that these impacts are avoided. Highlights of measures to avoid these impacts include no activity buffer zones, modification of harvesting design and equipment, avoidance of sensitive site during critical periods, consultation with other regulatory agencies and of course, monitoring. Specific measures that govern each forestry activity are detailed in Appendix 1.

8.3.6 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.

8.3.7 Information and Education

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

8.4 District 13

8.4.1 Harvesting

There is 113 000 m3 of timber scheduled to be harvested in District 13 for the next 5 years. The majority of the harvest (94%) is scheduled for commercial purposes. This is due to nature of the landbase which was originally designated for industrial purposes. In most other traditional crown districts the landbase is located near the coast where there are many communities and the domestic demand is high. In District 13 the entire domestic demand is to supply firewood for remote cabins. The AAC for district 13 will not be exceeded in this planning period

8.4.1.1 Commercial

The timber scheduled for commercial harvest in the district is overmature with some small pockets of mature dispersed throughout. This proposed harvest approximates the harvest schedule that was used to determine the AAC in Section 3. The allocated operating area and associated harvest volumes represent as much as two times the actual proposed harvest (Table 22). 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.

There are 105 742 m3 of timber scheduled to be harvested commercially in the next five years (Table 25). Commercial harvesting of all species accounts for over 94 percent of the total proposed harvest in the district. Approximately 10 percent of the commercial harvest will be hardwoods in both pure and residual stands. Commercial activity in hardwoods is limited due to the availability of suitable stands.

Table 25 Proposed commercial harvest in District 13 for 2016 to 2020

District:				**Softwood Volume m^3**					**Hardwood Volume m^3**				
Operating Area	Name	Tenure	Area	Core	Operational Constrainted	Sub-total	Non AAC wood Operational	Regulatory	Core	Operational Constrainted	Sub-total	Non AAC Wood Operational	Regulatory
C13001	Hospital Pond	Crown	945	88805					6545				
C13002	Red Indian	Crown	94.3	7074					3300				
Totals				**95897**					**9,845**				

8.4.1.2 Domestic

There are 7 000 m3 scheduled to be harvested domestically from 2016 to 2020 which represents 6 percent of the proposed harvest (Table 26). Harvesting will occur in designated domestic cutting areas and is generally conducted on a small patch cut system. All domestic cutting is done under permit which has conditions attached that outline the species, volume, location and utilization standards to be employed. Most cutting occurs in fall and winter with extraction by snowmobile or ATV. Domestic permit allocation is 23 m3. In remote parts of the district not covered by any operating areas, domestic permits may be issued to remote cabin owners for firewood to heat their cabins as requested.

Table 26 Proposed domestic harvest in District 13 for 2016 to 2020

District:				Softwood Volume m^3					Hardwood Volume m^3				
							Non AAC wood					Non AAC Wood	
Operating Area	Name	Tenure	Area	Core	Operational Constrainted	Sub-total	Operational	Regulatory	Core	Operational Constrainted	Sub-total	Operational	Regulatory
C13503	Red Indian Lake	Crown	n/a	250	250	500						1500	
C13502	Portage lake	Crown	n/a	250	250	500						1500	
C13501	Peter Strides	Crown	n/a	1250	250	1500						1500	
Totals				**1750**	**750**	**2500**						**4,500**	

8.4.2 Silviculture

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

There are two silviculture prescriptions scheduled; planting/gap planting including site preparation (mechanical, prescribed burning and/or herbicide), where required, and thinning (pre-commercial/diameter limit and commercial). Planting is designed to return a site to a minimum stocking level with the desired species, mainly spruce. Full planting is required where there is complete natural regeneration failure and gap planting when a site has some desired regeneration but not enough to meet minimum stocking standards. Pre-commercial thinning is conducted on regenerating stands (0 - 25

years) to reduce the high density and concentrate the growth on the remaining crop trees thus reducing the time to harvest. Diameter limit /commercial thinning is carried out on immature stands (25-40 years) and is designed to produce a sawlog crop while salvaging any trees thinned as pulpwood or fuelwood.

Each district in the zone has unique silviculture challenges. In Districts 10, 11 and 12 these challenges include sites transitioning to alders or kalmia post harvest; and limited pre commercial thinning opportunity because stands have passed the treatment window. In District 13 challenges include more fir regeneration than spruce making the forest more susceptible to insect outbreaks, and logistical concerns due to remoteness when applying silviculture treatments.

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

Potential silvicultural treatment areas need to undergo reconnaissance and / or intensive surveys to determine the regeneration level and severity adelgid attack. Such surveys will be conducted during this five year period but until they are completed, specific locations and treatment amounts cannot be identified. Silviculture prescriptions have been developed however, for implementation on specific site conditions. These prescriptions are described below.

Areas that are scheduled for commercial harvest or have been harvested are identified on the operating area maps and are candidates for planting or gap planting to black, white or Norway spruce. These areas will undergo reconnaissance and or intensive regeneration surveys to determine the need for planting

and the presence of adelgid. Adelgid damage evaluation will be based on damage class as described below.

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

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

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

There have been problems in some parts of District 11 and12 with sites transitioning to alders after harvest. A treatment employing mulching, herbicide and planting in successive years has been conducted to try and reclaim some of these highly productive sites. The effectiveness of this treatment is still being evaluated; however it has been discontinued due to high cost. Since there is a known regeneration problem on these sites, planting with white spruce immediately after harvest is employed to allow the seedlings to "get the jump" on the alders.

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

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

8.4.3 Primary Access Roads and Bridges

There are 52 km of primary forest access roads scheduled to be constructed in District 13 in the next five years (Table 27) to access timber for commercial purposes. All roads will be built to the specifications of the Class C-2 standard and all pertinent EPG's will be followed. In addition, secondary, operational and winter access roads and upgrading of existing road will be required and will be submitted in the annual operating plan prior to the year that they are planned to be built. As well, referrals will be sent to all relevant agencies (including DFO and Water Resources Division) before any construction is initiated.

Table 27 Summary of primary access road construction in District 13 for 2016-2020

Operating Area		Construction/ Reconstruction	Length (km)	Water Crossings	
Name	Number			Culvert	Bridge
Hospital Pond	C13004	construction	12		1
		Sub-total	**12**		

8.4.4 Activities in Protected Water Supply Areas

In operating areas where operations are scheduled to occur in protected water supply areas (PWSA), there are wider buffers established inside these PWSA and the pertinent EPG's will be attached to any commercial or domestic permits issued for these areas. There will be continuous monitoring inside these areas and buffers will be flagged to ensure compliance with the guidelines. In addition, approval under the Water Resources Act must be obtained annually by the Forestry and Agrifoods Agency before any commercial or domestic harvesting commences inside the PWSA.

8.4.5 Environmental Protection

8.4.5.1 Fire

Wildfire has not been prevalent in the district in the past number of years and as a result there have been little merchantable volume lost. There have been major fires in the past however, so the district must remain vigilant in its fire suppression program to ensure any future losses are minimized.

There are fire crews and equipment stationed at St. George's in the fire season whose direct responsibility is fire protection. In addition, support, equipment and manpower at both the regional and

provincial level is available should the need arise. There are air tankers stationed at Deer Lake and Gander and helicopters in Gander that are available for initial attack.

8.4.5.2 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.

8.4.5.3 General Environment

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

8.4.6 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.

8.4.7 Information and Education

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

Section 9 Plan Administration

9.1 Monitoring

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

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

9.2 Amendments

Due to the dynamic nature of forest activities, amendments are often required because of changes in the forest, operational realities, imposition of addition requirements or guidelines, or some other unforeseen circumstance. These changes to the five year operating plan must be submitted as amendments and approved before they are implemented. There are two types of possible amendments for this plan, one that can be approved internally by the Forestry and Agrifoods Agency and one that must be submitted to the Environmental Assessment Division for public review. Changes to this plan can be approved by the Forestry and Agrifoods Agency if they are:

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

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

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

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

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

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

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