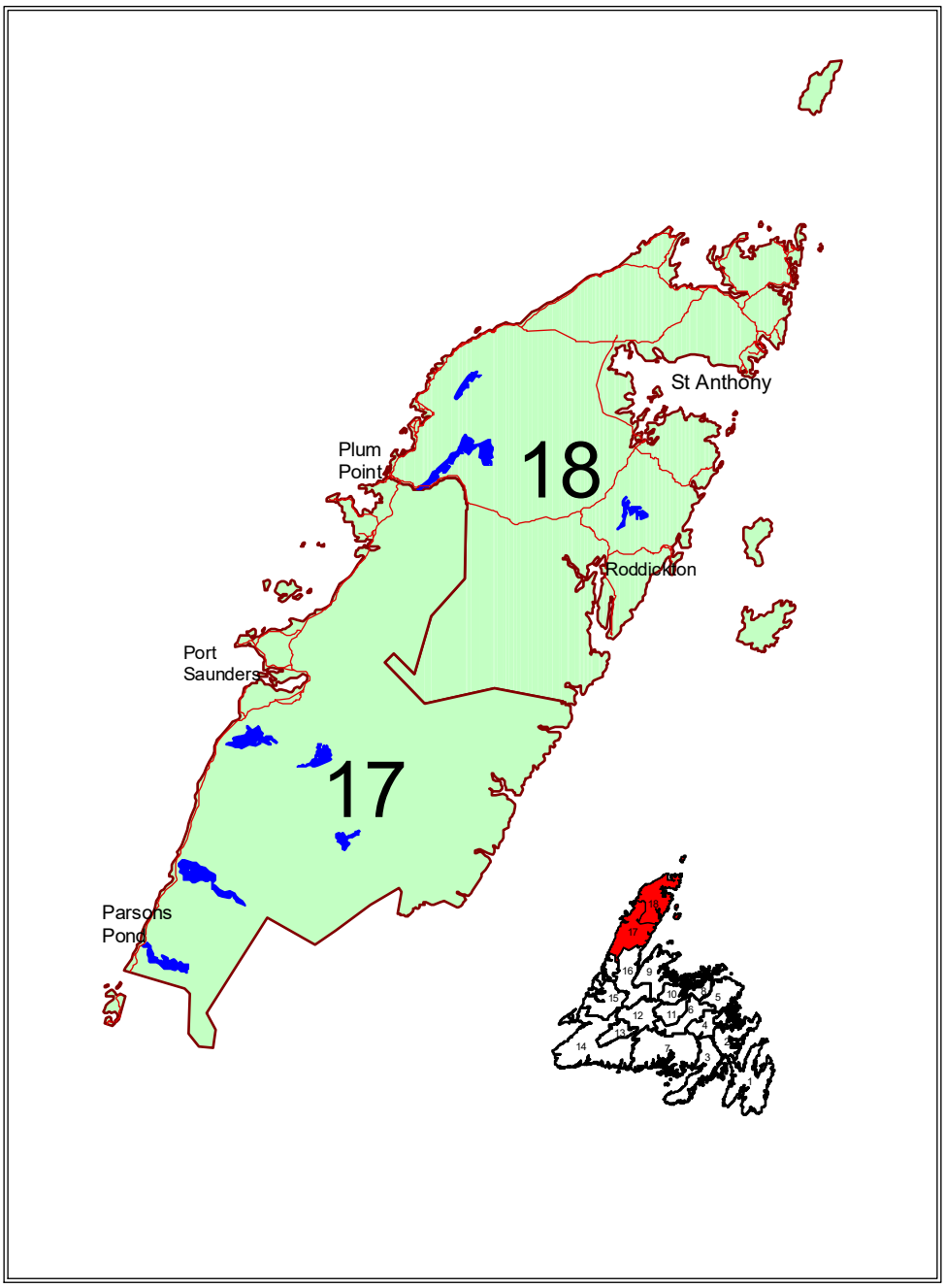
Forest Management Planning Zone 8



Five Year Operating Plan
2023-2027

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INTRODUCTION

This new five year operating plan covers the period January 1, 2023 to December 31, 2027 and represents proposed forestry activities upon crown land within Forest Management Districts 17 and 18. The management of this land is consistent with strategies and philosophies implemented by Fisheries, Forestry and Agriculture on all other crown land managed districts within the Province. This five-year operating plan incorporates established provincial planning requirements, environmental protection guidelines, and standard operating procedures developed under a stringent Environmental Management System (EMS) which is registered under the ISO 14001 standard. Topics that are provincial in scope such as carbon and global warming are included in the provincial sustainable forest management strategy, while sections that are more descriptive or depict local conditions such as values, forest characterization and ecosystem description are included into this five year operating plan. Forest Management Districts 17 and 18 are adjacent and share common ecoregion characteristics and collectively form Planning Zone Eight (8). Within a planning zone, there is a requirement for each tenure to develop a five year operating plan. These plans have to be submitted to Forestry and Wildlife Branch and Department of Environment (for an environmental assessment review). As a result, there will be only one (1) five-year plan submissions for this zone. Throughout this five-year plan, references will be made to Districts 17 and 18 individually but when combined they will collectively be referred to as Planning Zone Eight or the zone.

This document will attempt to fully integrate the presentation of information and discussions for crown land in the zone. 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 the positive results of previous five-year plan documents. Information will be updated as required or new sections will be added as any new information is available.

SECTION 1 DESCRIPTION OF THE LAND BASE

1.1 General

1.1.1 Location

Planning Zone Eight encompasses Forest Management Districts 17 and 18 (Figure 1). It extends from Gros Morne National Park in the south to include all of the Northern Peninsula. Major towns located within the zone are Parsons Pond, Port Saunders, Port au Choix, Roddickton, and St. Anthony. District 17 is administered from Port Saunders while District 18 is administered from Roddickton with a satellite office in St. Anthony.

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. Generally, settlement occurred around the coastal areas where the fishery was prevalent. Initially the forest was used as a source of fuelwood as well as construction materials for houses and fishery related items (stages, lobster pots, boats etc.). Sawmills developed to supply the local demand for lumber and construction timber and there was a small export market for pulpwood. In the zone, logging towns such as Hawkes Bay, Main Brook and Roddickton developed as a result of the pulp and paper industry. From the 1920's until 2013, there were large scale commercial harvesting and processing operations in the zone. The closure of pulp and paper mills at Stephenville and Grand Falls reduced the demand for timber throughout the province and the economic viability of timber on the Northern Peninsula declined. Currently, there is no active secondary wood processing facility operational in the zone. Holson Forest Products in Roddickton which has the capacity to produce wood pellets and lumber has been inactive since 2013, and Countryside Forest Products in Main Brook is advertised for sale. The new trend is towards small domestic and commercial bandsaw operations.

1.1.3 Ownership

The entire zone is owned and managed by the Crown. Corner Brook Pulp and Paper held timber rights in both District 17 and 18 but relinquished them to the Crown in 2010.

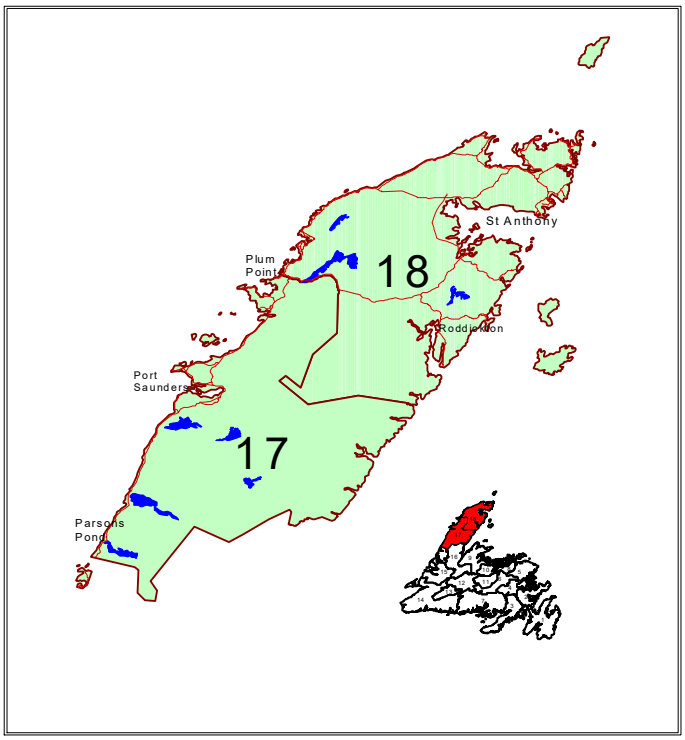

FIGURE 1 LOCATION OF FOREST MANAGEMENT PLANNING ZONE 8

1.2 Physical

1.2.1 Topography and Hydrology

The two dominant topographic features of the zone are the rolling coastal plain and the Long Range Mountains (Brown, 1979). The coastal plain rises from the Gulf of St. Lawrence and continues eastward until it reaches the base of the Long Range Mountains. It varies in width from a few kilometers in the south to 40 kilometers in the north and extends in a north-south axis along the western side of the zone broken only by the Highlands of St. John. This plain is of a gentle rolling nature, reaching a maximum elevation of less than 200 meters. North of the Long range mountains lies a gently rolling sheltered lowland dominated by calcareous parent material. It is on the plains and sheltered lowlands that a large portion of the forestry activity within the zone takes place. Although officially termed mountains, the Long Range is more accurately a plateau. It rises abruptly from the coastal plain to elevations of 600 meters, then forms an eastward dipping plateau that extends unbroken to the eastern shore of the Great Northern Peninsula where it forms a steep rugged coastline. The two most striking topographic features of the Long Range Mountains are the numerous deeply incised glacially carved valleys, in many cases occupied by lakes, that interrupt the sheer western face and the several narrow steep sided valleys, eroded by the easterly flowing rivers, found on the plateau. Due to its exposed nature, the plateau supports little area of commercial forest except in the river valleys. Where trees have established, they are usually of a

stunted, wind deformed nature known as tuckamore. The extreme northern part of the zone is characterized by extensive areas of coastal bog and barrens.

The two major topographic features present have given rise to separate hydrographic patterns. The flat coastal plain is characterized by large shallow lakes with broad slow moving rivers that drain large watersheds. The east-west orientation of these watersheds creates a barrier to the orderly development of a road network necessary for intensive forest management. The major watersheds in this category are; Parsons Pond, Portland Creek, River of Ponds, Torrent River, Castor's River, St Genevieve River, Main Brook, Beaver Brook, Northeast Brook, and Salmon River.

The other hydrographic pattern is present on the high plateau of the Long Range Mountains. Here there are few large lakes, the rivers being narrow and fast moving with narrow watersheds. The major watersheds of this nature are the Cat Arm River, Little Harbour Deep River, Soufflets River, Hooping Harbour, Northwest Brook and Cloud River.

1.2.2 Geology

The geological evolution of the Great Northern Peninsula is said to begin with the rocks of the Long Range Mountains. This complex of igneous and metamorphic rocks, dominated by granite and granitic gneiss are the oldest rocks on the Island aged at approximately 950 million years (Fleming, 1971). Other components of the Long Range Mountains include various types of schists, amphibalite and unseparated intrusions. The rock of the Long Range Complex were formed or deposited during the precambrian period.

The coastal highland area is composed of rocks from the Cambrian and Ordovician periods. They include shale, sandstone, slate, greywack, limestone, conglomerate and basic volcanic rocks. Conche Peninsula and Cape Rouge Peninsula, which protrude from the coastal highland, consist of rocks from the carboniferous period and make up the Anguille Group. These rocks include conglomerates, sandstones, siltstones, shales, dolomite, slate, conglomerate and basalt.

Both the coastal plain and White Hills massive were formed during the Ordovician period. The coastal plain consists of limestone, dolomite, quartzite, sandstone and shale, while the White Hills is made up of periodite with lesser occurrences of pyroxenite, dunite and talcarbonate alterations of mafic to ultramafic rocks.

Rocks forming the base of the coastal plain north of Portland Creek were formed during the Cambrian and Ordovician Periods when the Great Northern Peninsula was the slightly submerged eastern margin of the North American Continent. The sedimentary deposits formed into sandstone, limestones, dolostones and carbonate rocks. The sequence of deposit has been deformed very little and is termed autochthonous. South of Portland Creek the bedrock is of a different nature having been deposited in a deep water environment and consists of sandstones, thin bedded limestones and shales, and limestone conglomerates. The sequence of deposit of these rocks is highly deformed and they are found on top of the autochthonous sequence. This inconsistency leads to the hypothesis that the rocks were

formed some 65 kilometers to the east of the Great Northern Peninsula and moved in mass, by gravity, to their present location.

1.2.3 Soils

Damman (1962) developed a very detailed description and location for all the soil types in the zone.

In District 17 the most productive forest sites occur on the coastal plain. These soils are of several types; (1) orthic podzol soils of varied texture, usually with the parent material being a mixture of sandstone and limestone tills, (2) relatively deep nutrient-poor soil with non--calcareous tills as parent material; on these sites, moderately well-drained slopes with sandy loam to loam texture soil are more productive than the well-drained loamy sands to sandy loams, and (3) excessively drained, loamy or silt-sands with a non-calcareous till as parent material. The largest concentration of these productive sites is found between Portland Creek and Hawkes Bay.

Large areas of poorly drained peat bogs are also found throughout the coastal plain. Because of their excessive moisture and accumulation of organic material these sites have a very low productive capability. Along the east coast of the Great Northern Peninsula productive sites are usually shallow lithosolic soils. Because of exposure and their shallow nature these sites have only a moderate capability. On the higher elevations of the exposed Highlands of St. John and Long Range Mountains the terrain consists of rock and soil barren which have little or no forest capability.

District 18 was glaciated during the Pleistocene period and a layer of glacial till consisting of calcareous (calcium and limestone) and non-calcareous (shale, slate and sandstone) sediment make up the majority of parent material. The most common soil type is well drained podzol. Other less common soil types found throughout the district are gleysols, regosols and organics. The most productive calcareous soils occur in the central lowlands between Ten Mile Lake and Coles Pond. For the most part, these are fairly deep tills of varying texture underlain by limestone. The most productive non-calcareous soils occur on well drained, loamy sands to sandy loams. The northern part of District 18 is almost completely covered by organic soils with predominately open ombrotophic peat bogs and contains very little productive forest sites.

1.2.4 Climate

The prevalent weather system affecting the zone is the maritime system. This weather mass has a moderating effect which results in cool summers and relatively warm winters. The warmest month is July with a mean temperature of 13^{o}C and the coldest month is January with a mean temperature of -9^{o}C. Rainstorms and high wind are frequent in the fall. The length of the vegetative season decreases rapidly along the northern peninsula, ranging from 150 days in Bonne Bay to 100 days at Cape Bauld (Hare, 1952). The annual precipitation averages 90 - 115 cm. which includes approximately 320 cm. of snow.

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 8, 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 favored 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 topo sequence, vegetation structure, floristic composition, and floristic distributions can provide the primary criteria. According to Damman, nine ecoregions are represented in Newfoundland. Each of these is further divided into sub-regions (also known as ecodistricts)

All of the Newfoundland ecoregions and sub-regions contain many of the same ecosystem variables. It is the dominance and variance of these variables (e.g., vegetation and climate) that determine their classification. Figure 2 depicts Planning Zone 8 relative to Damman's ecoregion classification system.

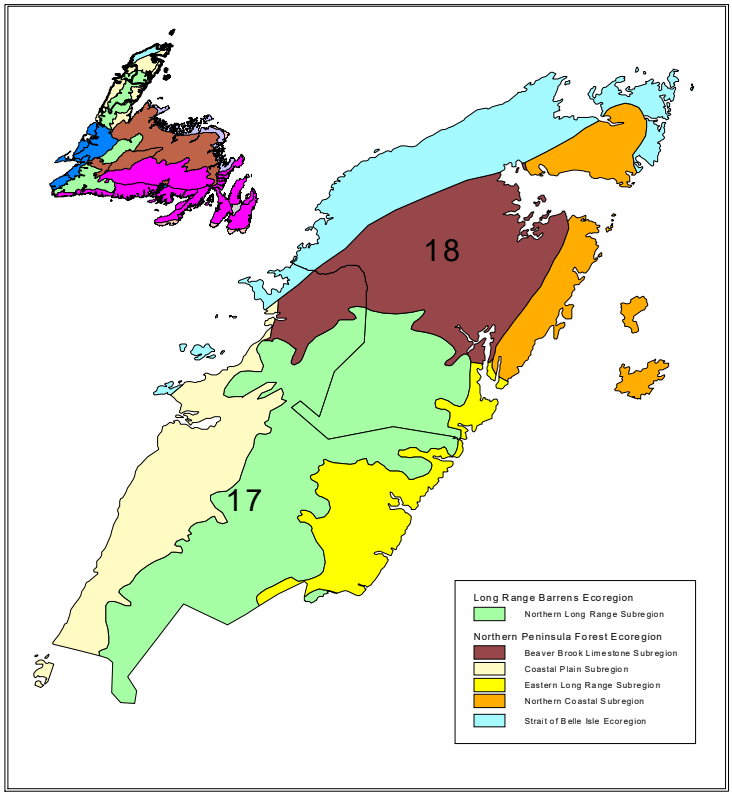

FIGURE 2 ECOREGIONS AND SUB-REGIONS OF PLANNING Zone 8.

1.3.2.1 Northern Peninsula Forest Ecoregion

This ecoregion differs from most other forested parts of the Island by the shortness of the growing season, 110-150 days compared to 145-170 days for other areas. The frost-free period is comparable to most other areas and somewhat better than in central Newfoundland. Precipitation is lower, but, because of low summer temperatures and a shorter growing season, soil moisture supply is probably adequate at most times. The soils are comparable to those of western Newfoundland. Limestone underlies most of the region, with acidic rocks more common on the eastern side of the Peninsula.

Balsam fir is the dominant forest cover except at high elevations (300-400 m) on the eastern side of the peninsula where black spruce appears to be a natural component of the stands. There is very little fire history in this ecoregion. White pine, red maple, yellow birch and trembling aspen are conspicuous by their absence. There are approximately 100 species of plants that are excluded from this ecoregion presumably because of the difference of climate. One of the most conspicuous changes is the replacement of speckled alder by green alder, satiny willow and balsam willow in swamps. Also tall shrubs such as mountain-holly, wild raisin and rhodora are sparse or lacking in the scrub bog-border forests. Silviculturally, they are similar to Western Newfoundland with hardwoods rather than ericaceous shrubs being the most common brush problem on understocked cutovers. Skunk currant, swampy red currant and red-osier dogwood appear to be a much more conspicuous component of seral vegetation on cutovers. Raspberry is also very abundant in the early years of succession.

1.3.2.1.1 Eastern Long *Range Subregion*

This sub-region includes the productive but inaccessible forest on the eastern slopes of the Long Range Mountains up to 450 m elevation. It extends from Cat Arm in the south to Canada Bay in the north. It extends farther inland in the south to include the Little Cat Arm and Soufflets River watersheds before narrowing to a thin coastal strip. The forests tend to be somewhat open balsam fir-black spruce mixtures. The tree line decreases towards the northern end of the sub-region.

1.3.2.1.2 Coastal Plain Subregion

This sub-region encompasses the flat coastal plain and the western lower slope of the Long Range Mountains from St Pauls north to Squid Cove. The coastal plain is occupied mostly by low plateau bogs. Forests are restricted to the slopes of the mountains and an area on till near Hawkes Bay.

1.3.2.1.3 Northern Coastal Subregion

This sub-region extends as a narrow coastal strip from Canada Bay in the south to Hare Bay in the North. This sub-region is climatically the least favorite because of the coldness of the surrounding ocean water. Vegetation consists of exposed, rocky dwarf shrub barrens with local areas of poor forest. Serpentine barrens occur on the White Hills near St. Anthony.

1.3.2.1.4 Beaver Brook Limestone Sub-region

This sub-region contains the productive forests in the sheltered lowlands north of the Long Range Mountains. This is the most climatically favored sub-region in the Northern Peninsula

Forest Ecoregion. Limestone underlies most of this area and rich, calcareous fens are common. Ombrotrophic bogs are limited to the northwestern part of the sub-region. It covers the entire Central Lowland from Ten Mile Lake in the west to Coles Pond in the east. This area is characterized by very gently rolling topography, with a variety of soil and bedrock types. The area has an abundance of underground brooks and sink holes, which have been eroded in the limestone substrate. Some of the most prominent are Under Ground Salmon Hole and Browsey Hole.

1.3.2.2 Long Range Barrens Ecoregion

This ecoregion comprises the highlands extending from the southwestern coast to the northern part of the Northern Peninsula. It consists of three distinct units, the Southern Long Range, the Buchan's Plateau-Topsails, and the Northern Long Range sub-regions. They are separated by areas of more or less continuous forest. Cool summers and cold winters are typical of this ecoregion. 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. Forests dominated by balsam fir occur only in deep sheltered valleys on the northwest side of the Long Range Mountains and the Cloud River valley basin.

1.3.2.2.1 Northern *Long Range Sub-region*

This sub-region encompasses the central portion of the Great Northern Peninsula from Gros Morne National Park in the south to Grenfell Drive (Route 432) in the north and includes the Highlands of St. John, which is the coldest part of the island. The best developed snow bank vegetation occurs in this sub-region. Mountain alder thickets are characteristic on alluvial soils in deep valleys. Many northern plant species occur in the forested valleys.

1.3.2.3 Strait of Belle Isle Barrens Ecoregion

The Straits of Belle Isle Ecoregion is a narrow strip of land which extends north along the western coastline from the northern part of St. John's Bay in the south to the community of St. Anthony. It is an undulating plain, predominately less than 47 metres in elevation, and only very locally rising to elevations of 60 metres. The southern section has a hummocky topography, but towards the north it becomes flatter (Damman, 1963). It widens gradually toward the north and extends across the Peninsula at Hare Bay. The area is characterized by barren, undulating topography, with extensive bogs that contain many small ponds. The entire area was glaciated during the Pleistocene period and there are numerous raised beaches caused by the submergence of the coastal plain. Due its flat topography and poor drainage, this area contains many bogs with a network of small scattered ponds.

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.

1.4.1.1 Productivity

Productivity is the accrual of matter and energy in biomass. In simple terms, primary productivity is the sum total of all biomass produced through photosynthesis. Secondary productivity occurs when this "primary" biomass is ingested and is added to that organism's biomass. Since secondary productivity is directly dependent on primary productivity, it is this primary productivity component that drives the system. The level of primary production is dependent on the ability to produce biomass. This in turn is dependent on landscape features, soil, climate etc. In general terms, the more productive (ability to grow trees) a site is, the higher level of primary productivity. For example a forested stand would have a higher primary productivity than a bog and a good site would have a higher potential than a poor site.

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.

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. Forest Harvesting can be considered a major disturbance in the zone, occurring 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 the black spruce type especially on the poorer sites. The component of balsam fir regeneration increases as the sites get better. There is substantial regeneration failure in this forest type with average not sufficiently restocked (NSR) rates of approximately 20 percent. Another general trend is that the poorer the site quality the higher the NSR rate. These sites would be candidates for planting with spruce.

In the balsam fir types, regeneration success back to balsam fir is much higher averaging 65 percent. Regeneration rates to balsam fir are higher on the medium sites and fall off somewhat on the poor and good sites. There is also some regeneration to black spruce and white birch types. Regeneration failure is relative constant across all ecoregion types at 25 percent.

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

There are few pure hardwood stands in the zone. Anecdotal evidence from domestic cutting in these types indicates that they will regenerate to mixed wood types dominated by balsam fir and white birch.

1.4.1.4.2 Fire

White birch is the most prolific regeneration species after fire across all forest types, site types and ecoregions within the zone. It regenerates as pure stands or in combination with black and white spruce. Balsam fir is conspicuously absent after fir because most advanced regeneration in the under story is killed by the fire. White birch regeneration is correlated with the presence and distribution in the pre fire stand. Pure hardwood stands are uncommon. Therefore fire origin site will have large non-sufficiently restocked areas. In mixed wood stands a higher component of white birch is present after fire. Regeneration failure after fire is on average 55 percent across all forest types and is higher as sites get poorer

1.4.1.4.3 Insect

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

Mature balsam fir types usually regenerate to balsam fir or to balsam fir hardwood mixtures following an insect disturbance. The component of white and black spruce will increase proportionally to its distribution in the original stand. Regeneration failure occurs approximately 20 percent of the time but can be significantly higher if pure stands of immature balsam fir are killed and regeneration is severely impacted by moose browsing. This is prevalent in remote sites not accessed by forest access roads.

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.

While the boreal forest may 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. 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 potentially up to 500 times as many mycorrhiza fungi. Despite the large number of organisms contained within the boreal forest, only a small amount are actually plants and vertebrates. The larger portion remains largely unrecorded and unstudied. As a result, we need to 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.

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 color, 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.

1.5 Forest Characterization

1.5.1 Land Classification

The total mapped land area in the zone is approximately 1.12 million hectares. There are four basic categories that currently represent how the land is classified; productive, non-productive, non-forest and fresh water. Figures 3 and 4 displays the relative percentages of each major land class category in each district with all ownerships combined.

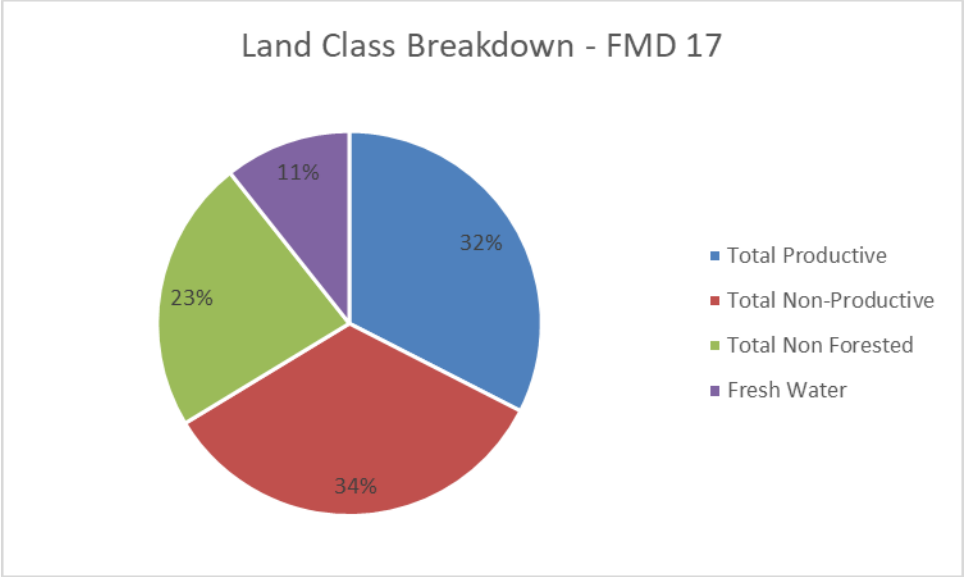

FIGURE 3 LAND CLASS BREAKOUT FOR DISTRICT 17

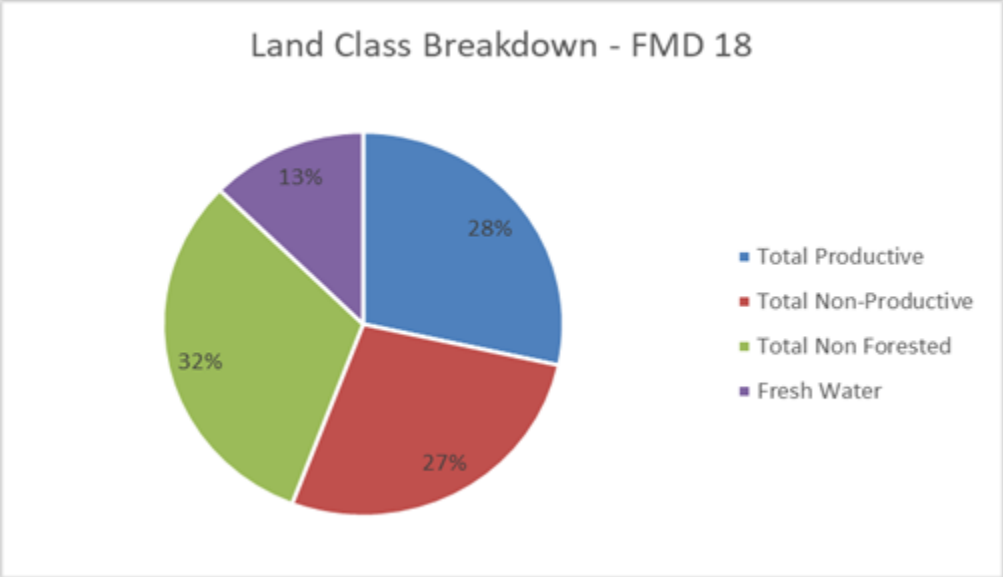

FIGURE 4 LAND CLASS BREAKOUT FOR DISTRICT 18

1.5.2 Age Class

Individual tree ages within any given stand have the potential to be the same after fire or planting. However; in most cases the ages vary. Foresters describe forest stand age in terms of age classes which generally encompass 20 years. The age classes present in the zone are described as regenerating (age class 1, 0-20 years), immature (age class 2, 21-40 years), semi-mature (age class 3, 41-60 years), mature (age class 4, 61-80 years), and over mature (age class 5, 81-100 years), (age class 6, 100-120 years), (age class 7, 120+ years). The age class distribution for planning zone 4 is shown in Figure 3. In general terms, a continuous timber supply is limited by the lower age class. This means a more balanced age class distribution within a district would yield a greater opportunity for an even flow sustained yield of timber.

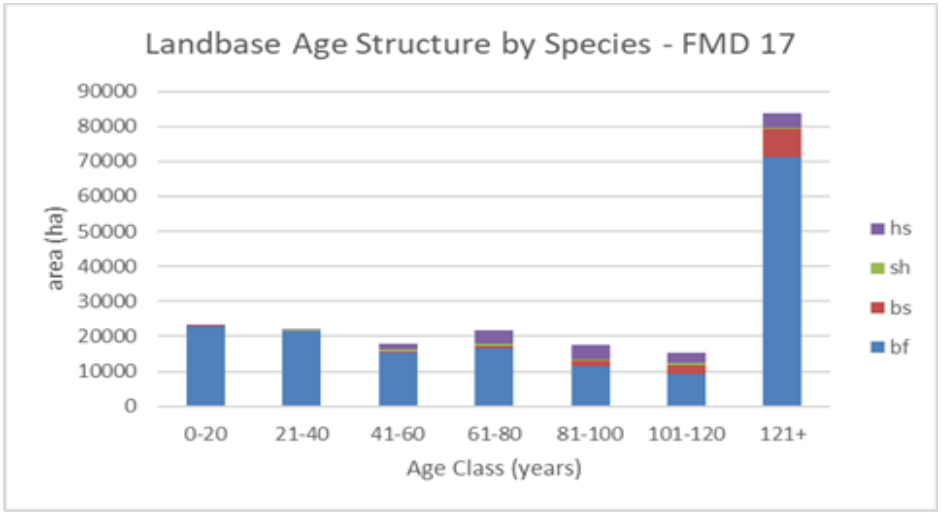

FIGURE 5 AGE CLASS DISTRIBUTION FOR DISTRICT 17

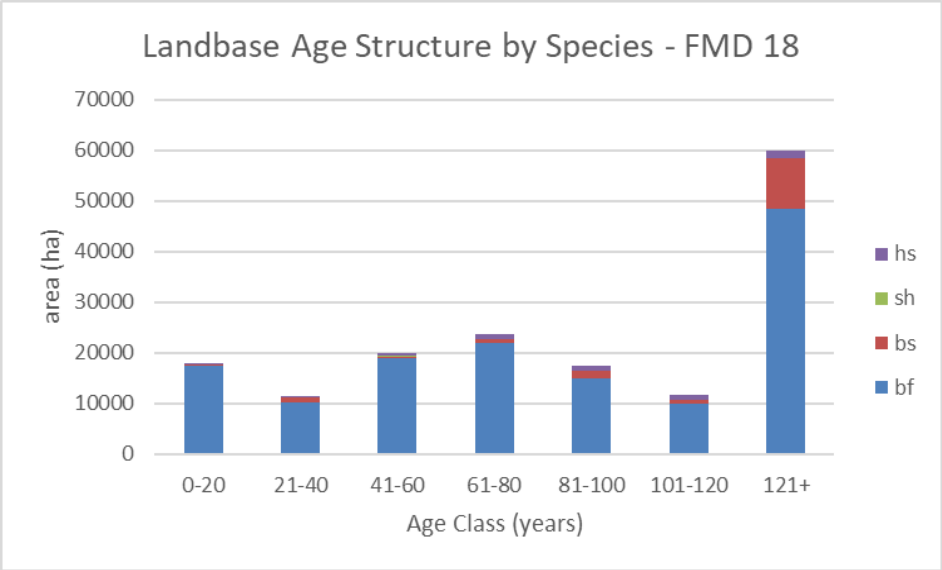

FIGURE 6 AGE CLASS DISTRIBUTION FOR DISTRICT 18

1.5.3 Site Class

The productive forest in the zone is further sub-divided along a gradient of productivity ranging from poor to high 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 some of which include soil fertility, moisture regime and geographic (slope) position. Generally the balsam fir and softwood hardwood working groups occupy the better sites in the zone. The black spruce working groups dominate the very dry and very wet areas that are of poorer site quality. The distribution of area by site class for each district is shown in Figures 7 and 8. On average, good sites are capable of producing > 2.3 m3/ha/yr, medium sites 1.7 m3/ha/yr, and poor sites 1.0 m3/ha/yr

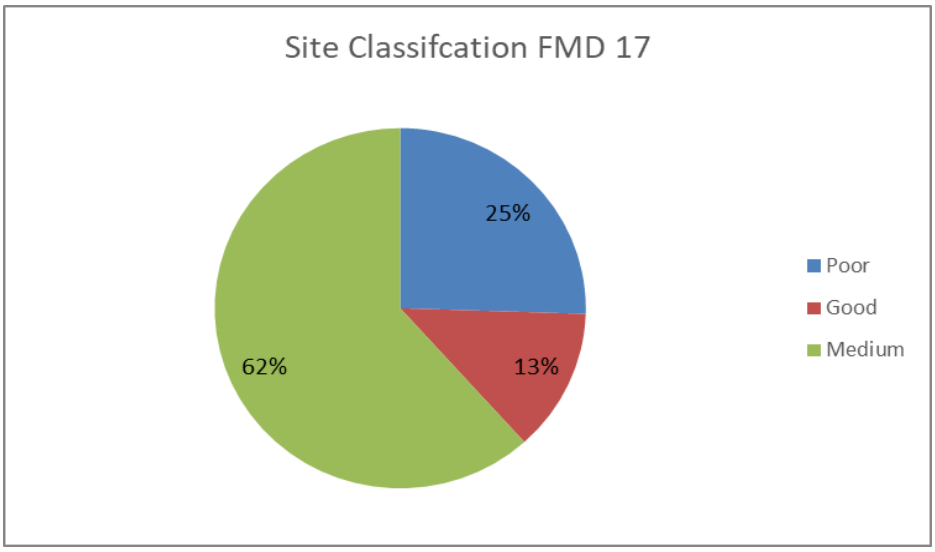

FIGURE 7 SITE CLASS BREAKDOWN FOR DISTRICT 17

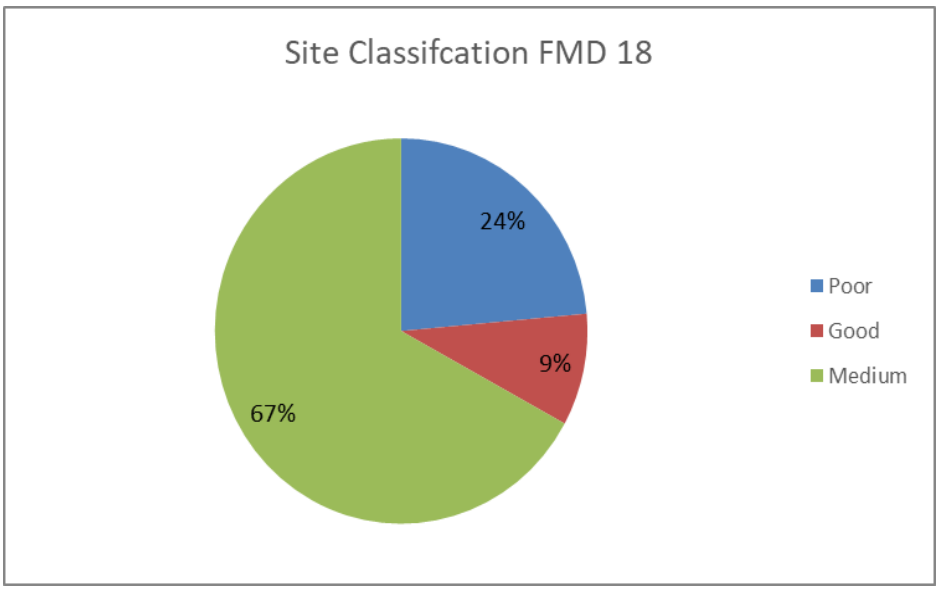

FIGURE 8 SITE CLASS BREAKDOWN FOR DISTRICT 18

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 90 percent of the productive forest. Balsam fir (bF) is by far the most prolific accounting for 84 percent of the working groups in District 17 and 88 percent in District 18 (Figures 9 and 10). Balsam fir can occur in pure stands or in association with one or more of black spruce, white spruce, white birch, or larch in varying species compositions. The black spruce (bS) working group is the second most abundant accounting for 8 percent in each District.

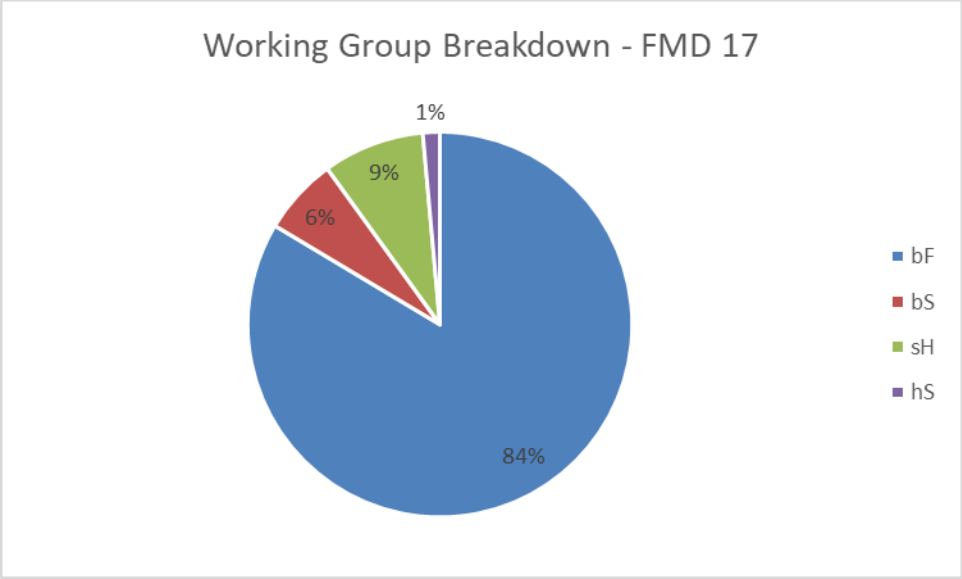

FIGURE 9 WORKING GROUP BREAKDOWN FOR DISTRICT 17

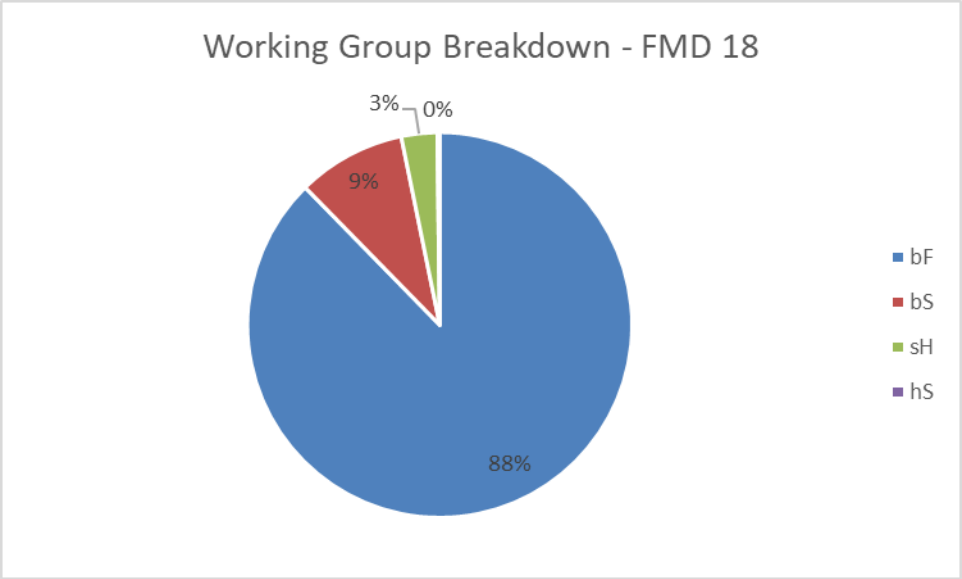

FIGURE 10 WORKING GROUP BREAKDOWN FOR DISTRICT 18

1.5.5 Forest Disturbances

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

Historical records indicate that there have been major hemlock looper and spruce budworm infestations in 1962, 1972 to 1976, 1986 to 1989, and 1999 and 2001 in the northern portion of the zone near Plum Point has caused extensive mortality throughout zone 8. This infestation started in the Doctors Brook area and moved north towards St. Anthony and east towards Main Brook. The majority of this mortality was in remote domestic areas. A significant portion of this volume has been salvaged and continues to be salvaged as domestic and commercial fuelwood. Over the past three years small infestations of hemlock looper have occurred throughout zone 8. Like the previous outbreak between 1999 and 2001, most of the mortality is in domestic harvest areas. However, mortality is occurring in the commercial forest landbase. A salvage reduction program has been implemented to provide commercial logging contractor with an incentive to harvest severely infested areas and to give priority to thinned stands in which Government has invested millions of silviculture dollars over the past 25 + years.

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 more environmentally benign bacillus thurengiensis (bT), a naturally occurring, biological control agent. Despite the use of insecticides, the hemlock looper and spruce budworm continue to pose a significant threat to the forests of the zone due to the dominance of balsam fir.

Section 2 Past Activities

2.1 District 17

2.1.1 Overview

There was significant activity in District 17 from 2018 to 2022. There was over 199,814 m3 harvested both domestically and commercially on Crown Land. Domestic harvest was distributed throughout the district and occurred mainly adjacent to communities near the coast. Commercial harvesting was more concentrated, occurring near Bateau Barrens, Three Mile Lake, East Castor Pond and Mt. St. Margaret.

There were 1,230 hectares silviculturally treated, 6.3 km of access roads constructed and approximately 2,661 hectares treated with insecticide.

2.1.2 Harvesting

2.1.2.1 Commercial

Table 1 summarizes the Commercial harvest in District 17 between 2018 and 2022. There was an under harvest of the AAC's on Crown in Core, Operationally constrained and Non-AAC areas. An explanation of Core, Operationally Constrained and Non-AAC landbases can be found in section 3.4.2. There was a significant undercut in the commercial AAC's. There is very little market small diameter wood (i.e. non sawlog fiber). There was a small volume of fiber that was sold to Corner Brook Pulp and Paper Ltd as pulpwood and hog fuel, but the majority of small diameter wood was sold locally as fuelwood. There has been very little growth in this market over the past five years.

Table 1 Summary of commercial harvest in District 17 by Crown for 2018 to 2022.

District 17		Core				Operational (Available)				Non-AAC Wood	
		AAC	Commercial	Deviation	Total	AAC	Commercial	Deviation	Total	Operational	Regulatory
SWD	Crown	393,865	55,292	338,573	393,865	88,812	0	88,812	88,812	4,497	
	Sub-Total	393,865	55,292	338,573	393,865	88,812	0	88,812	88,812	4,497	
		Core				Operational (Available)				Non-AAC Wood	
		AAC	Commercial	Deviation	Total	AAC	Commercial	Deviation	Total	Operational	Regulatory
HWD	Crown	2,328	0	2,328	2,328	216	0	216	216	5,638	
	Sub-Total	2,328	0	2,328	2,328	216	0	216	216	5,638	
District Total		381,812	72,126	309,686	381,812	89,028	0	89,028	89,028	10,135	0

There was approximately 82,216 m3 of softwood harvested commercially in District 17 in the last plan period which represents approximately 17.5 percent of the harvest. This total represents a ratio of 19% pulpwood, 25% sawlogs, 29% energy wood and 27% fuelwood.

2.1.2.2 Domestic

There were over 117,547 m3 of domestic softwood harvested in District 17. At a ratio of 6% sawlogs: 94% fuelwood. It is expected that the domestic demand will remain constant at 1100 permits/year.

Table 2 Summary of domestic harvest in District 17 by Crown for 2018 to 2022.

District 17		Core				Operational (Available)				Non-AAC Wood	
		AAC	Domestic	Deviation	Total	AAC	Domestic	Deviation	Total	Operational	Regulatory
SWD	Crown	126,720	81,216	45,504	126,720	11,400	6,514	4,886	11,400	18,519	
	Sub-Total	126,720	81,216	45,504	126,720	11,400	6,514	4,886	11,400	18,519	
		Core				Operational (Available)				Non-AAC Wood	
		AAC	Domestic	Deviation	Total	AAC	Domestic	Deviation	Total	Operational	Regulatory
HWD	Crown	0				0				10,033	
	Sub-Total	0				0				10,033	
District Total		130,788	82,481	48,307	130,788	11,400	6,514	4,886	11,400	28,552	

2.1.3 Silviculture

Table 3 summarizes the completed silviculture treatments for the past planning period. There was no pre-commercial thinning completed in favor of a more aggressive planting program. The switch to gap or fill planting is becoming more popular because it increases stocking on the marginally stocked areas and increases the spruce content which is less susceptible to insect attack and moose browsing. The herbicide was done to remove competing vegetation from site in preparation for planting.

Table 3 Summary of silviculture treatments on Crown land in District 17 from 2018 to 2022.

Treatment Type	Area (ha)	
	Proposed	Treated
Pre Commercial Thinning	0	0
Site Preparation	0	0
Planting	0	417.03
Commercial Thinning	0	0
Plantation Maintenance	0	145.01

2.1.4 Road Construction

Table 4 Summary of access roads constructed on Crown Land in District 17 from 2018 to 2022.

Roads		
	Proposed (km)	Constructed (km)
New Construction Crown Built	0	0
New Construction Contractor Built	0	0
Re-Construction	0	2.8
Winter Road Contractor Built	0	1.5
Total	0	4.3
Bridges	0	0

2.1.5 Natural Disturbance

2.1.5.1 Fire

District 17 has had a very infrequent fire history due to its long winters and abundant precipitation. Over the past planning period there were only eight (8) reported forest fires. This resulted in only 6.36 ha of productive forest burnt which indicates a very aggressive and effective fire protection program.

2.1.5.2. Insect

On the island portion of the province two native insect populations have been increasing in recent years. The insect species of primary concern are the eastern spruce budworm and hemlock looper. Beginning in 2018 eastern spruce budworm populations have been increased to the level that the Department has implement wide scale treatment programs as a part it's Integrated Pest Management Strategy. In 2020 the province treated over 32,000 hectares of forested land with one or more application of Btk north of Gros Morne National Park. In 2021, the province expanded its treatment program along the provinces West coast and over 135,000 hectares was treated with one or more applications of Btk from Point aux Mal to Castor River South. In 2022, the province plans to treat over 160,000 hectares with one or more application

of Btk from Jefferey's to St. John Bay. Aerial defoliation Surveys in 2020 reported more than 3,300 of Spruce Budworm Defoliation in Gros Morne National Park and its enclaves and forested area in Forest Management District 17. Aerial defoliation Surveys in 2020 reported more than 65,000 of Spruce Budworm Defoliation in Gros Morne National Park and its enclaves and forested area in Forest Management Districts 15 and 17. Beginning in 2022 it is likely that the aerial defoliation survey will report defoliation and mortality in softwood stands caused by rising Spruce Budworm populations. The spruce budworm continues to move northward and season have reached the southern boundary of District 18.

Hemlock Looper areas of concern are limited to District 18 and is moving east to west across the district. In 2020 hemlock looper populations increased to levels high enough to cause severe defoliation in forested stands the Scammels Pond area. During the 2020 aerial defoliation survey recorded 159 hectares of sever defoliation near Scammels Pond. During the 2021 aerial defoliation 799 hectares of defoliation was reported during the aerial defoliation survey. The preferred Integrated Pest Management Strategy for helmock looper defoliated stands is removal by salvage harvest.

2.2 District 18

2.2.1 Overview

There has been significant activity by the Crown in District 18 from 2018 to 2022. There was nearly 251,736 m3 of timber harvested on Crown land during this period. A total of 1,384 ha was silviculturally treated, 13.5 km of forest access road was constructed or re-constructed, and 2 600 ha was treated for insects in the last planning period.

2.2.2 Harvesting

Table 5 summarizes the commercial harvest in District 18 between 2018 and 2022. There was an under harvest of the AAC's on Crown in Core, Operationally constrained and Non-AAC areas. An explanation of Core, Operationally Constrained and Non-AAC landbases can be found in section 3.4.2. There was a significant undercut in the commercial AAC's. There is very little market small diameter wood (i.e. non sawlog fiber). There was a small volume of fiber that was sold to Corner Brook Pulp and Paper Ltd as pulpwood and hog fuel, but the majority of small diameter wood was sold locally as fuelwood. This market has seen a steady growth over the past five years.

2.2.2.1 Commercial

Commercial harvesting accounted for 137,482 m3 or 55 percent of the overall harvest in the district between 2013 and 2017. The product breakout for this harvest was approximately 26 percent pulpwood, 31 percent sawlogs, 31 percent energy wood and 16 percent fuelwood.

Table 5 Summary of Commercial harvest in District 18 by Crown for 2018 to 2022.

District 18		Core				Operational (Available)				Non-AAC Wood	
		AAC	Commercial	Deviation	Total	AAC	Commercial	Deviation	Total	Operational	Regulatory
SWD	Crown	310,530	112,110	198,420	310,530	40,255	0	40,255	40,255	18,622	
	Sub-Total	310,530	112,110	198,420	310,530	40,255	0	40,255	40,255	18,622	
		Core				Operational (Available)				Non-AAC Wood	
		AAC	Commercial	Deviation	Total	AAC	Commercial	Deviation	Total	Operational	Regulatory
HWD	Crown	490	0	0	0	90	0	0	90	6,750	
	Sub-Total	490	0	0	0	90	0	0	90	6,750	
District Total		311,020	112,110	198,420	310,530	40,345	0	40,255	40,345	25,372	0

2.2.2.2 Domestic

During the 2018-2022 planning period, domestic harvesting accounted for 114,254 m3 or 45 percent of the overall harvest in the district. The product breakout for this harvest was approximately 95 percent fuelwood and 5 percent sawlogs. Local residents still have a very strong attachment and sense of ownership of the forest in the district. There were between 1400-1600 domestic cutting permits issued annually. The number of permits issued at approximately 1500 has remained fairly constant over the past five years.

Table 6 Summary of domestic harvest in District 18 by Crown for 2018 to 2022.

District 18		Core				Operational (Available)				Non-AAC Wood	
		AAC	Domestic	Deviation	Total	AAC	Domestic	Deviation	Total	Operational	Regulatory
SWD	Crown	194,162	103,868	90,294	194,162	12,975	10,386	2,593	12,975	0	0
	Sub-Total	194,162	103,868	90,294	194,162	12,975	10,386	2,593	12,975	0	0
		Core				Operational (Available)				Non-AAC Wood	
		AAC	Domestic	Deviation	Total	AAC	Domestic	Deviation	Total	Operational	Regulatory
HWD	Crown	0	0	0	0	0	0	0	0	0	
	Sub-Total	0	0	0	0	0	0	0	0	0	
District Total		194,162	103,868	90,294	194,162	12,975	10,386	2,593	12,975	0	0

2.2.3 Silviculture

Table 9 summarizes completed silviculture treatments for the 2018-2022 planning period. There were a total of 1,384 hectares completed over this period. An extremely high moose population and their impact on advance balsam fir regeneration have resulted in a major shift in the silviculture program from thinning to planting. The planting program has almost doubled due to the change from full planting to gap planting. The prescription has changed from 2500 seedlings per hectare to 1500 seedlings per hectare. Therefore, almost double the area can be planted with the same number of seedlings.

Table 7 Summary of silviculture treatments on Crown land in District 18 from 2018 to 2022.

Treatment Type	Area (ha)	
	Proposed	Treated
Pre Commercial Thinning	0	0
Site Preparation	0	0
Planting	0	1,049.10
Commercial Thinning	0	0
Cone Collection	0	0
Plantation Maintenance	0	334.77

2.2.4 Road Construction

Table 8 summarizes proposed and completed forest access road construction for the 2018-2022 planning period.

Table 8 Summary of access roads built on Crown Land in District 18 from 2018 to 2022.

Roads		
	Proposed (km)	Constructed (km)
New Construction Crown Built	0	6.4
New Construction Contractor Built	0	0
Re-Construction	0	1.28
Winter Road Contractor Built	0	2.0
Total	0	9.68
Bridges	0	0

2.2.5 Natural Disturbance

2.2.5.1 Fire

District 18 does not have an active fire history due to its long winters and abundant precipitation. In fact there were only four (4) fires recorded in the last planning period which burnt .17 ha of productive forest.

2.2.5.2. Insect

There has been sporadic insect activity in District 18 over the past five years. In 2014, a pocket of 2,506 hectares of moderate & severe defoliation was discovered in the Ten Mile Lake area. In 2015, 2,600 hectors were sprayed with BtK in the Ten Mile Lake area to control the hemlock looper. In 2016, a total of 3,897 hectors of moderate to severe defoliation was found in various forestation across the district. The majority of the defoliation was in the Straits and St Anthony domestic areas. There is no spray program planned in District 18 for 2017.

Section 3 Timber Supply Analysis

3.1 Introduction

The province conducts a review of timber supply every five years to reflect any changes in forest land base, growth rates, and management strategies. This schedule is consistent with the Forestry Act, with oversight by forest management districts, and mandates a wood supply analysis to be completed every five years. The result of this analysis is the establishment 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 into the future (applicable for a period of 160 years). Annual allowable cuts must be calculated on a district basis, and the cumulative sum would provide the total island annual allowable harvest level. The current AAC was extended for a two year period and a new five year AAC will commence with this five year plan on January 1, 2023.

3.2 Guiding Principles and Policy Direction

The key underlying principles guiding the provincial woodsupply analysis are:

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

In addition to the establishment of sustainable timber harvest levels, the legislation also requires that forest harvesting not exceed the established AAC's. Likewise, government's policy is to optimize forest industry opportunities from the sustainable fiber supply.

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.

This imbalanced age class structure of intermediate age forest within insular Newfoundland is one of the most important factors influencing AAC's and is therefore the basis for many of the department's forest management strategies. Essentially, the department utilizes a matrix of management techniques designed to marginalize the imbalance in age structure. These

techniques range from an aggressive forest protection program (insect control and fire suppression), forest harvesting programs that attempt to exclusively target harvesting the oldest stands first, and pre-commercial thinning of the regenerating forest so that it becomes merchantable and ready for harvest 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. These adverse conditions is very challenging when determining the economic availability of timber supply.

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 reduced as a result of other users' requirements. 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. Therefore, it is very important that we continue to determine methods to minimize the loss of productive landbase and expand on efforts to grow more volume on the existing land base.

3.4 Timber Supply Analysis

The timber supply analysis is structured to determine sustainable timber availability, while respecting 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) involves the use of computer models to forecast the sustainability of possible AAC levels. These models require three basic inputs as described below:

(1) a description of the current state of the forest (forest characterization and availability),

(2) growth rates associated with the current forest, and

(3) management strategies applied to the forest.

These basic inputs requires careful and detailed consideration of a broad range of both timber and non-timber values. The following topics in this chapter are considered when determining the sustainable timber supply.

3.4.1 Forest Characterization

To realize the current description of the forest resource (referred to as forest stock), the province has invested significant resources into creating and maintaining a Provincial Forest Inventory. This program is designed to ensure the estimate of forest stock is current and accurate, while other regular programs employed by the department also evaluates:

1. Natural and man-made disturbances (fire, insects and harvesting)
2. Enhancement activities (tree planting and pre-commercial thinning)

3. In addition, the actual stands within the forest inventory is updated to reflect any yield changes

3.4.2 Land Availability

Through a regular timber supply analysis, the Forest Inventory is updated and classified at the stand level on the basis of harvest potential. This classification system consists of three broad classes;

i. Core - available for harvest under normal operating conditions

ii. Operationally Available – adverse conditions for forest harvesting, making that landbase more expensive and less available under current economic conditions. However, an AAC is still calculated in the event of improved economic conditions making the area more feasible for commercial operations.

iii. Operationally Unavailable – unavailable for forest harvesting. No AAC is calculated on this landbase, which incorporates a broad range of timber and non-timber values as indicated in the following sections.

3.4.2.1 Non-Timber Related

Implementation of non-timber values has a direct impact on provincial AAC's. As the amount of productive forested landbase available for timber management declines, so will the AAC. With the current non-timber related considerations, the net landbase (area where harvesting operations can occur) is only 17% of the total landmass on the island or 66% of the total productive forest land base. Typically, in any given year, less than 1% of the productive forest land base is influenced by harvesting operations.

3.4.2.1.1 No-Cut Buffer Zones

The Department has implemented guidelines requiring all water bodies (visible on a 1:50,000 map sheet) be given a minimum 30 meter (from the edge of water) unharvested buffer. In addition to these legislated water buffers, District Ecosystem Managers, in consultation with interested stakeholders may have increased buffer zone widths to protect special values such as; salmon spawning areas, cabin development areas, aesthetic areas, wildlife habitat, outfitting camps, etc.

3.4.2.1.2 Pine Marten and Caribou Habitat

Wildlife Habitat specialists are working in consultation with industry to ensure future adequate habitat remains available for wildlife species such as pine marten and caribou. Analysis of the

landbase continues with examining the quantity and quality of habitat, as well as, the required connectivity. Wildlife specialists also examine how this arrangement of habitat would change over time. Forest management strategies take into consideration the results and recommendations of the Wildlife Habitat Specialists.

3.4.2.1.3 Protected Areas

All established and proposed protected areas approved within the Natural Areas Systems Plan (NASP) are removed from potential harvest considerations and the AAC calculations.

3.4.2.2 Timber Related

The potential AAC within a Forest Management District is also further impacted by taking into account other potential losses of landbase or timber as indicated below

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. 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. 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, negative pressure on future AAC's will continue to increase.

3.4.3 Growth Forecasting

A key requirement for forecasting future wood supply is an understanding of how forest stands grow and develop through time. That is, as a forest stand develops, how much merchantable (i.e. harvestable) volume does it carry at any given point? These yield forecasts (referred to as yield curves) are required for each type of forest stand (called a stratum) comprising the forest. In Newfoundland, there are dozens of distinct forest stratum 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 one hundred percent certainty how stands will actually grow in the future, care must be taken to ensure that the yield projections are realistic and reasonable. Respecting the sensitivity and importance of these forecasts, the department 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 departments forest inventory program were used to make stand growth predictions. These projections were then evaluated 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 strategy is utilized in the wood supply analysis. This strategy produces the maximum even flow harvest but results in less than optimum economic use of the forest resource. Conversely, if this strategy was not applied, then harvest levels are permitted to fluctuate which may result in increased commercial potential of the forest at specific intervals. However; applying the even-flow constraint provides more stability within the forest industry.

3.4.4.2 Spatial Analysis

The provincial wood supply analysis implements a technique of manual harvest scheduling. In 2001, the harvest scheduling was an automated process where the software allocated the stands to be harvested over the upcoming 25 years, based on user supplied criteria. The 2001 approach of scheduling harvest stands was an improvement over previous wood supply analysis. However, the software used cannot realistically know all the operational restrictions within a forest management district. By utilizing the manual process, District Staff are able to identify specific ground conditions that restrict commercial harvesting, which are then incorporated into a spatial harvest schedule. The proposed harvest schedule is then vetted back through the modeling software to ensure sustainable and non-timber objectives are met. In most case, this process has to go through several cycles before an acceptable harvest schedule can be implemented. 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 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 spatial plan must already be in the second (20-40 years old) or third (41-60) age class and can be easily identified and highlighted.

Having the ability to visualize the timber that will be harvested in the future helps reassure the resource is being used in a responsible manner. Next, harvest scheduling helps integrate the management of other forest resource values into timber management planning. Specific forest values can be directly related to forest areas, which can be mapped and potential issues can be addressed. Finally, the harvest schedule maps developed for the wood supply analysis can be a starting point for a 5 year operational planning process. Worthy to note is that harvest scheduling is completed for Core landbase only. The Operationally Constrained AAC, for the most part, is considered opportunistic if economic conditions become favorable.

3.4.4.3 Planning Horizons

Given the province's commitment to long term sustainability of our forest resource, timber supplies are 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. This 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 including:

1. Some of the non-timber objectives are not explicitly accounted for in the planning process and therefore will require a growing stock buffer to achieve them.

2. The ability to completely incorporate the optimum harvest schedule due to operational restrictions on commercial harvesting.

3. Lowers the overall risk associated with the sustainability of the timber supply.

For these reasons a growing stock constraint of two times is utilized. This constraint is used in concert with harvest scheduling to help map out a reasonable harvest for the upcoming 20 years.

3.4.4.5 Old Growth Forest Targets

Within the wood supply analysis, the department considers a target for Old Growth forest, where at least 15 percent of forests at any given time must be older than 80 years. While this is a minimum target, actual results are usually higher. This initiative was designed to provide a coarse filter approach to maintaining representative forest structure. It ensures the presence of certain amounts of old forest across the landscape into the future and can be tracked across a district.

3.4.4.6 Operability Limits

Operability limits are considered the timeframe in which forest harvesting activity can be undertaken within specific forest stands. Stand growth development (merchantable timber volume) and individual piece size of trees are factors which determine a stands readiness for commercial harvest activity. Some younger stands may have acceptable harvest volumes, but still contain trees that are too small (diameter and height) to commercially harvest. In the 2006 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 60 m3/ha, after which that stand is not

considered to have enough volume to make it economical feasible to commercial harvest operations. 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 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 analyzing the many different future forests that are generated using the wood supply modelling software.

The silvicultural actions used in the current woodsupply analysis include:

1. Pre-commercial thinning of balsam fir, black spruce, and softwood hardwood stands,
2. Full planting of any areas that do not regenerate naturally with either white spruce, black spruce, or Norway spruce, and
3. Gap planting of stands with either black spruce or balsam fir seedlings. Gap plant is the filling in of “holes” within stands that have inadequate natural regeneration of either balsam fir or black spruce.

The thinning levels (ha) for districts 17 and 18 used in the analysis were 125 and 375 ha respectively. The planting levels (ha) for districts 17 and 18 used in the analysis were 500 and 1000 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: fire, insects/disease, timber utilization practices and the presence of stand remnants. It was recognized that a need existed to study each component more intensely and the staff from the Forest Engineering and Industry Services Division, over a seven year period, completed an analysis of the individual components. The results of these (and other) analysis are incorporated into the current wood supply analysis. For the current analysis a 20 % reduction was used for commercial harvesting and 25% for domestic harvesting. Most domestic harvesting occurs in the winter months and there is a higher utilization loss.

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 FFA. Fire losses in Zone 8 are very low.

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 FFA to determine the amount of productive area lost to insect mortality each year.

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 where the information is analyzed by harvesting system and season.

3.6 Results

Table 9 summarizes the result of the timber supply analysis for District 17. There has been a significant decrease in the commercial AAC. In the 2016 wood supply analysis the industry was projected to be a pellet/sawlog industry with a new pellet plant constructed in Hawkes Bay. In this analysis, the primary market is sawlogs with a small market for pulpwood and fuelwood. Thus, the stand entry and operability limits were increased significantly resulting in a lower Core AAC (34% reduction). In addition to stand entry Core caribou areas were removed from the landbase.

Table 9 Annual Allowable Cut results (m3) for Crown Land District 17.

District 17	Core Softwood	Oper. Constr. Softwood	Core Hardwood	Oper. Const. Hardwood
District 17 Commercial	42,200	8,400	250	8
District 17 Domestic	23,300	0	90	16
Total	**65,500**	**8,400**	**340**	**24**

Table 10 summarizes the result of the timber supply analysis for District 18. There has been a significant decrease in the commercial AAC. In the 2016 wood supply analysis the industry was projected to be a pellet/sawlog industry with a new pellet plant constructed in Hawkes Bay. In this analysis, the primary market is sawlogs with a small market for pulpwood and fuelwood. Thus, the stand entry and operability limits were increased significantly resulting in a lower Core AAC (34% reduction). In addition to stand entry Core caribou areas were removed from the landbase.

Table 10 Annual Allowable Cut results (m3) for Crown Land District 18.

District 18	Core Softwood	Operationally Constrained. Softwood	Core HW
Central Zone Commercial	46,800	6,200	40
Central Zone Domestic	8,000	0	0
Straits Zone	9,000	0	0
St. Anthony Zone	9,700	0	0
Total	**73,500**	**6,200**	**40**

Section 4 Values

4.0 Guiding Principles of Sustainability

Environmental, Economic, Political, Social, and Cultural are considered the five guiding principles of sustainability.

Environmental sustainability evaluates current and future ecosystem health. It ensures the needs of the present are obtained without compromising the ability of future generation's needs. Ecosystem health is determined by such factors as ecosystem integrity, biodiversity, productive capacity, and resiliency. The five year operating plan strives to ensure these factors are maintained.

Economic sustainability requires forest resources to be managed efficiently and equitably among stakeholders. Economic development remains high priority for many of the residents within the Province. However; economic development should only proceed with the incorporation of the other principles of sustainability.

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

Social sustainability means fairness and equity to all interested stakeholders. The forest management strategy should not jeopardize the basic requirements of the public. As a result, public involvement/awareness, participation, and decision-making are considered necessary to development of proper forest management plans.

Cultural sustainability is attained by applying Newfoundland and Labrador's culture to the planning process. A forest management strategy cannot be successful without allowances within the strategy for traditional access and use of the land. For generations, many of Newfoundland and Labrador's public has had free range in our pristine wilderness, a fact that cannot be ignored when planning for the zone. All are key interlocking components and each must be maintained if sustainable development is to be properly achieved.

4.1 Value Structure

The forest ecosystems of the zone provide a wide range of values to different individuals and groups, which include:

- Consumptive values such as: timber products, hunting, trapping, sport fishing, and berry picking.
- Non-Consumptive values such as: skiing, snowmobiling, hiking, and bird watching.
- 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, spiritual values are considered to be a product or an accumulation of all values.

Other values such as water quality, parks and protected areas provide the protection of forest ecosystems, which can enhance the above identified values. Many of the values in the zone are identified by many years of forest management planning and engagement with interested stakeholders. The following represents a framework for characterizing values in a clear and consistent manner. This approach consists of three components:

VALUE STRUCTURE	
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 can be 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: • Policies that should be in place to protect or enhance the resource value; • Methods for negotiation or inclusion of other interested stakeholders in resolving potential conflicts; • Special management provisions/strategies such as: riparian buffer zone consideration, temporal operating periods, modified harvesting, or best management practices, and/or • Models and/or forecasting strategies to determine economic contribution, biodiversity impact, or community sustainability

In many instances, the Environmental Protection Guidelines (EPG's) developed by the department help 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

MOOSE	
Characterization	• Moose were introduced in 1878 (Gander Bay) and 1904 (Howley) and are now distributed throughout the entire Island. • The 2020 population estimate is 118,000 animals. • The Province is divided into Moose Management Areas (MMA); boundaries, season dates and license quotas are reviewed annually for each MMA. All or portions of MMA 1, 2, 3, 3a, 39, 39a, 40 and 45 are located within Zone 8. • Approx. 100,000 residents actively participate in the annual moose license application process. If successful, it provides an opportunity to hunt, to take part in an outdoor fall activity, to be part of an important social event and to provide local food. • Non-resident harvest is conducted through outfitting establishments, employing guides, cooks, maintenance people, pilots, etc. Other businesses benefiting from the non-resident outfitting industry include local stores, accommodations and restaurants, outdoor stores, aviation companies, etc. • Moose are also important for non-consumptive activities. Intrinsic value is added to hiking, cycling, camping, paddling, sightseeing, etc., when there is a chance to view megafauna such as moose. The tourism industry relies on this intrinsic value to promote many of the activities offered.

Critical Elements	• Habitat
	  ○ Moose select different habitats at different times of the year and therefore require a mixed forest landscape year-round: a mixture of closed, mature stands for cover, shelter and winter moose yards; early-seral stages (due to disturbances such as insects, fires and logging) with a high amount of young regenerating areas for browsing; and aquatic foraging areas in the summer.
	• Forest harvesting
	  ○ Recently harvested large scale areas can be low quality moose habitat as forage and cover are removed. Five plus year old cutovers tend to have enough regeneration to support a slow return of moose to the area. Regenerating cutovers provide excellent foraging opportunity until trees become too tall for moose to reach.
	• Forest roads

	○ Provide hunters access into areas previously free from vehicle traffic. Removal of access, in particular in areas of new forest regeneration, may allow moose densities to increase beyond sustainable levels.
Guiding Principles	• Proposed forestry activity is reviewed by the staff at the Wildlife Division and recommendations are incorporated into this five-year plan.

4.1.1.1.2 Caribou

CARIBOU	
Characterization	○ Caribou in Canada occur in two primary ecotypes: Barren-ground caribou and Woodland caribou, often referred to as boreal caribou. The latter ecotype inhabits mosaics of barren, wetlands, and mature forests. The herds on the island of Newfoundland belong to this ecotype. They are cyclic by nature mainly due to being density-dependent; meaning restricted by food and/or space, as well as regulated by predators such as wolves and managed hunters. ○ Caribou is the only native ungulate species on the island (Northcott, 1980). Numbers are anecdotal at best for the 1800's (ranged from 40,000 to 200,000). By 1925 hunting was closed as the island population was down to a few thousand caribou. From the 1960's through the 1990's the caribou population recovered, peaking at over 90,000 in the 1990's. In late 1990's caribou started another downward trend (2014 assessment: just over 32,000 animals). The 2019 population estimates suggests 30,600 animals island-wide. ○ The Province is divided into Caribou Management Areas (CMA): boundaries, season dates and license quotas are reviewed annually for each CMA. All or portions of CMA 69 and 76 are located in Zone 8. ○ Approx. 100,000 residents actively participate in the annual big game license draw process. If successful, it provides an opportunity to hunt, to take part in an outdoor fall activity, to be part of an important social event and to provide local food. ○ Non-resident harvest is conducted through outfitting establishments, employing guides, cooks, maintenance people, pilots, etc. Other businesses benefiting from the non-resident outfitting industry include local stores, accommodations and restaurants, outdoor stores, aviation companies, etc. ○ Caribou are also important for none-consumptive activities. Intrinsic value is added to hiking, cycling, camping, paddling, sightseeing, etc., when there is a chance to view megafauna such as caribou. The tourism industry relies on this intrinsic value to promote many of the activities offered. Caribou is also iconic to the NL Regiment. ○ In 2014 the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessed Newfoundland caribou and recommended a listing of "special concern". COSEWIC assessments are usually done on a 10 year cycle.
Critical Elements	• Caribou display a highly mobile nature and some herds occupy large home ranges. • Caribou show a high selection for bogs and mature coniferous forests, as well as shrubs and water bodies. These habitats provide refuge from predation and support

	an abundance of forage. • Direct impacts from large cut overs and linear features include habitat destruction and fragmentation, increase in mortality and reduced recruitment rates likely due to increased and improved access for humans as well as predators, and avoidance of disturbed areas
Guiding Principles	• Caribou populations are monitored and assessed on a regular basis via o Annual fall classification surveys: provide regular updates to sex ratios and recruitment within each herd. This work feeds into herd level assessments and quota evaluation/development. o Collar deployment: analysis of caribou movements, mortality rates and range occupation • This supports the development and assessment of Caribou Management Guidelines for forest management planning. New iterations of these guidelines may incorporate maximum targets for disturbance and linear features (e.g., forest roads) as well as no net losses within certain caribou core ranges. • The guiding principles for forestry operations and road construction will apply to all crown operations within the province. Wildlife Division will provide herd specific guidance and recommendations.

4.1.1.1.3 Black Bear

BLACK BEAR	
Characterization	• The black bear is native to the island and is found in forested areas (Nortcott, 1980). Black bears are solitary creatures and do not truly hibernate but enter a state of lethargic sleep. A den is chosen in mid fall under tree stumps or logs which are lined with grass, twigs and leaves. If reproducing females gained enough body fat they will give birth between January and February before emerging from the den with the cub(s) in April or May. • Currently, the number of black bears occurring on the island has been estimated at approximately 6,000 - 10,000 animals. • The Province is divided into Black Bear Management Areas (BMA), which correspond to MMAs (except for sub-areas). Portions of BMA 1, 2, 3, 3a, 39, 39a, 40, and 45 are located within Zone 8. Currently, only one license (with a bag limit at two black bears) is required by hunters on the Island to hunt black bear in both the spring and fall.
Critical Elements	• Heavily wooded areas with dense bush intercepted with smaller clearings or early successional seral stages represent suitable habitat for black bears.
Guiding Principles	• A 50-metre undisturbed buffer must be maintained around known Black Bear den sites (winter) or those encountered during harvesting.

4.1.1.2 Furbearers

FURBEARERS	
Characterization	• There are a variety of furbearers within the Province: lynx, red fox, beaver, otter, muskrat, short-tailed weasel, red squirrel, mink, coyote, wolf (Labrador) and Newfoundland marten (currently listed as a Species at Risk). Of these, mink and red squirrel are not native to the Island and coyotes are considered recent colonizers as they expanded their range naturally. • Furbearer populations fluctuate from year to year and are influenced by factors such as predator/prey relationships, food supply and disease. Trapping pressure (i.e. due to fur market prices) can also influence population growth or decline. • Trapping furbearers for their fur, meat and other natural products has a long tradition in this Province. Today's trapping is a choice of lifestyle, most times deeply rooted in the family and local culture, provides food, clothing and money as well as an enduring connection and experience with nature. Approx. 2,500 people in the province trap and snare furbearers. • Management of furbearer species within the province is highly regulated and the responsibility of the Wildlife Division. There are 13 furbearer management zones throughout Newfoundland and Labrador. Within these zones, harvest activities for each species occurs during optimum periods for fur quality, which is generally during the fall and winter period. However, furbearer seasons may vary for each different species.
Critical Elements	• Embedded in conservation of furbearers is the conservation of biodiversity and the ecological processes that support that biodiversity. Furbearers depend on other species; lynx on snowshoe hares, marten on mice and beaver on deciduous trees. Each species belong to a diverse community that depends on specific habitat conditions. Habitats change from one forest successional stage to another and are therefore inextricably linked to forest management. (Fur Institute of Canada, 2019) • Species respond differently to logging operations or Silviculture treatments (i.e. thinning, prescribed burns). Hare and grouse increase with logging, which is advantageous to lynx, coyote and fox. The wolf depends on caribou and moose, and beaver. • Snags, coarse woody debris, and sufficient understory provide sites for shelter, denning, nesting, traveling, etc. • Maintaining sufficient undisturbed riparian buffer zones along aquatic areas such as wetlands and waterbodies ensures water quality maintenance as well as shelter from upland disturbances • A mix of various forest conditions and successional stages that provides diversity of habitats supports a diversity of prey and thus a diversity of furbearers.
Guiding Principles	• The Wildlife Division develops and implements an annual *Furbearer Management*

	Strategy. Similar to the big game management plan, a furbearer management plan reviews the status of each furbearer species, addresses the season dates and lengths, and if necessary closure of areas (or no open season as currently in place for marten).

4.1.1.3 Species of Interest

4.1.1.3.1 American Marten

AMERICAN MARTEN	
Characterization	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 up listing to "endangered" due to further declines. Habitat loss, trapping and incidental snaring are possible reasons for the marten population decline. Through the work of the Marten Recovery Team, 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 currently (2010) listed as "threatened" under both the federal *Species at Risk Act* and provincial *Endangered Species Act*. To identify factors affecting marten survival, stakeholders from the Canadian Forest Service, Wildlife Division, Corner Brook Pulp and Paper and the Forestry Branch became members of the Newfoundland Marten Recovery Team. The primary function of the Recovery Team was to prepare and periodically revise the recovery plan for American marten in Newfoundland and to provide advice on species recovery. The initiation of the live-trapping program, 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 remain on harvested areas throughout the province and provision made to have connectivity (i.e., unbroken corridors of forest).
Critical Elements	• Older studies of habitat associations of American marten in Newfoundland have found that they are dependent on old-growth or overmature (>80-years-old) forests due to a depauperate prey base which restricts marten to older forests where prey are accessible. More recent research suggests that marten will use a wide variety of habitat types, including immature regenerating forests, precommercially thinned forests, areas disturbed by forest insects, and areas of mature and overmature forests sufficient habitat to support a viable population of marten; • Overall experts agreed that forest management promotes marten populations when some remnant stands of over mature/ old-growth (80+) forests remain unharvested across the island and a provision made to have connectivity between these over mature or old growth stand with the habitats that are listed above in the first bullet (this does not include recently harvested areas). • Under Brian Hearn's work with the Canadian Forest Service, previous proposed harvest schedules within various forest management districts have been analyzed and indicate suitable habitat remained after harvest.

Guiding Principles	These guiding principles are put in place to further recovery of the Newfoundland Marten and allow for forest harvesting. • **Sustainably manage and conserve core marten areas**: In the early 1990's-2000's there were three high-density marten areas on the island: Main River (southern Northern Peninsula), Little Grand Lake-Red-Indian Lake (Western) and Terra Nova (Eastern). Marten have and continue to expand their range from these core areas. Based on this information, it is important that marten habitat be managed with a focus on the sustainable use and conservation of these core areas and the management of forests to promote and continue range expansions beyond the three core areas. • **Ensure habitat connectivity**: Forest planning ensure sufficient connectivity between habitat patches to allow continued dispersal and expansion of the species back to its historical range. • **Protect denning female and kits**: Activities previously identified by the Newfoundland Marten Recovery Team, as having the potential to disrupt female marten and her kits during the critical denning period, where possible should be limited during the period April 1st to June 30th within the areas identified as marten critical habitat in the 2010 Provincial Recovery Plan. This includes any activity that results in the removal of trees, significant noise, or compression or disturbance to brush or soil. Wildlife Division must be consulted on activities proposed in critical habitat during this period. • The guiding principles for Habitat requirements during forestry operations will apply to all crown operations within the province.

4.1.1.3.2 Rare Plants

RARE PLANTS	
Characterization	• The distribution of specific species as well as plant communities depend on regional and landscape-level factors, such as climate, geology, altitude and terrain as well as more local factors, such as the depth, moisture regime and fertility of the soil, microclimate and other biota, such as presence of herbivores, pathogens or pollinators. • "For those interested in rare and unusual plants, the island of Newfoundland has been called the best kept secret in North America (Hermanutz,2000). The island's west coast is especially diverse, with more than 200 plant species assigned as provincially rare (Hermanutz,2000). The western side of the Great Northern Peninsula with its cool moist climate, strong prevailing winds and shallow limestone soils rich in calcium support a vast array of rear and vascular plants from northern alpine plants to the

	more southerly Appalachian species. • Information on the distribution of plant species in Newfoundland and Labrador is obtained from various surveys initiated by government, research institutions, individual naturalists or local organizations, as well as those by consulting firms required through Environmental Assessment processes. • Currently, 27 plant and 3lichen species are listed under the *Endangered Species Act*, with several hundred other plant and lichen species considered to be of conservation concern. • Four of the Endangered plant species are not found anywhere in the world outside of the Gulf of St. Lawrence Region, and three of them, the Fernald's Braya, Long's Braya and Barrens willow, are only found on the Island of Newfoundland. • There are many species of plants, lichen and fungi throughout the Province that are not rare or endangered but still have an important social or economic value. Many of these species also play important roles in the functioning of the province's ecosystems. • The vast majority of the rare plant species throughout Newfoundland are inhabitants of open habitats, such as river gravels, salt marshes, wetlands, aquatic habitats, alpine areas and coastal barrens, which are not targeted by commercial forest operations and in some cases receive special protection
Critical Elements	• A small subset of the plant and lichen species of conservation concern, such as the Endangered Graceful Felt Lichen, depends on forests, and some of them are specialists requiring late-successional forests. • Without proper protection measures, negative effects can occur from: o quarrying and road construction o logging and extraction using heavy equipment o mechanical site preparation o all-terrain vehicle traffic o prescribed burning o stand conversion to different tree species and/or earlier seral stages
Guiding Principles	o Work with the Wildlife Division to educate forestry Personnel and develop mitigative measures in areas where rare plants occur. o Identify and update all rare plant sites on GIS forestry data base o Encourage domestic harvesting in the winter • The guiding principles for Protection during forestry operations will apply to all crown operations within the province.

4.1.1.3.3 Waterfowl

WATERFOWL	
Characterization	Maintaining waterfowl populations depends on effective conservation efforts throughout North America. Newfoundland and Labrador most productive waterfowl breeding and staging areas are either owned by or are under management control of major corporations, private or communities. To help manage for waterfowl areas, stewardship agreements are signed at either the municipal, corporate or private levels. The community of Hawkes Bay has a waterfowl stewardship area within its municipal boundary. In Hare Bay, there are a series of islands that are protected for Eider Duck enhancement.

Critical Elements	• Habitat
	  ○ maintenance of habitat
	• Breading
	  ○ disturbance of waterfowl during the brood rearing, breeding, and staging period

Guiding Principles	• Habitat
	  ○ 50-metre treed buffer will be established around designated sensitive waterfowl areas.
	• Breeding
	  ○ A minimum 30-metre, treed buffer must be maintained from the high water mark in other waterfowl breeding, molting, and staging areas.
	  ○ no forestry activities are recommended during the brood rearing, breeding, and staging period
	• The guiding principles for Habitat and Breeding during forestry operations will apply to all crown operations within the province.

4.1.1.3.4 Other Species

Other species, particularly the red crossbill, are currently listed as endangered. The Forestry and Wildlife Division has a representatives 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 implemented accordingly.

4.1.1.4 Water Resources

WATER RESOURCES	
Characterization	The protection of water resources is an important topic both nationally and provincially. Human impacts both locally and globally have the potential to impair or alter water quality and water quantity.

Critical Elements	• Road construction / maintenance, Timber harvesting, and Silviculture
	  ○ Potential to alter the quantity and quality of water draining from watersheds.
	  ○ Negative Impacts could include: Negative impacts could include: stream hydrology (e.g. water quantity/flood risk), sediment loadings, and stream characteristics. Such activity would also potentially increase access by the public to land inside a Protected Public Water Supply Area (PPWSA) that was not previously accessible.
	• Storage and handling of fuels
	• Public Protected Water supply Areas (PPWSA)
	  ○ Human Activity (e.g. domestic and commercial forestry has the potential to negatively affect the area of land and water designated as a Protected Public Water Supply Area, for a municipal authority or local service district (LSD) operating a waterworks or using or intending to use a water sources, under Section 39 of the Water Resources Act. 3
	• Working in and within 15 metres of a waterbody or wetland
	  ○ The management of water resources helps to protect, enhance, conserve, develop and effectively utilize NL water resources and is accomplished through the issuance of Permits to Alter a Body of Water and Water Use Licences under Section 48 and Part 1 of the Water Resources Act respectively.

Guiding Principles	• Road Construction
	  ○ Any alteration to a body of water (e.g. culvert or bridge installation) within 15 metres of a natural waterbody (i.e. any water identified on the latest 1:50,000 NTS map) or development within a protected public water supply area, will require prior approval by the Water Resources Management Division of the Department of Environment and Climate Change (ECC).
	  ○ Approvals from Transport Canada are required for culverts, bridges and abutments on navigable waters (i.e. any waterbody capable of being navigated by floating vessels of any description for the purpose of transportation, commerce or recreation. Transport Canada's Navigability Self-Assessment Tree) must be utilized for each project to determine if a stream is Navigable or Not Navigable.
	  ○ When extraction trails and winter roads are to be constructed, soil disturbance and impacts on water bodies are to be minimized.
	
	• Timber Harvesting
	  ○ Heavy equipment and machinery are not permitted in any waterbody, on a wetland or a bog, unless frozen, without a permit from Water Resources Management Division
	  ○ Woody material of any kind (i.e. trees, slash, sawdust, slabs, etc.) is not

	permitted to enter a waterbody. Depositing woody material on ice within the high water floodplain of any waterbody is also prohibited. o Buffers inside PPWSAs vary and are applied using Policy 95-01 (Policy for Land and Water Related Developments in Protected Public Water Supply Areas) o Extraction trails and landings shall not be established within 30 metres of a waterbody o A minimum 30 metre, no harvesting activity buffer zone shall be established around all water bodies that are identified on the latest 1:50,000 national topographic system (NTS) maps. o All buffers may be increased inside PPWSAs. o Where possible, a closure plan will be identified at the end of Forestry activity to minimize access. • Storage and handling of fuels o No heavy equipment or machinery is to be refueled, serviced, or washed within 30 metres of a waterbody. o Gasoline or lubricant depots must be placed at least 100 metres from the nearest waterbody o All fuel-storage tanks must be registered with Digital Government and Service NL o Used oil storage, handling and disposal is to comply with the Used Oil Control Regulations, NLR, 82/02 under the Environmental Protection Act. o Contaminated soil or snow must be disposed of at an approved treatment facility • Protected Public Water supply Areas (PPWSA) o In Newfoundland and Labrador forestry operations may be permitted in Protected Public Water Supply Areas on a limited and controlled basis provided the potential negative impacts of the proposed operations can be mitigated. o Approvals required include: ▪ Approval of the Five-year operating plan by the Environmental Assessment Division of ECC, and ▪ Issuance of a permit under section 39(6) of the Water Resources Act which will include consultation with the community involved. o Buffers inside PPWSAs vary and are applied using Policy 95-01 (Policy for Land and Water Related Developments in Protected Public Water Supply Areas) o Refueling must not take place within 150 meters of an intake pond. o Fuel storage tanks approved by Digital Government and Service NL must be located at a minimum distance of 500 meters from any major waterbody. o A fuel or oil spill clean-up kit must be kept on site to facilitate any clean-up in the event of a spill. o Policy Directive 95-01 (Land and Water Related Developments in PPWSAs) shall apply • Working in and within 15 metres of a waterbody o All waterbodies, including wetlands will be identified within the project area as per the most up to date 1:50,000 NTS topographic maps.

	○ Work within mapped wetland areas will follow the WRMD's Policy for Development in Wetlands to ensure that adverse effects to water quantity, quality, hydrological functions and terrestrial and aquatic habitats are restricted. ○ All necessary erosion/siltation control measures will be taken during infilling, dredging and debris removal activities near waterbodies. ○ Impacts to the natural drainage pattern of the work area shall be identified including the redirection and discharge of water. ○ Flood risk areas will be identified and work activities categorized as per the WRMD Policy for Flood Plain Management to ensure structural, public, and environmental health and safety. ○ Required permits and licenses will be attained prior to commencing work include; ▪ Issuance of a Permit to Alter a Body of Water under Section 48 of the Water Resources Act ▪ Issuance of a Part 1 – Water Use Licence for all non-domestic water use. • The guiding principles for forestry operations, road construction, fuel handling and operating with PPWSA's will apply to all crown operations within the province.

4.1.2 Human Values

4.1.2.1 Timber Resource

TIMBER RESOURCE	
Characterization	Commercial logging contractors are allocated the majority of the annual allowable cut level 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. Commercial uses have arisen for timber, which includes: lumber, pulp and paper products, and value added products. Domestic harvesting provides fuelwood to heat many homes and sawlog material for residential house construction in the zone. Domestic harvesting is conducted in specific domestic cutting areas via a crown domestic cutting permit that is required and issued within each forest management district. Unless otherwise specified; domestic cutting is limited to these designated cutting areas. A Domestic Permit specifies 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 as it ensures that a vigorous and healthy forest is maintained. Forest renewal activities facilitate renewal of productive landbase by manual 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 for commercial harvesting activity. Upon completion, these roads are often used for silviculture and recreational purposes. A significant amount of money will be spent to construct forest access roads each year in the zone. Protection of the forest from various disturbances is a major characteristic of resource management, which includes: integrated pest management and forest fire prevention/suppression techniques. Other resource values are protected through modification of activities and enforcement.
Critical Elements	• 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, 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

AGRICULTURE	
Characterization	The agricultural industry provides both direct and indirect employment to residents of the province. Brophy's farm is a major dairy operation that is located in Daniels harbour. There are a couple of small commercial sheep farmers in the zone with a flock size of less than 40

	ewes. There are hundred's of subsistence farming plots scattered throughout the zone. The vegetables grow on these plots are mostly root crops used to supplement food requirements during the winter months. The wild berry industry (Bakeapples, partridge berry and raspberry) plays a significant role in the subsistence style of living enjoyed in the zone. While there is no actual record of production, thousands of kilograms of berries are harvested annually. There is one jam producer in the zone who purchases berries and produces jam on a commercial basis.
Critical Elements	• Landbase o Land resources are at the foundation of all agricultural enterprises and provide the requirements for crop production. 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. o Although a suitable landbase is the first critical element necessary for a successful agriculture operation, markets and the interest of individuals are also prime factors in the development and location of future farms. • Operational Requirements o When approval is granted for an agricultural lease, the land needs to be cleared and prepared for production
Guiding Principles	• Landbase o Both the Forestry and Agrifoods sections have identified Agricultural Areas of Interest (AOI's) across the province, representing approximately 155,600 hectares. The area in AOI's have been removed from woodsupply calculations and is available for agricultural development. o Agricultural Development is still considered for areas falling outside established AOI's • Operational Requirements o Forestry Act has been amended to allow clearing of land to occur without a commercial cutting permit if applicant is utilizing the fibre for their own private use. o Where possible, existing commercial forest operators should be encouraged to work with farmers to clear new land for development. o Where possible, existing commercial forest operators are encouraged to clear identified land within the departments Agriculture areas of Interest (AOI's). Five Year Plans includes AOI areas which are not part of woodsupply calculations o Home gardening leases should be confined to areas already developed for this activity. • The guiding principles for Landbase and operational requirements will apply to all crown operations within the province.

4.1.2.3 Mining, Mineral Exploration and Quarrying

MINING, Mineral Exploration, and Quarrying	
Characterization	Mineral exploration, mining, and quarrying are recognized as separate and distinct activities, each of which is approved and regulated under a separate piece of legislation. Mineral exploration activities may consist of prospecting, geological mapping, grid line-cutting, geochemical surveys, ground-based and airborne geophysical surveys, the preparation and use of access trails, mechanized trenching, diamond drilling, and – in remote areas – the preparation and use of campsites. Mineral exploration takes place province-wide and is a significant contributor to the provincial economy, particularly in rural areas. There are a large number of active quarries throughout the province which generate significant royalties and which provide the raw material for the development and maintenance of infrastructure such as highways, building lots, and concrete. There are a number of active mines in the province at any given time and mining represents a major component of the provincial economy.

Critical Elements	• Forest Ecosystem
	  ○ Mining, quarrying, and mineral exploration activities can have potential negative impacts to Forest Ecosystems and future Woodsupply calculations. Mining and quarrying represent permanent (but sequenced – not all at once) alterations to the landscape whereas mineral exploration activities at most involve temporary disturbance. Each activity is subject to rehabilitation requirements.
	• Utilization of Timber Resource
	  ○ When exploration activity occurs, merchantable trees may need to be harvested to gain access to work sites. Under forestry act, all merchantable trees can only be removed with a cutting permit and that holders of a cutting permit must utilize all portions of the tree to a top diameter of 8cm (outside bark). Section 18 of cutting of timber regulations state that all timber cut shall be removed from the cutting area to a roadway while harvesting operations are in progress unless otherwise specified in the cutting permit.

Guiding Principles	• Forest Ecosystem
	  ○ Regulations and permitting conditions require that all mine sites, quarry sites, and mineral exploration sites be rehabilitated. While each activity is regulated separately, rehabilitation requirements for each include the requirement that the organic overburden (e.g., topsoil, ground vegetation) be stockpiled and stored in a manner so that it can be used to rehabilitate the site. Rehabilitation requirements can be further specified in special terms and conditions and could include, if warranted, the requirement that the site be left in a condition conducive to forest regrowth.
	• Utilization of Timber Resource
	  ○ As part of exploration and development activities, individuals must attempt to extract timber harvested. If timber cannot be feasibly extracted using conventional means, then timber shall be piled so that it may be extracted

	during winter months by snowmobiles. ○ Mineral Exploration companies are permitted to use some harvested timber within access routes for the purposes of corduroy or brushmatting to prevent rutting and minimize ground disturbance on sensitive sites. • Additional: ○ The Forestry Branch will consult with the Mining and Mineral Development Branch in determining appropriate silviculture buffer distances from the boundaries of sites covered by a quarry permit or quarry lease. In many cases, 100 meters is an appropriate buffer distance that will accommodate discrepancies in plotting. However, in other cases, there may be valuable aggregate resources present and expectations that the area will see proposals for new quarry developments in the foreseeable future, in which case a buffer zone should be specially planned in consultation with Mines. In other cases, where quarry development is expected to proceed slowly, silviculture buffer distances may be much reduced. ○ For mine sites (including all associated infrastructure), an appropriate silviculture buffer distance should be chosen in consultation with the site operator and the Mining and Mineral Development Branch. ○ Mineral exploration activity that proposes to explore or develop within a silviculturally treated area must be undertaken with minimal disturbance and under approval of Forestry Branch. A standard condition has been developed by the Mineral Development Branch and Forestry Services Branch to include as a condition in mineral exploration approvals document where silviculture treatments may be impacted. ○ Mineral exploration and/or development on mineral licenses will not be impeded and will follow government policy. Specific proposed forest management activities are identified in annual operating plans for each upcoming calendar year. ○ Should future quarry or mineral resource developments or exploration programs (i.e., new quarry development, existing quarry expansion, new mine development, exploration for quarry materials, or mineral exploration) be considered by the Forestry Services Branch as having the potential to cause a significant impact on the forest resource and forest resource users, the Forestry Services Branch will work closely with the Mining and Mineral Development Branch and the proponent to ensure that mutual impacts are minimized. ○ For the purpose of road construction, quarry permits or quarry leases are required only for aggregate material taken outside of the road right-of-way. ○ Non-compliance with exploration permits identified by Forestry Branch will be passed to Mining and Mineral Development Branch. ○ Many forest access roads and bridges are used by other land users, among them parties carrying out mineral exploration or quarrying. Where possible, the Forestry Services Branch will forward plans to decommission roads or bridges as a matter of course to ensure that all road/bridge rehabilitation and decommissioning plans are reviewed to consider whether mineral exploration, quarrying, or mining may be affected. Plans should be forwarded to MinesBranchReferrals@gov.nl.ca • The guiding principles for Forest Ecosystem, Utilization of Timber Resource, and

	additional comments will apply to all crown operations within the province

4.1.2.4 Historic Resources

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. Most often, archaeological sites are small in size, so it is important to protect these sites and professionally record as much information possible to fully understand its history. To do this properly, the site must not be disturbed. The preservation and interpretation of archaeological sites will continue to benefit in this province in the future. Thousands of tourists from all over the world visit archaeological sites in Zone 8 each year. L'ANCE AUX MEADOWS and Port au Choix are the two most prominent archaeological sites in the zone.
Critical Elements	• Protection o Activities which disturb soil layers and/or provide unintended public access to an archaeological site can have a negative impact on that historic resource. Without applying best management practices, forestry activities such as: construction of access roads and bridges, harvesting, and mechanical site preparation have the potential to destroy historic resources. o While forestry activities can have adverse impacts on historic resources, beneficial effects can be realized. 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	• Protection o The provincial archaeology office will review forestry's five year plan proposals through the Environmental Assessment process. Applicable protection measures will be identified by the archaeology department and incorporated into the forestry plans. o Buffer Zones will be implemented to protect known archaeological sites and potential unknown sites. If deemed necessary, archaeological

	assessments may be required to fully assess the site. ○ Buffer zones are 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. • The guiding principles for Protection during forest Harvesting will apply to all crown operations within the province.

4.1.2.5 Parks and Protected Areas

PARKS AND PROTECTED AREAS	
Characterization	There are several different types of conservation areas in the province contributing to the provincial system of protected areas. ○ Wilderness Reserves are designed to protect complete ecological systems, while Ecological Reserves may be established to protect representative samples of each of the province's natural regions. Both Wilderness and Ecological Reserves are established via the *Wilderness and Ecological Reserves Act*. ○ 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. ○ Public or Crown Reserves may be established for conservation reasons under the *Lands Act*. ○ 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, opportunities for environmental education, provide standards against which the effects of development can be measured, and provide natural venues for enjoyment of nature. Protected areas in the zone include: Gros Morne National Park, LANCE AUX MEADOWS National Historic Site, Port au Choix National Historic Site and Big Droke Historic sites, Watts Point and Table Point ecological reserves, and a series of proposed protected areas on the GNP.
Critical Elements	• Protection ○ preservation of biodiversity ○ maintenance of protected area integrity ○ maintain natural processes and features • Operational ○ Forestry activity occurring around Parks and Protected Areas.

Guiding Principles	• Protection
	  ○ Some protected areas prohibit new development such as mining activity, hydroelectric projects, forestry activity, agriculture activity, roads/trails, cabins and new structures;
	  ○ the type of activities encouraged or permitted within various protected areas in the province depends entirely on the type of protected area and the rational for its establishment
	• Operational
	  ○ a 500 m no roads buffer is to be maintained around all existing and proposed protected areas to reduce access and minimize damage from motorized vehicles
	  ○ where forestry operations are scheduled within one kilometer of provisional and ecological reserves, wilderness reserves or provincial parks, modified operations may be necessary
	• The guiding principles for Protection and operational requirements will apply to all crown operations within the province.

4.1.2.6 Outfitting

OUTFITTING	
Characterization	Outfitting is an iconic, high yield tourism demand generator and one of Newfoundland and Labrador's most developed tourism products. Outfitters annually attract high end hunting and angling enthusiasts that benefit local communities, other private operators, transportation providers and guides. Since the early 1900's, the outfitting industry has been an integral component of the tourism industry in Newfoundland and Labrador. The province has 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 this forest management zone, which provide seasonal employment for many local individuals. Over the past decade or so, a significant number of traditional hunting and fishing facilities have diversified into the non-consumptive areas of the tourism industry. Such activities include: 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 a result, increasing numbers of operators are considering this opportunities. Pristine wilderness settings are necessary for many of these types of diversification.

Critical Elements	• Resource Roads
	  ○ Some outfitting camps are considered remote and construction of forest access roads too closely to a main camp could have negative impacts to this remote appeal.
	  ○ Increasing accessibility through increased access roads has the potential for increased hunting and fishing pressures within in a given area. Increased

	pressure on the wildlife resource within a given area could potentially lead to decreased success rates of outfitter guests. o With improved road access, there is also a potential for increased cottage development, which can also impact both remoteness and wildlife availability. • Visual o While clients of hunting and fishing outfitters are primarily interested in the actual hunting or fishing experiences, they also show a great respect and admiration for pristine conditions and a healthy looking landscape. Activities such as forest harvesting can potentially detract from the overall visitor experience. o The landscape view experienced by clients plays a large role in leaving a lasting impression of the province. The viewscape experience may also have a direct impact on repeat client bookings and recommending the destination to others. o Viewscapes become even more important as outfitters begin diversification into non-consumptive tourism activities. • Wildlife o Without proper application of best management practices, forest harvesting has the ability to negatively impact wildlife travel corridors, bear denning areas, and moose and caribou feeding and calving areas. Removal of large areas of forest can simulate the same effect of reducing wildlife habitat, particularly winter staging areas. o Forest harvesting has the ability to lead to disturbances of wildlife, including shifts in where they live, disturbances for hunters accessing hunting areas and finding animals in these traditional hunting areas, and other disturbances for outfitters. This has the potential to significantly impact their business.
Guiding Principles	• Resource Roads o Where possible, new access roads will be strategically located away from an outfitters existing main outfitting Lodge. o Consideration will be given to decommissioning roads and bridges (where possible) after harvesting is completed, which will help reduce possibilities of increased hunting pressure. o When roads are in use actively for harvesting purposes, access to hunters could be restricted or limited. o Where possible and feasible, conduct harvest activity in the winter and construct winter roads that are less passable in summer/fall and will help to reduce vehicular traffic around an outfitters main lodge. • Visual o In consultation with the outfitter, efforts will be made to minimize negative effects regarding the view from the outfitter's main lodge and their hunting areas when conducting nearby forest operations. o Environmental Management System (EMS), developed procedures for: ▪ Ensuring all garbage is removed from the harvest area. ▪ Appropriate stream and wildlife buffers are implemented and maintained • Wildlife o All forestry Plans are reviewed by the Wildlife Branch. o Travel Corridors and Buffer Requirements are designed and implemented

	upon direction of Wildlife Branch using scientific data. ○ Modified or deferred harvest based on Wildlife Habitat requirements is under the direction of the Wildlife Branch • Forest Operations ○ shall be undertaken in compliance with existing regulations ○ In consultation with the outfitter, the timing forest harvesting can be modified around the main lodge during the season of operation. ○ Unless located on registered crown land issued to the specific outfitting business, Bear Bait Stands are considered temporary hunting tools, which do not require protection mechanisms and are not considered permanent fixtures on the landscape. ○ However, through the five year plan development and consultation process, outfitters can identify the location of temporary hunting tools such as Bear Bait Stands in an effort to mitigate any issues prior to implementation. • The guiding Principles for Resource Roads, Visual, Wildlife and Forest Operations above are applicable for all licensed outfitting businesses within the province. In addition, direct consultations with specific outfitters and the Newfoundland and Labrador Outfitters Association may occur to mitigate specific forestry proposals near the Main Lodge.

4.1.2.7 Tourism / Recreation

TOURISM / RECREATION	
Characterization	Non-timber values such as: hiking, skiing, canoeing/kayaking, ATV/UTV and snowmobiling constitute an important role within the Province for tourism and recreational purposes. The Province has outstanding scenery, varying topography and opportunities for viewing wildlife and flora in a natural setting. The tourism industry in Newfoundland and Labrador has experienced significant growth over the years and is now a significant economic driver, generating $1.14 billion in revenue in 2019. Newfoundland and Labrador has the resources to compete nationally and internationally with tourist destinations. As such, protection of these resources is vital for continued growth and prosperity.
Critical Elements	• Wilderness ○ Adventure tourism activities require the existence of wilderness areas. If best management techniques are not applied, forest harvesting may result in the alteration of this feeling of pristine wilderness, which could have short and long term adverse effects. • Accessibility ○ Construction and maintenance of Forest Access roads has both a positive and negative effect. On a positive side, it provides the ability to increase vehicular and ATV/UTV traffic allowing more opportunity for this activity. However, on a negative side, it also has the potential to decrease the value of the experience for those individuals seeking a “remote” type setting.

	• Viewscapes
	  ○ Either walking a trail, snowmobiling on a groomed trail or canoeing down a river, the visual experience of the surrounding landbase plays an important role in the overall pleasure of the activity. Over the past number of years, viewscapes have become an integral portion of forest management planning.
	  ○ The Trans Canada Highway is a strategically important touring route for the tourism industry. Any development that is near this touring route and would impact scenic settings, must be managed to minimize the negative visual viewscapes.

Guiding Principles	• Wilderness
	  ○ Forest operations will avoid established ecological reserve areas and will make every attempt to consult with local stakeholders in areas of high concentrations of tourism and recreational activities. In such areas, stakeholder meetings could prevent conflicts through temporal scheduling.
	• Limiting Accessibility
	  ○ Where possible in sensitive areas, forest harvesting will be scheduled during winter months and take advantage of winter road construction techniques. Winter roads usually restrict vehicular traffic and decommission naturally. In addition, decommissioning of regular forest access roads near sensitive areas is a possible option when forest operations are completed.
	• Viewscape
	  ○ Where possible within areas where high concentrations of tourism and recreational activities occur, negative impacts to viewscapes could be managed using landscape design techniques. This could mean that forest harvesting operations employ: treed buffers, tree retention methods or implement reforestation activity immediately to return the site to a forested condition. Route 430 (The Viking Trail) and Route 432 (Grenfell Drive) are primary tourist routes that access National historic sites on the Great Northern Peninsula.
	• The guiding principles for Wilderness, Accessibility, and Viewscapes will apply to all crown operations within the province.

Section 5 Mitigations

5.1 General

Best Management Practices adopted from previous planning processes to be incorporated into this plan, which include:

1. A 30 m buffer will be maintained on both sides of any other rivers, brook, ponds or other water bodies that are shown on 1:50,000 topographic maps.
2. There will be no cutting buffer within 100 meters of the Newfoundland T'Railway.
3. There will be no cutting buffer within 100 meters of a cabin development area and 30 meters of an approved cabin.
4. Scheduled salmon rivers will be evaluated on a site-by-site basis and buffers will vary in width from 50 -100 meters.
5. Within protected water supplies, there will be no cutting within 150 meters of the intake pond or stream and no cutting within 75 meters of the main river channel. There will be no cutting within 50 meters of all ponds and streams flowing into the intake pond or stream.
6. In Domestic Cutting areas there will be a 30 meter no cut buffer left on approved trails. In commercial Harvest blocks, where old large timber is expected to blow down 2 meter trail markers will be left to identify the trail. Areas harvested will be planted immediately. The Forestry and Wildlife Division will work with the NLSF to minimize winter use of forest access roads that are part of the NLF trail network.
7. Forestry and Wildlife Division will work with Private Park Owners and Tourism businesses near any proposed commercial or domestic areas to develop mitigative measures for issues that may arise.
8. The Forestry and Wildlife Division will work with Gros Morne National Park and develop mitigative measures for issues that may arise
9. The following condition has been added to domestic cutting permits in FMD 17 and18. "Green Timber and Birch can only be harvested in approved cutting blocks. Cutting of Deadwood and blow down is permitted within 100 meters of a public highway and also permitted outside of domestic cutting blocks, but NOT within areas designated for NO cutting such as Municipal boundaries, Protected Water Supply Areas, Ecological Reserves and Proposed Protected Areas".
10. In commercial Harvest blocks, where old large timber is expected to blow down 2 meter trail markers will be left to identify the trail. Areas harvested will be planted immediately. The Forestry and Wildlife Division will work with the NLSF to minimize winter use of forest access roads that are part of the NLF trail network

Results of consultation process for the development if this Five-Year Plan (2023-2027) as described in section 6 are presented below:

Interdepartmental Review (2023-2027) Plan

Department / Agency	Issue / Concern	Action for Forestry
FFA - Aquaculture Development Division	Implementation of Aquaculture buffer developed in 2021, which states "50 meter no cut buffer required near waterbodies hosting shellfish aquaculture operations."	No areas of concern identifed. No further action
Water Resources Management Division	1) FMD 17 and 18 contain some (6-10) very small protected public water supply areas (PPWSAs) designated under S39 of the Water Resources Act that we consider to be high risk and therefore would not permit any activity inside. WRMD is also looking at amending some of the boundaries in these areas and would request that Forestry keep up-to-date with our mapping or at least in communication with us as we proceed through the ILUC process on these amended boundaries. There are also a few watershed that are not protected in this area, and WRMD will be trying to get them protected in the near future.	The high risk watersheds were identified and removed from future harvest planning.
	2) Permits required for working within PPWSA's	Obtain Permits prior to schedule of work and conduct forestry activity according to Water Resources Guidelines for work within PPWSA's
	3) Two areas identified as operationsal areas are located within the Parsons Pond Watershed	
	4) No work/ activities within 100m of identified drinking water wells (excel table provided)	Incorporate the wellheads provided by Water Resources into Forestry GIS database and identify in mappin in AOP development
Forestry and Wildlife Branch	1) Seasonal restrictions apply to any proposed harvest activities within secondary caribou calving core area (April 15 to July 15).	New Woodsupply and five year plan is developed taking into account new caribou guidelines
	2) CC017-054, CC17-056, CC17-057, CC17-063 – there are several plant species of conservation concern within these OA.	AOP's to be developed and reviewed by Widllife Staff to determine exact location of plant species
	3) Within CC18050 (Round Lake / Ten Mile Lake), request 30m undisturbed buffer from the Manuel's and Roses Feeder rivers and connecting stream/tributaries	30m buffer is implemented along streams and tributaries according to the EPG's
Mineral Lands Division	1) No concerns with domestic cutting areas or Proposed Roads	
	2) Portions of 8_2023_2027_CC17057 nearest the highway are overlapped by a mineral licence	Where commercial cutting areas overlap a mineral licence, Forestry should expect that areas may be cut in future by the mineral exploration operator under their own commercial cutting permit.
	3) 8_2023_2027_CC17064a and 8_2023_2027_CC17064d overlap mineral licences located northeast of the former Daniels Harbour zinc mine	
	4) 8_2023_2027_CC18057: There is a 2 hectare quarry permit located on the southern side of the road	
	5) The southwestern portion of 8_2023_2027_CC18061 overlaps a mineral licence which covers recognized occurrences of marble.	
	6) The southeastern portion of 8_2023_2027_CC18058c contains three contiguous areas covered by quarry permits corresponding to an existing quarry site. The quarry permits cover a combined area of approx. 8 hectares	Where commercial cutting areas overlap areas covered by a quarry permit or quarry lease, Forestry should expect that areas immediately adjacent to existing quarry workings may be cut in future by the quarry operator under their own commercial cutting permit to facilitate quarry expansion.
Policy, Planning, and Natural Areas Division	1.) FMD 17 – proposed commercial harvest overlaps with the Highlands of St. John proposed ecological reserve which has interim Cabinet protection from development (MC 2000-0345 refers). The overlap is slight but must be removed.	Expansion identified in maps submitted in ADM review. Area for expansion was inside of NASP and is removed from plan. Parks and Natural Areas Division evaluating the posssibility of conducting a local public consultation on this issue. Waiting on assessment from Parks and Natural Areas.
	2. FMD 18 – proposed domestic harvest overlaps with the Cloud River proposed ecological reserve and with the Mare Cove proposed ecological reserve. As with all previous 5-yr plan reviews, we do plan to grandfather in domestic harvest when the protected areas are established, but only at the levels/locations that were pre-existing. You can see from the attached map that domestic harvest has already existed in both these proposed protected areas (black hatched areas on the map – approved in two previous 5-yr planning periods), but these new 5-year plans have expanded domestic harvest blocks (light brown areas). We request that all light brown, newly proposed domestic harvest areas that overlap Cloud River and Mare Cove proposed ecological reserves be removed from the 5-yr plans (the black hatched areas are ok to remain as domestic harvest blocks).	Expansion of domestic cutting blocks have been submitted in ADM review. Some area proposed is inside of NASP areas and has been removed from the plan. Parks and Natural Areas Division evaluating the posssibility of conducting a local public consultation on this issue. waiting on assessment from Parks and Natural Areas.
Agriculture and Lands		
Tourism Product Development		

Community Review (2023-2027) Plan

DATE	Community	Reason for Contact	Action for Forestry
04/28/22	Town of Raleigh	-CC18501: Letter from Town to ensure there was no cutting inside of Town Limits and protected water supply.	This are was removed from Domestic Cutting Block in 2018-2022 plan. No Domestic or Commercial areas are proposed in new five year plan. no further action
02/08/22	Port Au Choix Town Council	-CC17507: Town was looking for an increase in size of Domestic cutting Block to encompass more sawlogs.	After a field review, an increase in size of domestic cutting block was identified and submitted in plan.
02/22/22	Town of Roddickton/Bide Arm	Potential removal of Bridges on forest access roads in District 18.	Letter sent back to the Town by Minister with Department response. Removal of Watercrossing will be evaluated on a case by case basis, as safety concerns warrant. Advanced public notification will be provided in the event of required removal.
05/02/22		Potential removal of Bridges on forest access roads in District 18. Expansion of Domestic Cutting Block. Employment for silviculture workers. Reductions in AAC.	Letter sent back to the Town by Minister with Department response. Removal of Watercrossing will be evaluated on a case by case basis, as safety concerns warrant. Advanced public notification will be provided in the event of required removal.
05/02/22		Expansion of domestic cutting blocks; removal of bridges in District 18; employment for silviculture workers and Reductions in AAC.	Expansion of domestic cutting blocks are proposed which are located inside some NASP areas. Parks and Natural Areas Division has denied expansion of Domestic Areas, so the expansion is removed from the plan. Parks and Natural Areas are evaluating the possibility of conducting local consulation on allowing futher domestic activity inside NASP areas. Forestry will wait until approval from PNAD before resubmitting any further domestic activity inside NASP areas
05/30/22		Do not want any additional cutting inside of Protected water supply.	No additional cutting areas proposed inside of protected water Supply area. This water supply removed from Commercial Landbase.
02/22/22	Town of Main Brook	Potential removal of Bridges on forest access roads in District 18.	Letter sent back to the Town by Minister with Department response. Removal of Watercrossing will be evaluated on a case by case basis, as safety concerns warrant. Advanced public notification will be provided in the event of required removal.
02/22/22	Town of Englee	Potential removal of Bridges on forest access roads in District 18.	Letter sent back to the Town by Minister with Department response. Removal of Watercrossing will be evaluated on a case by case basis, as safety concerns warrant. Advanced public notification will be provided in the event of required removal.
03/23 22		Expansion of domestic cutting block into proposed Nasp Area	Expansion of domestic cutting blocks are proposed which are located inside some NASP areas. Parks and Natural Areas Division has denied expansion of Domestic Areas, so the expansion is removed from the plan. Parks and Natural Areas are evaluating the possibility of conducting local consulation on allowing futher domestic activity inside NASP areas. Forestry will wait until approval from PNAD before resubmitting any further domestic activity inside NASP areas
03/07/22		Removal of Bateau Cove Domestic Cutting Block.	The Town of Englee had walking trails in the Bateau Cove Domestic cutting block and requested there be no more domestic cutting in this area. The Bateau Domestic block is removed from the plan.
03/28/22	Town of Port Saunders	Expansion of Domestic Cutting Blocks.	Proposed expansion on one block, the other request under review. Ongoing discussions.
05/17/22		Requested a new domestic cutting Block in the Angle Pond area.	FFA has considered but due to potential future commercial opportunity, impact on Commercial AAC and movement of landbase and PCT to domestics, Tthe request for a new domestic area has been refused.
01/25/22	Town of Hawkes Bay	Expansion of domestic cutting blocks. General information on Public expression of interest for commercial timber in District 17.	Able to accommodate small increases in domestic blocks. Provide general information on expression of interest in commercial timber in District 17.
06/01/22	Town of Hawkes Bay	Outcome of meeting on Commercial cutting in Protected water supply.	The Town has concerns with proposed commercial activity in PPWSA and wants it removed from the plan. Long term effects will result in a 15% reduction in Core AAC and 20 % reduction in Operational AAC, as such FFA cannot agree to remove the commercial blocks Woody Hill and Ratt Pond from potential harvesting.

DATE	Outfitter	Reason for Contact	Action for Forestry
3/28/2022	Rack Lake Hunting & Fishing	Received email on March 24, but don't have google earth files, so couldn't view the proposed plan	DEM Gibbons called Owner and outlined the proposed plan. There is no activity proposed within the general vicinity. No concerns identified

Section 6 Public Consultation

6.1 Planning Framework

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

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

- Establish a productive planning framework to include all interested stakeholders. An effective planning framework must have information and defined spatial issues.
- Learn more about forest ecosystems while they are being actively managed (i.e. adaptive management). Adaptive management incorporates strategies which help us learn about the forest ecosystem and to deal with uncertainties.
- Establish an ecosystem approach to forest management which integrates the scientific knowledge of ecological relations and limits of growth with social values. This will help to attain the goal of sustaining natural ecosystem integrity and health over the long term.

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

6.2 Stakeholder Involvement

Since the mid 1990's, for each five-year plan, the Forestry Services Branch embarked upon a rigorous public consultation process involving a series of meetings spanning a number of

months at an established venue, where interested stakeholders could discuss a range of forest management issues at an operational level.

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

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

The following describes the consultation process taken in 2022 regarding upcoming five year plans

1. February 23- March 11, 2022 – an Interdepartmental review, also known as an ADM review was conducted. Notifications were sent to:
    - FFA - Crown Lands, Land Management, Fisheries and Wildlife Divisions
    - ECC - Natural Areas, Tourism Product and Water Resources Divisions
    - Mines & Energy – Mineral Lands Branch

2. An updated List and contact information of Outfitters and Tourism stakeholders was provided by Tourism Product Division. On March 24, 2022, notifications of proposed forestry plan and google earth files was sent to:

BUSINESS NAME
Newfoundland and Labrador Outfitters Association
Newfoundland and Labrador Snowmobile Federation
Hospitality NL
Legendary Coasts NL DMO
Adventure Central DMO
Go Western DMO
Beaulieus Caribou Hunts (2005) Limited (Double Pond Lodge)
Big River Camps (2012) Inc. (Mike's Pond Camp)
Brophy & Sons Outfitters (Perry Pond Camp)
Carey's Gros Morne Hunting Inc.
Hynes Hunting & Fishing Lodge
Northern Arm Lodge
Northern Lights Adventures Ltd.
Parsons Pond Outfitters (Partridge Pond Lodge)
Patey & Sons Ltd.
Rack Lake Hunting and Fishing Lodge
Big River Camps (2012) Inc. (Biggin Lake Lodge)
Bough Wiffen Outfitters Ltd.
Caines' Adventure Outfitters
Cloud River Outfitters Ltd.
Dylan's Northern Edge Outfitters Ltd.
J & B Outfitters Limited
Mayflower Outfitters Lodge
Off the Grid Adventures
Pinnacle Lodge
Portland Creek Outfitters
Ten Mile Lake Lodge
Tuckamore Lodge Ltd.
White Hills Outfitters

3. March 31, 2022. Letters with detailed maps were sent out to Local Governance, with a request to review and provide any comments or concerns

Community
Town of Raleigh
Port Au Choix Town Council
Town of Roddickton/Bide Arm
Town of Main Brook
Town of Englee
Town of Port Saunders
Town of Hawkes Bay
Town of Port Saunders

4. March 25, 2022. Notification of proposed forestry plan with associated google earth files was sent out to Indigenous Groups
    - Qalipu First Nation
    - Miawpukek First nation

5. March 25, 2022. Notification of proposed forestry plan with associated google earth files was sent out to local MHA.

Section 7 Management Objectives and Strategies

7.1 Harvesting

The boreal forest is characterized by natural stand replacement following a natural disturbance, which results in the formation of relatively even aged stands. A forest management technique called the Clearcut Silvicultural system is utilized as it closely emulates this natural disturbance pattern. The size, shape, arrangement and juxtaposition of harvest areas vary across the landscape depending on localized topography and terrain conditions

7.1.1 Commercial Harvesting

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

Specific commercial strategies include:

- 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 viewscapes
- minimize timber utilization loss (< 6 m3/ha)
- areas of bug killed stands including areas that have been silviculturly treated as salvage harvest. These areas / stands will be identified on the ground and royalty rates may reflect salvage rates.

7.1.2 Domestic Harvesting

The harvest of domestic fuelwood and sawlogs occurs from designated areas, recent commercial harvest areas and sporadically throughout the zone with the removal of blowdown trees. Utilization of cutover residue, dead timber and scrub areas do not form part of the woodsupply analysis. Generally, domestic cutting areas are generally established near communities. However, within areas of the zone not covered by any operating areas, domestic permits may be issued to remote cabin owners for firewood as requested. The number of permits and volume associated with these permits will be extremely low and insignificant.

Specific domestic strategies include:

- target low volume stands having poor commercial opportunity and areas of Non AAC along southern portion of zone

- 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, blown down, burnt or insect damaged stands that are beyond commercial salvage throughout the zone and specifically within 100 meter buffer of highways.
- target alienation class 3 lands that have low commercial opportunity
- in areas of high domestic demand, limit volume allocation in designated cutting areas and encourage alternate sources (cutovers, landings, scrub etc)
- Provide opportunity for small scale non industrial commercial harvesting that closely mimics domestic harvesting. Commercial permits will be limited in size to less than 200m^3

7.2 Silviculture

As a general rule, approximately 80% of the Boreal Forest regenerates naturally following a disturbance. Forest renewal management programs are applied by forest managers within the 20% that do not successfully natural regenerate. Forest renewal silvicultural treatments are designed to help facilitate a new forest after disturbances caused by harvesting, insect, wind or fire. These prescriptions can involve either Site Preparation (scarification), Planting or Pre-Commercial Thinning.

Site Preparation

When a site does not regenerate at all, a full planting program is required. In some cases, the site may need to be manually prepared to aid in the establishment and growth of the planted seedlings (generally black or white spruce and to a lesser extent, norway spruce). Site preparation techniques can include:

- Mechanical site preparation (scarification) involves using heavy equipment (skidder) equipped with special attachments to reduce the thickness of the duff layer, and remove or disturb any kalmia that is present, which would restrict seedling growth.
- Prescribed burning is 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.
- Treatment to prepare sites that have been overgrown with hardwoods and other herbaceous species has been done with herbicides to reduce this competition, making the site more accessible and suitable for planting. Release herbicide treatment reduces the competition for a few years to allow planted seedlings to get established. 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.

Planting

A full planting technique is required when no regeneration occurs to ensure regeneration of selected tree species is at acceptable levels. Gap planting is normally achieved with spruce seedlings, coupled with the natural regeneration already present on site to increase seedling density to acceptable levels.

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. However, where adelgid has been a problem, balsam fir regeneration is sometimes ignored and the site is planted with spruce seedlings.

Where possible, seedlings used in the silviculture program 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 to form any substantive proportion of the planting program in the foreseeable future.

Thinning

In an attempt to enhance development, silviculture thinning programs are designed to treat established forest stands.

Pre-Commercial Thinning (PCT) usually involves partial removal of overstocked balsam fir stands at a young age 10 -15 years. In areas which have high moose browsing potential, the age is increased to 20 – 25 years, so that crop trees are tall enough to be out of reach of moose. PCT reduces density levels which facilitates maximizing volume increment and operability (piece size). Trees removed are not of merchantable size and remain on site, returning the nutrients back into the soil. In the zone, balsam fir is usually thinned to favour any spruce present within 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 would occur in the intermediate age 25 - 35 years and is undertaken in older balsam fir stands (either natural or previously thinned). It is designed to capture any mortality that would normally occur in the stand through self-thinning. The trees removed from commercial thinning operations are extracted and utilized. The remaining trees are left to grow, free from competition and are harvested when mature. As with PCT, spruce and hardwoods are left where possible to increase the stand diversity.

Thinning programs aim to shorten the rotation period of a stand and produce large diameter stems. This program should increase the percentage of merchantable volume considered suitable for sawlogs. Commercial thinning has not been completed in the zone and diameter limit thinning has been done sparingly. In recent years the pre-commercial thinning program has dropped significantly. This trend is expected to continue.

Specific silviculture strategies include:

- 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

Forestry roads are required to gain access to scheduled commercial harvest areas. Access roads also provide opportunities for other recreational and commercial values such as: hunting, fishing, skiing, berry picking, hiking, outfitting, cabin development and mineral exploration.

As a general rule of thumb, only the minimal amount of access roads are constructed to effectively and efficiently conduct commercial harvest operations. Access roads are constructed to specifications minimizing right-of-way and running surface width. Forwarding distances will be maximized to curtail the overall amount of road constructed. In sensitive and wet areas, winter harvesting and road construction are encouraged. Following these principles helps to ensure the minimum amount of road will be constructed, reducing the loss of productive forest landbase and minimizing environmental disturbance. Road and bridge maintenance and/or decommissioning are considered depending on cost, and mitigation of conflicting uses for a particular road.

Specific roads strategies include:

- construct winter roads in 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
- 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 considered a major natural disturbance within the zone. Balsam fir is susceptible to most of the major insects including spruce budworm, hemlock looper, and balsam woolly adelgid. In the event of a major insect infestation, salvage efforts may change harvest priorities. However, deviations from harvest schedules will be closely monitored to ensure that the validity of the AAC is not compromised.
Monitoring and protection programs for insects and disease are coordinated by the forest protection division in Corner Brook. Local district staff provide assistance in detection, monitoring, and protection surveys against insects and disease.

Specific insect and disease strategies include:

- 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 minimize potential for severe insect infestation
- in conjunction with provincial and federal initiatives, use pertinent and approved insecticides

7.4.2 Fire

There has been a cyclic fire history in the zone. A fire in an unusually dry year can have devastating effects on the forest and can exacerbate an established wood supply. The risk of a serious forest fire can minimized 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. Within the zone, there have been major forest fires in the past. However, in recent years, wildfire has not been a major issue. There have been some minor wildfire's but all have been quickly contained and not much timber has been lost. The Department of Fisheries, Forestry and Agriculture is committed to protection of the resource and continues to invest in a fire suppression program to ensure any future losses are minimized. There are fire crews and equipment stationed at local forestry depots within the zone during the forest fire season, whose direct responsibility is forest 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.

Specific fire strategies include:

- 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 older stands that have been predisposed by some other disturbance such as insects and disease. To minimize the effects of Windthrow (blowdown), stands will be managed to promote forest health and vigour mainly through silvicultural treatments and protection from insects.

Specific windthrow strategies include:

- avoid thinning in areas with high wind damage potential (hilltops on high elevations etc.)
- maintain forest in healthy vigorous condition through silvicultural treatments and protection from insects
- design cut blocks to follow contours and natural boundaries to minimize risk of windthrow to residual forest

7.5 Environmental Protection & Climate Change

7.5.1 General Environment

The Department of Fisheries, Forestry and Agriculture have developed has developed an Environmental Management System (EMS) that is registered with the International Standards Organization (ISO). As part of this process, an EMS Policy was developed and proper operating procedures developed for various forest management activity. Initial registration was on December 17, 2015 and through regular monitoring and audits (internal and external), the EMS remains registered. Under the EMS, the department has developed stringent operating procedures for fuel handling, working around waterbodies, and overall pollution prevention. In addition, inspection programs are implemented are implemented to evaluate forest operations and rectify any deviations from established protocols.

To ensure forestry activity is conducted to minimize any potential negative impacts to the environment, operating procedures and best management practices called Environmental Protection Guidelines (EPG's) have been developed and implemented across the province. 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 monitoring.

Through implementation of the EMS and the EPG's, the department strives to be responsible stewards of the landbase. As well, the programs illustrated in this document relating to forest protection from Insects and Fires, help to maintain a forested landbase. As indicated in previous sections, harvested sites are evaluated for regeneration potential and proper reforestation techniques are implemented to facilitate tree growth. Maintaining and achieving a stocked forest at the earliest timeframe help provide for carbon storage.

7.5.2 Climate Change

FFA has been working with the Canadian Forest Service (CFS) over the past two years in an attempt to model the amount of carbon currently existing within our provincial forest. In addition, FFA will strive to quantify the potential carbon impacts associated with implementing the forest management activities outlined in our five-year operating plans. Considering the specialized training requirements and complexities involved, this process is slowly evolving with preliminary results anticipated for the fall of 2022.

FAA recognizes that new or changing ecological conditions have potential varying impacts on tree species. To help minimize negative effects, FFA supports the Atlantic Tree Improvement Council, which is focused on evaluating the genetic diversity within species and quantifying their ability to adopt to a changing environment. The results of this information are integrated into our provincial tree improvement program. To date, three planting trials have been established in this province, with replicas studies established in each of the three remaining Atlantic Provinces (Nova Scotia, Prince Edward Island and New Brunswick). Under this program, utilizing seedling stock from each province aims to measure species adaptability over time.

To help raise awareness of healthy forests and support urban forest initiatives, FFA implemented a program to distribute tree seedlings (free of charge) to residents across the province during national forestry week in 2021. With approximately 110,000 tree seedlings distributed, FFA considers this a successful program and anticipates it will continue in future years.

FFA is currently developing a 2 billion tree initiative program with Natural Resources Canada. This objective of this program is to restock naturally disturbed areas (fire, insect, & wind damage) which have not sufficiently regenerated. In addition, another objective of the program is to aid in the restoration of sensitive wildlife habitats and reduction of linear features through targeted tree planting initiatives. Implementation of this program will increase demand for seedlings from the provincial tree nursery at Wooddale. With anticipated increase in demand, the nursery has recognized the requirement to upgrade its seeder line and increase the number of cold frames on site. It is anticipated this 2 billion tree initiative will also result in engagement and partnership building with indigenous and community groups to develop and implement various tree planting programs.

7.5.3 Surveys

Utilization surveys will be conducted on both commercial and domestic cutovers to ensure loss of merchantable timber is minimized. Results of these surveys will be used to evaluate the expected volume in an operating areas to those actually attained. The results of this survey will help refine inventory deductions in future woodsupply analysis.

Reconnaissance and intensive regeneration surveys will be conducted on commercial cutovers in this upcoming five year period, and as well as those created in the past five years to determine the requirement for silvicultural activity. Reconnaissance surveys will be completed on regenerating stands to determine the suitability for pre-commercial thinning.

7.6 Information and Education

Information and education is one of the key elements to providing 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 ones values and positions is gained. The more we know about other values and their location, the better the ability to mitigate any potential negative impacts. 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. Districts within the zone will continue to educate the general public and engage in meaningful consultations with interested stakeholders where applicable. Annual National Forest Week activities provides a great opportunity for interested individuals to gain a greater understanding of the Provinces' Forest.

Sources of information can include:

- government website
- field trips
- school visits
- information meetings
- general day to day contact

Section 8 Proposed Activities

8.1 Overview

This section will outline all forest activities that will occur on crown land in the zone from 2023-2027, including: proposed commercial and domestic harvesting, silviculture, access road construction, and activities proposed within protected water supply areas.

To present a more comprehensive overview of proposed activities in both Forest Management District 17 & 18, overview maps are presented in the appendices. These maps shows all proposed operating areas so that operations can be viewed from a landscape perspective. Maps of individual operating areas and summary sheets are also presented. The summary sheets give a brief description of each area, the type of activities that will occur and any issues raised and mitigative measures employed.

8.1.1 Allocation of Timber Supply

Tables 11 & 12 below indicates the scheduled proposed forest harvest for the upcoming five year period 2023-2027. Note: the total volume identified maybe over the final AAC for each forest management district, but when scheduling activity, the maximum sustainable harvest over the five year period will not be exceeded.

Table 11 Proposed commercial harvest on Crown Land in District 17 from 2023-2027

	Core Softwood	Operationally Constrained SW	Core Hardwood	Operationally Constrained HW
Commercial AAC	211,000	42,000	250	8
Commercial Harvest	211,000	41,850	0	0
Deviation (+/-)	0	+(150)	+(250)	+(8)
Domestic AAC	116,500	N/A	90	N/A
Domestic Harvest	89,133	0	0	
Deviation (+/-)	+(27,387)	0	+(90)	

Table 12 Proposed harvest on Crown Land in District 18 from 2023-2027 (5 year totals)

Zone	Core Softwood	Operationally Constrained SW	Core HW	Operationally Constrained HW
St Anthony Zone AAC	48,500	N/A	N/A	0
Domestic Harvest in St Anthony Zone	47,510			0
Deviation (+/-)	+(990)			0
Straits Zone AAC	45,000	N/A	N/A	0
Domestic Harvest in Straits Zone	42,414			0
Deviation (+/-)	+(2,586)			0
Central Zone Commercial AAC	234,000	31,000	40	31,000
Commercial Harvest in Central Zone	234,000	15,800	0	15,800
Deviation (+/-)	0	+(15,200)	+(40)	+(15,200)
Central Zone Domestic AAC	40,000	N/A	N/A	N/A
Domestic Harvest in Central Zone	35,516			
Deviation (+/-)	+(3,516)			

8.1.2.1

Commercial

The timber scheduled for commercial harvest in the district is overmature with some small pockets of mature dispersed throughout. This proposed harvest follows the harvest schedule that was used to determine the AAC in Section 3. For commercial operations on Core and Operationally Constrained timber, the first two five year periods are highlighted on the operating area maps. This represents two times the actual proposed harvest. The purpose of including more

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

In FMD 17, There are 237,695 m3 of Core AAC scheduled to be harvested commercially in the next five years (Table 13). The Core AAC of 211,000 will not be exceeded unless the Department can salvage harvest areas that are currently breaking up due to insect mortality and wind throw or large scale mortality occurs across the forest landscape. Based upon current Core AAC's, commercial harvesting will accounts for 64 percent of the total proposed harvest in the district. Approximately ten percent of the commercial harvest will supply the commercial fuelwood demand in the district.

Table 13 Summary of commercial harvest by operating area in District 17 for 2023-2027

Operating Area		**Volume (net m3) by Commercial AAC Source**		
Number	Name	Core Softwood	Operationally Constrained Softwood	Residual Hardwood
CC17050	East Castor	9,540	100	1,100
CC17051	(Alt) Kelly's Pond	2,000	0	240
CC17052	Mt. St. Margret	5,105	0	600
CC17053	Pittman's Pond	1,500	50	150
CC17054	Squid Cove	5,000	500	550
CC17055	Barr Harbour	5,105	0	600
CC17056	Birches	2,315	0	450
CC17057	Eddies Cove West	2,385	0	200
CC17058	Raft Pond	5,575	0	330
CC17059	Jessies Meadows	70,000	0	3,500
CC17060	(Oper Const) Woody Hill	1,000	40,000	2,000
CC17061	(Alt) Site Road	2,650	0	130
CC17062	Bateau Barrens	97,090	0	4,853
CC17063	(Salvage) Western Bluey	5,000	500	600
CC17064	Zinc Mine	7,500	200	800
CC17065	(silvic) Northeast Pond	0	0	0
CC17066	Brig Bay	5,000	500	600
CC17067	Camp Ten	930	0	600
CC17068	Angle Pond	10,000	0	1,200
	Total	**237695**	**41850**	**18503**

In FMD 18, There are 366,825 m3 of commercial timber scheduled to be harvested in the next five years (Table 14). The commercial Core AAC of 234,000 will not be exceeded unless the Department can salvage harvest areas that are currently breaking up due to insect mortality and

wind throw or large scale insect mortality occurs across the forest landscape. Based upon current Core AAC's, commercial harvesting will accounts for 64 percent of the total proposed harvest in the district. Approximately ten percent of the commercial harvest will supply the commercial fuelwood demand in the district.

Table 14 Summary of commercial harvest by operating area for the Central Zone in District 18 for 2023-2027

Operating Area		**Volume (net m3) by Commercial AAC Source**		
Number	Name	Core Softwood	Operationally Constrained Softwood	Residual Hardwood
CC18050	Round Lake	45,000	500	4,500
CC18051	Spring Hill	12,000	0	1,400
CC18052	Brig Bay	8,000	0	960
CC18053	Fox Steady	10,000	100	1,200
CC10854	Mitchells	6,000	500	700
CC18055	Rubes Steady	10,000	500	500
CC18056	Dawes Pond	5,249	100	600
CC18057	Kings Road	3,536	100	180
CC18058	Roddickton	9,072	300	550
CC18059	Five Mile	2,000	0	240
CC18060	Don's Road	8,166	0	500
CC18061	Chris' Road	3,730	0	350
CC18062	Rabbit Pond	7,072	0	350
CC18063	Scammels Pond	14,700	0	700
CC18064	Camp Twenty	58,944	0	5,000
CC18065	Wilbert's Road	8,000	100	900
CC18066	Coates Road	10,000	100	1,000
CC18067	Dog Pond	15,000	500	1,500
	Total	**366,825**	**15,800**	**28,650**

8.1.2.2 Domestic

In FMD 17, There are 111,158 m3 scheduled to be harvested domestically from 2023 to 2027 (Table 15). Harvesting will occur in designated domestic cutting areas and is generally conducted on a small patch cut system. Domestic wood cutters will also be allowed to harvest deadwood and blow down outside of domestic cutting blocks, but not on commercial cutovers or areas designated for no harvest activity All domestic cutting is done under permit which has conditions attached that outline the species, volume, location and utilization standards to be employed. For the most part cutting occurs in winter with extraction by snowmobile

Table 15 Summary of domestic harvest by operating area in District 17 for 2023-2027.

Operating Area		**Volume (net m3) by Domestic AAC Source**		
Number	Name	Core Softwood	Residual Hardwood	Non-AAC Wood
CC17501	Ten Mile Lake	5280	330	990
CC17502	St Margaret's Bay	6952	434	1304
CC17503	Castor River	1320	82	248
CC17504	Otter Pond	3607	225	676
CC17505	Squid Cove	2904	181	544
CC17506	John Mahar Barren	2992	187	561
CC17507	Flat Brook/Sandy Cove	12407	775	2326
CC17508	Middle Arm	1495	93	280
CC17509	Little Brook Pond	2640	165	495
CC17510	Scaffold Marsh	2551	159	478
CC17511	Burnt Head	2992	187	561
CC17512	Bateau Barrens	3432	214	643
CC17513	Belburns	5984	374	1122
CC17514	Daniels Harbour	1319	82	247
CC17515	Portland Creek	2288	143	429
CC17516	Feeder Ridge	3432	214	644
CC17517	Parsons Pond	2112	132	396
CC17518	Parsons Pond Head	4400	275	825
CC17519	Cow Head/St. Paul's	6687	418	1003
CC17520	Mooney	2727	170	511
CC17521	Harbour Deep	175	11	33

CC17522	Camp 10	3607	225	676
CC17523	Forkie Feeder	3520	220	660
CC17524	Torrent River	2200	137	412
CC17525	Fox Road	1935	121	363
CC17526	Raft Pond	175	11	33
	Total	**89,133**	**5,565**	**16460**

In FMD 18, There are 158,038 m3 scheduled to be harvested domestically from 2023 to 2027 (Table 16). Harvesting will occur in designated domestic cutting areas and is generally conducted on a small patch cut system. Domestic wood cutters will also be allowed to harvest deadwood and blow down outside of domestic cutting blocks, but not on commercial cutovers or areas designated for no harvest activity. All domestic cutting is done under permit which has conditions attached which outline the species, volume, location and utilization standards to be employed. For the most part cutting occurs in winter with extraction by snowmobile.

Table 16 Summary of domestic harvest by operating area and zone in District 18 for 2023-2027

Operating Area		**Volume (net m3) by Domestic AAC Source**		
Number	Name	Core Softwood	Residual Hardwood	Non-AAC Wood
St. Anthony Zone				
CC18501	Raleigh/Ship	4839	302	907
CC18502	Second Pond	1847	115	346
CC18503	Stinking	2375	148	445
CC18504	Griquet Road	7743	484	1452
CC18505	Brehat/St	5103	319	957
CC18506	Goose Pond	8184	511	1534
CC18507	Pilgrims Pond	2025	126	380
CC18508	First Pond	967	60	181
CC18509	Pincents	5896	368	1106
CC18510	Goose Cove	1495	93	280
CC18511	Cooks/Boat	2727	170	511
CC18512	St. Anthony	1847	115	346

CC18513	Mount Mer	175	11	33
CC18514	Watson's	352	22	66
CC18515	Big Brook	175	11	33
CC18516	Phil's Pond	352	22	66
CC18517	North West	1408	88	264
	Total St. Anthony Zone	**47,510**	**2,965**	**8,907**
Straits Zone				
CC18518	Big Brook	1144	71	214
CC18519	Green	8360	522	1568
CC18520	Sandy Cove	12,055	753	2260
CC18521	Bear Cove	17,600	1,100	3300
CC18522	Blue Cove	3,255	203	610
	Total Straits Zone	**42,414**	**2,649**	**7952**
Central Zone				
CC18523	Main Brook	6072	379	1138
CC18524	Burnt Village	88	6	15
CC18525	Croque	1584	99	297
CC18526	Conche	3079	192	577
CC18527	Brophy's Pond	88	6	15
CC18528	Coles Pond	1055	66	198
CC18529	Rushey	1760	110	330
CC18530	Shoal Cove	3607	225	676
CC18531	Stennies Hill	265	17	50
CC18532	Beaver Arm	1055	66	198
CC18533	Bushey's Pond	2815	176	528
CC18534	Englee/Big Pond	11,264	704	2112
CC18535	Hancocks Pond	2552	160	478
CC18536	Chimney Bay	967	60	181
CC18537	Wild Cove	265	16	50
	Total Central Zone	**36,516**	**2282**	**6843**
	Domestic Total	**126,440**	**7,896**	**23702**

8.1.2.3 Hardwoods

Throughout the zone, hardwoods (birch) will be harvested during commercial and domestic activity, as birch occurs as a mixture in softwood stands. At this point there are insufficient pure hardwood stands or residual on commercial cutovers to support any commercial hardwood sawlog activity. However, birch is sold commercially as fuelwood

8.1.3 Silviculture

There are three silviculture prescriptions for Zone 8; planting/gap planting including site preparation (herbicide) where required, pre-commercial thinning and commercial/diameter limit thinning. Planting is designed to return a site to a minimum stocking level with the desired species, mainly spruce. There is full planting when there is complete natural regeneration failure and gap planting when a site has some desired regeneration but not enough to meet minimum stocking standards. Pre-commercial thinning is done to reduce the density on overstocked regeneration so that growth can be concentrated on the remaining crop trees and thus reduce the time to harvest. Commercial/diameter limit thinning is done on older stands (25-40 years) and is designed to produce a sawlog crop while salvaging any trees thinned out as pulpwood or fuelwood.

As stated in previous sections, there is a problem with moose browsing in District 17. Browsing affects young balsam fir trees by severely reducing growth rates or killing trees and thus reducing the productivity of some sites to a point where commercial viability is questionable. Part of the silviculture program in the next five years will be designed to mitigate the impacts of moose browsing on sites dominated by balsam fir. The other part of the program is to plant or gap plant sites where competition problems are immanent to get the jump on the competing vegetation. To help achieve both objectives, white spruce is only to be harvested domestically for sawlogs. All other white spruce is to be left as seed trees which are less susceptible to moose browsing.

Potential silviculture treatment areas need to undergo reconnaissance and/or intensive surveys to determine the severity of moose browsing and competition problems. These surveys will be conducted during this five year period but until they are completed, specific locations and treatment amounts cannot be identified. There has been silviculture prescriptions developed however, which will be implemented for specific on the ground conditions. These prescriptions are described below.

Areas that are scheduled for commercial harvest or have been harvested in the past five years (eligible planting areas) are identified on the operating area maps and are candidates for planting or gap planting to black, white or Norway spruce.

1a) If the sites are adequately regenerated to balsam fir then moose browsing is assessed. If browsing or potential browsing is not a problem then the site is left to develop naturally. If browsing or potential browsing is a problem then the site is gap planted to a density of 1000 to 1500 stems per hectare.
1b) If the sites are not regenerated adequately but there is some balsam fir regeneration then the site is gap planted to a density of 1100 to 1500 stems per hectare.
1c) If there is complete regeneration failure the sites are planted to a density of 1500 to 2000 stems per hectare.

If sites which require planting have competing vegetation which may hinder the planting operation and future development of seedlings then they may be treated with herbicide to prepare them for planting. Other sites which are planted but develop a regeneration problem may be treated with herbicide to release seedlings from competing vegetation.
Stands that are candidates for pre-commercial thinning have been identified on operating area maps.

2) If moose browsing is not a problem in the area then the stands are thinned at 10-15 years to a density of 1400 -1600 stems per hectare. If moose browsing is a problem, then stands are thinned at age 20-25 to a density of 1400-1600 stems per hectare so that remaining crop trees are too tall to be browsed by moose.

The silviculture levels used in the timber supply analysis for District 17 is 100 ha of planting and 25 ha of pre-commercial thinning per year. Depending on survey results, it is anticipated that these levels will be surpassed during the planning period.

The silviculture levels used in the timber supply analysis for District 18 is 200 ha of planting and 75 ha of pre-commercial thinning per year. Depending on survey results, it is anticipated that these levels will be surpassed during the planning period.

8.1.4 Primary Access Roads and Bridges

There are 34.2 km of primary forest access roads scheduled to be constructed in District 17 in the next five years (Table 17) 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 12.5 km of reconstruction will be required on various existing resource roads. Operational and winter access roads will also be required and 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 17 Summary of primary access road construction in District 17 for 2023-2027

Operating Area		Length (km)
Number	Name	
CC17050	East Castor	1.5
CC17051	Kelly's Pond	1.0
CC17054	Squid Cove	1.5
CC17058	Raft Pond	0.8
CC17059	Jessies Meadow	3.5

CC17060	Woody Hill	12.2
CC17062	Bateau Barrens	9.5
CC17064	Zinc Mine	2.0
CC17068	Angle Pond	2.2
	Total	**34.2**

There are 34.6 km of primary forest access roads scheduled to be constructed in District 18 in the next five years (Table 18) 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 18.8 km of reconstruction will be required on various existing resource roads. Operational and winter access roads will also be required and 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 18 Summary of primary access road construction in District 18 for 2023-2027.

Operating Area		**Length (km)**
Number	Name	
CC18050	Round Lake	10.5
CC18052	Brig Bay	0.5
CC18053	Fox Steady	1.0
CC18055	Rubes Steady	2.0
CC18056	Dawes Pond	2.0
CC18058	Roddickton Highway	0.6
CC18059	Five Mile Steady	7.5
CC18064	Camp Twenty	4.7
CC18065	Wilbert's Road	3.8
	Total	**32.60**

8.1.5 Activities in Protected Water Supply Areas

FMD 17 - There is one commercial operation scheduled to occur in the Hawkes Bay protected water supply areas (PWSA). There are domestic operations scheduled to occur in protected water supply areas (PWSA) in the following operating areas: Ten Mile Lake CC17501, St Margaret's Bay CC17502, Flat Brook/Sandy Cove CC17507, St. Pauls/Cow Head CC17519, CC17520 Mooney Block, CC17523(a) Forkie Feeder and CC17524 Torrent River. Domestic harvesting in these PWSA will take place in the winter utilizing snowmobiles for extraction. There are wider buffers established inside these PWSA and the pertinent EPG's will be attached to any commercial or domestic permits issued for these areas. There will be continuous monitoring inside these areas and buffers will be flagged to ensure compliance with the guidelines. In addition, a Certificate of Approval under Section 10 of the Environment Act

must be obtained by the Forest Service before any commercial or domestic harvesting commences inside the PWSA.

FMD 18 - There are no commercial operations scheduled to occur in any of the protected water supply areas (PWSA). There is limited domestic activity scheduled in the Griquet Road Grout CC18504, Brehat/St Carrols CC18 505, Green Island Brook CC1859, Sandy Cove CC18520, Blue Cove CC18522, Bushey's Pond CC18533 operating areas. Harvesting in these areas will take place in the winter utilizing snowmobiles for extraction. There are wider buffers established inside these PWSA and the pertinent EPG's will be attached to any domestic permits issued for these areas. There will be continuous monitoring inside these areas and buffers will be flagged to ensure compliance with the guidelines. In addition, a Certificate of Approval under Section 10 of the Environment Act must be obtained by the Forest Service before any domestic harvesting commences inside the PWSA.

Section 9 Plan Administration

9.1 Monitoring

Monitoring of planned activities is critical to ensure objectives and operations are carried out in a manner consistent with various guidelines and provincial and federal legislation. Monitoring occurs at the operational level and the planning level. Forest 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 applicable legislation, cutting permit conditions, and Environmental Protection Guidelines. Permit holders and contractors are also subject to financial penalties if deviations occur.

9.2 Amendments

Changes to an approved Operating Plan may be required occasionally resulting from operational challenges or unforeseen circumstances. These changes are submitted as amendments and must be approved by the Forest Ecosystem Management Division prior to implementation.

There are two types of possible amendments:

1) Internally within the Department of Fisheries and Land Resources, where approval is required by the Forest Ecosystem Management Division. Internal amendments are governed by the following conditions:
    a. 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
    b. 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
    c. 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

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

2) Externally, through the Department of Environment. Any required revisions which are not covered by the above internal requirements must be submitted for Environmental Assessment (EA) in the form of an amendment to the five year operating plan.

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