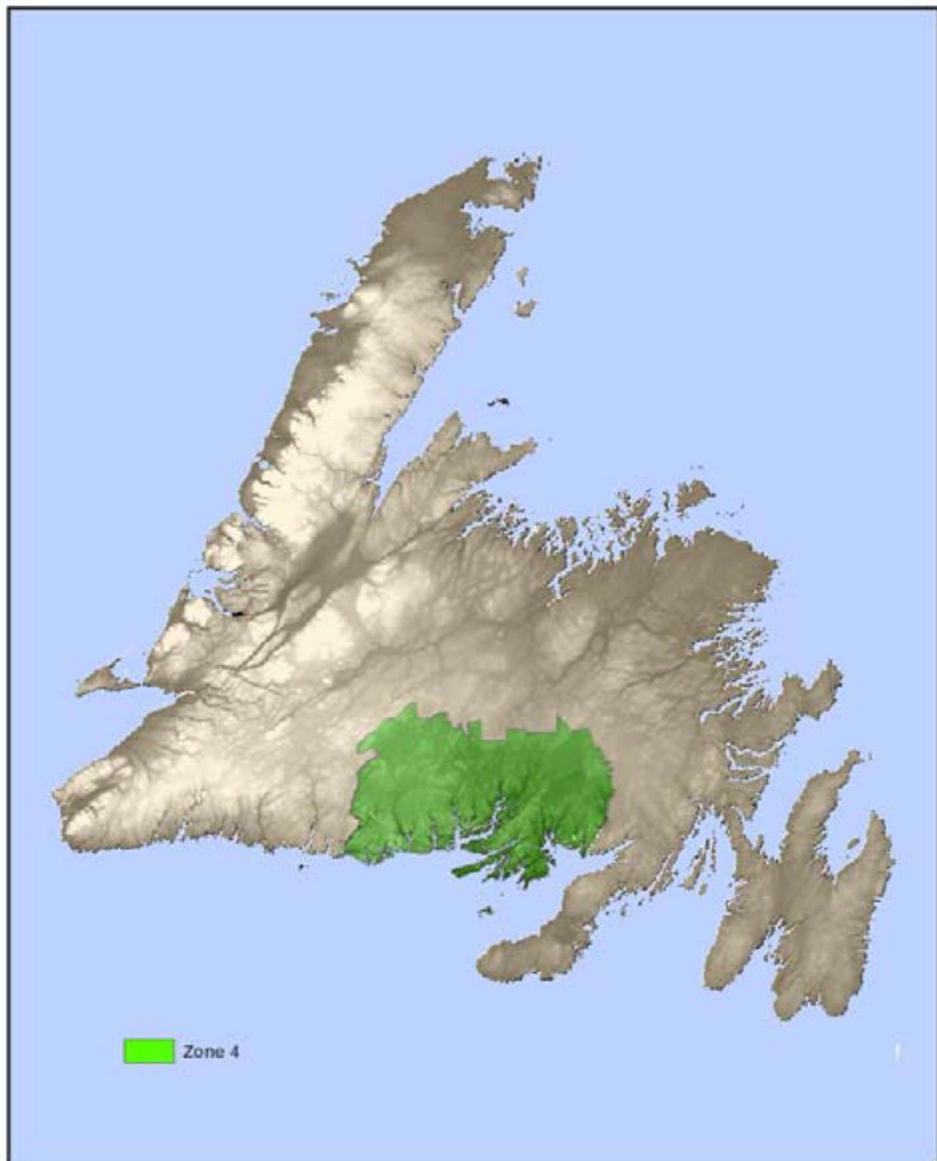


ZONE 4
FOREST MANAGEMENT PLAN
2023 – 2027



Department of Fisheries, Forestry, and Agriculture
Forestry & Wildlife Branch
Regional Services

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INTRODUCTION

This new five-year plan is scheduled for the period January 1, 2023 to December 31, 2027 and represents proposed forestry activity upon crown timber lands within Forest Management District 07. 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.

This document will attempt to fully integrate the presentation of information and discussions for crown land in the zone. 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 Four encompasses Forest Management District 07 (Figure 1). Located on the south coast, the District lies approximately halfway between St. John's and Port-aux-Basques and is also referred as the Bay d'Espoir District. The northern boundary extends to Berry Hill Pond on the Bay d'Espoir highway and to Great Burnt Lake and Meelpaeg Lake in the northwest section of the District. Communities in the District are located along the coast. The main centers include St.Alban's, Milltown, Conne River, Harbour Breton, Belleoram and Hermitage.

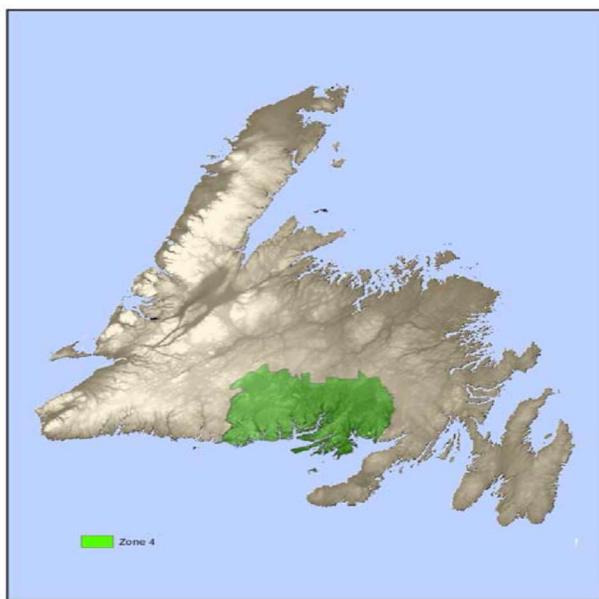


Figure 1: Location of Planning Zone 4

1.1.2 History

The major communities within the District were built around the fishery and forest industries, with the largest, single concentration around the Milltown/St. Alban's area.

1.1.3 Ownership

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

1.2 Physical

1.2.1 Topography and Hydrology

Major watersheds within District 07 include portions of the Bay du Nord River, Long Harbour River, Salmon River, Dolland Brook and Grey River systems

1.2.2 Geology

Characterized by the effects of glaciation with rolling terrain and rock outcrops interspersed with mantles of glacial moraine. Within Canada the zone is described as the Boreal Shield Ecozone under Canada's Ecological Classification System.

1.2.3 Soils

Soils of the boreal forests in District 07 are predominantly classed as podzols although brunisols are also present. Throughout the contrasting areas of exposed bedrock, morainal deposits and low lying sphagnum bogs, this mosaic of soils and non-soils tends to be occupied by a range of plant communities dominated by lichens, shrubs and forbs

1.2.4 Climate

Climatic conditions of this region are heavily influenced by the proximity to the southern currents which result in warm moist air along the coast. Fog is common along coastal areas. Inland cold air masses are prevalent resulting in a cooler climate

1.3 Ecosystems

1.3.1 Forest Ecosystems

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.

1.3.2 Ecoregions and Subregions

Damman 1979, defined ecoregions as areas where comparable vegetation and soil can be found on sites occupying similar topographic positions on the same parent material, provided that these sites have experienced a similar history of disturbance. Thus, an ecoregion cannot be defined in isolation from the physical landscape, but vegetation toposequence, vegetation structure, floristic composition, and floristic distributions can provide the primary criteria. According to Damman, nine ecoregions are represented in Newfoundland. Each of these is further divided into subregions (also known as ecodistricts) All of the Newfoundland ecoregions and subregions contain many of the same ecosystem variables. It is the dominance and variance of these

variables (e.g., vegetation and climate) that determine their classification. Figure 2 depicts Planning Zone 4 relative to Damman's ecoregion classification system.

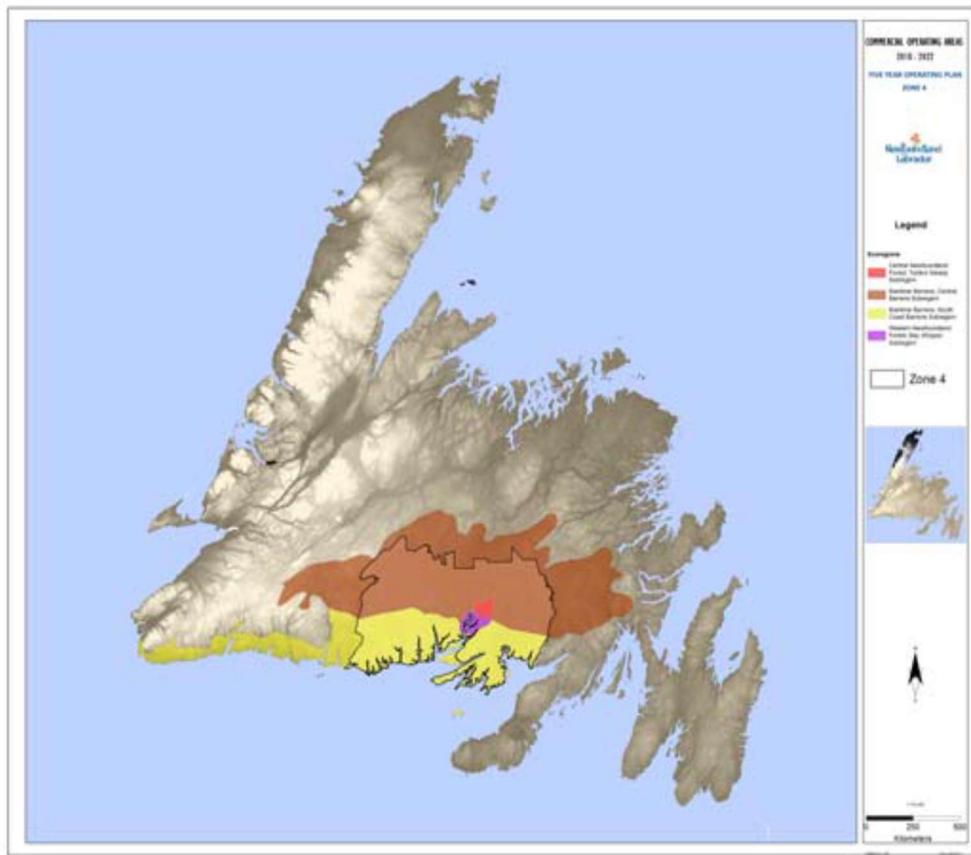


Figure 2: Ecoregions and subregions of Planning Zone 7

1.3.2.1 Central Newfoundland Forest Ecoregion

This ecoregion is located in the north-central part of the island with a small outlet near Bay d'Espoir. The topography is gently rolling to hilly with most elevations between 150 and 450 meters. It has the most continental climate in insular Newfoundland with the warmest summers and coldest winters. It has the least wind and fog of any ecoregion and a growing season of 140-160 days and average precipitation of 900-1300mm. This ecoregion is heavily forested and is the most distinctly boreal part of the island. Balsam fir, black spruce, and to a lesser extent white birch are the dominant tree species. There is an extensive fire history thus fire origin stands of black spruce and white birch cover extensive areas in the northern and eastern portions. Trembling aspen forms local stands after fire but is restricted to the central and northern portion. *Hylocomium*-balsam fir is the zonal forest type and is dominant in areas not disturbed by fire. *Kalmia*-black spruce and *Pleurostium*-balsam fir forests are also common. The *Kalmia*-black

spruce-lichen forests, which occur on outwash sands and gravels, are unique to this ecoregion. Red pine also occurs but is restricted to extremely dry sites.

1.3.2.1.1 Twillick Brook Subregion

This subregion occurs immediately to the north of the Bay d'Espoir Subregion of the Western Newfoundland Forest Ecoregion. Balsam fir is the most common upland cover type.

1.3.2.2 Maritime Barrens Forest Ecoregion

The Maritime Barrens Ecoregion extends from the eastern Peninsulas westward through south-central Newfoundland to Port-aux-Basques. The Maritime Barrens Ecoregion is characterized by cool, foggy and windy summers and relatively mild winters. Intermittent snow cover is common within the coastal portions of this ecoregion but increases in accumulation and duration in the interior barrens. The landscape pattern is one of almost pure Balsam Fir interspersed throughout extensive open heath-land. Productivity of the forest is better on long slopes which occur in infrequent valleys. A natural history of frequent wildfire occurrence in much of this ecoregion has had a significant influence in the development of this largely heath-covered landscape.

1.3.2.2.1 SouthCoast Barrens Subregion

This subregion includes the higher elevations along the south coast of the district that are up to 300 meters in elevation. Snow cover is shallow and arctic-alpine plants occur locally. Yellow birch is present in valleys.

1.3.2.2.2 Central Barrens Subregion

This area occurs south of the Central Newfoundland Forest Ecoregion and north of the South Coast Barrens Subregion. This subregion has warmer summers, less fog and more persistent snow cover than the other subregions in the Maritime Barrens Ecoregion. Forest patches, predominately composed of Balsam Fir Forest, are common throughout the barrens. Fire has played a significant role in the development of the ecology of the Central Barrens Subregion. Within FMD2, this subregion is unique in that it provides the eastern range for the Middle Ridge caribou herd.

1.3.2.3 Western Newfoundland Ecoregion

This Ecoregion is characterized by a humid climate with a relatively long frost-free period. It contains some of the most favorable sites for forest growth in the province. The *Dryopteris-Hylocomium*-Balsam Fir Forest is the dominate forest type of this ecoregion. The absence of prolonged dry periods has excluded fires from all but the most coarse-textured soils. Consequently, balsam fir rather than black spruce is the dominant forest cover type. Yellow birch is common and it displays its best growth in protected valleys below 200 meters in elevation. Red maple is also most common and robust in this ecoregion. On flat coastal areas, extensive plateau bogs occur.

1.3.2.3.1 Bay d'Espoir Subregion

This small outlier of the Western Newfoundland Ecoregion is in a sheltered valley system on the southeast coast. Excellent stands of *Dryopteris*-Balsam Fir forest type dominate the area.

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.

Overall, the total landscape in Planning Zone 4 has approximately 9 percent productive forest. This distribution of productive sites across the landscape and range of productivity within these sites is largely dependent on landscape patterns, climate, and soils. The more productive areas of the zone occur in the lowlands of the river valleys. These areas have deeper soils and less exposed bedrock. The landscape patterns are more consistent and the growing season is longer. In contrast, the southern part of FMD 7 along the coast, have soils that are shallower with bedrock at or near the surface. The terrain in southern and southwestern section is very rough and the growing season is shorter than in the valley lowlands.

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 generally back to the black spruce type with a minor component of balsam fir and some white birch on the better sites. There are two main white birch site types in the zone. The basic difference between them is terrain which impacts site quality. These sites are prone to revert to alder dominated NSR sites in the absence of very hot ground fire as the disturbance mechanism. Consequently the management prescription to ensure productivity on these valuable sites is to plant fast growing softwood species. The medium white birch sites are typically on more level terrain and will revert to white birch /balsam fir or white birch/black spruce after disturbance. Regeneration failure on these sites is low (10 percent). The management prescription to regenerate these site to white birch is to remove the overmature birch in a seed tree cut to provide a seed source for the next rotation of birch. Harvesting of white birch in this zone has traditionally been for firewood purposes with a limited amount used for value added purposes. Evidence from domestic cutting in these types indicates that they will regenerate to mixed wood types dominated by balsam fir and white birch

1.4.1.4.2 Fire

Since black spruce is a fire adapted species, it is not surprising that it is the most prolific regeneration species after fire across all forest types, site types and ecoregions within the zone. It regenerates as pure stands or in combination with white birch. Balsam fir is conspicuously absent after fire because most advanced regeneration in the under story is killed by the fire. Black spruce regeneration is somewhat correlated with the amount present in the pre fire stand. Generally, the higher the component of black spruce in the original stand, the higher the percentage of regeneration to black spruce. In mixed wood stands a higher component of white birch and sometimes trembling aspen is present after fire. Fire in pure hardwood stands can sometimes regenerate to trembling aspen in certain areas. Regeneration failure after fire is on average 20 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, balsam woolly adelgid, balsam fir sawfly, and spruce budworm whereby 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 throw. Mature balsam fir types usually regenerate to balsam fir or to balsam fir hardwood mixtures. Disturbance by insect kill in young balsam fir stands can cause succession to white spruce. Regeneration patterns in mixed wood types usually depend on the type of mixture. If black spruce is a component then it will persist and form part of the new stand. Otherwise balsam fir and balsam fir/hardwood mixtures regenerate after insect attack.

Regeneration failure occurs approximately 20 percent of the time particularly if pure stands of immature balsam fir are killed.

1.4.2 Biodiversity

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

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 mycorrhizal 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 colour, weight and height, are examples of genetic diversity found in humans. Genetic diversity within species is the foundation of all biodiversity. Assessing genetic diversity does not mean tracking every gene in the zone's forest. Responsible planning should design and implement measures which maintain or enhance viable populations of all forest vegetation species and which use the genetic diversity of commercially important species to a maximum benefit. The genetic diversity of commercially important species can also be managed to increase economic benefit from some portions of the landscape while allowing other portions to provide greater social and ecological values. Genetic diversity is the basis by which populations (flora and fauna) can adapt to changing environmental conditions.

1.4.2.3 Ecosystem Diversity

Ecosystem diversity describes the range of natural systems found throughout a region, a country, a continent, or the planet. Wetlands and grasslands are examples of ecosystems in Canada. A complex and intricate mix of plants, animals, micro organisms and the soil, water, and air they occupy create virtually limitless ecosystems around the world.

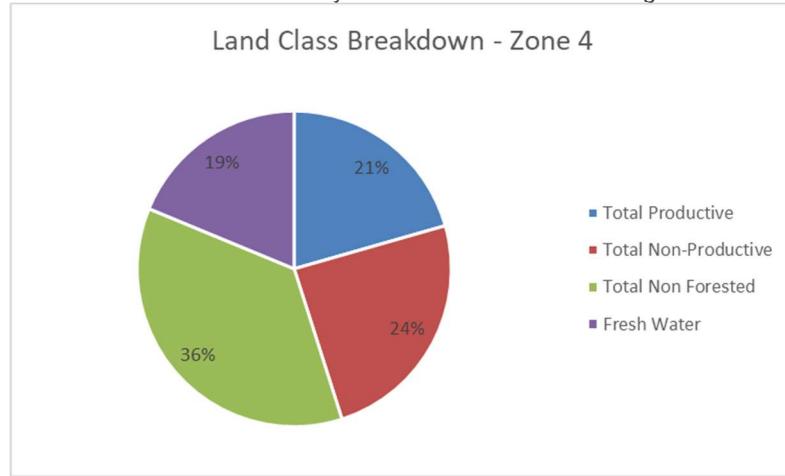
A forest interspersed with barrens, marshes, lakes and ponds provides for diversity across the landscape. Each ecoregion in the province should have representative areas protected which displays the diversity where such exists. These areas can serve as a benchmark from which to measure and guide management decisions. These representative areas protect the integrity of the ecoregion and are vital for guiding management actions. As benchmark areas, they will illustrate the multi-species mosaic that planning actions must maintain.

1.5 Forest Characterization

1.5.1 Land Classification

Table 1 displays the land classification broken down by ownership and district for Planning Zone 4. The total mapped land area in the zone is approximately 450,094 hectares. There are four basic categories that currently represent how the land is classified; productive, non productive, non-forest and fresh water.

Table 1: Land classification by district and area for Planning Zone 4.



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.

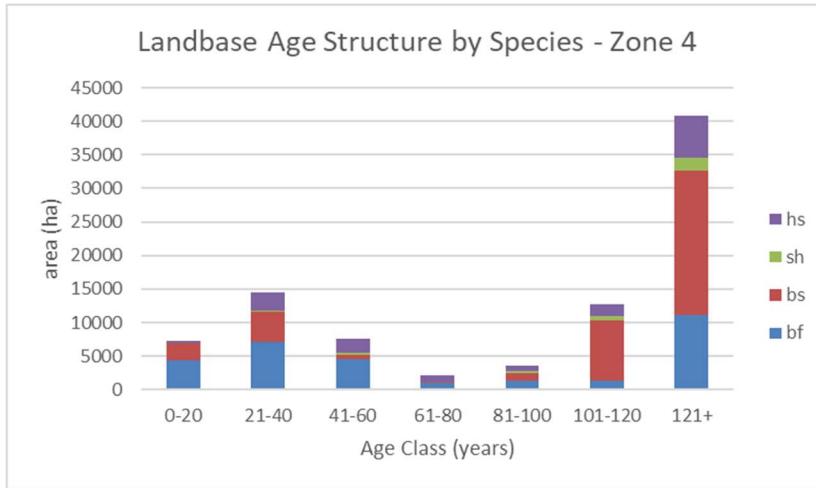


Figure 3: Age class distribution for District 07.

1.5.3 Site Class

The productive forest in the zone is further sub-divided along a gradient of productivity ranging from poor to good site class. The site class is determined through air photo interpretation supplemented with field checks, and is based primarily on the sites ability to produce timber. Site capability is determined on a number of factors including: soil fertility, moisture regime and geographic (slope) position. The distribution of area by site class for each district is shown in Figure 4. On average, good sites are capable of producing 2.6 m³/ha/yr, medium sites 1.7 m³/ha/yr, and poor sites 0.8 m³/ha/yr.

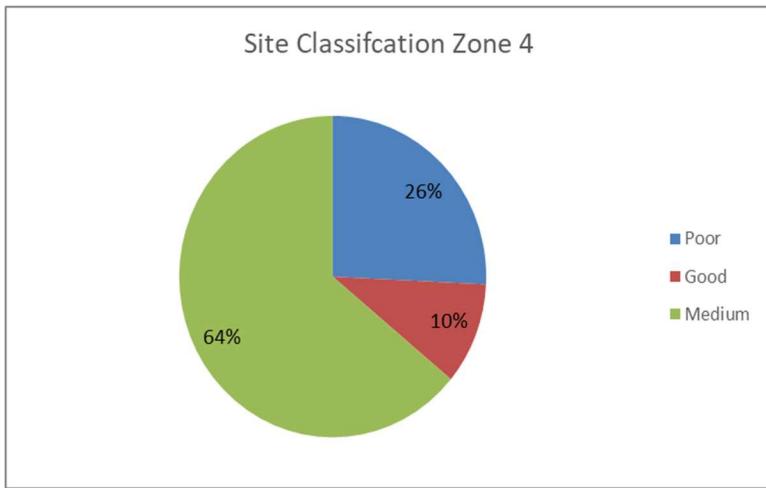


Figure 4: Site class breakdown for District 07.

1.5.4 Species and Working Group

A Working group is a term used to describe 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 as opposed to species composition which specifically describes the relative proportion of each individual tree species that make up a stand.

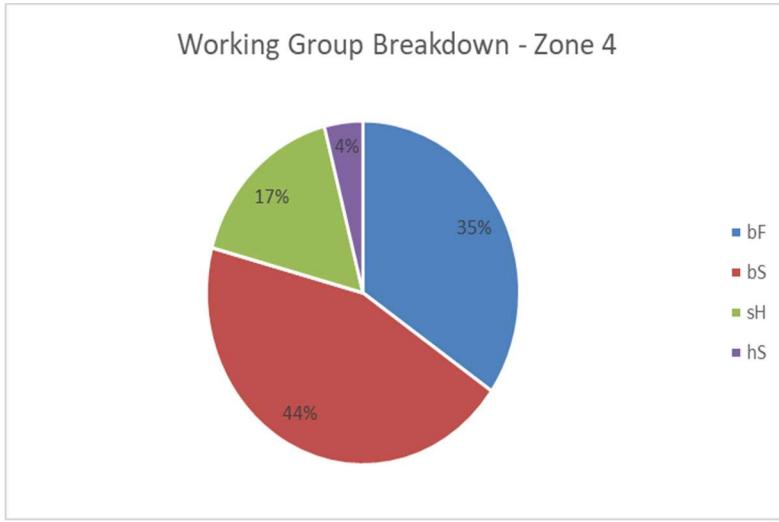


Figure 5: Working group breakdown for District 07.

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.

SECTION 2 PAST ACTIVITIES

2.1 Harvesting

2.1.1 Commercial

Tables 2, summarizes the commercial and some domestic harvest in the zone for the period 2018-2022.

Table 2: 2018- 2022 Commercial Harvest District 07

District 07		Core Landbase				Operational Landbase				Non-AAC Wood	
		Crown	AAC	Commercial	Total	AAC	Commercial	Total	Operational	Regulatory	
SWD	2018		1330								
	2019		1387								
	2020		1346						60		
	2021		1684				911				
	2022		1400								
	Sub-Total		7147				911		60		
		Core Landbase				Operational Landbase				Non-AAC Wood	
HWD	Crown	AAC	Commercial	Total	AAC	Commercial	Total	Operational	Regulatory		
	2018	374									
	2019	340									
	2020	283									
	2021	167									
	2022	250									
	Sub-Total		1414								
District Total			8561				911		60		

2.1.2. Domestic

Tables 3 summarizes the Domestic harvest in the Zone Landbase for the period 2018-2022

Table 3: 2018-2022 Domestic Harvest District 07.

District 02		Domestic Landbase	
Crown		AAC Drain	Non - AAC
SWD	2018	4146	4174
	2019	4570	4556
	2020	3401	5245
	2021	3646	4480
	2022	3700	4700
	Sub-Total	19463	23155
		Domestic Landbase	
HWD	Crown	AAC Drain	Non - AAC
	2018	654	2714
	2019	697	2903
	2020	283	3137
	2021	765	3069
	2022	700	3000
	Sub-Total	3099	14823
District Total		19772	37978

2.2 Silviculture

Table 4 summarizes the completed silviculture treatments in the zone for the period 2018-2022. Due to the shape and small size of commercial harvest area most blocks come back under natural regeneration.

Table 4: 2018-2022 Silviculture treatments District 07.

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

2.3 Road Construction

Table 5 summarizes forest access road construction in the zone for the period 2018-2022

Table 5: 2018-2022 Road Construction District 07

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

2.4 Natural Disturbance

2.4.1 Fire

This zone has had a very infrequent fire history due to its relatively long winters and abundant precipitation. There were no significant fires during the last planning period. During the period 2018-2021, were 7 reported fires that burned approximately 40 hectares.

2.4.2 Insect

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

SECTION 3 TIMBER SUPPLY ANALYSIS

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 are 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 require 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 evaluate:

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. Class 1 - available for harvest under normal operating conditions
- ii. Class 3 – 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. Class 5 – 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 class 1 landbase only. The class 3 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 Forest Targets

Within the woodsupply 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.

There will be no thinning levels (ha) for districts while planting levels (ha) used in the analysis were 50ha 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 woodsupply analysis.

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

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.

3.5.4 Stand Remnants

Following harvesting operations, small fragments of stands often are left for a variety of reasons (operational constraints, low volume stands, terrain conditions). These often result in the inability of the operator to achieve volumes predicted by the computer models. Surveys were conducted across the province and the results analyzed to determine the amount of productive area attributed to remnants. The total inventory adjustment for Forest Management Districts 09 and 16 was 18 percent.

3.6 Results

The results of the timber supply analysis for Forest Management District 07 for the period 2023-2027 is shown in Table 6.

Table 6: Annual Allowable Cut Zone 7 2023-2027

	Annual Allowable Cut Volume (m ³)		
	Core Softwood	Operational Softwood	Domestic Softwood
DISTRICT 07	20,280	4,914	0

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	<p>Description: Why the value is important, types of activities, intensity, spatial extent, employment, etc.</p> <p>Data in support: Statistical references</p>
Critical Elements	Forest Features: Elements at risk from harvesting or enhanced by harvesting (viewscapes, adjacency to water, mountains, habitat, wilderness ambience, road Access, etc.)
Guiding Principles	<p>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:</p> <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none">• 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• 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	<ul style="list-style-type: none">• Habitat<ul style="list-style-type: none">○ 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-serial 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<ul style="list-style-type: none">○ Recently harvested large scale areas can be low quality moose habitat as forage and cover are removed. 5+ 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<ul style="list-style-type: none">○ 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none"> ○ 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. 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. ○ 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	<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> Caribou populations are monitored and assessed on a regular basis via <ul style="list-style-type: none"> 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. 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.
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4.1.1.1.3 Black Bear

BLACK BEAR	
Characterization	<ul style="list-style-type: none"> The black bear is native to the island and is found in forested areas. 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). 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	<ul style="list-style-type: none"> Heavily wooded areas with dense bush intercepted with smaller clearings or early successional seral stages represent suitable habitat for black bears.
Guiding Principles	<ul style="list-style-type: none"> A 50-metre undisturbed buffer must be maintained around known bear den sites (winter) or those encountered during harvesting.

4.1.1.2 Furbearers

FURBEARERS	
Characterization	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> The Wildlife Division develops and implements an annual <i>Furbearer Management Strategy</i>. 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).
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4.1.1.3 Species of Interest

4.1.1.3.1 American Marten

AMERICAN MARTEN	
Characterization	<p>In 1986, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessed the Newfoundland population of the american marten and the species was listed as threatened. Revisions in 1996 and 2000 resulted in an uplisting to “endangered” due to further declines. Habitat loss, trapping and incidental snaring are possible reasons for the marten population decline. 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 <i>Species at Risk Act</i> and provincial <i>Endangered Species Act</i>.</p> <p>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).</p>
Critical Elements	<ul style="list-style-type: none"> • 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	<p>These guiding principles are put in place to further recovery of the Newfoundland Marten and allow for forest harvesting.</p> <ul style="list-style-type: none"> • 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.
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4.1.1.3.2 Rare Plants

RARE PLANTS	
Characterization	
	<ul style="list-style-type: none"> • 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. • 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.

	<ul style="list-style-type: none"> Currently, 27 plant and 3 lichen species are listed under the <i>Endangered Species Act</i>, 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	<ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> quarrying and road construction logging and extraction using heavy equipment mechanical site preparation all terrain vehicle traffic prescribed burning stand conversion to different tree species and/or earlier seral stages
Guiding Principles	<ul style="list-style-type: none"> Work with the Wildlife Division to educate forestry Personnel and develop mitigative measures in areas where rare plants occur. Identify and update all rare plant sites on GIS forestry data base 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.
Critical Elements	<ul style="list-style-type: none"> • Habitat <ul style="list-style-type: none"> ◦ maintenance of habitat • Breeding <ul style="list-style-type: none"> ◦ disturbance of waterfowl during the brood rearing, breeding, and staging period
Guiding Principles	<ul style="list-style-type: none"> • Habitat <ul style="list-style-type: none"> ◦ 50-metre treed buffer will be established around designated sensitive waterfowl areas. • Breeding <ul style="list-style-type: none"> ◦ 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	<ul style="list-style-type: none"> • Road construction / maintenance, Timber harvesting, and Silviculture <ul style="list-style-type: none"> ◦ 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 Watersupply Areas (PPWSA) <ul style="list-style-type: none"> ◦ 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 <ul style="list-style-type: none"> ◦ 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	<ul style="list-style-type: none"> • Road Construction <ul style="list-style-type: none"> ◦ 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

	<ul style="list-style-type: none"> ○ 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. ○ Buffers inside PPWSAs vary and are applied using Policy 95-01 (Policy for Land and Water Related Developments in Protected Public Water Supply Areas) ○ Extraction trails and landings shall not be established within 30 metres of a waterbody ○ 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. ○ All buffers may be increased inside PPWSAs. ○ Where possible, a closure plan will be identified at the end of Forestry activity to minimize access. <ul style="list-style-type: none"> ● Storage and handling of fuels <ul style="list-style-type: none"> ○ No heavy equipment or machinery is to be refueled, serviced, or washed within 30 metres of a waterbody. ○ Gasoline or lubricant depots must be placed at least 100 metres from the nearest waterbody ○ All fuel-storage tanks must be registered with Digital Government and Service NL ○ Used oil storage, handling and disposal is to comply with the Used Oil Control Regulations, NLR, 82/02 under the Environmental Protection Act. ○ Contaminated soil or snow must be disposed of at an approved treatment facility ● Protected Public Watersupply Areas (PPWSA) <ul style="list-style-type: none"> ○ 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. ○ Approvals required include: <ul style="list-style-type: none"> ■ 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. ○ Buffers inside PPWSAs vary and are applied using Policy 95-01 (Policy for Land and Water Related Developments in Protected Public Water Supply Areas) ○ Refueling must not take place within 150 meters of an intake pond. ○ Fuel storage tanks approved by Digital Government and Service NL must be located at a minimum distance of 500 meters from any major waterbody. ○ A fuel or oil spill clean-up kit must be kept on site to facilitate any clean-up in the event of a spill.
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	<ul style="list-style-type: none"> ○ Policy Directive 95-01 (Land and Water Related Developments in PPWSAs) shall apply ● Working in and within 15 metres of a waterbody <ul style="list-style-type: none"> ○ 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; <ul style="list-style-type: none"> ▪ 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.
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4.1.2 Human Values

4.1.2.1 Timber Resource

TIMBER RESOURCE	
Characterization	<p>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.</p> <p>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.</p>

	<p>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.</p> <p>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.</p> <p>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.</p>
Critical Elements	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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.
Critical Elements	<ul style="list-style-type: none"> • Landbase <ul style="list-style-type: none"> ○ 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. ○ 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 <ul style="list-style-type: none"> ○ When approval is granted for an agricultural lease, the land needs to be cleared and prepared for production
Guiding Principles	<ul style="list-style-type: none"> • Landbase <ul style="list-style-type: none"> ○ 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. ○ Agricultural Development is still considered for areas falling outside established AOI's • Operational Requirements <ul style="list-style-type: none"> ○ 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. ○ Where possible, existing commercial forest operators should be encouraged to work with farmers to clear new land for development. ○ 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 ○ 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	<p>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.</p> <p>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.</p> <p>Mineral exploration takes place province-wide and is a significant contributor to the provincial economy, particularly in rural areas.</p> <p>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.</p> <p>There are a number of active mines in the province at any given time and mining represents a major component of the provincial economy.</p>
Critical Elements	<ul style="list-style-type: none"> • Forest Ecosystem <ul style="list-style-type: none"> ○ 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 <ul style="list-style-type: none"> ○ 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	<ul style="list-style-type: none"> • Forest Ecosystem <ul style="list-style-type: none"> ○ 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.

	<ul style="list-style-type: none"> ● Utilization of Timber Resource <ul style="list-style-type: none"> ○ 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: <ul style="list-style-type: none"> ○ 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
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	<p>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</p> <ul style="list-style-type: none"> • The guiding principles for Forest Ecosystem, Utilization of Timber Resource, and additional comments will apply to all crown operations within the province
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4.1.2.4 Historic Resources

HISTORIC RESOURCES	
Characterization	<p>The provincial archaeology 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.</p> <p>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.</p>
Critical Elements	<ul style="list-style-type: none"> • Protection <ul style="list-style-type: none"> ○ 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. ○ 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	<ul style="list-style-type: none"> • Protection <ul style="list-style-type: none"> ○ 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.

	<ul style="list-style-type: none"> ○ 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. <ul style="list-style-type: none"> ● The guiding principles for Protection during forest Harvesting will apply to all crown operations within the province.
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4.1.2.5 Newfoundland T'Railway

NEWFOUNDLAND T'RAILWAY	
Characterization	The T'Railway is a linear park approximately 850 km in length, comprising the former CNR right of way, which varies from 25 to 100 feet each side of the center line. It provides for an all season, multi-use recreation corridor and is developed and managed with Parks and Natural Areas Division in conjunction with the T'Railway Council. The <i>Provincial Parks Act</i> provides the legislative framework for the administration and management of the T'Railway and is protected for present and future enjoyment of the public. The T'Railway constitutes the province's contribution to the Trans Canada Trail System and is used primarily by snowmobile and all-terrain vehicles. Industrial or traditional uses such as: commercial and domestic harvesting, quarry and mining access and cabin access are also granted with a special permit.
Critical Elements	<ul style="list-style-type: none"> ● Protection <ul style="list-style-type: none"> ○ protection of the historical landscape integrity of the T'Railway corridor ○ preservation of the scenic quality along the corridor ● Operational <ul style="list-style-type: none"> ○ Regulating land usage adjacent to the T'Railway
Guiding Principles	<ul style="list-style-type: none"> ● Protection <ul style="list-style-type: none"> ○ co-ordination of activities with various other agencies responsible for land management outside the T'Railway corridor to ensure that the integrity of the park is maintained ○ build partnerships with other stakeholders and user groups such as communities, industry and recreational organizations for the long term maintenance and development of the T'Railway ○ Establishment of a 100 meter buffer along the right-of-way corridor to preserve the natural value of the T'Railway. Also, consider viewscapes in forestry management plans. ○ where access is required, any landings or turnaround areas shall be 100 meters or more along the resource roads from the T'Railway. ● Operational

	<ul style="list-style-type: none"> ○ where feasible and possible, Forestry Activity utilizing the T'Railway will avoid peak snowmobile and ATV seasons. ○ Applicable permits will be obtained for use of vehicular and heavy equipment on the T'railway ● The guiding principles for Protection and operational requirements will apply to all crown operations within the province.
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4.1.2.6 Parks and Protected Areas

PARKS AND PROTECTED AREAS	
Characterization	<p>There are several different types of conservation areas in the province contributing to the provincial system of protected areas.</p> <ul style="list-style-type: none"> ○ 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 <i>Wilderness and Ecological Reserves Act</i>. ○ Provincial Parks established under the <i>Provincial Parks Act</i>, 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 <i>Wildlife Act</i> for the protection of specific species or habitats. ○ Public or Crown Reserves may be established for conservation reasons under the <i>Lands Act</i>. ○ National Parks such as Terra Nova, Gros Morne and Torngat Mountains are established under the federal <i>National Parks Act</i>. <p>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.</p>
Critical Elements	<ul style="list-style-type: none"> ● Protection <ul style="list-style-type: none"> ○ preservation of biodiversity ○ maintenance of protected area integrity ○ maintain natural processes and features ● Operational <ul style="list-style-type: none"> ○ Forestry activity occurring around Parks and Protected Areas.
Guiding Principles	<ul style="list-style-type: none"> ● Protection <ul style="list-style-type: none"> ○ Some protected areas prohibit new development such as mining activity, hydroelectric projects, forestry activity, agriculture activity, roads/trails, cabins and new structures;

	<ul style="list-style-type: none"> ○ 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 <ul style="list-style-type: none"> ○ 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 kilometre 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.
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4.1.2.7 Outfitting

OUTFITTING	
Characterization	<p>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.</p> <p>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.</p> <p>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.</p>
Critical Elements	<ul style="list-style-type: none"> ● Resource Roads <ul style="list-style-type: none"> ○ 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.

	<ul style="list-style-type: none"> ○ With improved road access, there is also a potential for increased cottage development, which can also impact both remoteness and wildlife availability. ● Visual <ul style="list-style-type: none"> ○ 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. ○ 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. ○ Viewscapes become even more important as outfitters begin diversification into non-consumptive tourism activities. ● Wildlife <ul style="list-style-type: none"> ○ 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. ○ 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	<ul style="list-style-type: none"> ● Resource Roads <ul style="list-style-type: none"> ○ Where possible, new access roads will be strategically located away from an outfitter's existing main outfitting Lodge. ○ Consideration will be given to decommissioning roads and bridges (where possible) after harvesting is completed, which will help reduce possibilities of increased hunting pressure. ○ When roads are in use actively for harvesting purposes, access to hunters could be restricted or limited. ○ 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 outfitter's main lodge. ● Visual <ul style="list-style-type: none"> ○ 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. ○ Environmental Management System (EMS), developed procedures for: <ul style="list-style-type: none"> ▪ Ensuring all garbage is removed from the harvest area. ▪ Appropriate stream and wildlife buffers are implemented and maintained ● Wildlife <ul style="list-style-type: none"> ○ All forestry Plans are reviewed by the Wildlife Branch.

	<ul style="list-style-type: none"> ○ 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 <ul style="list-style-type: none"> ○ 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.
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4.1.2.8 Tourism / Recreation

TOURISM / RECREATION	
Characterization	<p>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.</p> <p>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.</p>
Critical Elements	<ul style="list-style-type: none"> ● Wilderness <ul style="list-style-type: none"> ○ 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 <ul style="list-style-type: none"> ○ 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.

	<p>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.</p> <ul style="list-style-type: none"> Viewscapes <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Wilderness <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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. Viewscape analysis using computer modelling has been completed in areas along the Exploits River and the Trans Canada Highway to minimize the initial visual effects of Forest Harvesting. 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:

- 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.
- There will be no cutting buffer within 100 meters of the Newfoundland T'Railway.
- There will be no cutting buffer within 100 meters of a cabin development area and 30 meters of an approved cabin.
- Scheduled salmon rivers will be evaluated on a site-by-site basis and buffers will vary in width from 30 -100 meters.
- 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.

Results of consultation process for the development if this Five year plan as described in section 6 are presented below:

Community	Issue / Concern	Action for Forestry
St. Alban's	does not want harvesting in water supply	no harvesting will take place in PWSA with out consulting water resourece and town
St. Joseph's Cove - Local Service District		
Milltown - Head of Bay d'Espoir	does not want harvesting in water supply	no harvesting will take place in PWSA with out consulting water resourece and town
Morrisville		
Conne River		
Pool's Cove		
Rencontre East		
Belleoram		
St. Jacques - Coomb's Cove		
Harbour Breton	does not want any harvesting in town limits and 5 km no harvest buffer on town limits.	Town boundary will be removed form domestic harvest area. Can not agree to 5km buffer.
Hermitage - Sandyville		
Seal Cove, F. Bay		
Gaultois		
McCallum - Local Service District	Wanted to make sure domestic harvesting could still take place East of block 07-31	Explained that domestic harvesting was allowed and area is include in block 07-30
Francois - Local Service District		
Grey River - Local Service District		

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."	A shellfish operation is located in this zone (Connaigre Fish Farms), but no proposed domestic or commercial areas proposed within the vicinity. No further action
Water Resources Management Division	1) FMD 7 contain some (5-7) very small PPWSAs that we consider to be high risk and therefore would not permit any activity inside. Also, some of these PPWSAs are located within municipal boundaries and the communities are unlikely to allow forest harvesting.	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) One operational area overlaps a small section of the Gander River 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
Forestry and Wildlife Branch	1) the Bay D'Espoir area has one of the highest conservation concerns when it comes to lichen presence on the Island.	Work with Wildlife staff to develop proper Lichen Survey procedures. The 2023 EPG's will have procedures for Lichen Surveys
	2) A SWA is proposed within a portion of the Twin Brooks Operating Area (CC07-010), avoid cutting within the SWA is being requested.	Forestry activity within the proposed SWA boundary in CC07-010 will be deferred for this plan
Mineral Lands Division	1) No concerns with domestic cutting areas or Proposed Roads	
	2) Except for 4_2023_2027_CC07006 and some areas southwest and northeast of Conne River, all of the proposed commercial cutting areas are overlapped by mineral licences	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) The southern half of 4_2023_2027_CC07017 corresponds to an area of active exploration where exploration activities such as drilling, trenching, and the cutting of survey lines have been approved and such activities are expected to be proposed again in this area in future (see attached KMZ for approximate outline). A higher than average level of exploration activity should be expected for the northern half of 4_2023_2027_CC07017	
	4) 4_2023_2027_CC07014: There is a 3 hectare area covered by quarry permit located in the southern portion and two areas covered by a quarry permit and quarry lease, respectively, for a combined area of almost 12 hectares, in the central portion. In both cases, commercial cutting plots are proposed immediately adjacent to existing quarry workings.	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) No concerns with any of the proposed activity. Note that domestic harvest proposed for Zone 4-FMD 7 in Facheaux Bay proposed ecological reserve is permitted, as these domestic harvest blocks pre-existed the proposed reserve and were approved in previous 5-yr plans.	No further action required
Agriculture and Lands		
Tourism Product Development		

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
Amalijek Lodge
Brophy & Sons Outfitters (Leander Lake Lodge)
Efford's Hunting Adventures (Steele Lake Lodge)
Grey Lake East Outfitters Ltd.
Grey River Lodge
Ironbound Outfitters
Kaegudeck Lake Lodge
Lake Douglas Hunting and Fishing Inc. (Little Caribou Lake Lodge)
Woodman's 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
St. Alban's
St. Joseph's Cove - Local Service District
Milltown - Head of Bay d'Espoir
Morrisville
Conne River
Pool's Cove
Rencontre East
Belleoram
St. Jacques - Coomb's Cove
Harbour Breton
Hermitage - Sandyville
Seal Cove, F. Bay
Gaultois
McCallum - Local Service District
Francois - Local Service District
Grey River - Local Service District

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

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 silviculturally treated as salvage harvest. These areas / stands will be identified on the ground and royalty rates may reflect salvage rates.

7.1.2 Domestic

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 200m³

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 precommercial 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, berrypicking, 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 be 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.

FFA 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 on the entire district an overview map is presented in the Appendices. This map 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

Table 7 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 the zone, but when scheduling activity, the maximum sustainable harvest over the five year period will not be exceeded.

Table 7: Proposed forest harvest in Zone 4 from 2023-2027

	Core Softwood	Oper. Constrained
Commercial AAC	101,400	24,570
Commercial Harvest	161,913	19,450
Deviation (+/-)	+ 60,513	- 5,120

8.1.1.1 Commercial

The timber scheduled for commercial harvest in the district is overmature with some small pockets of mature dispersed throughout. This proposed harvest approximates the harvest schedule that was used to determine the AAC. The allocated operating area and associated harvest volumes represent as much as two times the actual proposed harvest. The purpose of including more volume than is actually proposed is to allow for operational flexibility and inventory deviations within operating areas without having to constantly amend the plan. These operations occur manually or mechanically using conventional harvesting equipment such as chainsaws, shortwood harvesters, skidders and forwarders and are conducted year round. The more

sensitive sites are usually harvested in winter and most operations are integrated utilizing sawlogs, pulpwood and fuelwood.

Table 8: FMD 07 Potential Commercial Harvesting from 2023 to 2027

Operating Area					Volume Harvested (m ³)							
					Softwood			Hardwood				
Number	Name	Tenure	Area (ha)	Number of Permits	Core	Operational Constrained	Sub-total	Non AAC wood	Core	Operational Constrained	Sub-total	Non AAC Wood
CC07001	North Salmon	Crown	2,039		16,050	1,700			590			1,400.00
CC07002	Diversion	Crown	1,007		5,200	0			415			550.00
CC07003	Domshell Ridge	Crown	1,136		16,200	900			0			1,100.00
CC07004	Cold Spring Pond	Crown	670		4,450	0			0			300.00
CC07005	Bailey Bridge	Crown	257		7,650	250			0			800.00
CC07006	Long Pond	Crown	121		2,000	0			0			700.00
CC07007	Swanger Cove	Crown	1,079		10,750	1,500			1,800			3,300.00
CC07008	Forebay	Crown	785		9,300	300			1,400			2,700.00
CC07009	North Salmon 2	Crown	2,276		10,450	4,400			0			1,500.00
CC07010	Twin Brooks	Crown	1,037		250	0			0			70.00
CC07011	Mill Pond	Crown	498		13	0			0			0.00
CC07012	Camp 6	Crown	520		5,950	0			0			750.00
CC07014	Camp 4	Crown	2,706		7,400	6,600			290			1,000.00
CC07016	Conne Ridge	Crown	7,916		40,650	2,000			28,900			13,300.00
CC07017	Little River	Crown	1,947		25,600	1,800			4,400			9,200.00
Sub-Total			23,994	0	161,913	19,450	0	0	37,795	0	0	36,670

8.1.2.2 Domestic

Harvesting will occur in designated domestic cutting areas and is generally conducted on a small patch cut system. 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. All domestic cutting is done under permit which has conditions attached that outline the species, volume, location and utilization standards to be employed. Most cutting occurs in fall and winter with extraction by snowmobile or ATV. Domestic permit allocation is 23 m³.

Table 9: FMD 07 Proposed Domestic Harvesting From 2023 to 2027

Operating Area				Number of Permits		Estimated Volume	
Number	Name	Tenure	Total Area (ha)	Commercial	Domestic	Softwood	Hardwood
CC07502	Tangle Pond	Crown	6,858		15	224	45
CC07504	Seven Island Pond	Crown	17,424		85	1271	255
CC07505	Salmon River	Crown	10,170		80	1196	240
CC07506	St. Albans	Crown	14,777		495	7400	1485
CC07507	St. Joseph's Cove	Crown	5,488		445	6653	1335
CC07508	Burnt Jacket	Crown	13,755		70	1047	210
CC07509	Hd Bayd'espoir	Crown	3,560		195	2915	585
CC07511	Twin Brooks	Crown	7,578		70	1046	210
CC07513	Twillick Brook	Crown	13,818		130	1943	390
CC07514	Spruce Pond	Crown	22,943		75	1121	224
CC07518	Camp One	Crown	5,806		160	2392	480
CC07519	Milltown	Crown	3,524		345	5158	1035
CC07522	Little River	Crown	5,064		0	0	0
CC07523	Hr. Breton Road	Crown	32,942		25	374	75
CC07524	Pool's Cove	Crown	27,675		420	6279	1245
CC07525	Rencontre East	Crown	22,747		40	598	121
CC07526	Belleoram	Crown	22,023		565	8447	1695
CC07527	Harbour Breton	Crown	19,767		270	4037	810
CC07528	Hermitage	Crown	19,562		515	7699	1545
CC07529	Gaultois	Crown	29,604		65	972	180
CC07530	Macallum	Crown	49,499		60	897	60
CC07531	Gray River	Crown	85,885		20	299	60
CC07532	Bois Island	Crown	31,805		5	75	0
<i>Sub-total</i>							
<i>Grand-total</i>				472,274	4150	62041.75	12285

8.1.2.3 Hardwoods

This domestic harvest of birch occurs as a mixture in softwood stands and is utilized as fuelwood. The commercial hardwood harvest is for sawlogs and fuelwood and occurs in some pure stands but mostly as residual in hardwood/softwood and softwood/hardwood stands.

8.1.3 Silviculture

Potential silvicultural treatment areas need to undergo reconnaissance and / or intensive surveys to determine the regeneration level and severity adelgid attack. Such surveys will be conducted during this five year period but until they are completed, specific locations and treatment amounts cannot be identified. However, silviculture prescriptions have been developed for implementation on specific site conditions. Areas that are scheduled for commercial harvest or have been harvested are identified on the operating area maps and are candidates for planting or gap planting to black, white or Norway spruce. These areas will undergo reconnaissance and or intensive regeneration surveys to determine the need for planting and the presence of adelgid.

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

Table 10: FMD 07 Proposed Silviculture treatment 2023-2027.

Treatment	Operating Area Number	Operating Area Name	Area (ha)
<i>Precommercial Thinning</i>			
Sub-Total			0
	CC07001	North Salmon	20
	CC07002	Diversion	20
	CC07003	Domshell Ridge	20
	CC07004	Cold Spring Pond	20
	CC07005	Bailey Bridge	10
	CC07006	Long Pond	20
	CC07007	Swanger Cove	20
	CC07008	Forebay	
	CC07009	North Salmon 2	20
	CC07010	Twin Brooks	20
	CC07011	Mill Pond	20
	CC07012	Camp 6	2
	CC07014	Camp 4	20
	CC07016	Conne Ridge	20
	CC07017	Little River	20
Sub-Total			252
<i>Scarification</i>			
Sub-Total			0
<i>Other</i>			
Sub-Total			0
Grand-Total			252

8.1.4 Primary Access Roads and Bridges

There are 49 km of new forest access roads scheduled to be constructed within the zone for the next five years to access timber for commercial purposes. All roads will be built to the specifications of the Class C, C-2 standards and all pertinent EPG's will be followed. In addition, secondary, operational and winter access roads and upgrading of existing road will be required and will be submitted in the annual operating plan prior to the year that they are planned to be built. As well, referrals will be sent to all relevant agencies (including DFO and Water Resources Division) before any construction is initiated.

Table 11: FMD 07 Proposed Road Construction for 2023 to 2027.

Operating Area		Construction/ Reconstruction	Length (km)	Water Crossings	
Name	Number			Culvert	Bridge
North Salmon	CC7001	Construction	9.00	2	
Domshell Ridge	CC07003	Construction	1.45		
Bailey Bridge	CC07005	Construction	1.10		
Swanger Cove	CC07007	Construction	1.50		
Swanger Cove	CC07007	Reconstruction	7.75	3	
Forebay	CC07008	Construction	5.05		
North Salmon 2	CC07009	Construction	11.55	1	
Twin Brooks	CC07010	Construction	15.50	3	
Twin Brooks	CC07010	Reconstruction	0.55		
Mill Pond	CC07011	Reconstruction	2.10	1	
Camp 6	CC07012	Construction	2.80		
Sub-total			49.35	10	0

8.1.5 Activities in Protected Water Supply Areas

Larger buffers are established inside 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. All activity within a PPWSA must be approved by the Department of Environment.

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 than 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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