



Five Year Operating Plan

Forest Management District 20



(Sandwich Bay, Labrador)

Operating Period

January 01, 2020 - December 31, 2024

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Table of Contents

LIST OF FIGURES	v
LIST OF TABLES	v
EXECUTIVE SUMMARY	vi
1.0 INTRODUCTION	1
2.0 LANDBASE DESCRIPTION	2
2.1 General	2
2.1.1 Location	2
2.1.2 History	2
2.1.3 Ownership	3
2.2 Physical Description	3
2.2.1 Topography and Hydrology	3
2.2.2 Geology	4
2.2.3 Soils	4
2.2.4 Climate	4
2.3 Ecological Characteristics	4
2.3.1 Ecosystem Description	4
2.3.2 Ecosystem Condition and Productivity	5
2.3.3 Productivity	5
2.3.4 Resilience	7
2.3.5 Stability	7
2.3.6 Disturbance Regimes and Successional Patterns	7
2.3.7 Biodiversity	8
2.3.8 Species Diversity	9
2.3.9 Genetic Diversity	9
2.3.10 Landscape Diversity	9
2.4 Forest Characterization	9
2.4.1 Land Classification	9
2.4.2 Forest Profile	14
3.0 TIMBER SUPPLY ANALYSIS	16
3.1 Methodology	16
3.2 Forest Profile Dynamics	17
3.3 AAC Adjustments	18
3.4 GMV Volume Adjustments	18
3.5 Spatial Blocking Adjustments	18
3.7 Harvest Profile	19
4.0 RESOURCE VALUES	19
4.1 Values Structure	19
4.1.1 Hunting and Trapping	19
4.1.2 Cabin Development	19
4.1.3 Historical Resources	19
4.1.4 Trans-Labrador Highway	20
4.2 Values Mitigations and Monitoring Requirements	20
5.0 MANAGEMENT GOALS, OBJECTIVES AND STRATEGIES	22
5.1 Harvesting	22

5.2	Commercial	22
5.3	Domestic.....	22
5.4	Hardwoods	22
5.5	Silviculture	23
5.5.1	Forest Renewal	23
5.5.2	Forest Improvements	23
5.6	Forest Access Roads.....	23
5.7	Forest Protection	24
5.7.1	Insect and Disease	24
5.7.2	Fire.....	24
5.7.3	Windthrow	24
5.8	Information and Education.....	24
6.0	PROPOSED ACTIVITIES	25
6.1	Harvesting	25
6.1.1	Commercial	26
6.1.2	Selective-Commercial	26
6.1.3	Domestic.....	26
6.2	Silviculture	28
6.3	Forest Access.....	28
6.4	Forest Protection	29
6.4.1	Fire.....	29
6.4.2	Insects and Disease	29
6.4.3	Windthrow	30
6.4.4	Surveys	30
6.5	Activities in Protected Public Water Supply Areas	30
6.6	Information and Education.....	31
7.0	PAST PLANNING ACTIVITIES	31
7.1	Harvesting	31
7.1.1	Commercial Activity	31
7.2	Silviculture	33
7.3	Forest Access.....	33
7.4	Natural Disturbances	33
7.4.1	Fire.....	33
7.4.2	Insects	33
8.0	RESEARCH.....	33
8.1	Research Initiatives	33
8.2	Environmental Management System	34
8.3	Forest Certification.....	35
9.0	PLAN ADMINISTRATION	35
9.1	Monitoring.....	35
9.2	Amendments.....	36
LITERATURE CITED	.....	37
APPENDIX I	.....	38
APPENDIX II	.....	40
APPENDIX III	.....	Error! Bookmark not defined.
APPENDIX IV – PROPOSED MAPS	.....	72
APPENDIX V	.....	105

LIST OF FIGURES

Figure 2.1	Forest Management District 20 boundary and communities	2
Figure 2.2	Managed land classes in District 20.	3
Figure 2.3	Ecoregions of District 20.	13
Figure 2.4	Species composition based on Working Group of D20.....	15
Figure 2.5	Summary of productive forest area (ha) by age class in FMD 20.	15
Figure 2.6	Summary of productive forest area (ha) by site class in FMD 20.	16
Figure 2.7	South side management are of District 20.	17

LIST OF TABLES

Table 2.1	Canadian Ecological Land Classification System.	10
Table 2.2	Land base classifications in District 20.	120
Table 2.3	Ecoregions and their area and percentage within Labrador and the District. ...	14
Table 3.1	Results of timber supply analysis for District 20.....	18
Table 4.1	Issues and proposed mitigations raised during 2014 planning process.	21
Table 4.2	Issues and proposed mitigations raised during previous planning processes that are still valid.	22
Table 6.1	Proposed commercial harvest activity 2015-2019.....	25
Table 6.2	Proposed domestic harvest activity 2015-2019	27
Table 6.3	Proposed primary access road construction and water crossings 2015-2019...	28
Table 7.1	Commercial harvest summary 2010-2014.....	32
Table 7.2	Domestic harvest summary 2010-2014	32

EXECUTIVE SUMMARY

Forest management planning sessions were initiated by the Department in 2019. These sessions in addition to previous sessions provided local residents and stakeholders a voice on the preparation and implementation of the Forest Management Plan in District 20. Over time many stakeholders including local residents have contributed both scientific and local knowledge, which was used to develop this plan. Every attempt was made to include all stakeholders including representatives from Innu Nation and NunatuKavut including the signing of an annual Forest Management Consultation Agreement with NunatuKavut.

Results of the public consultation process over many cycles yielded this five year operating plan (2020-2024). This plan outlines the various management activities that will take place in the district during the specified planning period. A detailed description of timber harvesting, road construction, silviculture, resource protection, monitoring, and public consultation is provided. Further refinements of operational activities are made in the annual work schedule.

District 20 is 2.2 million hectares of boreal forest, situated on the south coast of Labrador. It is comprised of approximately 95% mature to over mature age classes of mainly dominant black spruce forest. Generally it is bound to the north by Lake Melville, to the west by Etagaulet and Paradise Rivers, to the south by the Main and Hawke Rivers and to the east by the Labrador Coast.

Historically commercial activity in District 20 has been inconsistent and currently commercial operations are minimal. Domestic activities remain relatively consistent as residents of Cartwright, Paradise River and Black Tickle/Domino harvest fuelwood and sawlogs for domestic use.

The current inventory covers the majority of the non-isolated commercial forest in the district. The current annual allowable cut (AAC) for the district has been calculated to be 30,085 m³ for a total harvest of 150,425 m³ over the five year planning period. This AAC is unchanged from the previous five year plan and is only based on the commercial forest of the Southside operating area.

Extensive areas have been identified to preserve ecological, traditional and local values. Approximately 91% of the total district land base was excluded from the determination of available wood supply. Consequently, this has resulted in vast areas in the District that are not considered for commercial or domestic harvest. These areas, which are identified at three scales; landscape, watershed and stand, provide habitat for various native flora and fauna and act as scientific benchmarks.

Fifteen commercial operating blocks are proposed for harvest over the next five years. These blocks contain sufficient volumes to support commercial allocations of approximately 25,000 m³/year. Additionally an area between Cartwright and Paradise River remains a selective commercial harvest area. Domestic harvests, estimated to be approximately 4,285 m³/year, will take place in several defined blocks located near the communities. In all cases, permit

conditions and the Environmental Protection Guidelines will govern all operations.

The majority of commercial timber available for harvest is accessible by current road networks. If current levels of commercial activity significantly increase an additional 14.2 kilometers of forest access roads will need construction. Due to the lack of disturbed area, silviculture efforts will focus on monitoring and research activities. Protection will focus on maintaining forest health by monitoring and protecting people, property, and resources from forest fires.

Information and research including, surveys will be used to monitor past actions and provide hard data for future management decisions. Numerous surveys including pre-harvest surveys, regeneration surveys, utilization surveys, and site disturbance surveys will be conducted during this time period. District Conservation Officers will routinely monitor all activities to ensure compliance with various conditions, legislation and guidelines.

1.0 INTRODUCTION

This Five Year Operating Plan reflects the legislated planning requirements of the Newfoundland Forest Service. In the past, there were five major planning documents; Provincial Sustainable Forest Management Strategy, District Strategy Document, Five Year Operating Plan, Annual Operating Plan, and Past Annual Report. The most recent planning framework has eliminated the District Strategy Document. Its former contents are now split between the Provincial Sustainable Forest Management Strategy and the Five Year Operating Plan. Sections that are Provincial in scope such as carbon, global warming and criteria and indicators are now included in the Provincial Sustainable Forest Management Strategy while sections that are more descriptive or depict local conditions such as values, forest characterization and ecosystem description are located in the Five Year Operating Plan. Linkages between strategies from the Provincial Sustainable Forest Management Strategy and on the ground activities in the Five Year Operating Plan will be provided where applicable.

The Forest Ecosystem Management planning process is based on the input of various stakeholders who participate in public meetings over several planning periods and continue to provide input on activities throughout the life of the plan. The result is a process that provides flexibility over the planning period to adapt to changes in forest ecosystem processes, disturbance regimes, environmental and industrial changes, as well as public values. In addition to public consultation sessions, the Provincial Government has signed a Forest Management Consultation Agreement with NunatuKavut Community Council to facilitate their participation in the process. This agreement which is subject to annual appropriations outlines the consultation process on five year operating plans.

Participants are acknowledged for the time and effort put into the current and previous processes in the District. A summary of the topics discussed during all meetings can be seen in Appendix I.

The five year operating plan provides details of various management activities that are scheduled to occur between January 01, 2020 and December 31, 2024. These activities, including harvesting, silviculture, road construction, ecosystem protection, and surveys and monitoring, are intended to maintain ecosystem health, ensure the sustainable management of resources, and minimize the environmental impact. Further refinements of the individual planning activities are set out in an Annual Operating Plan on a yearly basis and are subject to review.

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

In accordance with the Forestry Act, this document will be submitted by the Department to the Minister of the Department of Municipal Affairs and Environment to be registered for assessment under the Environment Protection Act and is subject to further public review.

2.0 LANDBASE DESCRIPTION

2.1 General

The planning zone consists of only one District and is a large area (approximately 2.2 million ha) of boreal forest situated on the South Coast of Labrador. Physical features vary a great deal over such a large landscape. The following descriptions apply generally to District 20.

2.1.1 Location

Forest Management District 20 (FMD20) is situated on the south coast of Labrador (Figure 2.1). It is generally bound to the North by Lake Melville, to the West by the Etagaulet and Paradise Rivers, to the South by the Main and Hawke rivers and to the East by the Labrador Coast.

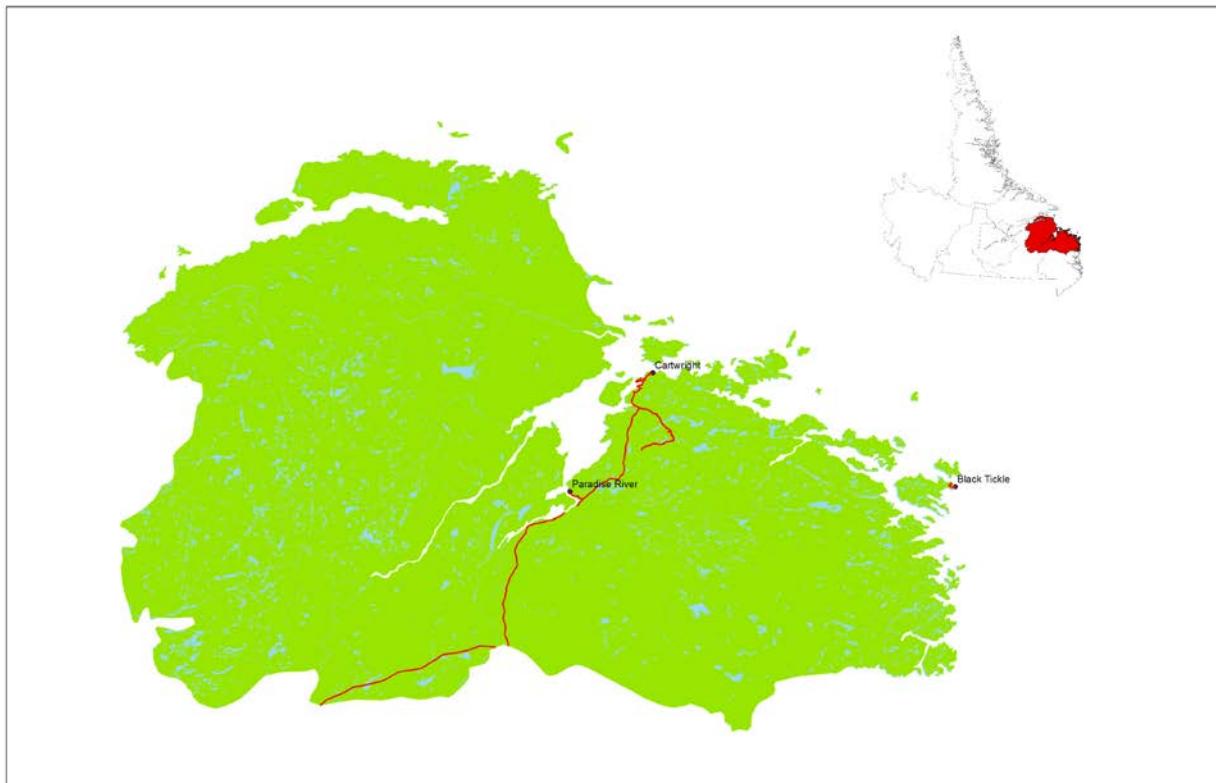


Figure 2.1 Forest Management District 20 boundary and communities.

2.1.2 History

Early accounts of commercial harvesting and sawmill operations in the Sandwich Bay area are vague. Several attempts were made to establish operations in the district. Traditionally timber was harvested for use in the local commercial salmon industry and for general building needs

around Sandwich Bay. Several operations were attempted in the area but were unsuccessful. Early attempts of establishing harvesting operations were susceptible to numerous problems; forest managers continue to struggle with similar issues today. Including: lack of infrastructure; transportation issues; lack of experienced labor; high logging costs and financial challenges.

2.1.3 Ownership

Although the majority of the land base in District 20 is Crown managed land, there is federal land around a north warning site, there is a proposed Mealy Mountain National Park, proposed Provincial Waterway Park, settled Aboriginal land claims agreements and Aboriginal land claims in progress (Figure 2.2).

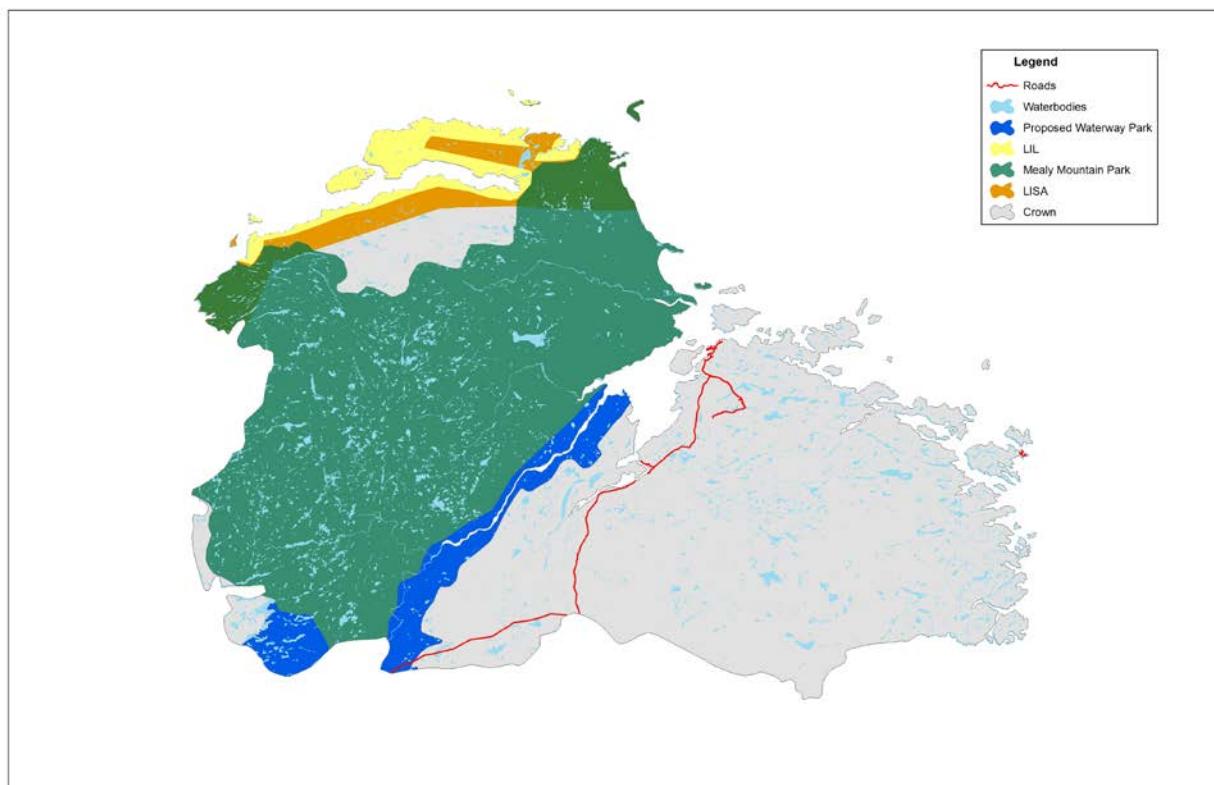


Figure 2.2 Managed land classes in District 20.

2.2 Physical Description

2.2.1 Topography and Hydrology

District 20 contains a diversity of terrain types. The area has generally rolling topography with the exception of the more rugged Mealy Mountain Range. Rolling hills are commonly between 100 and 200 meters, and rarely extend above 300 meters. The Mealy Mountain range reaches heights of more than 1,000 m (3,281 ft), with the highest peak being more than 1,180 m (3,871 ft). The District has an extensive coastline dominated by bedrock with scattered pocket beaches. Inland, the district is dominated by numerous lakes, rivers, and wetland areas.

2.2.2 Geology

Labrador occupies the eastern most section of the Canadian Shield which can be divided into five major geologic provinces. In general the underlying bedrock, which is mostly acidic with metamorphic gneiss, is characterized as the Grenville Province. It is comprised of mostly tough ancient Precambrian igneous and metamorphic rocks. Sedimentary rocks form local outcrops. Anorthosite, gabbro and quartzofeldspathic gneiss are present with sedimentary and igneous rocks present in trough areas (Meades 1990).

2.2.3 Soils

Detailed information on soils in the area is sparse. The District was heavily glaciated in the past which has resulted in the majority of the bedrock being covered with a veneer (less than 1.5m) of glacial till or marine sediments. Till consists of a mixture of grain sizes from clay to boulders. There is a section in the northwestern area of the District where the depth of till approaches 1.5m along with some sand and gravel deposits.

2.2.4 Climate

The climate of Labrador is more Arctic than Atlantic. Because it is on the eastern side of the continent, it experiences strong seasonal contrasts in the characteristics and movement of air masses. The Labrador Sea is infested with floating pack ice and icebergs for eight months of the year. The masses of ice keep sea temperatures below 4°C. An east wind off the Labrador Current is a cool wind in summer, often with light rain or drizzle. In winter, when the Atlantic air is relatively mild, the accompanying weather includes cloud and frequent snow flurries. Whenever easterly winds bring very moist air from the Atlantic, widespread fog occurs. Winters are very cold, with typical daytime temperatures for January between -10 and -15C, colder than Newfoundland and more like the frigidity of the southern Prairies. An occasional incursion of Atlantic air will result in brief periods of warming during the winter months. The summer season is brief and cool along the coast because of the cold Labrador Current. July average temperatures are from 8 to 10C along the coast but are 3 to 5C warmer in the interior. The pleasantness of the summer day along the coast is often determined by the wind direction, westerly winds bring clear, mild continental air, whereas easterlies, blowing off the Labrador Current, bring cold, cloudy, and moist weather. Southern Labrador is not unlike the moist northern shores of Newfoundland, with 1000 mm, as a typical yearly fall of precipitation. About 45% of this occurs as snow. Cartwright averages 440 cm of snow fall annually.

2.3 Ecological Characteristics

2.3.1 Ecosystem Description

An ecosystem is a community of interacting and interdependent plants, animals and microorganisms, together with the physical environment within which they exist. It is important to remember that within an ecosystem the interactions between the biotic and abiotic components are at least as important as the component themselves. Another critical characteristic of ecosystems is their overlapping boundaries. While each is definable in time

and space, and distinguishable from adjacent ecosystems, each is intimately integrated with other local ecosystems. Additionally, each local ecosystem is nested within increasingly larger ecosystems. The scale at which an ecosystem is viewed is contingent on the species or abiotic characteristic under consideration. While planet Earth represents the ultimate global ecosystem, complex ecosystems also exist under fallen logs and rocks.

A forest ecosystem, as the term implies, is an ecosystem dominated by tree cover. At the coarsest level, the forest of District 20, form part of the boreal forest ecosystem. The boreal forest is a green belt which spans much of the northern hemisphere. It stretches from the Atlantic shores of Scandinavia through Russia, across Alaska, through the mid latitudes of Canada until it reaches the Atlantic Ocean again in Newfoundland and Labrador.

One of the distinguishing characteristics of the boreal forest is the phenomena of periodic, catastrophic stand replacement. Natural disturbances such as fire and insect outbreaks typically give rise to uniform, even aged forests dominated by a few tree species. The tree species which characterize the Canadian boreal forest include black spruce, white spruce, balsam fir, eastern larch, trembling aspen, white birch and jack pine. By far the dominant species in District 20 are black spruce and balsam fir.

Aquatic ecosystems of the boreal forest are heavily dependent on forest cover for temperature regulation, nutrient cycling and stream flow regulation. Consequently, forest harvesting activities adjacent to riparian areas are critical to sustainability of fish habitat and maintenance of fish migration routes. Suitability of various streams and ponds as waterfowl breeding, feeding and resting areas are also dependent on adjacent forest cover. Biological production in streams is based on a combination of internal and external nutrient and energy pathways. Stream side vegetation has a strong influence on both since they are so closely linked to surrounding terrestrial events. Small streams in forested areas receive much of their materials from the surrounding terrestrial ecosystem. For these reasons, maintenance of suitable riparian zones for protection of aquatic ecosystems, as well as providing wildlife travel corridors is a primary consideration of any forest management strategy.

2.3.2 Ecosystem Condition and Productivity

The need to maintain forests in a healthy and productive state enabling them to support the diversity of life that occurs within them is a reflection of ecosystem condition and productivity. The relationship of an interwoven complex of biological processes operating at both temporal and spatial scales determines how a forest will function. Measures of these processes indicate whether levels of energy transfer, nutrient cycling, recovery potential and species productivity are sufficient to ensure sustainability. The boreal forest is adapted to incidents of disturbance and stress for its rejuvenation. Mainly in District 20 natural succession and small disturbances from forest fire provide the opportunity for new stands to become established; however a proper balance of all processes is important to ensure maintenance of forest ecosystem condition and productivity.

2.3.3 Productivity

Productivity can simply be defined as the accrual of matter and energy in biomass. The boreal forests in Labrador are characterized, for the most part, by an even age structure being dominated by an over mature age class. The tree canopy is poorly developed in many parts of the district (<25% crown cover). Among the factors that limit stand density and thus crown cover are severe climatic conditions, soils with restricted or excessive drainage, and proximity to the coast. Disturbance, either natural or human, has had little impact on forest stands, except in the southern part of the district, where extensive fires occurred in 1958.

Closed canopy forests occur only on rich, moist, mid to lower slopes. They contain a mixture of spruce, fir and hardwood tree species and a well-developed ground layer of feather mosses (primarily *Pleurozium schreberi*). On coarse-textured soils (typical of river terraces and eskers), the dominant vegetation is lichen woodland, which is characterized by an open canopy of black spruce and a well-developed lichen layer. Most animal species found in forested areas of the district are typical of boreal forest regions across northern Canada.

The general characteristics of forest stands in District 20 (site class, age class, height class, crown closure, and working group) are described later in the forest profile section (2.4.2). These characteristics define the limits within which the commercial forest development must function. Stands greater than 160+ years, primarily even-aged, form the dominant age class structure in this forest, although an extensive fire disturbed area has yet to be classified. Most forest sites are classed as poor to medium. Silviculture intervention may enhance future productivity on some sites, but how such treatments will affect the long rotation period (120 years) of forest stands in southeastern Labrador is not fully understood at this time.

Extant biomass is an integrating measure of forest ecosystem condition. Biomass represents the mass of living organisms inherent in an ecosystem and the ecosystem serves as a repository for animal, plant and microbial biomass. Accordingly, biomass is a measure of forest ecosystem condition and productivity. It refers to the condition of the forest in terms of organic matter production of all species and types.

Indicators to measure forest ecosystem extant biomass during the planning period include:

- mean annual increment ($m^3/ha/yr$) by forest type and age class
- frequency and occurrence within selected indicator species

Aquatic ecosystems within forest ecosystems integrate the overall watershed condition and thus provide an important measure of forest ecosystem condition and productivity. Elevated nutrient levels and flow rates in forest streams sustained over a long period clearly indicate a major forest ecosystem malfunction. In these situations, water and nutrients that should be utilized in forest growth are moving rapidly into drainage systems. This threatens the sustainability of the forest as well as the aquatic systems through eutrophication and flooding of downstream areas.

Indicators to measure changes in water quality and quantity during the planning period include:

- water quality as measured by water chemistry, turbidity, and other parameters for selected waterways
- trends and timing of events in stream flows from forest catchments for selected waterways

Information collected on all indicators will be used to assess forest ecosystem condition and productivity change (if any) during the planning period based on the management actions of the plan as well as natural disturbances that will occur.

2.3.4 Resilience

Resilience is the capacity of a forest ecosystem to respond to a disturbance by resisting damage and recovering quickly. Healthy forest ecosystems maintain their resilience and adapt to periodic disturbances with little change. Properties of the forest ecosystem such as climate, soils, topography and flora often control the resilience of a forest.

2.3.5 Stability

Maintenance of natural genetic and ecosystem diversity across the landscape is an integral component to ensure species maintain viability through their capacity to evolve and adapt to change. Maintenance of the natural range of ecosystems and the ability of their components to react to external forces and processes provides the equilibrium required for maintenance of species diversity (CCFM 2000). The fundamental requirement for the conservation of biological diversity is the in-situ conservation of ecosystems and the natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings. The Sandwich Bay District's geographic location, topography and shallow soils make its forest ecosystems vulnerable to temperate extremes. These ecosystems are susceptible to development and comprehensive land use planning is required to ensure that biodiversity is maintained at the present level.

2.3.6 Disturbance Regimes and Successional Patterns

The primary natural disturbance factors attributed to boreal forests are fire and insects. Forest fires are frequent and extensive in Labrador and result in specific successional trends depending on the site type. More often than not, the spruce component is increased following fire, whereas other disturbance types such as insects and cutting often result in an increase in the fir component.

Human uses of the forest resources around Sandwich Bay have had little influence on the overall forest structure. Fuel wood cutting has been a common practice however is mostly localized around the communities. Small scale commercial harvesting has also occurred close to the community of Cartwright. Indicators can be used as measurable variables to report on

disturbances, resilience and extant biomass for evaluation of maintenance and enhancement of forest ecosystem condition and productivity. Using the CCFM approach, (CCFM 2000) criteria and indicators will be selected to initiate measuring of these variables. Data for these indicators are considered attainable during the planning period.

Incidence of disturbance and stress refers to the frequency/severity of major biotic stresses. Depending on the particulars of the disturbance, stress negatively or positively affect forest condition over time.

Indicators for assessment of disturbance and stress on forest condition and productivity include:

- area and severity of fire damage
- area and severity of blow down
- area harvested

2.3.7 Biodiversity

Biodiversity is a term used to describe the variety of life on earth. A basic definition of biodiversity includes the variety of animals, plants and microorganisms that exist on our planet, the genetic variety within these species and the variety of ecosystems they inhabit. Some scientists estimate the total number of species on earth between two and 100 million, however, the best estimate is considered to be within the range of 10-30 million. This is remarkable considering only 1.4 million species have actually been given names. The largest concentration of biodiversity on the planet is found in the tropical areas of developing countries. Small areas of rainforest often contain species that are found nowhere else on earth. Mishandling even small tracts of land could lead to extinction of several species, one of which may hold the key for the prevention or cure of some disease. While the boreal forest does not have the extent of biodiversity that some of the equatorial regions possess, Canada does have just over 70,000 species of plants, animals, and microorganisms in its boreal and other forest regions. An equivalent number remain un-described or unreported by science. While the boreal forest has less diversity of large plants than many other forest regions, it has greater biological diversity in some microorganisms. For example, the boreal forest has fewer tree species than the tropical rainforest but 500 times as many mycorrhizal fungi. Despite the large number of organisms contained within the boreal forest, only five percent are actually plants and vertebrates. The other 95 percent remain largely unrecorded and unstudied. As a result, we need to conduct more surveys and studies and manage with caution so that species are not inadvertently wiped out. Biodiversity provides such essential services as climate control, oxygen production, and purification of freshwater supplies, carbon dioxide removal from the atmosphere, soil generation, and nutrient cycling for humans. Without the species that provide these processes, humanity would be unable to survive. There have been several international initiatives during the 1900's directed at developing strategies to protect Earth's biodiversity. Canada signed the United Nations Convention on Biological Diversity in 1992 at the Rio de Janeiro earth summit. All governments at both the federal and provincial level have agreed to

meet these objectives through implementation of the 1995 Canadian Biodiversity Strategy: Canada's Response to the Convention on Biodiversity. The three components of biodiversity are species diversity, genetic diversity, and ecosystem diversity.

2.3.8 Species Diversity

Species diversity describes the overall range of species in a given area or ecosystem. Species are groups of animals, plants, and microorganisms capable of producing fertile offspring. An example would be all breeds of domesticated dogs are of the same species, while dogs and cats are members of different species. Species extinction is the most dramatic and recognizable form of reduced biodiversity; habitat loss the most drastic in terms of far reaching effect. The prevention of species extinction is a key factor in the conservation of biodiversity. Changes in species population levels indicate the potential for serious changes in ecosystem integrity.

2.3.9 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.

2.3.10 Landscape 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, microorganisms 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. To ensure biodiversity is maintained at all scales this plan ensures extensive areas have protection of ecological values.

2.4 Forest Characterization

2.4.1 Land Classification

A hierarchical framework of ecological land classifications has been recognized for some time in most jurisdictions as a means of stratifying the earth into progressively smaller areas of increasingly uniform ecological units. In Canada, the Canadian Ecological Land Classification

System (Wiken, 1986) provides for seven levels of examination or organization based on ecological principles. This system of classification is better suited than a classical forest inventory for use in an ecological approach to forest management. The seven categories are listed and described in table 2.1.

Level	Description	Common Map Scale
ECOZONE	Areas of large land masses representing very generalized ecological units, based on the consideration that the earth's surface is interactive and continuously adjusting to the mix of biotic and abiotic factors that may be present at any given time (e.g. Boreal Shield).	1: 50 000 000
ECOPROVINCE	Areas of the earths surface characterized by major structural or surface forms, faunal realms, vegetation, hydrology, soil, and climatic zones (e.g. Labrador)	1: 10 000 000 1: 5 000 000
ECOREGION	A part of the ecoprovince characterized by distinctive ecological responses to climate as expressed by vegetation, soil, water, and fauna (e.g. Mid Boreal Forest – Paradise River)	1: 3 000 000 1: 1 000 000
ECODISTRICT	A part of ecoregion characterized by a distinctive pattern of relief, geology, geomorphology, vegetation, water, and fauna.	1: 500 000 1: 125 000
ECOSECTION	A part of the ecodistrict throughout which there is a recurring pattern of terrain, soil, vegetation, waterbodies, and fauna.	1: 250 000 1: 50 000
ECOSITE	A part of the eosection having a relatively uniform parent material, soil, hydrology, and chronosequence of vegetation.	1: 250 000 1: 50 000
ECOELEMENT	A part of ecosite displaying uniform soil, topographical, vegetative, and hydrological characteristics.	1: 10 000 1: 2 500

Table 2.1 Canadian Ecological Land Classification System.

Not all of the land in District 20 is classed as Crown lands in fact although in much smaller portions there are many land base classifications which are described further in Table 2.2.

		District 20			
	Land Base Classification	Forested Area (ha)	Non-Forested (ha)	Total Area (ha)	% of Total District
1	Regulatory Alienations				

		District 20			
	Land Base Classification	Forested Area (ha)	Non-Forested (ha)	Total Area (ha)	% of Total District
1.a	Parks				
1.a.1	Federal (MMNP)	599,689	268,029	867,718	41.9
1.a.2	Provincial (Proposed)	73,476	23,482	96,958	4.7
1.a.3	Private				
1.a.4	Aboriginal Land Claims (Inuit)	39,922	26,952	66,874	3.0
1.b	Reserves				
1.b.1	Ecological (Ganet Isl.)			200	0.01
1.b.2	Wilderness				
1.b.3	Others				
1.c	Agricultural Areas				
1.d.1	Cottage Development Areas				
1.d.2	Crown Lands Other				
1.d.3	Private Lands				
1.e.1	Wildlife Exclusions				
1.f.1	Permanent Sample Plots (PSP's)	24		24	0.001
1.f.2	Regulation Buffers Water (30m)			39,138	1.9
Section Sub-Total					
2	Non-Harvestable Inventory Types				
2.a	Coniferous Scrub	285,182		285,182	49.2
2.b	Deciduous Scrub				
2.c	Vegetated Non-Forested				
2.d	Non-Vegetated				
2.e	Cleared Land				
2.f	Residential Land				
Section Sub-Total					
3	Water Features				
3.a	Water Bodies				
3.a.1	Lakes/Ponds			129,571	6.2
3.a.2	Double Sided Rivers				
3.a.3	Salt Water				
Section Sub-Total					
4	Operational Alienations				
4.a	Roads				
4.a.1	Right-of-way (Roads)				
4.a.2	Resource Roads (6m buffer)				
4.a.3	Protected Road Buffers				
4.a.4	Aesthetic Road Buffers				

		District 20			
	Land Base Classification	Forested Area (ha)	Non-Forested (ha)	Total Area (ha)	% of Total District
4.b	Stand Level				
4.b.1	Stand Remnants				
4.b.2	Islands				
4.b.3	Steep Slopes				
4.b.4	Isolated Stands				
4.b.5	Other Stand-Level Constraints				
4.b.6	Area Not Interpreted				
Section Sub-Total					
5	Harvestable Land Base				
5.a	Crown				
5.a.1	Coniferous	260,828			11.9
5.a.2	Coniferous/Deciduous	319,250			14.5
5.a.3	Deciduous/Coniferous				
5.a.4	Deciduous				
5.a.5	Unclassified	1,619,922			73.6
Section Sub-Total					
Grand Total					

Table 2.2 Land base classifications in District 20.

2.4.1.1 Ecoregions and Subregions

With the evolution of an ecosystem approach to forest resource management, it would be advantageous to have a standard framework to classify combinations like general climate and regional physiography, as well as the other components of an ecosystem, into distinguishable regions. Damman defined ecoregions as areas where a 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 (Damman, 1979).

According to Damman, Labrador has ten ecoregions. These 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. District 20 contains five distinct ecoregions. They are: the mid boreal forest – Paradise River Ecoregion, Coastal Barrens-Okak/Battle Harbour Ecoregion, and string bog – Eagle River plateau Ecoregion (Figure 2.3). Of these, the mid boreal forest contains the largest portion in the district (Table 2.2).

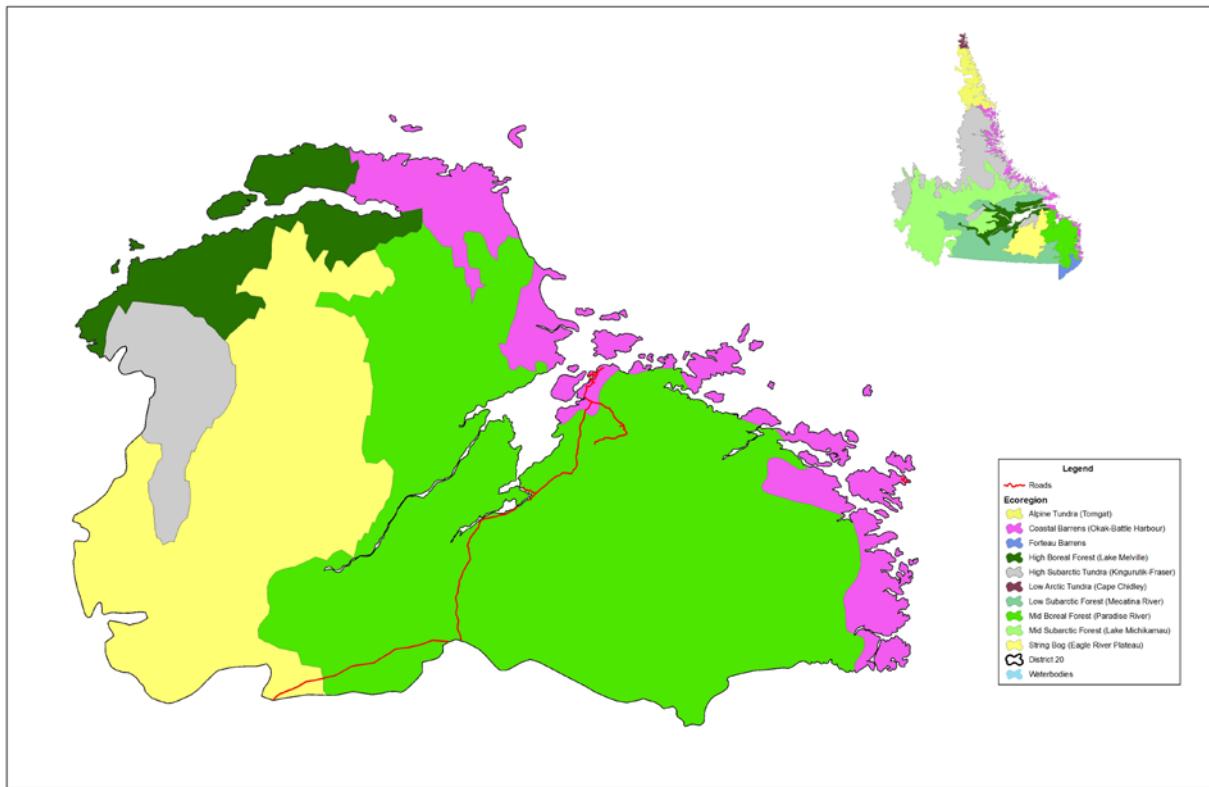


Figure 2.3 Ecoregions of District 20.

Mid Boreal Forest - Paradise River

This undulating, bedrock controlled landscape of southeastern Labrador has many rock outcrops and supports fairly productive, closed-crown forests. The climate is considered boreal and is moister and cooler than the Lake Melville area. Summers are cool to warm and winters are short and cold. The growing season is 120 to 140 days. Black spruce and balsam fir are the most common tree species, but hardwoods are commonly encountered. Raised bogs are characteristic of valleys in the area (FLR, 2014).

Coastal Barrens - Okak/Battle Harbour

This ecoregion extends from Napaktok Bay south to the Strait of Belle Isle. Much of the coast is characterized by long, sheltered inlets. The summers are cool to warm and the growing season is 100 to 120 days. The winters are cold. Empetrum barren is the dominate vegetation type, with forest occurring in sheltered valleys. Most mid and lower slopes support a continuous spruce forest with a moss understory. Repeated fires have changed many forested areas to dwarf shrub barrens. Plateau bogs with frozen peat (palsas) and salt marshes on marine terraces are characteristic of the valleys in this ecoregion (FLR, 2014).

String Bog - Eagle River Plateau

The Eagle River Plateau comprises most of this ecoregion. This upland plateau is composed of extensive string bogs with numerous open pools surrounded by fen vegetation. Bog hummocks

are dominated by scrub spruce, Labrador tea, and feathermoss. The peatland expanses are occasionally interrupted by only a few conspicuous eskers, which support open, lichen woodland. Alder thickets are common along river banks (FLR 2014).

High Boreal Forest – Lake Melville

This ecoregion encompasses the Churchill River Valley and the coastal plain surrounding Lake Melville. River terraces are composed of coarse-textured, alluvial soils, and uplands have shallow, well-drained soils. This region has the most favourable climate in Labrador. Summers are cool and winters cold. The growing season is 120 to 140 days. The forests are closed-canopied and highly productive. Richer slopes are dominated by balsam fir, white birch, and trembling aspen. Black spruce is present in most stands, but only dominates in upland areas and lichen woodlands, which occupy river terraces. Ribbed fens occur in upland depressions; plateau bogs occur on coastal plains (FLR 2014).

High Subarctic Tundra – Kingurutil/Fraser

The George River Plateau makes up the main (northern) portion of this ecoregion. Various mountainous outliers, including the Benedict Mountains, Wine River Mountains, Mealy Mountains, and the McPhadyen Plateau also belong to this region. Summers are short and cool, with a growing season of 80 to 120 days; winters are long, severe, and very cold. The upland vegetation is similar to the Low Arctic Tundra - Torngat ecoregion; however, the valleys support tree growth. Closed black spruce forests (with some larch) occur on lower valley slopes. River terraces support open spruce forests with a lichen dominated understory. Shallow fens with frozen peat occupy small depressions in plateau surfaces (FLR 2014).

	EcoRegions		
	Area (ha)		%
	in Labrador	in District 20	
Mid-Boreal Forest - Paradise River	2032737	1076121	51.9%
Coastal Barrens - Okak/Battle Harbour	1360628	217177	10.5%
High Boreal - Lake Melville	1728143	146158	25.4%
High Subarctic Tundra - Kingurutil/Fraser	6529479	106188	7.1%
String Bog - Eagle River Plateau	1822682	527422	5.1%
Grand Total	13473669	2073066	100.0%

Table 2.3 Ecoregions and their area and percentage within Labrador and the District.

2.4.2 Forest Profile

2.4.2.1 Species Composition

Black spruce (*Picea mariana*) is the most common tree species in the management district, based on volume (63%) and working group (approximately 41%). Balsam fir (*Abies balsamea*) constitutes 30% of the volume, while other softwoods and hardwoods make up the balance.

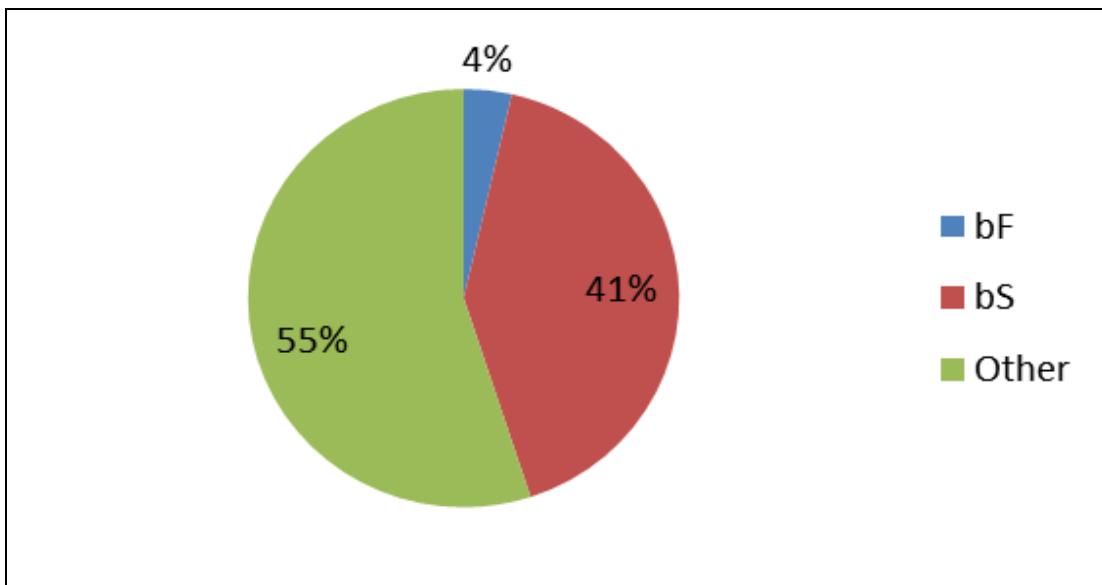


Figure 2.4 Species composition based on Working Group of D20.

2.4.2.2 Age Class

Individual tree ages in a stand can all be the same after disturbance such as fire or harvesting; however in most cases the ages vary. Forest managers describe stand ages in terms of age classes which generally encompass 20 years. The forests in District 20 have not been subjected to any large scale disturbance in recent years. Fires have been relatively small and isolated and harvesting activity has been limited. This has resulted in a relatively old forest. As illustrated in Figure 2.5, approximately 95% of the forest is greater than 100 years of age. Forests in the 0-20 year age class account for less than 1% of the total.

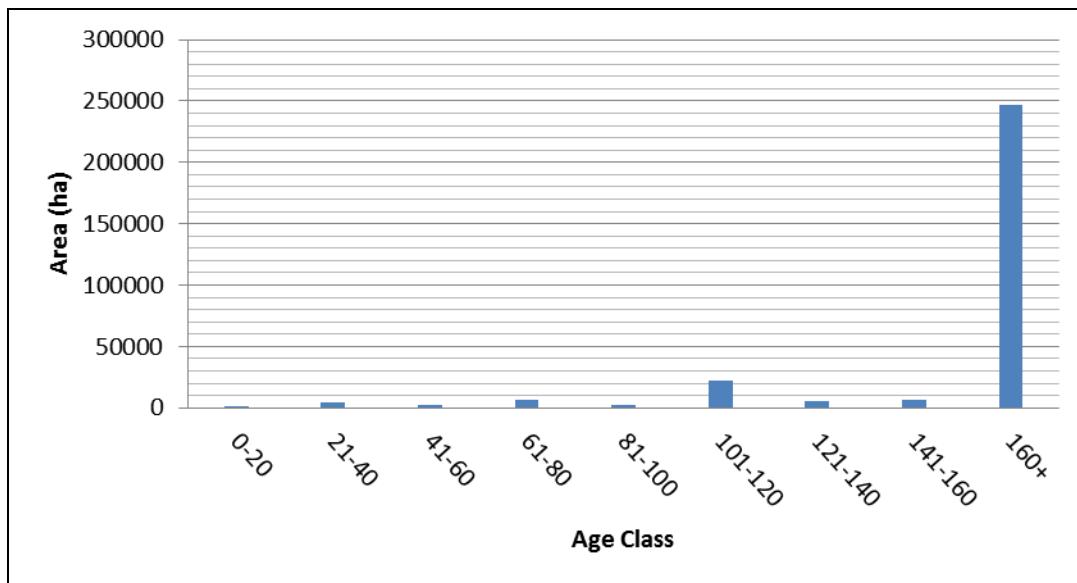


Figure 2.5 Summary of productive forest area (ha) by age class in FMD 20.

2.4.2.3 Site Class

Many factors determine site class of productive forest including soil moisture, fertility, slope and geographic orientation. In District 20 medium and poor sites are most dominant accounting for approximately 47% each on productive sites. The distribution of each site class is illustrated in Figure 2.6. Based upon its northern location it is estimated that the mean annual increment of a good site is $2.4 \text{ m}^3/\text{ha}/\text{yr}$, medium site $1.4 \text{ m}^3/\text{ha}/\text{yr}$ and poor site $0.8 \text{ m}^3/\text{ha}/\text{yr}$. Site class often determines the limits of growth and along with the limits of existing harvesting and processing technologies this will define the limits within which commercial forest development can function in the District.

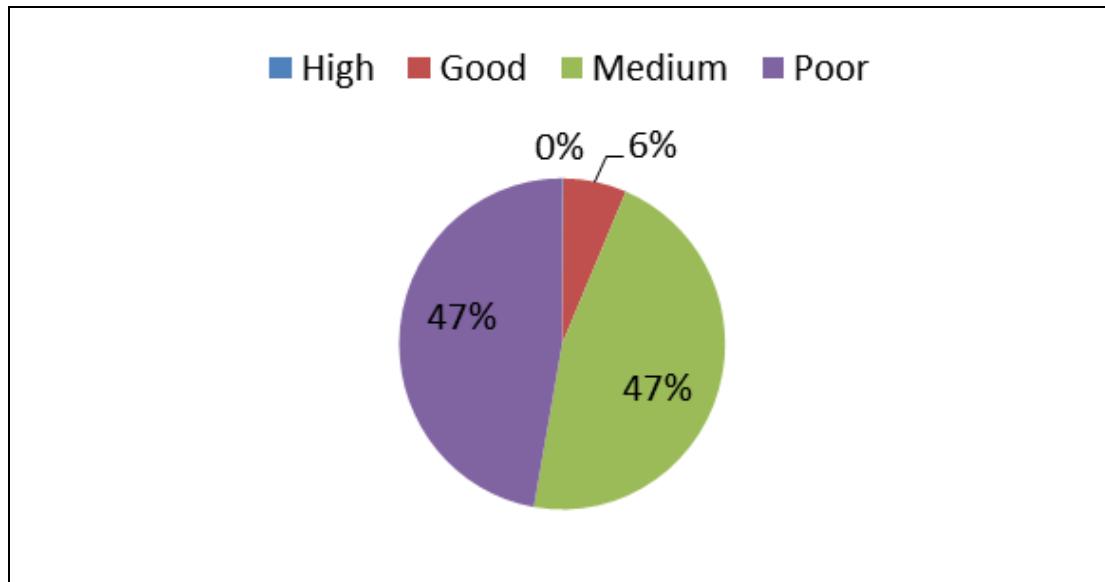


Figure 2.6 Summary of productive forest area (ha) by site class in FMD 20.

3.0 TIMBER SUPPLY ANALYSIS

3.1 Methodology

The annual allowable cut (AAC) is the maximum volume that can be harvested on an annual basis while maintaining a sustainable supply of timber and providing a landscape, which supports non-timber values for future generations. Since the necessary growth and yield data required to run linear wood supply models (such as Woodstock) are absent for the District, the AAC is calculated using a basic area/volume formula (Appendix II). The total AAC for the south side management area in District 20 is $30,085 \text{ m}^3/\text{yr}$ (Figure 2.7). This volume includes reductions (20%) to account for retention, waste and natural disturbances (Appendix II). Recently the overseas wood/fuel pellet market has been potentially identified as a growing opportunity for our forest industry in Labrador. Pellet plants are able to utilize timber which is typically non-merchantable for a pulp and paper operation. The result is the ability to recoup losses as a result of poor utilization and cull. In the event of such an industry it's possible the waste and cull reductions applied to the AAC (13%) could be considered for removal which would increase the AAC to $35,128 \text{ m}^3/\text{yr}$.

The 1992 forest inventory used in the determination of the AAC did not survey the entire District; however it did survey the majority of the non-isolated commercial forest in District 20. Efforts will be made to inventory these areas prior to the next wood supply analysis. The 1992 inventory was incorporated into a Geographical Information System which was used in the development of this plan.

During this five year period, only a portion of the South side of Sandwich Bay is considered for harvesting (Figure 2.7). Consequently, the AAC calculation is based solely on this area. The South side operating area, in which all commercial harvesting is scheduled to take place, does not intersect Nunatsiavut Land areas nor the Mealy Mountain National Park. In future operating periods, alternate sources of commercial timber may be explored. Current inventory data indicates that the North side of Sandwich Bay has the potential for commercial harvesting. The current operable land base excludes the Mealy Mountain National Park as well as the area between the Paradise and Eagle Rivers.

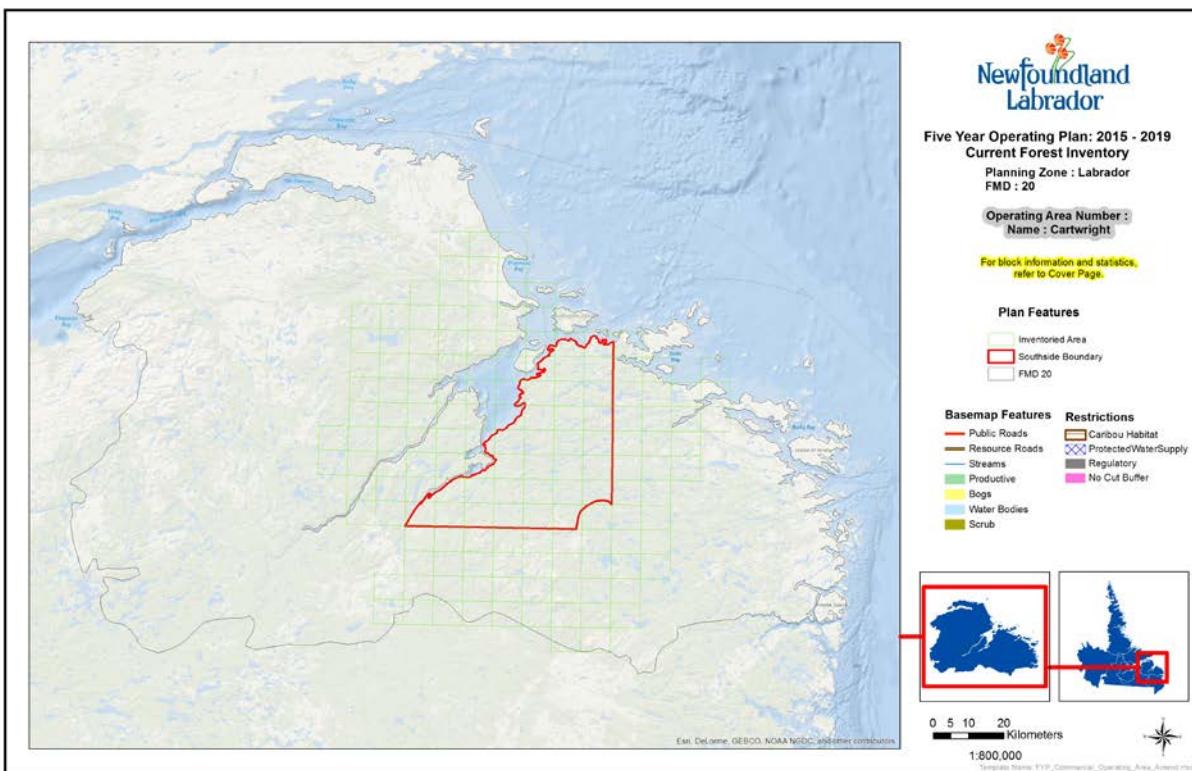


Figure 2.7 South side management area of District 20.

3.2 Forest Profile Dynamics

Due to the methodology used to calculate the annual allowable cut for District 20, changes or outputs of forest profile dynamics are not predicted.

3.3 AAC Adjustments

Due to the methodology used to calculate the annual allowable cut for District 20, annual allowable cut adjustments are not used.

3.4 GMV Volume Adjustments

During calculation of the net AAC the GMV (Gross Merchantable Volume) is further refined to account for retention, waste and natural disturbances. This number, referred to as the **Net Commercial Volume**, is then used in the AAC calculation. The expected net downs for District 20 were applied to account for the following losses:

Cull*	10%
Residual Stands	6%
Harvesting Losses	3%
Fire	1%
Total	20%

3.5 Spatial Blocking Adjustments

Due to the methodology used to calculate the annual allowable cut for District 20, spatial scheduling software is not used therefore spatial blocking adjustments are not required. Harvest blocks are identified in areas with stand volume meets minimum commercial volumes and road access is available or potentially available.

3.6 AAC Results & Outputs

The annual allowable cut (AAC) is the maximum volume that can be harvested on an annual basis while maintaining a sustainable supply of timber and providing a landscape, which supports non-timber values for future generations. Since the necessary growth and yield data required to run linear wood supply models (such as Woodstock) are absent for the district, the AAC was calculated using a basic area/volume formula (Appendix I). Based on the method used one output was derived as seen in Table 3.1 below.

Land Tenure	Zone	District #	Softwood Volume (m ³ /yr)			Hardwood Volume (m ³ /yr)		
			Core	Const.	Sub-Total	Core	Constrained	Sub-Total
Crown	LAB	20	30,085	0	30,085	0	0	0

Table 3.1 Results of timber supply analysis for District 20.

3.7 Harvest Profile

Due to the methodology used to calculate the annual allowable cut for District 20, harvest profiling is not determined. When identifying commercial harvest areas, areas that fit the stand, age, and height profile of the surrounding area were identified if possible.

4.0 RESOURCE VALUES

4.1 Values Structure

4.1.1 Hunting and Trapping

During the planning process stakeholders expressed concerns that increased road access would have negative impacts on the furbearer population in the interior when the Trans-Labrador Highway (TLH) was complete. Already residents have seen increased trapping pressure from individuals from other regions. The Department of Fisheries and Land Resources, Wildlife Division will monitor furbearer populations and resource pressure.

During this operational period domestic hunting and trapping opportunities will continue to exist. Domestic harvesting of wild meat (small game including ptarmigan, rabbit and grouse), fish, berries and mushrooms for subsistence and furs for sale are common. Current areas will allow these activities to continue within normal levels. Seasons and bag limits along with research requirements and regulations are prepared by the Department of Fisheries and Land Resources, Wildlife Division with public input on a yearly basis.

4.1.2 Cabin Development

During the planning process stakeholders expressed concerns that increased road access may facilitate increased cabin development. They requested that the construction of cabins near sensitive wildlife areas be discouraged. Currently Crown Lands have a no cabin development within 1 km of the TLH. Current environmental guidelines require a minimum of 50m treed buffer between operations and approved cabin development areas. As sensitive wildlife areas are identified, this concern can be addressed through the Crown Lands Referral process.

4.1.3 Historical Resources

Officials of the Historical Resources Division indicated that Muddy Bay Pond (Dykes River) is considered to have archeological potential. Activity in this area will be limited to domestic harvesting during winter months; therefore, it is anticipated that standard no cut buffers on these larger water bodies will provide adequate protection of potential archeological sites.

Schwartz (1997) classified the areas proposed for commercial harvesting as having “unknown archeological potential”. The proposed harvesting areas are located on upland sites, which are considered to have lower risk of encountering historical artifacts. In the event that an archeological site or artifact is found, all operations will cease and the

Historical Resources Division will be notified.

4.1.4 Trans-Labrador Highway

Currently the Trans-Labrador Highway (TLH) connects the communities of Cartwright and Paradise River to several other communities along the south coast and west to Happy Valley Goose Bay. A minimum of 100m no cutting buffer will be implemented for all domestic and commercial harvesting along the highway.

Harvesting activity may be visible from the route but in an effort to minimize the visual impact of these operations, the proposed harvesting areas have been modified. Skyline reserves will be maintained and roads will be located on the lower slope and buffered so as not to be seen from the highway.

In an effort to ensure the conservation and long term sustainability of all resources in this relatively new accessible landbase, enforcement and compliance will be important over the next planning period along the TLH.

4.2 Values Mitigations and Monitoring Requirements

During the 2014 planning process, a number of mitigations were developed that are designed to protect other ecosystem values, which are specific to the responsibility of DFLR. The table below outlines these issues and proposed mitigations.

Stakeholder		ISSUES RAISED DURING PLANNING PROCESS	Mitigation
DFLR – Agrifoods		<ul style="list-style-type: none">▪ No comments received	
DFLR – Mines Branch		<ul style="list-style-type: none">• No comments received	
DMAE – Water Resources Mgmt Division		<ul style="list-style-type: none">• Permit required for work in any waterbody (including culverts, bridges, fording, etc)• Permit required for work adjacent to or within Burdett's Pond Public Water Supply Area	Prior to any work in a waterbody, permits will be applied for. No activity scheduled to take place in the Burdett's Pond Public Water Supply Area. The area is also designated as a "No Cutting" area for harvesters.
DMAE – Wildlife Division		<ul style="list-style-type: none">• Domestic harvest area for Black Tickle intersects with Mealy Mountain Caribou herd winter/spring range.	This is the only and closest possible domestic block for the residents of Black Tickle. Not viable to relocate the block. Agreed to add a condition on the permit indicating potential presence of caribou and advise harvesters to lessen disturbance should it become evident caribou are in the area.
DMAE – Land Use Planning		<ul style="list-style-type: none">• Mapping of the protected water supply areas should be clearer• Domestic Block overlaps both Rural and Environmental Protection zone for Cartwright.	Maps have been redone. FLR will confer with the Town of Cartwright to discuss Forestry use in the Environmental Protection Zone and obtain necessary permits.

Stakeholder			ISSUES RAISED DURING PLANNING PROCESS	Mitigation
			Permit required from the town for Forestry uses in the Environmental Protection Zone	
DTRC – Tourism Branch			<ul style="list-style-type: none"> • No concerns identified 	
DLAA – Labrador Affairs			<ul style="list-style-type: none"> • No comments received. 	

Table 4.1 Issues and proposed mitigations raised during 2014 planning process.

Several other issues were identified during previous planning processes, but not discussed at this one. FLR still considers these issues and their mitigations valid. The table below outlines the issue and proposed mitigation.

Issue	Proposed Mitigation
1) Requirement for approval from Dept. of Environment and Conservation for construction activities within 15m of any water body and for activities within protected water supply areas.	FLR will ensure that all rivers and waterbodies are buffered with minimum 30m buffers (and wider where commitment has been made). FLR will monitor all harvesting and road construction activities to ensure siltation does not occur. All water crossings will be carried out under permit from the Dept. of Fisheries and Oceans and Water Resources Division, Dept. of Environment and Conservation.
2) Ensuring proper waste disposal and litter control as a result of forest activities	FLR closely monitors all operations for compliance with regulations and commitments made in FMP's.
3) Ensuring air quality management as a result of forest activities	FLR closely monitors all operations for compliance with regulations and commitments made in FMP's.
4) Ensuring the use of pesticides is in compliance with Acts and Regulations	FLR closely monitors all operations for compliance with regulations and commitments made in FMP's.
5) Ensuring the storage and handling of gasoline and associated products are in compliance with regulations	FLR closely monitors all operations for compliance with regulations and commitments made in FMP's. FLR encourages the Dept. of Environment and Conservation (DOEC) to become involved in forest activities and are welcome to inspect operations on a regular basis.
6) Ensuring activities within the proposed MMNP and ERWPP are conducted in consultation with PNAD	At this point, FLR has no plans to alter the activities outside of the approved 5 year management plan.
7) Ensuring activities are conducted in compliance with Occupational Health and Safety Act and Regulations	FLR closely monitors all operations for compliance with regulations and commitments made in FMP's.
8) Ensuring activities are conducted in compliance with regulatory requirements in water supply areas	
9) Requirement for a 100m buffer between sawmill operations and any water body and storing sawdust 150m from a water body and leveling it on a regular basis	FLR applies conditions to all permits it issues for sawmills in the Province.

Issue	Proposed Mitigation
10) Ensuring activities are conducted in compliance with Municipal Plans and Development Regulations	FLR closely monitors all operations for compliance with regulations and commitments made in FMP's.
11) Ensuring that all water crossings are approved under the Navigable Waters Protection Act.	
12) Ensuring compliance with regulatory requirements of Environment Canada	FLR closely monitors all operations for compliance with regulations and commitments made in FMP's.

Table 4.2 Issues and proposed mitigations raised during previous planning processes that are still valid.

5.0 MANAGEMENT GOALS, OBJECTIVES AND STRATEGIES

5.1 *Harvesting*

5.2 *Commercial*

Commercial operations will be confined to the fifteen identified blocks in the plan and the selective-commercial reserve area. In general mechanical harvesters and conventional harvesting methods will be used in commercial areas. Selective operations will be done manually using chainsaw and will mainly operate during the winter months. It is anticipated that, with the exception of the selective-commercial reserve area, all commercial harvesting will be through the clearcut silvicultural system with the retention of non-merchantable and wildlife trees.

5.3 *Domestic*

Domestic harvesting is expected to continue at current levels (less than 4285 m³/year) consequently; approximately 21,425 m³ is estimated to be sufficient to meet district domestic requirements for the next five years. The majority of domestic cutting will occur near one of the three communities in the district, Cartwright, Paradise River, and Black Tickle. Majority of the domestic wood harvested will be during winter months with snowmobile and chainsaw. This harvesting method will have little environmental effect and ground disturbance within the domestic areas.

5.4 *Hardwoods*

Local residents also use white birch (*Betula papyrifera*) for fuelwood and value added products such as snowshoes. For this, and other domestic uses, white birch within the defined domestic harvesting areas is available for harvest, providing all other conditions (ex. buffers) are adhered to. It is requested that straight stemmed trees with clear boles not be harvested for firewood and left standing for future value added opportunities.

5.5 *Silviculture*

Silviculture refers to the theory and practice of controlling the establishment, composition, growth and quality of forest stands to achieve the objectives of management (Smith, Larson, Kelty and Ashton 1997). Two of the most common techniques that are associated with this practice are planting and thinning.

Silviculture activities will focus on monitoring and research with the view of developing an effective silviculture strategy for this District. Possible areas for planting and thinning maybe identified and efforts will focus on the assessment of previous plantations.

Based upon past observations, it is anticipated that most areas when harvested will regenerate naturally within a five year establishment period, however recent hemlock looper infestations may warrant planting less prone spruce species in areas where balsam fir regeneration is inadequate. Harvested areas will be monitored for regeneration and detailed surveys will be conducted in areas where regeneration appears to be inadequate.

5.5.1 *Forest Renewal*

The silviculture program in District 20 will focus on monitoring and research. However, cutovers which do not regenerate as expected or burns may be identified for planting during the operating period. Further refinements to each project will be described in the Annual Work Schedules developed each year.

5.5.2 *Forest Improvements*

These areas may also become suitable areas for pre-commercial thinning, hardwood management, or require site preparation in the operating period covered by this plan. Further refinements to each project will be described in the Annual Work Schedules developed each year.

5.6 *Forest Access Roads*

The construction of an effective road network is essential to ensure the success of commercial operations in the area. To ensure this success, 14.2 kilometers in total of primary access road have been proposed for construction during this planning period. Based on current costs this will require a funding commitment well in excess of one million dollars.

Operational roads (secondary and tertiary) are not identified in the five year plan. However, they may be necessary in order to ensure that the timber scheduled for harvest can be fully accessed. Royalty reductions, as per regulations, will be offered as incentive for commercial operators to construct their own access roads. These roads must adhere to established construction and environmental standards and will be subject to approval by District staff and identified in annual plans. Considering the limited access that currently exists within the District, decommissioning (barring or rehabilitating of access roads) has not been scheduled for this planning period. It will be considered when it is in the interest of protecting sensitive

wildlife or fish habitat. Road construction activity will be carried out as per the Environmental Protection Guidelines, which are provided in Appendix III. Certificates of approval must be obtained from the Department of Environment and Conservation for any stream crossing.

5.7 *Forest Protection*

5.7.1 Insect and Disease

Protection of the regions forests and related values continue to be a priority in Labrador. The hemlock looper insect control program has not been required since 2009 due to low insect numbers. No treatments are planned for 2020 due to expected low numbers. Monitoring for insects will continue with aerial and ground reconnaissance being conducted. The spruce budworm has caused defoliation in the Goose Bay area but there is no evidence of damage in this district.

5.7.2 Fire

Resource protection, in particular fire suppression is necessary to protect Labrador's forest resource and is considered an essential operational activity. Even though large fires are uncommon in the recent past within District 20, forest fire occurrence is unpredictable. We must be prepared to respond quickly to reduce the loss of valuable commercial, recreational and non-commercial values on the landscape.

To determine initial attack strategies the FMD 20 has been sub-divided into the following priority zones: 1) life, 2) property, 3) resources, 4) other.

5.7.3 Windthrow

Due to the old age class structure of the forests in District 20, areas of wind throw are highly likely. Areas of wind throw have been observed on small scales throughout the District however with changing climate conditions with increased wind speeds and occurrences, wind throw will be more prevalent in the District over the next five years. Identified commercial blocks have targeted some of the oldest stands first to try to salvage the wood before it can blow down. Should the District experience an excess of wind throw, additional measures will be considered. Existing measures for domestic permit holders include wind throw harvest outside of a domestic block with District Manager approval.

5.8 *Information and Education*

Public awareness and education is a continued priority for district. Staff will work with the Regional office in educating the public on best management practices. Staff will take part in several activities to ensure good communication and relations between the department and communities.

Conservation Officers plan to be involved in public relation activities including: school visits; Labrador Expo; National Forestry and Wildlife Week; and career fairs. We also anticipate school visits to the district office for tours and information sessions. Throughout the life of this plan we hope to build on the success of these activities.

6.0 PROPOSED ACTIVITIES

An overview of proposed forest management activities scheduled for this five-year period (2020-2024) is presented in the appended maps (Appendix IV). Activities include: i) harvesting, ii) silviculture, iii) road construction.

The operational activity for this planning period is described in the following sections. A more detailed description of operations will be outlined in annual work schedules.

6.1 *Harvesting*

Over this planning period a total of 150,425 m³ is proposed for commercial and domestic harvest.

A summary of the wood supply analysis is provided in Appendix II. A total of 129,000 m³ has been allocated for commercial operations and 21,425 m³ has been estimated for domestic use.

Operating Area					Volume Proposed		
					Softwood		
Number	Name	Tenure	Area (ha)	Number of Permits	Core	Const.	Sub-Total
20-2015-2019-CC20001		Crown	345		23,018		23,018
20-2015-2019-CC20002		Crown	124		9,348		9,348
20-2015-2019-CC20003		Crown	101		14,801		14,801
20-2015-2019-CC20004		Crown	148		15,376		15,376
20-2015-2019-CC20005		Crown	142		8,003		8,003
20-2015-2019-CC20006		Crown	89		10,982		10,982
20-2015-2019-CC20007		Crown	68		7,337		7,337
20-2015-2019-CC20008		Crown	60		7,210		7,210
20-2015-2019-CC20010		Crown	30		3,499		3,499
20-2015-2019-CC20011		Crown	123		17,895		17,895
20-2015-2019-CC20012		Crown	62		8,641		8,641
20-2015-2019-CC20013		Crown	138		15,237		15,237
20-2015-2019-CC20014		Crown	64		7,963		7,963
20-2015-2019-CC20015		Crown	151		14,437		14,437
20-2015-2019-CC20016		Crown	226		18,748		18,748
Totals			1,871		182,495		182,495

Table 6.1 Proposed commercial harvest activity 2020-2024

6.1.1 Commercial

Commercially 125,000 m³ will be available for allocation, scheduled for harvest from fifteen blocks in the commercial operating area, identified south of Muddy Bay Pond (Dykes River). Appended in the maps are the locations of these areas (Appendix IV). A summary of the commercial harvesting blocks is provided in table 6.1.

The proposed commercial areas contain an estimated 182,495 m³ Net Commercial Volume (NCV) of timber. This additional volume, 57,495 m³ greater than what has been scheduled, will provide operational flexibility. This is to ensure that the Environmental Protection Guidelines are met and that any additional land removed from the harvesting areas as a result of the pre-harvest surveys for the annual operating plans can be accommodated. All harvesting operations are governed by the *Environmental Protection Guidelines* (EPG) which have been developed by the Department in consultation with various government departments and industry (Appendix III).

6.1.2 Selective-Commercial

For this five year period the Selective-Commercial area will be merged into a large domestic area incorporating the previous domestic areas of Bill Learning Pond and Paradise River. This approach was suggested through the public consultation process due to the low level of commercial harvesting in the Selective Commercial area. Commercial operators who have traditionally cut there will be able to continue without disruption due to their low volume permits (less than 200 cubic meters). This larger domestic area will better serve the fuelwood needs of both communities.

6.1.3 Domestic

The harvest of fuelwood, sawlogs and building materials for domestic use will be carried out under a permit in identified harvesting areas throughout the District. These areas are generally located in close proximity to communities such as Cartwright and Paradise River (Appendix IV). Residents of Black Tickle fulfill their domestic requirements in the Porcupine Bay area (Appendix IV). Small volumes are also harvested at various locations throughout the District by cabin owners. Twenty-one thousand four hundred and twenty five cubic meters (21,425 m³) will be available for domestic harvesters over the five year period. Based on previous years permit sales, this should be more than enough to satisfy domestic demands. The Department will ensure that the number of permits issued for each domestic block do not exceed sustainable harvest levels. Requests for domestic harvesting blocks outside the approved domestic area, as indicated in the appended maps (Appendix IV), will require prior approval from District staff. They will be closely monitored and subject to review on an annual basis. Modifications to this practice may be recommended and enforced as required.

Domestic harvesting will not be permitted in the commercial areas, which is located south of Muddy Bay Pond (Dykes River) while commercial operations are present. However once commercial operations cease in an area, domestics may be allowed to harvest or clean up commercial areas. Over time this will reduce the pressure on the green tree resource and increase the utilization. Through consultation, one domestic sawlog block, White Hills

(Appendix IV) has been identified with access through the TLH and snowmobile for domestic harvesters who wish to harvest sawlogs. Certain conditions apply to harvesting within this block such as, maximum 10m³ total sawlogs per allocation, assigned in 5m³ blocks at any one time. Once allocation is reached, a Conservation Officer must inspect harvest activity and give approval for additional 5m³ to be harvested. These activities will require prior approval from District staff, and will be closely monitored and subjected to review by the local planning team on an annual basis. Modifications to these practices may be recommended as required.

Harvesting is also restricted in various buffers that have been established for roads (100m) and snowmobile trails (30m). A minimum of 125m no harvest buffer will be applied to all major waterbodies with an additional 50m of modified harvest, when required, to be determined in the field by District staff. Consensus was reached and major waterbodies were defined by local stakeholders during public consultation sessions. All other waterbodies identified on a 1:50,000 map or have a width greater than 1.0 meter will have a minimum no harvest buffer zone of 30m. In any instance, when field conditions require, additional buffer distance may be applied. Consensus was reached among local planning team members that the following exceptions should apply to domestic harvesting in buffers:

- some dead trees may be harvested
- some blow-downs can be salvaged
- special building materials (i.e. boat timbers) may be harvested provided good utilization is practiced

These activities will require prior approval from District staff, and will be closely monitored and subjected to review by the local planning team on an annual basis. Modifications to these practices may be recommended as required.

Black spruce, the common fuelwood species in FMD20, will account for 90% of the domestic fuelwood harvest. The remaining volume, balsam fir (*Abies balsamea*), will be sawn in local sawmills.

Operating Area				Estimated Number of Permits		Estimated Volume	
Number	Name	Tenure	Total Area (ha)	Commercial	Domestic	Softwood	Hardwood
20-2020-2024-CC20501	Cartwright	Crown	58,016	0	110	2,530	0
20-2020-2024-CC20502	Paradise River	Crown	18,956	0	20	460	0
20-2015-2019-CC20505	Black Tickle	Crown	30,150	0	20	460	0
20-2015-2019-CC20506	White Hills	Crown	109	0	20	460	0
Total			107,231	0	170	3,910	0

Table 6.2 Proposed domestic harvest activity 2020-2024

6.2 *Silviculture*

Harvested stands (or portions of harvested stands) that are not regenerating will be scheduled for planting up to 100 ha per year (500 ha/5yr). The planted species will be determined on a site specific basis but will be highly dependent on the pre-disturbance stand structure.

Research will focus on silviculture techniques that will enhance natural regeneration. Potential projects include:

- (1) Retention of groups of seed trees.
- (2) Modification of harvesting patterns.
- (3) Investigation of various site preparation techniques.
- (4) Species trials
- (5) Past plantation assessment

A species trial within an old burn area, with poor to medium soils is proposed for the District. The project will be approximately 5 ha. in size, and will contain 5-7 different conifer species, depending on seedling availability at the time of planting. The trial will consist of approximately 100 seedlings per species, with 150-200 pine surrounding the trail to provide a wind break. It's possible that the windrow will be planted first, and the rest in the following years, to give the pine some time to establish.

6.3 *Forest Access*

Approximately 14.2 kilometers in total of Crown and operator built primary access road has been proposed for this planning period (Table 6.3). The current forest access road system originates from the DND access road, which connects the community of Cartwright to the North Warning Radar Site located on the White Hills. Proposed road construction will be an extension of our forest access road system. This access will be required to maintain the proposed harvest schedule if large scale commercial operations are identified.

The location of the proposed primary road construction activity is illustrated on the 1:50,000 cover type and 1:50,000 topographic maps provided in the appended maps (Appendix IV). This road network will potentially provide access to approximately 182,000 m³ (NCV) during the first four years of this plan. All roads constructed by the Department will be of class C-2 standard (Appendix VI).

Operating Area		Construction/ Reconstruction	Length (km)	Water Crossings	
Name	Number			Culverts	Bridges
Cartwright Forest Access Road	C-20-7 to C- 20-10	Construction	4.2	1	
	C-20-11 to C-20-16	Construction	10.0	3	

Table 6.3 Proposed primary access road construction and water crossings 2020-2024.

6.4 Forest Protection

6.4.1 Fire

Large fires have not been common in District 20 in recent years. Wildfire, however, is documented as a natural occurrence in the Labrador Region. Large fires have occurred in Southern Labrador (Port Hope Simpson); therefore an effective fire suppression program is necessary to ensure that losses to fire are minimized. Fires, which pose no threat to life, property or commercial resources, will be allowed to burn. The priority fire suppression zones within Labrador are outlined in the appended maps (Appendix IV).

The District Office in Cartwright currently has staff and equipment to provide initial suppression attacks. Two seasonal fire protection staff is stationed in Cartwright from mid May to September, complemented by three permanent District staff, all trained in forest fire suppression. The office is manned from 1200 to 1900 hours daily. After regular hours, the District Fire Duty Officer is responsible for receiving fire reports and dispatching staff and equipment. The Forest Management Centre located in North West River, assists in coordinating air support (tanker, helicopter) and can provide additional staff and equipment as required.

6.4.2 Insects and Disease

In addition to fire suppression, resource protection will focus on maintaining ecosystem health from forest insect damage. Recently a Hemlock Looper (*Lambdina fiscellaria*) outbreak has caused extensive damage to balsam fir – black spruce forest throughout neighboring District 21. This is the first known outbreak of Hemlock Looper in Labrador. Small localized areas with severe damage have been identified in District 20 in the past.

Over mature stands increase the risk of insect and /or disease outbreaks. The five year harvest schedule targets oldest stands first in an attempt to reduce the potential risk for such outbreaks and also reduce the risk of major forest fires. Harvesting alone is not enough to control the population. Silviculture will focus on planting harvested sites with less susceptible species such as spruce. At the planning meetings stakeholders were made aware of the seriousness of this outbreak and our control options. No stakeholders raised concerns over treatment. Crews from the Insect and Disease branch at Headquarters in Corner Brook, with input from District staff, will monitor insect populations through aerial and ground reconnaissance. Information collected will assist managers in the development of adequate forest protection measures that can be presented to the local public for input and approval.

The Department and other organizations may be undertaking a number of studies to examine the affects and impact of a Hemlock Looper outbreak in the region. Researching the outbreak in Labrador is particularly of interest as it relates to the effects of climate change on forested ecosystems in northern areas. The current circumstances provide the opportunity to investigate and improve existing knowledge and fill information gaps to better monitor, forecast and manage Hemlock Looper outbreaks.

6.4.3 Windthrow

In the event that the district experiences an excessive amount of windthrow, salvage areas will be considered and identified for both commercial and domestic harvesting. If required, amendments to the plan will be made to cover this activity.

6.4.4 Surveys

Surveys are important management tools that are necessary in order to evaluate past action and provide data on which to base future management decisions. A number of surveys are scheduled for this upcoming planning period subject to adequate staffing and budgets.

Proposed harvesting areas will be surveyed for sensitive habitats such as the presence of raptor nesting sites, critical spawning areas and presence of aquatic furbearers. Detailed harvest sensitivity surveys (slope, groundwater condition, soil texture) may also be conducted to identify areas with high compaction and soil erosion hazard potential. A trial comparing the amount of coarse woody debris before and after logging may also be initiated.

Surveys will be conducted on areas that have been harvested in order to determine the quantity and quality of natural regeneration as per the Regeneration Assessment Procedures for Newfoundland and Labrador. Areas will normally be surveyed three to five years after harvesting to allow sufficient time for seedlings to establish.

Problems with improper utilization will be addressed through regular monitoring and enforcement by District Conservation Officers. Formal surveys, defined by Newfoundland & Labrador Forest Service, will also be carried out in order to obtain baseline data or to resolve disputes.

While these surveys are necessary to measure the immediate impact of activities on the ecosystem, mechanisms to monitor change over the long term are also necessary. During the summer of 2001 approximately 30 PSP (permanent sample plots) were established in District 20 by the inventory branch of FLR. These permanent sample plots will be an important component of long term monitoring. A five to ten year measurement cycle is expected in District 20. In addition to obtaining growth and yield information, data pertaining to site, coarse woody debris and the presence of small mammals and songbirds will be recorded and monitored over time. After two cycles of measurement, growth trends can be observed and preliminary data analyzed. More measurements are required to ensure that more representative results are obtained. These results will prove helpful in future planning period.

These surveys, as defined in the Ground Disturbance Survey Guidelines developed by the Newfoundland and Labrador Forest Service, will be conducted following harvesting activities to ensure compliance with the site disturbance and erosions sections of the Environmental Protection Guidelines.

6.5 Activities in Protected Public Water Supply Areas

There will be no commercial or domestic harvesting scheduled or permitted in either of the protected water supply areas. Furthermore, these protected areas will be identified on domestic maps supplied to harvesters and identified and enforced as no cutting areas.

6.6 Information and Education

Public awareness and education is a high priority for the Department in District 20. Educating the public on best management practices is necessary and has proven beneficial. Staff will take part in several activities to ensure good communication and relations between the Department and communities, such activities include visiting the local schools for presentations, career fairs, forestry and wildlife week and to judge science fairs. Some promotional materials will be distributed during special occasions. Throughout the life of this plan we hope to build on the success of these activities.

7.0 PAST PLANNING ACTIVITIES

The previous five year forest management plan (2010-2014) was an overall success. Activities remained consistent over each year of the planning period. The underlying management objective was to support the sustainable development of the forest ecosystem ensuring the general well-being of all resources for present and future generations. The fundamental objective of this was to provide maximum social and economic benefits from the forest ecosystem, while maintaining its integrity at all spatial scales.

7.1 Harvesting

7.1.1 Commercial Activity

The annual allowable cut (100,000 m³) from the mid 1990's to early 2000 was recognized as an opportunity for commercial development. As a result the Sandwich Bay Timber Ltd. began operations in 1994 and by the fall of 1996 had shipped two barge loads of pulpwood, totaling 9795 m³ (solid) to the Abitibi-Price mill located in Stephenville. Shortly after this operation ceased the Cottles Island Lumber Company began its commercial operation in Cartwright. The operation lasted for four months and approximately 7000 m³ of timber was harvested. The majority of this timber was shipped the next summer and fall, via barge, to their mill located in Summerford, NL, for processing with plans to commission a sawmill in Cartwright the following year. These plans later fell through.

The forest industry in District 20 has remained relatively stable in the past five years. Commercial operations have remained minimal. Over the past five year planning period approximately 1,031 m³ have been harvested from an available allocation of 125,000 m³ (Table 7.1). The lack of commercial operations has decreased other forestry related activities including road construction and silviculture. Commercial harvest levels will remain consistent in the immediate future until viable markets for lower quality fiber (pulpwood, fuel wood, bio-energy materials etc.) or value added products are identified. The current global market conditions have created a difficult environment for growth but overall there is a positive

outlook for the future. This is mainly due to the interest and dedication of many stakeholders and the Department.

District 20		Core				Operational (Available)				Non-AAC wood
		AAC	Commercial	Deviation	Total	AAC	Comm.	Dev.	Total	
Softwood	2019	25000	N/A	N/A						
	2018	25000	25	99,559						
	2017	25000	101	74,584						
	2016	25000	171	49,685						
	2015	25000	144	24,856						
Sub-Total		125000								
Hardwood	2019	0	N/A	N/A						
	2018	0	N/A	N/A						
	2017	0	N/A	N/A						
	2016	0	N/A	N/A						
	2015	0	N/A	N/A						
Sub-Total		0	N/A	N/A						
Total		441	99,559							

Table 7.1 Commercial harvest summary 2015-2019.

7.1.2 Domestic Activity

Domestic harvesting has remained consistent in the past five year period. The number of domestic permits issued averaged around 155 per year (@ 23 m³ per permit). Fuel prices were relatively high over the past five years and as a result residents of communities in the District depended on fuelwood for home heating. Over the past five year period domestic harvesting has accounted for approximately 14,283 m³ (Table 7.2).

Operating Area					Estimated Volume	
Number	Name	Tenure	Total Area (ha)	Number of Permits	Softwood	Hardwood
D-20-01	Cartwright	Crown	26,255	443	10,189	
D-20-02	Paradise River	Crown	9,750	62	1,426	
D-20-05	Black Tickle	Crown	30,150	62	1,426	
D-20-06	White Hills	Crown	109	0	0	
D-20-07	Table Bay	Crown	15,880	10	230	
D-20-08	Bill Learning Pond	Crown	4,081	44	1,012	
Total			86,225	621	14,283	

Table 7.2 Domestic harvest summary 2015-2018*

The majority of domestic harvesting occurred near the communities of Cartwright, Paradise River, and Reeds Brook (by residents of Black Tickle)(Appendix IV).

7.2 *Silviculture*

Silviculture has been limited because of a lack of large scale disturbance (harvesting or natural disturbance). As a result, there were no planting projects conducted during 2010-2014.

7.3 *Forest Access*

The majority of road that exists in the district was constructed in 1987 by the Department of National Defense (DND) to provide access to the radar site located on White Hills, 24 kilometers southeast of Cartwright. From this road system, the Department of Natural Resources (FLR) has constructed approximately 8.5 km of class C-2 primary forest access road to accommodate commercial operations. In the past five years there was no new construction of road however there was grading and alder removal from approximately 9km of the existing road network along with some light maintenance work.

7.4 *Natural Disturbances*

7.4.1 *Fire*

Several forest fires were reported during the past five years. However majority of these fires were small and required minimal suppression efforts. Majority of fires in the district was the result of lightning strikes. All fires were contained by District staff from Cartwright, as well as staff from Port Hope Simpson, Red Bay, and North West River, with some requiring water bomber and/or helicopter support from Goose Bay.

7.4.2 *Insects*

The levels of Hemlock Looper have dropped significantly since 2009, when the last area was treated for this insect. There has been spruce budworm damage reported in the Happy Valley-Goose Bay area, but no signs of this insect are evident in this district at this time. Crews from the Insect and Disease section at headquarters in Corner Brook, and local staff, will monitor insect populations through aerial and ground reconnaissance work.

8.0 *RESEARCH*

8.1 *Research Initiatives*

All stakeholders including FLR acknowledge the information gap, which exists in Labrador. Currently, little to no research has been conducted in the immediate area making management decisions cumbersome. In consultation with stakeholders, subject to funding, FLR plans to initiate several smaller research projects over the next five year period. These projects will

provide relevant site specific information, which can be used, for management decisions and processes during the next planning period.

Another important monitoring mechanism that is required under the current management planning process is the preparation of annual work schedules. These plans will be subject to review by the planning team and the general public. This will provide an opportunity for stakeholders to evaluate the plan progress and recommend necessary changes.

8.2 Environmental Management System

The Province has initiated the implementation of the ISO 14001 environmental management system (EMS) within crown lands of the Province. By doing so, the Department can demonstrate control and measure the impacts of programs and activities on the environment, with a goal to continue to minimize harmful effects, and improve environmental performance.

ISO 14001 is a series of internationally recognized standards on environmental management. It provides a structured framework for the development of an environmental management system and a supporting audit program, which can be integrated within the existing legislation and policies of an organization. There are many anticipated benefits in following the ISO 14001 EMS model. Some include:

1. Improved awareness of the key environmental issues.
2. An increase in the effectiveness of operations.
3. Improved forest management.
4. Improve relationships between Industry, Governments and Aboriginal Peoples.
5. Improved market advantages.
6. Improved ability to meet compliance with environmental regulations.
7. Improved public image.

The EMS will apply to all forest management activities and to all Forestry Services Branch employees, commercial permit holders, research institutions and contractors carrying out regulated forest management activities within the Province. Activities would include; commercial timber harvesting, forest access road construction and maintenance, loading and transportation or wood and silviculture.

The application of the EMS will ensure that all activities implemented in the district are following the same set of guidelines to ensure protection of the environment. It also ensures that reporting and monitoring will be conducted by the same set of guidelines and done on a regular basis. Overall the EMS will ensure further compliance of the cultural, ecological and economic objectives identified in this plan.

The ISO 14001 EMS requires a lengthy information gathering and review period which was initiated during the last planning period. It also requires a third party external audit for assessment and registration along with internal annual audits. Audits consist of documentation review, site visits and communications with employees. The third party external auditor will make a final decision on performance.

8.3 Forest Certification

Following the implementation of the EMS, forest certification may be explored for the district and Province. Forest certification is a voluntary standard, or tool, audited by a third-party for forest managers who wish to improve their planning and practices by implementing measures or standards that go beyond regulations by considering ecological, social and economic values (www.certificationcanada.org). Certification is the best practical tool available that allows for the monitoring of applied criteria and indicators to ensure sustainability (Kneeshaw *et al*, 2000).

In Canada, there are three major forest certification systems:

1. Canadian Standards Association (CAN/CSA Z809)
2. Sustainable Forestry Initiative Program (SFI)
3. Forest Stewardship Council (FSC)

While the choice of which certification scheme will be explored for the Province has not been made, the benefits and costs associated with applying for and implementing forest certification in the district are still being evaluated.

9.0 PLAN ADMINISTRATION

9.1 Monitoring

The adaptive management approach will afford the opportunity for participants and stakeholders to continually improve the plan and set the stage for the next planning period.

Further refinement of the sixteen proposed commercial harvest blocks outlined in this plan will be administered through the development of an annual work schedule by January 1st of each year. In addition, a past annual report will be completed after March 31 of each year.

Finally, District Conservation Officers will routinely monitor harvesting, road construction and silviculture operations. This will ensure that activities are being carried out in a manner consistent with various legislation, guidelines and the objectives of the five year plan.

9.2 Amendments

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

1. 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.
2. within a forest management district, 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.
3. 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.
4. 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.

Changes that are not covered by the above must be submitted for Environmental Assessment (EA) in the form of an amendment to the five year operating plan. Once approved through EA the amendment still has to be approved by the Ecosystem Management Division of the Forest Service. Amendments requiring submission through EA will be reviewed by the planning team.

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APPENDIX I

Planning Team Members and Correspondents

The following is a list of participants who have attended sessions since the planning process began in 2009.

Name	Community	Representation
Bird, Cecil	Cartwright	Public Member
Boudreau, Robert	Cartwright	Town Council Member
Cabot, George	Cartwright	Commercial Operator
Davis, Doris	Cartwright	Public Member
Davis, Lewis	Cartwright	Public Member
Dyson, Charlotte	Cartwright	Southern Aurora Development Association
Earle, Dorothy	Port Hope Simpson	Southern Aurora Development Association
Elson, Kirby	Cartwright	Fisherman
Elson, Tony	Cartwright	Public Member, Junior Rangers
Fequet, Mike	Cartwright	FLR
Glode, Jason	Cartwright	FLR
Jennings, Darren	HV-GB	FLR
Lethbridge, Dwight	Cartwright	Town Mayor (Acting)
Lethbridge, Norman	Cartwright	Public Member, outfitter
Lewis, Richard	Cartwright	NunatKavut representative
Martin, John	Cartwright	Public Member
Mesher, Howard	Cartwright	Commercial Operator
Michelin, Steve	HV-GB	FLR
Morris, Preston	Cartwright	FLR
Notley, Roxanne	Port Hope Simpson	Southern Aurora Development Association
Pardy, Judy	Cartwright	Public Member
Phillips, Frank	HV-GB	FLR
Roberts, Wade	Cartwright	Public Member
Sinclair, Josh	Cartwright	FLR
Tremblet, Shirley	Cartwright	Public Member
Worthman, Harry	Cartwright	FLR
Craig Coady	HV-GB	FLR
Paul Whalen	HV-GB	FLR
Patrick Ward	Cartwright	Public Member/Domestic Harvester
Roland Clarke	Cartwright	Public Member/Domestic Harvester
Howard Mesher	Cartwright	Commercial Operator
Donna Carroll	HV-GB	NunatKavut representative
Anthony Elson	Cartwright	Public Member/Domestic Harvester
Verna Roberts	Cartwright	FLR

In March of 2019 the planning process for District 20 was re-initiated in the Cartwright area. From this time until July 2019, 1 session was held with participants to discuss outstanding forestry issues relating to the District 20 five year operating plan. An initial meeting was held to discuss the draft document, proposed changes and receive feedback. The meetings were facilitated by Craig Coady (District Ecosystem Manager) and Paul Whalen (Regional Forester). Every effort was made to ensure representation by all stakeholders. Topics discussed included:

- Domestic harvesting, hunting and trapping
- Cabin development
- Waterway access/ public access
- Local resource access
- Harvesting method
- Ecosystem health – general
- Protected areas
- Rotation age
- AAC calculation – poor sites
- Local opportunities – sawmilling and harvesting
- Mealy Mountain National Park
- Forest industry
- Community consultation

APPENDIX II

Annual allowable cut results

$$\text{AAC (m}^3/\text{year)} = \frac{\text{Net Commercial Forest Area (ha)}}{\text{Net Merchantable Volume (m}^3)} \times \frac{\text{Rotation Age (yrs)}}{\text{Hectare}}$$

Where:

- **Net Commercial Forest Area** is the net landbase of commercial forest.
- **Rotation Age** is the time period (in years) required to establish and grow trees to a condition of maturity following a disturbance.
- **Net Merchantable Volume** is the expected merchantable volume on a specified landbase taking into account losses for fire, waste and retention.

Net Commercial Forest Area Determination

Landbase	Area (ha)	Swd. Volume (m3)
Total Area (1992 inventory)	612,337	23,928,973
Total Area (southside management area)	174,640	9,005,661
Productive Forest	50,933	6,899,254
Commercial Forest	50,125	6,882,947
Un-alienated Commercial Forest	38,612	5,330,052
Net Commercial Forest	32,820	4,530,544

Definitions and assumptions:

Productive Forest Stands that are capable of producing 35 m³/yr at rotation.

Commercial Forest Stands (bF, bS, wS, sH) that contain a minimum softwood volume of 88 m³/ha. Height class 3 and all 3P stands are not considered commercial

Un-alienated Isolated stands and sensitive areas were not included in the AAC calculations.

Net Comm. Forest Total commercial forest with a 15% reduction applied to account for buffers, stands located on slopes >30% and other sensitive areas requiring protection.

Rotation Age

Rotation age is the age at which the mean annual increment of merchantable volume reaches its peak and yields the most volume per unit area per year. Normal yield tables show that rotation age increases as site quality decreases. They also show that the corresponding merchantable volume and mean annual increment decrease greatly from good to poor sites (USDA 1990).

Averages for black spruce stands of three site classes in the boreal forest of Canada are as follows:

	Good	Medium	Poor
Rotation Age (yrs)	95	113	132
Merchantable Volume (m ³ /yr)	218	160	101
Mean Annual Increment (m ³ /ha)	2.3	1.4	0.8

Approximately 78% or more of the area in District 20 are black spruce stands. The proportion of site classes of forest stands is approximately 47% poor, 47% medium and 6% good. The average gross merchantable volume is approximately 140 m³/ha. Considering these figures a best estimation of the rotation age for District 20 is **120 years**.

Net Merchantable Volume Determination

The forest cover inventory used to derive the described landbase measures softwood and hardwood volumes per hectare of forestland. Analysis of 1:12,500 scale aerial photos identified height, species, age and productivity of the landbase. Ground truthing plots were used to verify this information and furthermore the resulting inventory has specific volume/hectare values for all forest cover types.

During the landbase net-down exercise the Commercial Volume and the commercial land base area are determined. The Gross volume/hectare is found by using the following formula:

$$\text{Gross Volume/ Hectare} = \frac{\text{Net Commercial Volume}}{\text{Net Commercial Area}}$$

This number (Gross Volume/hectare) is further refined to account for retention, waste and natural disturbances. This number, referred to as the **Net Commercial Volume**, is then used in the AAC calculation. The expected net downs for district 20 were applied to account for the following losses:

Cull*	10%
Residual Stands	6%
Harvesting Losses	3%
Fire	1%
Total	20%

* Due to lack of previous large scale harvesting operations, the exact percentage of cull in District 20 is unknown. Harvesting operations in the area will determine this percentage over time. Consideration will be given to recalculate the AAC if cull percentage difference is found to be greater than 5 % in the first year.

Estimations of the operable landbase and volume estimations for the Southside operating area are shown below.

	Gross Volume (m ³)	Gross Area (ha)	Commercial Volume (m ³)	Commercial Landbase Area (ha)
Southside Area	9,005,661	174,640	4,530,544	32,820

$$\text{Gross Volume/ Hectare} = \frac{\text{Commercial Volume}}{\text{Commercial Area}}$$

$$= \frac{4530544 \text{ m}^3}{32820 \text{ ha}}$$

$$= 138.04 \text{ m}^3/\text{ha}$$

$$\text{Net Volume/Hectare} = 138.04 \text{ m}^3/\text{ha} - 20\%$$

$$= 110 \text{ m}^3/\text{ha}$$

AAC Calculation

$$\text{AAC (m}^3/\text{year)} = \frac{\text{Net Commercial Forest Area (ha)} \times \text{Net Commercial Volume (m}^3\text{)}}{\text{Rotation Age (yrs)} \times \text{Hectare}}$$

$$= \frac{32820 \text{ ha}}{120 \text{ years}} \times \frac{110 \text{ m}^3}{\text{hectare}}$$

$$= 30,085 \text{ m}^3/\text{year}$$

Appendix III

Environmental Protection Guidelines for Forestry Operations in Newfoundland and Labrador

Date effective: January 01, 2018

Forestry and Wildlife
Forest Ecosystem Management

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Forestry and Wildlife
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www.faa.gov.nl.ca/forestry

CONTENTS

Forward.....	6
1. Harvesting Guidelines.....	7
1.1. Planning Operations	7
1.1.1. Permits Required	7
1.1.2. Consultation Required.....	7
1.1.3. Planning.....	8
1.1.4. Nutrient Poor Sites	8
1.2. Conduct of Operations	9
1.2.1. Minimizing Erosion and Disturbance.....	9
1.2.2. Archaeological Find	10
1.2.3. Timing of Operations	10
1.2.4. Leaving Buffers and Wildlife Trees	10
1.2.5. Petroleum Products.....	11
1.2.6. Clean up of Site	12
2. Forest Access Road Guidelines.....	13
2.1. Planning of Roads	13
2.1.1. Permits Required	13
2.1.2. Areas to Avoid.....	13
2.1.3. Waterbody Crossings.....	14
2.1.4. Burrow Pits and Quarries	14
2.1.5. Wildlife Values.....	14
2.1.6. Road Access	14
2.1.7. Decommissioning Roads	15
2.2. Construction and Decommissioning of Roads	15
2.2.1. Road Construction.....	15
2.2.2. Pits and Quarry Activity	15
2.2.3. Working near Waterbodies and Instream Work	16
2.2.4. Archaeological Find	18
2.2.5. Petroleum Products.....	18

2.2.6.	Winter Roads	18
2.2.7.	Decommissioning Roads	18
3.	Silvicultural Guidelines	19
3.1.	Silviculture Planning	19
3.1.1.	Permits Required	19
3.2.	Conduct of Silviculture Operations	19
3.2.1.	Preventing Erosion	19
3.2.2.	Protection of Waterbodies	19
3.2.3.	Placement of Windrows	19
3.2.4.	Trees Left for Wildlife and Other Values	19
3.2.5.	Timing of Silviculture	20
3.2.6.	Archaeological Find	20
3.2.7.	Fuels and Petroleum Products	20
3.2.8.	Scarification Method	20
3.2.9.	Choice of Species to Plant	20
4.	Forest Protection Guidelines	20
4.1.	Planning for the Application of Pesticides (Insecticides and Herbicides)	20
4.1.1.	Regulation of Pesticides	20
4.1.2.	Licences Required	20
4.2.	Conduct of Operations	21
4.2.1.	Pesticide Use	21
5.	Guidelines for Forestry Operations within Protected Public Water Supply Areas	22
5.1.	Conduct of Operations	22
5.1.1.	Map of Operating Area	22
5.1.2.	Prevention of Erosion	22
5.1.3.	Buffer Zones	23
5.1.4.	Petroleum Products	23
5.1.5.	Structures Prohibited in Water Supply Area	24
5.1.6.	Reporting Water Quality Problems	24
Appendix I		25
Resource Material		25
Federal Legislation		25
Provincial Legislation		25

FORWARD

The 2018 Environmental Protection Guidelines for Forestry Operations in Newfoundland and Labrador is an updated version of original guidelines developed in 1998. It has been developed through a consultative process with Forest Managers, Planners, Industry and other stakeholders throughout the province. These guidelines are intended to be stand level, on-the-ground procedures to be used by Forest Managers and operators to ensure sustainable use of the forest resource without degrading the environment. More specifically, the guidelines are designed to prevent and control degradation of soil, water, and vegetation in an effort to maintain healthy forest ecosystems.

The guidelines set out sound and practical measures and based the best available scientific information. To ensure the incorporation of new research findings and technologies, the guidelines will be reviewed periodically and adjusted to reflect new policies and procedures.

To facilitate use, the guidelines are structured by forestry activity and include sections on:

- harvesting,
- road construction,
- silviculture,
- forest protection, and
- operations within protected water supply areas.

Compliance with these guidelines will be monitored by Departmental staff.

The Environmental Protection Guidelines will complement the *Newfoundland and Labrador Forest Service Planning Guidelines*. Broader, landscape level issues will be addressed in the Provincial Sustainable Forest Management Strategy.

The Department of Fisheries and Land Resources (FLR) will continue to use science as a basis for refining and implementing sustainable forest policies and practices in the province. In particular, the development of the Environmental Protection Guidelines will continue to be an evolving process within which FLR will incorporate the best available information about forest ecosystems and sustainable forest management concepts in a timely fashion through adaptive management and other innovative, scientific based approaches.

1. HARVESTING GUIDELINES

1.1. PLANNING OPERATIONS

1.1.1. PERMITS REQUIRED

1. When temporary water crossings are required to facilitate travel of harvesting equipment, the location and type of all water crossings must be submitted to the Department of Municipal Affairs and Environment (MAE). A permit is required from Water Resources Management Division of MEA, for any water identified on the latest 1:50,000 topographic maps. A Letter of Advice is required from DFO for any alterations. Appropriate protection (i.e. the permit and Letter of Advice) is still required for streams greater than 1.0 metre in width, at its narrowest point from the high water mark, not found on the 1:50,000 topographic maps. The intent of these measures is to safeguard water quality and fish habitat.
2. All waste disposal sites require a valid permit under the *Environmental Protection Act*. Application for approval can be made by contacting the nearest Government Services Centre.
3. Timber harvesting is considered a development under the *Urban and Rural Planning Act*, and when this activity is proposed within a planning area boundary or within 400 meters of a protected road, a development permit is required from Service NL, before any activity takes place.

1.1.2. CONSULTATION REQUIRED

1. The Natural Areas Program of the Lands Management Division of FLR will be consulted during the preparation of each District five-year operating plan. Where harvesting is proposed within one kilometer of an ecological reserve, wilderness reserve, provincial park or proposed reserve, Natural Areas will be expected to identify/discuss any concerns during the planning consultation process. Also, access roads will not be located within 500 metres of the boundary of an ecological reserve, wilderness reserve, provincial park or proposed reserve, without first consulting Natural Areas.
2. The Wildlife Division of FLR will be consulted on timber harvesting within woodland caribou habitat during the preparation of each District five-year operating plan.
3. Rare and listed flora will be protected through mitigation measures, in consultation with the Wildlife Division.
4. When specific forest cover is a requirement for the management of moose or other wildlife species, such areas will be identified by the Wildlife Division.

5. The impacts of forest operations on Newfoundland Marten, *Martes americana atrata* (marten) have been an ongoing issue. Until provincial guidelines are developed for marten habitat, during the preparation of five-year operating plans, forestry activities within known marten recovery areas will require consultation with the Wildlife Division.
6. During the preparation of five-year operating plans, areas identified as “Sensitive Wildlife Areas” require consultation with the Wildlife Division.
7. The Arts and Heritage Division of the Department of Tourism, Culture, Industry and Innovation will be contacted during the preparation of the five-year operating plans to determine the location of historic resources and appropriate mitigation measures.

1.1.3. PLANNING

Planning forest operations for both Industry and Crown may include, but is not limited to:

- boundaries of protected public water supplies (if applicable);
- existing and proposed access roads;
- general location of extraction trails and landing locations;
- areas sensitive to erosion;
- buffer zones around water bodies;
- location of approved stream crossings;
- location of fuel storage;
- sensitive wildlife areas as shown in the five-year operating plan; and
- sensitive fish habitat (e.g., salmonid spawning and rearing areas) identified in consultation with Department of Fisheries and Oceans (DFO).

1.1.4. NUTRIENT POOR SITES

If it is deemed necessary to harvest nutrient poor sites such as those typed as poor or scrub within the Provincial Forest Inventory, all effort will be made to ensure such sites are regenerated in a timely manner.

1.2. CONDUCT OF OPERATIONS

1.2.1. MINIMIZING EROSION AND DISTURBANCE

1. When extraction trails and winter roads are to be constructed, soil disturbance and impacts on water bodies are to be minimized. The operator will use culverts and/or temporary bridges, depending on site conditions, in order to minimize erosion and sedimentation, avoid restricting stream flow, and ensure fish passage in fish-bearing streams. Erosion control measures, such as the laying down brush mats and the construction of diversion ditches for water run-off, are to be maintained while an extraction trail is in use. The trail is to be left in an environmentally acceptable condition thereafter. All temporary crossings are to be removed at the end of the operating season. As well, when an extraction trail is located on steep ground and is no longer in use, cut-off ditches and push-lanes must be created.
2. No more than 6 per cent of the forested floor within the harvested land base of an operating area can be disturbed by equipment. In situations where specific operating areas require more than 6 per cent disturbance to capture available timber, the operator is required to obtain approval and then rehabilitate the area (i.e., leave the area in a condition suitable for successful forest regeneration and growth) to reduce the total net disturbance to the 6 per cent maximum. **Disturbance is defined as per the Ground Disturbance Survey Guidelines developed by the Forestry & Wildlife Branch.**
3. 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 the Department of Municipal Affairs and Environment (MAE) and without contacting the DFO Area Habitat Biologist.
4. In areas prone to erosion and silting:
 - I. conduct winter logging (i.e. harvest during winter), or
 - II. place slash on extraction trails if conventional equipment is operating in an area.
5. Any forestry operation that directly or indirectly results in chronic sedimentation under normal conditions entering a waterbody must be dealt with immediately by notifying either the DFO Area Habitat Biologist or the District Manager within 24 hours.
6. 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.
7. To minimize potential for erosion and sedimentation, temporary waterbody crossings shall:

- I. have stable approaches;
- II. be at right angles, wherever possible, to the waterbody;
- III. be located where channels are well defined, unobstructed, and straight;
- IV. be at a narrow point along the waterbody; and
- V. allow room for direct gentle approaches wherever possible

8. Extraction trails and landings shall not be established within 20 metres of a waterbody.

1.2.2. ARCHAEOLOGICAL FIND

When an archaeological site or artifact is found, the *Historical Resources Act* requires that all development temporarily cease in the area and the discovery be reported to the Provincial Archaeology Office at (709) 729-2462. The Provincial Archaeology Office will respond immediately and will have assessment requirements and mitigation measures in place within seven days as agreed to by the Provincial Archaeology Office and the operator. Forestry activity can then continue.

1.2.3. TIMING OF OPERATIONS

1. Harvesting is not permitted within woodland caribou calving and post-calving areas from May 15 to July 31. Calving areas will be identified by Wildlife during the five year planning process.
2. Harvest scheduling may be modified during the migration of wildlife (e.g., caribou, waterfowl, etc.) and during temporary wildlife concentrations. Areas of concern and mitigation measures will be identified as part of the five year planning process.

1.2.4. LEAVING BUFFERS AND WILDLIFE TREES

1. A 20 metre, no harvesting activity buffer zone shall be established around all water bodies that are identified on the latest 1:50,000 topographic maps and along streams greater than one metre in width that do not appear on the maps. Where the slope is greater than 30 per cent there shall be a no harvest buffer of 20 metres plus 1.5 times per cent slope. All equipment or machinery is prohibited from entering waterbodies; thus, structures must be created to cross over such waterbodies for the protection of aquatic habitat. Every reasonable effort will be made to identify intermittent streams, and they will be subject to this buffer requirement.

The District Manager must adjust the specified buffer requirements in the following circumstances:

- I. The no harvesting activity buffer can exceed the 20 meters for sensitive fish habitat (e.g., salmonid spawning habitat).

- II. A 50 metre, no harvesting activity buffer will be maintained around known black bear winter denning sites or those encountered during harvesting. These den sites must be reported to the Wildlife Division.
- III. No forestry activity is to occur within 800 metres of an active bald eagle nest or osprey nest during the nesting season (March 15 to July 31) and 200 metres during the remainder of the year. For other raptor species like hawks, falcons, and owls, no forestry activity is to occur within 160 metres of a known nest at any time of the year. The location of any raptor nest site must be reported to the Wildlife Division.
- IV. All hardwoods within 30 metres of an active beaver lodge are to be left standing.
- V. A minimum 50 metre, no-cut buffer will be maintained from the high water mark in Sensitive Wildlife Areas for waterfowl including breeding, moulting and staging areas. These sites will be identified by the Canadian Wildlife Service (CWS) or the Wildlife Division.

2. A minimum average of 10 snags (i.e., standing dead trees) or other suitable living trees per hectare shall be left individually or as small clumps on sites identified as habitat for wildlife (i.e., nesting and perching sites for birds, den sites for particular wildlife species, etc.). Preference should be given to the largest trees (i.e., standing dead trees or live hardwoods). Research has shown that larger diameter snags are more valuable (last longer and contribute more to the biomass pool) than smaller diameter snags. Consequently, the trees retained should be ones which are from the dominant or co-dominant portion of the stand and be left in a fairly evenly distributed manner.

1.2.5. PETROLEUM PRODUCTS

1. In the event of a spill and/or leak of petroleum products, the owner or operator must make every effort to first; contain and second; clean up the spill. Spills in excess of 70 liters and **all leaks**, must be reported by calling the following spill report line:

Environmental Emergencies Spill Report Line
 Canadian Coast Guard
 (709) 772-2083 collect or 1 (800) 563-9089

In this province, spills and leaks must be remediated in accordance with the Guidance Document for the Management of Impacted Sites prepared by Pollution Prevention Division of MAE. (Appendix I)

2. 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 (including GEEP tanks) must be registered with Service NL and installed in accordance with the *Storage and*

Handling of Gasoline and Associated Products Regulations, 2003 as amended, under the Environmental Protection Act.

3. Used oil storage, handling and disposal is to comply with the *Used Oil Control Regulations*, NLR, 82/02 under the *Environmental Protection Act*.
4. Above ground storage tanks shall be surrounded by a dyke. The dyke will contain not less than 110 per cent of the capacity of the tank. The base and walls of the dyke shall have an impermeable lining of clay, concrete, solid masonry or other material, designed, constructed and maintained to be liquid tight to a permeability of 25L/m²/d. There shall be a method to eliminate water accumulations inside the dyke. Construction and installation standards are clearly listed in section 27 of the Storage and *Handling of Gasoline and Associated Products Regulations, 2003 as amended, under the Environmental Protection Act*.
5. Contaminated soil or snow must be disposed of at an approved treatment facility.

1.2.6. CLEAN UP OF SITE

Waste material is to be disposed of at an approved waste disposal site with the prior permission of the owner or operator. Prior to disposal it must be contained in a manner not to attract wildlife. All equipment and waste materials are to be removed from the operating area when operations are completed.

2. FOREST ACCESS ROAD GUIDELINES

2.1. PLANNING OF ROADS

2.1.1. PERMITS REQUIRED

1. Any alteration within 15 metres of a natural waterbody (i.e. any water identified on the latest 1:50,000 topographic map) or development within a protected public water supply area, will require prior approval by the Water Resources Management Division of the MAE. For alteration of a waterbody, a permit is required under Section 48 of the *Water Resources Act*, SNL 2002 cW-4.01. For any development in a protected public water supply area a permit is required under Section 39(6) of the *Water Resources Act*, SNL 2002 cW-4.01. Alteration of a waterbody may include culvert installations, temporary or permanent stream crossings, outfalls, infilling; and bridge, dam, and wharf construction. A Letter of Advice is also required from DFO for any alterations. Appropriate protection (i.e. the permit and Letter of Advice) is still required for streams greater than one metre in width not found on the 1:50,000 topographic map.
2. In addition to approvals from Water Resources Management Division and DFO, 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. This includes both inland and coastal waters).
3. Resource road construction or any forestry activity is considered a development under the *Urban and Rural Planning Act*. Where this activity occurs within a planning area boundary or within 400 metres of a protected road, a development permit is required from Service NL before any activity takes place.

2.1.2. AREAS TO AVOID

Forest access roads, borrow pits, and quarries, whenever possible shall avoid:

- I. deltas, floodplains or fluvial wetlands;
- II. terrain with high potential for erosion;
- III. known sensitive wildlife areas such as:
 - a. caribou areas (i.e. calving, post calving, migrations routes, rutting areas, and winter areas);
 - b. waterfowl areas (i.e. nesting and staging areas);
 - c. raptor nest sites; and
 - d. species at risk habitat, rare flora or fauna habitat, and other unique habitats as determined by qualified authorities.
- IV. known sensitive fish habitat areas such as spawning and rearing grounds;

- V. historically significant areas such as archaeological sites;
- VI. existing reserves such as parks (municipal, provincial, national), wilderness areas, ecological reserves and wildlife reserves; and
- VII. riparian buffer areas.

2.1.3. WATERBODY CROSSINGS

Waterbody crossings shall:

- I. have stable approaches;
- II. be at right angles, wherever possible, to the waterbody;
- III. be located where channels are well defined, unobstructed, and straight;
- IV. be at a narrow point along the waterbody; and
- V. allow room for direct gentle approaches wherever possible.

2.1.4. BURROW PITS AND QUARRIES

With respect to borrow pits and quarries, the operator shall wherever possible, avoid:

- I. minimize the number of new borrow areas opened for construction and/or maintenance;
- II. use existing borrow pits whenever practical;
- III. be in possession of a valid quarry permit from the Mineral Lands Division of Department of Fisheries and Land Resources and FLR, for borrow pits outside resources roads right of way, prior to aggregate extraction activities as per the *Quarry Materials Act*, and
- IV. not locate borrow pits and quarries in sensitive areas as identified by planning processes.

2.1.5. WILDLIFE VALUES

1. Wherever possible, forest access roads shall not obstruct wildlife movement. The following guidelines should be followed:
 - a. roads should be of low profile (i.e. less than one metre above the surrounding terrain);
 - b. slash and other debris shall be removed or buried; and
 - c. the slope of ditches and road banks shall be minimized.
2. Where road construction is to occur around identified waterfowl breeding, moulting and staging areas, mitigating measures will be identified during the 5 year planning process.

2.1.6. ROAD ACCESS

1. Areas proposed for harvest using winter roads shall not be harvested without a

reforestation plan approved in the Certificate of Managed Lands.

2. A regeneration survey is required for all forest areas that will be affected by access due to road decommissioning and bridge or stream crossing removals. Prior to decommissioning, an approved reforestation plan by the Silviculture and Research Section of the Forest Ecosystem Management Division is required for all areas that fail to meet the provincial silviculture stocking standards.

2.1.7. DECOMMISSIONING ROADS

On a site specific basis, roads may be decommissioned. Levels of decommissioning include:

- I. barring access;
- II. removal of watercourse crossings; and
- III. restoration of roadway including planting of trees.

Decommissioning is as decided through the planning team process or, under compelling circumstances, as decided by FLR (e.g. emergency closures).

2.2. CONSTRUCTION AND DECOMMISSIONING OF ROADS

2.2.1. ROAD CONSTRUCTION

1. There shall be no bulldozing or burying of merchantable timber or poor utilization of merchantable softwoods and hardwoods during the cutting of road right-of-way's. All merchantable timber shall be utilized and processed.
2. Where brush mat or corduroy is required, sub-merchantable or non-merchantable stems should be used first. In the event these are not available or sufficient, permission must be obtained from a Forestry Official prior to merchantable stems being utilized. Stems are to be placed in a "butt to top" alternating fashion for the entire length of the area to be brush matted.
3. Earth shall be excavated as required to complete earth cuts, ditching, sub-excavation and shall include hauling, handling and disposal as directed. Only with the approval of the Engineer or Inspector may excavation occur outside the limits of the roadway for the purpose of obtaining suitable or sufficient material to complete embankments. All holes and pits are to be rehabilitated.
4. Fill materials for road building must not be obtained from any waterbody, from within the floodplain of any waterbody, or within the 30 metres of a no-grub zone.

2.2.2. PITS AND QUARRY ACTIVITY

1. Where borrow pit or quarry activity is likely to cause sediment, laden runoff to contaminate a waterbody, sediment control measures such as filter fabric berms or

sedimentation ponds are to be installed. Contact is to be made with a Forestry Official prior to construction where such conditions exist.

2. Overburden or grubbed material pushed off any gravel pit site must be retained in a manner that allows it to be pushed back into the pit after construction and spread in a neat and tidy fashion.
3. Existing pits are to be used, where possible, to minimize the opening of new pits.
4. Borrow pits are to be located at least 50 metres from the nearest waterbody.

2.2.3. WORKING NEAR WATERBODIES AND INSTREAM WORK

1. A “no-grub zone” of 30 metres of undisturbed ground vegetation must be maintained around any waterbody crossing to minimize the damage to the lower vegetation and organic cover, thus reducing erosion potential.
2. Trees are to be felled away from all waterbodies. Slash and debris should be piled above the high water mark so that it cannot enter waterbodies during periods of peak flow.
3. Right-of-way widths at waterbody crossings should be kept to a minimum, preferably to the width of the driving surface plus water control features.
4. Unnecessary side casting or backfilling in the vicinity of waterbodies is not permitted. Where topographical constraints dictate that the roadbed must be constructed adjacent to a waterbody, road slope stabilization is to be undertaken at the toe of the fill (an area where active erosion is likely). The placement of large riprap, armour stone or slope stabilization material is recommended in such areas.
5. Take-off ditching should be used on both sides of the road or in conjunction with culverts to divert the ditch flow off into the woods or stable vegetation areas before reaching the waterbody. The ditch itself shall not lead directly into the waterbody.
6. Grades in excess of 10 per cent shall have culverts with baffle or ditch blocks on one end and cut-off ditches every 150 meters along the road. Baffle or ditch block can be constructed from gabion baskets, wooden structures, rock walls or other approved materials. Unless otherwise specified, the height of the baffle shall be a minimum of one-half the diameter of the culvert requiring the baffle.
7. When working near waterbodies, road building operations causing erosion or siltation are to be suspended during periods of intense rainfall or when soils are saturated.

8. Any forestry operation that directly or indirectly results in sediment or turbid water entering a waterbody must be dealt with immediately. (See Guideline 1.2.2.5 for further information.)
9. Fording of equipment for stream crossing installation is to be kept to a minimum. Equipment activity in water crossing areas is to be kept to a minimum. All work is to be carried out from dry stable areas. Permission for exceptions must be obtained from DFO.
10. Heavy equipment and machinery is not permitted in any waterbody, on a wetland or a bog, unless it is frozen, without a permit from MAE and without contacting the DFO Area Habitat Biologist.
11. Exposed mineral soil shall be stabilized during bridge construction and culvert installation.
12. All instream work is to be performed as per the DFO March 1998 "Guidelines for Protection of Freshwater Fish Habitat in NL." Marine Environment and Habitat Management Division Science Branch.
13. Cofferdams are to be used to separate work areas from the stream when installing bridges or similar structures requiring abutments, or footings.
14. Water pumped from work areas and coffer dams is to be directed into a settling pond or stable vegetation areas.
15. Not more than one third of the stream width is to be blocked at any one time.
16. The stream banks are to be rehabilitated upon completion and removal of a coffer dam.
17. All culverts, in fish bearing streams, are to be installed as per the DFO March 1998 "Guidelines for Protection of Freshwater Fish Habitat in NL." Marine Environment and Habitat Management Division Science Branch.
18. In fish bearing streams;
 - a. culverts having a diameter equal to or exceeding 2000 millimetres should be countersunk a minimum of 15 per cent of the diameter below the streambed elevation;
 - b. a minimum water depth of 200 millimetres should be provided throughout the culvert length. To maintain this water depth at low flow periods an entrance or downstream pool should be constructed; and

- c. downstream outlet pools are of particular importance for long culverts or culverts to be installed on steep slopes.

19. Work to be completed in the stream bed, should be scheduled to avoid potential adverse impacts on spawning activities, egg incubation, spawning habitat and fish migration. It should also be done in consultation with the DFO Area Habitat Biologist.

2.2.4. ARCHAEOLOGICAL FIND

When an archaeological site or artifact is found, the condition in Guideline 1.2.2 will apply.

2.2.5. PETROLEUM PRODUCTS

In the event of a spill or leak of petroleum products, see Guideline 1.2.5.1 for further details. Guidelines 1.2.5.2 to 1.2.5.5 relating to petroleum products also apply in road construction and decommissioning operations.

2.2.6. WINTER ROADS

As with all season roads, soil disturbance and impacts on waterbodies are to be minimized with winter roads. Culverts or temporary bridges are to be used. Erosion control measures are to be maintained while the winter road is in use. After use, it is to be left in an environmentally acceptable condition. All temporary crossings are to be removed at the end of the operating season and an inspection is to be conducted by a Forestry Official, engineer or other qualified person. This inspection is to ensure any required remediation has been completed.

2.2.7. DECOMMISSIONING ROADS

1. When roads are decommissioned or barred by gating or ditching or placement of obstacles, appropriate signage warning of any hazardous condition shall be placed in open view.
2. When decommissioning is through removal of watercourse crossings, areas adjacent to former culverts or bridge locations shall be stabilized to reduce potential for erosion. Appropriate signage shall also be placed.
3. When decommissioning roads by replacing soil, overburden and other natural obstacles on former roadway, so as to deny vehicular access and to enable planting in order to restore productive forest on the site, standard precautions such as silt fencing shall be used to prevent entry of silt in waterways.
4. Decommissioning shall not be undertaken until all necessary reforestation activities beyond the decommissioning point has taken place.

3. SILVICULTURAL GUIDELINES

3.1. SILVICULTURE PLANNING

3.1.1. PERMITS REQUIRED

Silviculture is considered a development under the *Urban and Rural Planning Act*. Where this activity occurs within a planning area boundary or within 400 metres of a protected road, a development permit is required before any activity can occur.

3.2. CONDUCT OF SILVICULTURE OPERATIONS

3.2.1. PREVENTING EROSION

To prevent erosion on sites proposed for row scarification, every effort should be made to follow the contours where slopes exceed 15 per cent. If in such instances scarification has to occur parallel to the slope, the scarified trenches are to be intermittent (i.e. for every 20 metres of trench, an un-scarified section two metres in length should be left).

3.2.2. PROTECTION OF WATERBODIES

1. Unless frozen, heavy equipment and machinery is not permitted in any waterbody, on wetland or a bog without a permit from MAE and without contacting the DFO Area Habitat Biologist.
2. Any forestry operation that directly or indirectly results in sediment and/or turbid water entering a waterbody must be dealt with immediately. See Guideline 1.2.1.5 for further information.
3. Trees thinned during pre-commercial thinning, diameter limit thinning, commercial thinning or any other silviculture treatment shall not be felled into waterbodies.

3.2.3. PLACEMENT OF WINDROWS

When slash is piled into windrows, it should be located where the slash cannot be washed into streams at peak flooding conditions.

3.2.4. TREES LEFT FOR WILDLIFE AND OTHER VALUES

1. There is to be no cutting of Eastern White Pine, *Pinus strobus*.
2. Hardwood species, such as birch, are to be left when encountered in a stand scheduled for thinning where these do not compete with the conifer crop trees. Portions of thinning areas which are pure hardwood may be left unthinned when encountered. In mixed regeneration, various hardwood or softwood species may be

favoured in future stand development in accordance with management objectives stated in the approved operating plan for the area.

3.2.5. TIMING OF SILVICULTURE

Where possible, silviculture operations are to be reduced or avoided in areas identified by the Wildlife Division during the periods of birth and hatching.

3.2.6. ARCHAEOLOGICAL FIND

When an archaeological site or artifact is found, the condition in Guideline 1.2.3 will apply.

3.2.7. FUELS AND PETROLEUM PRODUCTS

1. In the event of a spill or leak of petroleum products, see Guideline 1.2.5.1 for further details.
2. Guidelines 1.2.5.2 to 1.2.5.5 relating to petroleum products also apply in silviculture operations.

3.2.8. SCARIFICATION METHOD

Where mechanical site preparation is required, the method selected shall be best suited for preparing the area for planting and for minimizing ground disturbance.

3.2.9. CHOICE OF SPECIES TO PLANT

In planting situations, the use of native species is preferred. However, in certain situations, use of non-invasive, exotic species, such as those which have been established in the province for decades, or those which may come under future review, may be planted.

4. FOREST PROTECTION GUIDELINES

4.1. PLANNING FOR THE APPLICATION OF PESTICIDES (INSECTICIDES AND HERBICIDES)

4.1.1. REGULATION OF PESTICIDES

The use of pesticides is regulated federally by Health Canada and provincially by MAE. The federal *Pest Control Products Act* states which products are registered for use in Canada, and the provincial *Environmental Protection Act, Pesticide Control Regulations* outlines licensing requirements and the conditions under which they can be purchased, sold or handed.

4.1.2. LICENCES REQUIRED

1. To apply pesticides in the province, two licences are required from the Pollution Prevention Division of MAE. The first is a Pesticides Operators Licence which is issued

for a specific program and valid for five years. To obtain this licence, the applicant must submit project details including a map of the area to be treated, product to be used, and time of the year to be used. Following the completion of the project, a report must be submitted to MAE. The second licence required is a Pesticide Applicators Licence. To obtain this licence, the applicator must complete an exam. Only people in possession of this licence may use the pesticide. It is valid for a period of five years.

2. To apply herbicides, the same conditions apply as above. An Operator's Licence must be obtained for the project and is valid for five years. In addition, each member of the crew involved with application of the herbicide must complete an exam and obtain a Pesticide Applicators Licence.
3. A third program which requires an Operator's Licence and a Pesticide Applicators Licence is the tree nursery program which may use pesticides to grow seedlings. Again the same conditions apply.

4.2. CONDUCT OF OPERATIONS

4.2.1. PESTICIDE USE

Only bio-degradable pesticides will be used and only as part of an integrated pest management strategy.

5. GUIDELINES FOR FORESTRY OPERATIONS WITHIN PROTECTED PUBLIC WATER SUPPLY AREAS

The primary function of a Protected Public Water Supply Area (PPWSA) is to provide the public with an adequate quantity of safe and good quality water on a permanent basis and to meet its present and future demands. By definition, a Protected Public Water Supply Area is the area of land and water designated as a Protected Public Water Supply Area, for a municipal authority operating a waterworks or using or intending to use a water sources, under Section 39 of the *Water Resources Act*. Any other activity within a Protected Public Water Supply Area is considered secondary, and if permitted, must be strictly regulated and monitored to ensure that the water supply integrity is not threatened and the quality of the water is not impaired.

In Newfoundland and Labrador forestry operations are permitted in most Protected Public Water Supply Areas on a limited and controlled basis provided the proposed operations have no or minimal, water quality impairment potential. More specifically, commercial forest harvesting of more than 10 per cent of the total land area of the Protected Public Water Supply Area, or 10 per cent of the total merchantable timber; whichever is less, in any 12 month period will not be permitted.

The following permits and approvals are required prior to the beginning of any forestry operations, whether commercial or domestic operations, and includes road construction, silviculture activities, and harvesting within a Protected Public Water Supply Area:

- I. Approval of the Five-year operating plan by the Environmental Assessment Division of MAE,
- II. Issuance of a permit under section 39(6) of the *Water Resources Act* which will include consultation with the community involved. Applications for development inside Protected Public Water Supply Area can be obtained from the Water Resources Management Division website (Appendix I).

5.1. CONDUCT OF OPERATIONS

All permits and contracts should include any conditions outlined under section 39(6) of the *Water Resources Act*. In addition to environmental guidelines specified in sections above, the following will apply in Protected Public Water Supply Areas.

5.1.1. MAP OF OPERATING AREA

The appropriate Forestry or Company official will provide the operator with a map indicating the harvesting area and the location of no-cut buffer zones, and will ensure the operator is familiar with the boundaries and conditions of the approved detailed plan of operations.

5.1.2. PREVENTION OF EROSION

In areas sensitive to erosion, depending on the nature and location of the proposed forestry operation, the Water Resources Management Division may not permit the activity to take place. However, where permitted, the following mitigation measures should be put in place:

1. Sensitive areas prone to erosion and areas which have high potential for erosion can be harvested if proper harvesting and site restoration techniques are a part of a detailed plan.
2. Wherever possible, extraction trails should run along contours and avoid wetlands.
3. Use of landings will be minimized. Any approved landing area shall be less than 0.25 ha and located at least 150 metres from Protected Public Water Supply intake ponds.

5.1.3. BUFFER ZONES

No ground disturbance riparian buffer zone requirements in Protected Public Water Supply Areas are as follows:

Water Body	Width of Buffer
Intake Pond, Lake or Reservoir	Minimum 150 metres
River Intake (for a distance of 1000 metres upstream and 100 meters downstream)	Minimum 150 metres
Main River Channel	Minimum of 75 metres
Major Tributaries, Lakes or Ponds	Minimum of 50 metres
Other Waterbodies	Minimum of 30 metres

Any deviation will require approval from Water Resources Management Division.

5.1.4. PETROLEUM PRODUCTS

Fuel storage and the operation of fuel storage equipment are regulated by the *Storage and Handling of Gasoline and Associated Products Regulations*, 2003 as amended and the *Heating Oil Storage Tank System Regulations*, 2003 as amended.

In addition to the above regulatory requirements and Sections 1.2.5.1 to 1.2.5.5 the following are to be adhered to;

- I. If fuel must be stored in the Public Protected Water Supply Area, it must be in the least sensitive area and be approved by the Water Resources Management Division.
- II. Refueling must not take place within 150 metres of an intake pond.
- III. All tanks must be located at a minimum distance of 500 metres from any major waterbody.
- IV. A fuel or oil spill clean-up kit must be kept on site to facilitate any clean-up in the event of a spill. This kit must include absorbent pads, loose absorbent materials

such as dried peat, speedy-dry or sawdust, a container such as an empty drum for recovering the fuel or oil, and a containment boom.

5.1.5. STRUCTURES PROHIBITED IN WATER SUPPLY AREA

1. Dormitory camps, garages or any other structures are prohibited within a Protected Public Water Supply Area.
2. The establishment of new sawmills is not permitted in Protected Public Water Supply Areas.

5.1.6. REPORTING WATER QUALITY PROBLEMS

Any water quality impairment problem should be reported immediately to the Water Resources Management Division.

APPENDIX I

RESOURCE MATERIAL

Development Applications in Protected Public Water Supply Areas

<http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html>

Guidelines for Protection of Freshwater Fish Habitat in Newfoundland and Labrador

<http://www.dfo-mpo.gc.ca/Library/240270.pdf>

Guidance Document for the Management of Impacted Sites

http://www.env.gov.nl.ca/env/env_protection/ics/Guidance_Document_For_the_Management_of_Impacted_Sites_V2.0_Feb_6_2014.pdf

FEDERAL LEGISLATION

Canada Fisheries Act

<http://laws-lois.justice.gc.ca/eng/acts/F-14/index.html>

Canada Navigable Waters Protection Act

<http://laws.justice.gc.ca/eng/acts/N-22/>

Canada Species at Risk Act

<http://laws-lois.justice.gc.ca/eng/acts/s-15.3/>

PROVINCIAL LEGISLATION

Newfoundland and Labrador Endangered Species Act

<http://www.assembly.nl.ca/Legislation/sr/statutes/e10-1.htm>

Newfoundland and Labrador Environmental Protection Act

<http://www.assembly.nl.ca/legislation/sr/statutes/e14-2.htm>

Newfoundland and Labrador Forestry Act

<http://www.assembly.nl.ca/legislation/sr/statutes/f23.htm>

Newfoundland and Labrador Historical Resources Act

<http://www.assembly.nl.ca/legislation/sr/statutes/h04.htm>

Newfoundland and Labrador Quarry Material Act, 1998

<http://www.assembly.nl.ca/legislation/sr/statutes/q01-1.htm>

Newfoundland and Labrador Urban and Rural

Planning Act, 2000

<http://assembly.nl.ca/Legislation/sr/statutes/u08>

[.htm](#) Newfoundland and Labrador Wildlife Act

<http://www.assembly.nl.ca/Legislation/sr/statute>

[s/w08.htm](#)

APPENDIX I: RELEVANT LINKS

Applications:

Development Applications in Protected Public Water Supply Areas

<http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html>

Impacted Sites:

http://www.env.gov.nl.ca/env/env_protection/ics/guidancedocv.1.01external.pdf

Federal Legislation Links:

Canada Fisheries Act

<http://laws-lois.justice.gc.ca/eng/acts/F-14/index.html>

Canada Navigable Waters Protection Act

<http://laws.justice.gc.ca/eng/acts/N-22/>

Canada Species at Risk Act

http://www.sararegistry.gc.ca/approach/act/default_e.cfm#1

Provincial Legislation Links:

Newfoundland and Labrador Endangered Species Act

<http://www.assembly.nl.ca/Legislation/sr/statutes/e10-1.htm>

Newfoundland and Labrador Environmental Protection Act
<http://www.assembly.nl.ca/legislation/sr/statutes/e14-2.htm>

Newfoundland and Labrador Forestry Act
<http://www.assembly.nl.ca/legislation/sr/statutes/f23.htm>

Newfoundland and Labrador Historical Resources Act
http://www.assembly.nl.ca/legislation/sr/tableregulations/tableofregulations_h04.htm

Newfoundland and Labrador Quarry Material Act
<http://www.assembly.nl.ca/legislation/sr/statutes/q01-1.htm>

Newfoundland and Labrador Urban and Rural Planning Act
<http://assembly.nl.ca/Legislation/sr/statutes/u08.htm>

Newfoundland and Labrador Wildlife Act
<http://www.assembly.nl.ca/Legislation/sr/statutes/w08.htm>

APPENDIX IV

Five Year Planning Maps & Operating Area Sheets

Operating Area Name: NFS Inventory Map #: 271-21	Operating Area #: C-20-01 NTS Map # 13H10
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Description of Area: This area of Crown land is located south east of Cartwright and is accessed by the White Hills Forest Access Road. The terrain varies from hilly to rough. Merchantable forest stands are comprised of a mixture of black spruce and balsam fir.

Harvesting Activities: Commercial activities may include energy wood and sawlog harvesting with mechanical harvesters and chainsaws. Extraction may be by forwarders.

Silviculture Activities: Regeneration surveys will be carried out on cutovers 5 years after harvest to determine the need for planting and/or thinning. Suitable cutovers that are not regenerating properly will be targeted for those activities.

Forest Access Road Construction: There are 14.2 kilometers of forest access road proposed for construction from 2020-2024 to access stands for harvest. There is no new primary access road proposed to access this harvest block.

Non-Timber Considerations and Mitigations: A 30 meter buffer will be maintained on both sides of all rivers, brooks, ponds or other water bodies that are shown on 1:50,000 topographic maps.

Due to mineral exploration in the White Hills area, shared access to site would be acceptable.

Provisions of the Environmental Protection Guidelines will be adhered to.

Operating Area Name: NFS Inventory Map #: 271-22	Operating Area #: C-20-02 NTS Map # 13H11
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Description of Area: This area of Crown land is located south east of Cartwright and is accessed by the White Hills Forest Access Road. The terrain varies from hilly to rough. Merchantable forest stands are comprised of a mixture of black spruce and balsam fir.

Harvesting Activities: Commercial activities may include energy wood and sawlog harvesting with mechanical harvesters and chainsaws. Extraction may be by forwarders.

Silviculture Activities: Regeneration surveys will be carried out on cutovers 5 years after harvest to determine the need for planting and/or thinning. Suitable cutovers that are not regenerating properly will be targeted for those activities.

Forest Access Road Construction: There are 14.2 kilometers of forest access road proposed for construction from 2020-2024 to access stands for harvest. There is no new primary access road proposed to access this harvest block.

Non-Timber Considerations and Mitigations: A 30 meter buffer will be maintained on both sides of all rivers, brooks, ponds or other water bodies that are shown on 1:50,000 topographic maps.

Due to mineral exploration in the White Hills area, shared access to site would be acceptable.

Provisions of the Environmental Protection Guidelines will be adhered to.

Operating Area Name: NFS Inventory Map #: 271-11	Operating Area #: C-20-03 NTS Map # 13H10
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Description of Area: This area of Crown land is located south east of Cartwright and is accessed by the White Hills Forest Access Road. The terrain varies from hilly to rough. Merchantable forest stands are comprised of a mixture of black spruce and balsam fir.

Harvesting Activities: Commercial activities may include energy wood and sawlog harvesting with mechanical harvesters and chainsaws. Extraction may be by forwarders.

Silviculture Activities: Regeneration surveys will be carried out on cutovers 5 years after harvest to determine the need for planting and/or thinning. Suitable cutovers that are not regenerating properly will be targeted for those activities.

Forest Access Road Construction: There are 14.2 kilometers of forest access road proposed for construction from 2020-2024 to access stands for harvest. There is no new primary access road proposed to access this harvest block.

Non-Timber Considerations and Mitigations: A 30 meter buffer will be maintained on both sides of all rivers, brooks, ponds or other water bodies that are shown on 1:50,000 topographic maps.

Due to mineral exploration in the White Hills area, shared access to site would be acceptable.

Provisions of the Environmental Protection Guidelines will be adhered to.

Operating Area Name: NFS Inventory Map #: 271-11	Operating Area #: C-20-04 NTS Map # 13H10
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Description of Area: This area of Crown land is located south east of Cartwright and is accessed by the White Hills Forest Access Road. The terrain varies from hilly to rough. Merchantable forest stands are comprised of a mixture of black spruce and balsam fir.

Harvesting Activities: Commercial activities may include energy wood and sawlog harvesting with mechanical harvesters and chainsaws. Extraction may be by forwarders.

Silviculture Activities: Regeneration surveys will be carried out on cutovers 5 years after harvest to determine the need for planting and/or thinning. Suitable cutovers that are not regenerating properly will be targeted for those activities.

Forest Access Road Construction: There are 14.2 kilometers of forest access road proposed for construction from 2020-2024 to access stands for harvest. There is no new primary access road proposed to access this harvest block.

Non-Timber Considerations and Mitigations: A 30 meter buffer will be maintained on both sides of all rivers, brooks, ponds or other water bodies that are shown on 1:50,000 topographic maps.

Due to mineral exploration in the White Hills area, shared access to site would be acceptable.

Provisions of the Environmental Protection Guidelines will be adhered to.

Operating Area Name: NFS Inventory Map #: 271-11	Operating Area #: C-20-05 NTS Map # 13H10
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Description of Area: This area of Crown land is located south east of Cartwright and is accessed by the White Hills Forest Access Road. The terrain varies from hilly to rough. Merchantable forest stands are comprised of a mixture of black spruce and balsam fir.

Harvesting Activities: Commercial activities may include energy wood and sawlog harvesting with mechanical harvesters and chainsaws. Extraction may be by forwarders.

Silviculture Activities: Regeneration surveys will be carried out on cutovers 5 years after harvest to determine the need for planting and/or thinning. Suitable cutovers that are not regenerating properly will be targeted for those activities.

Forest Access Road Construction: There are 14.2 kilometers of forest access road proposed for construction from 2020-2024 to access stands for harvest. There is no new primary access road proposed to access this harvest block.

Non-Timber Considerations and Mitigations: A 30 meter buffer will be maintained on both sides of all rivers, brooks, ponds or other water bodies that are shown on 1:50,000 topographic maps.

Due to mineral exploration in the White Hills area, shared access to site would be acceptable.

Provisions of the Environmental Protection Guidelines will be adhered to.

Operating Area Name: NFS Inventory Map #: 271-11	Operating Area #: C-20-06 NTS Map # 13H10
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Description of Area: This area of Crown land is located south east of Cartwright and is accessed by the White Hills Forest Access Road. The terrain varies from hilly to rough. Merchantable forest stands are comprised of a mixture of black spruce and balsam fir.

Harvesting Activities: Commercial activities may include energy wood and sawlog harvesting with mechanical harvesters and chainsaws. Extraction may be by forwarders.

Silviculture Activities: Regeneration surveys will be carried out on cutovers 5 years after harvest to determine the need for planting and/or thinning. Suitable cutovers that are not regenerating properly will be targeted for those activities.

Forest Access Road Construction: There are 14.2 kilometers of forest access road proposed for construction from 2020-2024 to access stands for harvest. There is no new primary access road proposed to access this harvest block.

Non-Timber Considerations and Mitigations: A 30 meter buffer will be maintained on both sides of all rivers, brooks, ponds or other water bodies that are shown on 1:50,000 topographic maps.

Due to mineral exploration in the White Hills area, shared access to site would be acceptable.

Provisions of the Environmental Protection Guidelines will be adhered to.

Operating Area Name: NFS Inventory Map #: 270-14	Operating Area #: C-20-07 NTS Map # 13H11
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Description of Area: This area of Crown land is located south east of Cartwright and is accessed by the White Hills Forest Access Road. The terrain varies from hilly to rough. Merchantable forest stands are comprised of a mixture of black spruce and balsam fir.

Harvesting Activities: Commercial activities may include energy wood and sawlog harvesting with mechanical harvesters and chainsaws. Extraction may be by forwarders.

Silviculture Activities: Regeneration surveys will be carried out on cutovers 5 years after harvest to determine the need for planting and/or thinning. Suitable cutovers that are not regenerating properly will be targeted for those activities.

Forest Access Road Construction: There are 14.2 kilometers of forest access road proposed for construction from 2020-2024 to access stands for harvest. Approximately 1.0 kilometers of new primary access road is required to access this harvest block. Majority of the road fill will come from the road right of way.

Non-Timber Considerations and Mitigations: A 30 meter buffer will be maintained on both sides of all rivers, brooks, ponds or other water bodies that are shown on 1:50,000 topographic maps.

Due to mineral exploration in the White Hills area, shared access to site would be acceptable.

Provisions of the Environmental Protection Guidelines will be adhered to.

Operating Area Name: NFS Inventory Map #: 270-14	Operating Area #: C-20-08 NTS Map # 13H11
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Description of Area: This area of Crown land is located south east of Cartwright and is accessed by the White Hills Forest Access Road. The terrain varies from hilly to rough. Merchantable forest stands are comprised of a mixture of black spruce and balsam fir.

Harvesting Activities: Commercial activities may include energy wood and sawlog harvesting with mechanical harvesters and chainsaws. Extraction may be by forwarders.

Silviculture Activities: Regeneration surveys will be carried out on cutovers 5 years after harvest to determine the need for planting and/or thinning. Suitable cutovers that are not regenerating properly will be targeted for those activities.

Forest Access Road Construction: There are 14.2 kilometers of forest access road proposed for construction from 2020-2024 to access stands for harvest. Approximately 1.5 kilometers of new primary access road is required to access this harvest block. Majority of the road fill will come from the road right of way.

Non-Timber Considerations and Mitigations: A 30 meter buffer will be maintained on both sides of all rivers, brooks, ponds or other water bodies that are shown on 1:50,000 topographic maps.

Due to mineral exploration in the White Hills area, shared access to site would be acceptable.

Provisions of the Environmental Protection Guidelines will be adhered to.

Operating Area Name: NFS Inventory Map #: 270-14	Operating Area #: C-20-10 NTS Map # 13H11
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Description of Area: This area of Crown land is located south east of Cartwright and is accessed by the White Hills Forest Access Road. The terrain varies from hilly to rough. Merchantable forest stands are comprised of a mixture of black spruce and balsam fir.

Harvesting Activities: Commercial activities may include energy wood and sawlog harvesting with mechanical harvesters and chainsaws. Extraction may be by forwarders.

Silviculture Activities: Regeneration surveys will be carried out on cutovers 5 years after harvest to determine the need for planting and/or thinning. Suitable cutovers that are not regenerating properly will be targeted for those activities.

Forest Access Road Construction: There are 14.2 kilometers of forest access road proposed for construction from 2020-2024 to access stands for harvest. There is no new primary access road proposed to access this harvest block.

Non-Timber Considerations and Mitigations: A 30 meter buffer will be maintained on both sides of all rivers, brooks, ponds or other water bodies that are shown on 1:50,000 topographic maps.

Due to mineral exploration in the White Hills area, shared access to site would be acceptable.

Provisions of the Environmental Protection Guidelines will be adhered to.

Operating Area Name: NFS Inventory Map #: 271-11	Operating Area #: C-20-11 NTS Map # 13H10
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Description of Area: This area of Crown land is located south east of Cartwright and is accessed by the White Hills Forest Access Road. The terrain varies from hilly to rough. Merchantable forest stands are comprised of a mixture of black spruce and balsam fir.

Harvesting Activities: Commercial activities may include energy wood and sawlog harvesting with mechanical harvesters and chainsaws. Extraction may be by forwarders.

Silviculture Activities: Regeneration surveys will be carried out on cutovers 5 years after harvest to determine the need for planting and/or thinning. Suitable cutovers that are not regenerating properly will be targeted for those activities.

Forest Access Road Construction: There are 14.2 kilometers of forest access road proposed for construction from 2020-2024 to access stands for harvest. Approximately 1.0 kilometers of new primary access road is required to access this harvest block. Majority of the road fill will come from the road right of way.

Non-Timber Considerations and Mitigations: A 30 meter buffer will be maintained on both sides of all rivers, brooks, ponds or other water bodies that are shown on 1:50,000 topographic maps.

Due to mineral exploration in the White Hills area, shared access to site would be acceptable.

Provisions of the Environmental Protection Guidelines will be adhered to.

Operating Area Name: NFS Inventory Map #: 271-11	Operating Area #: C-20-12 NTS Map # 13H10
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Description of Area: This area of Crown land is located south east of Cartwright and is accessed by the White Hills Forest Access Road. The terrain varies from hilly to rough. Merchantable forest stands are comprised of a mixture of black spruce and balsam fir.

Harvesting Activities: Commercial activities may include energy wood and sawlog harvesting with mechanical harvesters and chainsaws. Extraction may be by forwarders.

Silviculture Activities: Regeneration surveys will be carried out on cutovers 5 years after harvest to determine the need for planting and/or thinning. Suitable cutovers that are not regenerating properly will be targeted for those activities.

Forest Access Road Construction: There are 14.2 kilometers of forest access road proposed for construction from 2020-2024 to access stands for harvest. Approximately 1.5 kilometers of new primary access road is required to access this harvest block. Majority of the road fill will come from the road right of way.

Non-Timber Considerations and Mitigations: A 30 meter buffer will be maintained on both sides of all rivers, brooks, ponds or other water bodies that are shown on 1:50,000 topographic maps.

Due to mineral exploration in the White Hills area, shared access to site would be acceptable.

Provisions of the Environmental Protection Guidelines will be adhered to.

Operating Area Name: NFS Inventory Map #: 271-11	Operating Area #: C-20-13 NTS Map # 13H10
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Description of Area: This area of Crown land is located south east of Cartwright and is accessed by the White Hills Forest Access Road. The terrain varies from hilly to rough. Merchantable forest stands are comprised of a mixture of black spruce and balsam fir.

Harvesting Activities: Commercial activities may include energy wood and sawlog harvesting with mechanical harvesters and chainsaws. Extraction may be by forwarders.

Silviculture Activities: Regeneration surveys will be carried out on cutovers 5 years after harvest to determine the need for planting and/or thinning. Suitable cutovers that are not regenerating properly will be targeted for those activities.

Forest Access Road Construction: There are 14.2 kilometers of forest access road proposed for construction from 2020-2024 to access stands for harvest. Approximately 3.0 kilometers of new primary access road is required to access this harvest block. Majority of the road fill will come from the road right of way.

Non-Timber Considerations and Mitigations: A 30 meter buffer will be maintained on both sides of all rivers, brooks, ponds or other water bodies that are shown on 1:50,000 topographic maps.

Due to mineral exploration in the White Hills area, shared access to site would be acceptable.

Provisions of the Environmental Protection Guidelines will be adhered to.

Operating Area Name: NFS Inventory Map #: 271-11	Operating Area #: C-20-14 NTS Map # 13H10
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Description of Area: This area of Crown land is located south east of Cartwright and is accessed by the White Hills Forest Access Road. The terrain varies from hilly to rough. Merchantable forest stands are comprised of a mixture of black spruce and balsam fir.

Harvesting Activities: Commercial activities may include energy wood and sawlog harvesting with mechanical harvesters and chainsaws. Extraction may be by forwarders.

Silviculture Activities: Regeneration surveys will be carried out on cutovers 5 years after harvest to determine the need for planting and/or thinning. Suitable cutovers that are not regenerating properly will be targeted for those activities.

Forest Access Road Construction: There are 14.2 kilometers of forest access road proposed for construction from 2020-2024 to access stands for harvest. Approximately 1.0 kilometers of new primary access road is required to access this harvest block. Majority of the road fill will come from the road right of way.

Non-Timber Considerations and Mitigations: A 30 meter buffer will be maintained on both sides of all rivers, brooks, ponds or other water bodies that are shown on 1:50,000 topographic maps.

Due to mineral exploration in the White Hills area, shared access to site would be acceptable.

Provisions of the Environmental Protection Guidelines will be adhered to.

Operating Area Name: NFS Inventory Map #: 271-11	Operating Area #: C-20-15 NTS Map # 13H10
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Description of Area: This area of Crown land is located south east of Cartwright and is accessed by the White Hills Forest Access Road. The terrain varies from hilly to rough. Merchantable forest stands are comprised of a mixture of black spruce and balsam fir.

Harvesting Activities: Commercial activities may include energy wood and sawlog harvesting with mechanical harvesters and chainsaws. Extraction may be by forwarders.

Silviculture Activities: Regeneration surveys will be carried out on cutovers 5 years after harvest to determine the need for planting and/or thinning. Suitable cutovers that are not regenerating properly will be targeted for those activities.

Forest Access Road Construction: There are 14.2 kilometers of forest access road proposed for construction from 2020-2024 to access stands for harvest. Approximately 2.0 kilometers of new primary access road is required to access this harvest block. Majority of the road fill will come from the road right of way.

Non-Timber Considerations and Mitigations: A 30 meter buffer will be maintained on both sides of all rivers, brooks, ponds or other water bodies that are shown on 1:50,000 topographic maps.

Due to mineral exploration in the White Hills area, shared access to site would be acceptable.

Provisions of the Environmental Protection Guidelines will be adhered to.

Operating Area Name: NFS Inventory Map #: 271-11	Operating Area #: C-20-16 NTS Map # 13H10
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Description of Area: This area of Crown land is located south east of Cartwright and is accessed by the White Hills Forest Access Road. The terrain varies from hilly to rough. Merchantable forest stands are comprised of a mixture of black spruce and balsam fir.

Harvesting Activities: Commercial activities may include energy wood and sawlog harvesting with mechanical harvesters and chainsaws. Extraction may be by forwarders.

Silviculture Activities: Regeneration surveys will be carried out on cutovers 5 years after harvest to determine the need for planting and/or thinning. Suitable cutovers that are not regenerating properly will be targeted for those activities.

Forest Access Road Construction: There are 14.2 kilometers of forest access road proposed for construction from 2020-2024 to access stands for harvest. Approximately 3.0 kilometers of new primary access road is required to access this harvest block. Majority of the road fill will come from the road right of way.

Non-Timber Considerations and Mitigations: A 30 meter buffer will be maintained on both sides of all rivers, brooks, ponds or other water bodies that are shown on 1:50,000 topographic maps.

Due to mineral exploration in the White Hills area, shared access to site would be acceptable.

Provisions of the Environmental Protection Guidelines will be adhered to.

APPENDIX V

Resource access road – classification standards and specifications

Road Class							
	A	B	C-2	C	C-1	D	
Design Load and Speed	(Loaded tractor trailer) @ 55 kph.		@ 50 kph.		(Loaded tandem [pallet]) 30 kph.		Single axle 3 metric tonnes or less @ 25 kph.
Road width, drop off to drop off	9.0 m		7.5 m		6.0 m 5.0 m 4.0 m	3.5 m – 4.5 m	
Max. grade	6%		8%		10%	15%	
R.O.W. width	30 m		20 m – 30 m		20 m	15 m – 20 m	
Min. sight dist.	150 m		120 m		90 m	45 m	
Max. change of grade (blind hill limitations)	0.6 m in 20 m		0.8 m in 20 m		1.0 m in 20 m	-----	
Min. depth of ditch	1.0 m		-----		0.6 m	0.3 m	
Surface material (type and depth)	Min. 15 cm of AASHO class A-1-b or better		Granular, no stones larger than 10 cm in the top 30 cm		Granular, no stones larger than 15 cm in the top 30 cm	Granular, no stones larger than 15 cm in surface	
Design load	(Loaded tractor trailer) @ 55 kph.		@ 50 kph.		(Loaded tandem [pallet]) 30 kph.	Single axle 3 metric tonnes or less @ 25 kph.	
Fill slope	2:1		1 ½:1		1 ½: 1	-----	
Cut slope (backslope)_	2:1		1 ½:1		1 ½:1	-----	