# Department of Natural Resources

## Five Year Operating Plan

## Forest Management District 7

## Bay d'Espoir

## Operating Period

## January 1, 2008 – December 31, 2012

Newfoundland Labrador

# Five Year Operating Plan

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# INTRODUCTION

This Five Year Operating Plan reflects the new legislated planning requirements of the Newfoundland and Labrador 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 Annual Report. This new planning framework has eliminated the District Strategy Document. However, its former contents are now split between the Provincial Sustainable Forest Management Strategy and the Five Year Operating Plan. Sections that are Provincial in scope such as carbon, global warming and criteria and indicators are now dealt with in the Provincial Sustainable Forest Management Strategy while sections that are more descriptive or depict local conditions such as values, forest characterization and ecosystem description are moved to the Five Year Operating Plan. Linkages between strategies from the Provincial Sustainable Forest Management Strategy and on the ground activities in the Five Year Operating Plan will be provided where applicable.

Another major change is the creation of eight planning zones on the Island which are based loosely on ecoregion location. Forest Management Districts (FMD's) that share common ecoregion characteristics are combined to form these zones. District 7 was considered a stand alone planning zone and is referred to as Planning Zone 4. The requirement for submission to the Newfoundland and Labrador Forest Service and for environmental assessment is one Five Year Operating Plan for each tenure owner in each zone. The past requirement was one Five Year Operating Plan by each owner in each district. In this zone there will be one submission by the Crown. Planning teams meetings for this zone were held in Milltown, Bay d'Espoir. Planning team format and structure will be discussed in a later section.

This document will try to fully integrate presentation of information and discussion for Crown Land and land transferred to the Crown in the zone, where possible. This will be done by combining statistics and other information for the district.

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

## SECTION 1 DESCRIPTION OF THE LAND BASE

### 1.0 Description of Forest Management District

### 1.1. General

Forest Management District 07, also referred to as the Bay d'Espoir District, is one of eighteen Forest Management Districts contained on the island portion of the province. Located on the south coast, the District lies approximately halfway between St. John's and Port-aux-Basques.
The northern boundary extends to Berry Hill Pond on the Bay d'Espoir highway and to Great Burnt Lake and Meelpaeg Lake in the northwest section of the District.

### 1.1.1. District Boundary

The District was established in 1974 and at that time was composed of Crown and Bowater (Nfld) Limited holdings. The Bowater holdings were sold to the Crown in 1979. This move was precipitated by the Forest Management and Taxation Act, which heavily taxed companies for not managing their limits. Bowater had no future plans for harvesting and silviculture work in the Bay d'Espoir area and coupled with the significant distance from its Corner Brook operations, decided to relinquish their holdings to the Crown.

The land acquisition for the District is outlined in Table 1

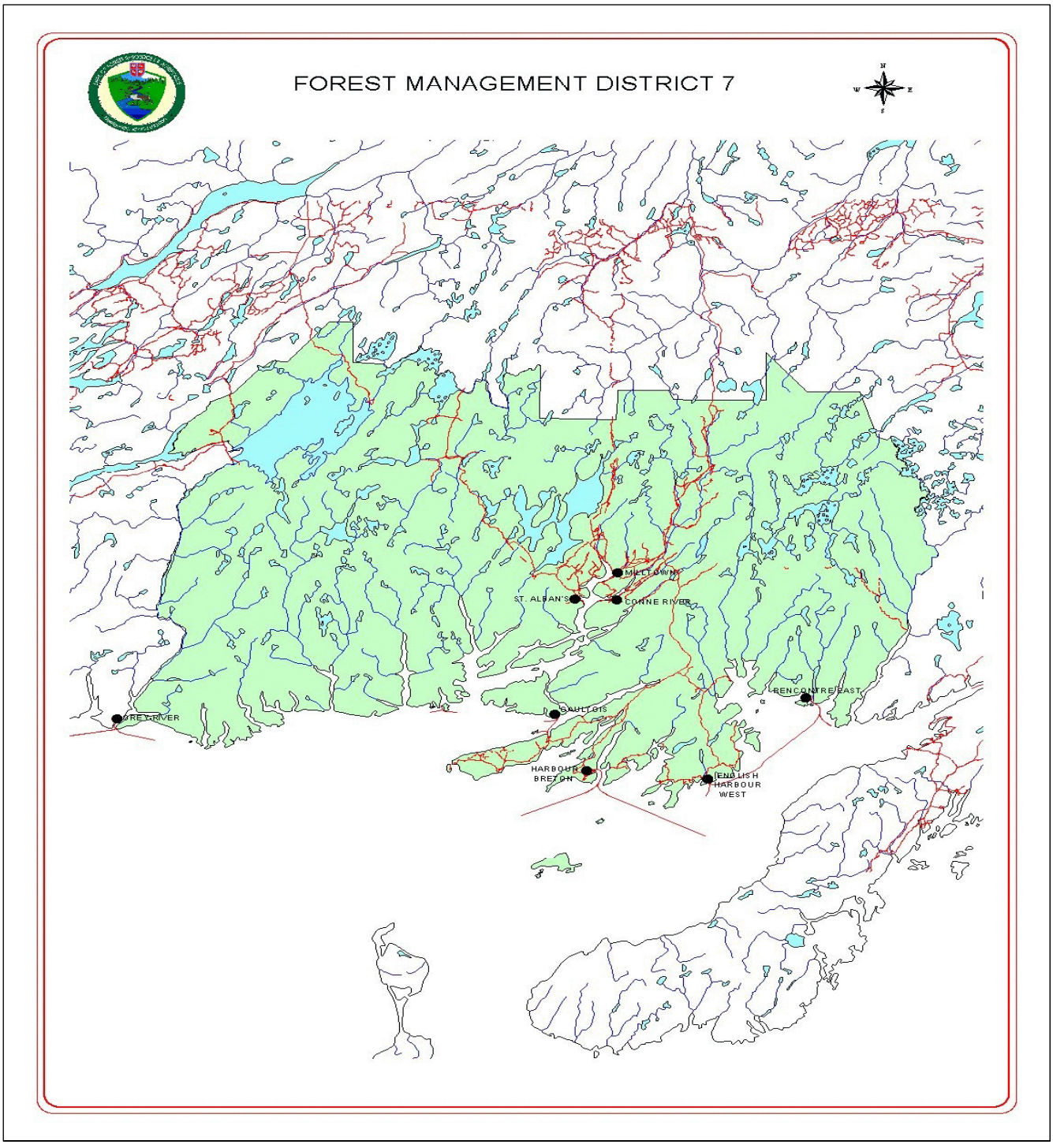
Table 1 – Land Acquisition - District 7

| Lot No. | Date of Acquisition | Area (ha) | Original Owners | Present Allocated Harvesting Rights | Original Registry | Date of Expiry | Tenure |
|---|---|---|---|---|---|---|---|
| | Dec. 13/79 | 398,081 | Bowater | Crown | | | Crown |
| 52 | Oct. 12/23 | 3,367 | Harry J. Crowe | Crown | | | |
| 53 | Oct. 12/23 | 77,700 | Harry J. Crowe | Crown | | | |

The boundaries for District 7 were originally filed on May 18, 1979 under Newfoundland Regulation 72/79, Forest Management Areas Proclamation, 1979 under The Crown Lands Act. This legislation was repealed in 1996 and replaced by the Consolidated Newfoundland Regulation 777/96, Forest Management Districts Proclamation under the Forestry Act. The legal description of the District (CNR777/96) is presented as Appendix 13.

Communities in the District are located along the coast. The main centers include St. Alban's, Milltown, Conne River, Harbour Breton, Belleoram and Hermitage.

Figure 1 Location of District 7 (Planning Zone 4)



### 1.1.2 History

The major communities within the District were built around the fishery and lumbering. Approximately 10,000 people live here and most are located in communities of various sizes that follow the coastline; however, the largest, single concentration is in the Milltown/St. Alban's area.

(a) Establishment

Before the establishment of the Management Unit Office, Bay d'Espoir had a forest ranger station. This office was staffed with a District Ranger and a Forest Ranger whose main responsibilities were the issuing of cutting permits and the checking of woods operations. The Management Unit was set up in September of 1974 as a result of the Forest Land Management and Taxation Act (1974) and has evolved to become the Forest Management District.

(b) Management Plans

In 1955, Finn Frost, Regional Forester with the Provincial Government prepared a tentative management plan for the Bay d'Espoir area. The plan only included that portion of Crown land containing commercial timber along with Bowater limits. Volume and acreage figures were outlined and a crude estimate was given for the allowable cut on both Crown and Bowater land.

(c) Development

In the past no control was placed on managing the forest resource. The Finn Frost Management Plan contained proposals but these were never implemented.

Records are limited but from the Finn Frost Report it is revealed that the first sawmill in the District was established around 1900.

Additional records reveal the following large scale pulpwood operations.

| | |
|---|---|
| 1922-1923 | St. Alban's Co-op cut 50,000 cords (120,346 $m^3$) pulpwood |
| 1933-1941 | During this time period Rolland Goodyear cut 7,000 cords (19,821 $m^3$) annually for a total of 56,000 cords (134,787 $m^3$) over this eight year period. |
| 1942-1959 | Bowater Nfld Limited harvested 25,000 cords (60,173 $m^3$) per year for a total of 325,000 cords (782,251 $m^3$). |
| 1956-1958 | Bowater Nfld Limited cut 4,000 cords (6,627 $m^3$) of export pulpwood. |
| 1959-1960 | Head of Bay d'Espoir Co-op harvested 10,000 cords (26,069 $m^3$). |

Most of these pulpwood operations were confined to Conne River and Twillick Brook because the only means of transporting the wood was by water. The wood was driven down Conne River to Bay d'Espoir where it was loaded on ships for overseas markets.

In 1970 the Government established a forest resource road program and throughout the five year period that followed 24.5 miles of road was completed. With the implementation of the access road program sawmill operators were given access to the more remote timber stands.

(d) Forest History

The majority of the forest stands in the District are overmature uneven age softwood stands dominated by balsam fir. The origin of these stands is from the lack of fire history and other major disturbances (i.e. harvesting operations, insect infestation, etc.). The Bay d'Espoir Management District has a relatively fire-free history and harvesting operations conducted in the past were limited. Records of cutting operations conducted in the past are also limited but it is known that sawlogs have been cut from the area for the past 100 years. The method of harvesting was a hi-grade method where only mature trees having good form, large diameter and free from defects were harvested. As a result overmature uneven age stands are common to the area. Throughout parts of the District particularly the former Bowater limits dense fir thickets were common. These stands were the result of past clear-cut pulpwood operations.

In the past Bay d'Espoir has been relatively free of forest fires. The Newfoundland Forest Fire History 1619-1916 shows that no major forest fires (in commercial timber) have been recorded in the Bay d'Espoir area during this time period. This is mainly attributed to the high relative humidity from the coastal fog.

The area of forest around Bay d'Espoir has a long list of insect attacks. The major outbreaks and the year of their occurrence are as follows:

| | |
|---|---|
| 1947 | Hemlock Looper *(Lambdina fiscellaria fiscellaria (Guenee))* 1200 acres (800 ha.) Bowater limits |
| 1961-1965. | Black headed budworm *(Acleris variana* (fern..)) and tussock moth *(Orgyia antiqua* (L.)) A salvage operation was carried out to remove the damaged forest and 6,000 cords (21,747 $m^3$) of wood was salvaged and exported. |
| 1969 | Hemlock Looper *(Lambdina fiscellaria fiscellaria (Guenee))* infestation of 68,593 acres (27,094.31 ha.) |
| 1970 | Balsam fir sawfly *(Neodiprion abietis* (Harr)) infestation of 150 acres (60.70 ha) near Swanger's Cove. The following year in 1971 the balsam fir sawfly *(Neodiprion abietis)* population collapsed. |

Other forest insects recorded in the area were: the Green Headed Sawfly *(Pikonema dimmockii*(Cress)), European Spruce Sawfly *(Diprion hercyniae* (Htg)), Birch Casebearer *(Coleophora fuscedinella* (Zeller)) and the Birch Skeletonizer *(Bucculatrix canadensisella* (Chambers)).

Spruce budworm *(Choristoneura fumiferana* (Clem)) created destruction of forest stands in the 1980's.

### 1.1.3 Ownerships - Jurisdictional Responsibility

Almost all productive land in District 7 is considered Crown Land. There are no company holdings in the District. As noted above, previous rights held by Bowater (Nfld) Limited were relinquished to the Crown in 1979. Municipal planning areas, protected water supply areas and private land account for a portion of the landbase. The Crown is responsible for all forestry activity in the District with the exception of the Conne River Reserve which is Federal Land that has been set aside as reserve land for the use and benefit of the Miawpukek First Nation.

## 1.2 Physical Features

Planning Zone 4 encompasses the complete District (approximately 1.2 million hectares) and covers a large portion of the south coast of Newfoundland. Physical features vary a great deal over such a large landscape. The following descriptions apply generally to the District.

### 1.2.1 Topography and Physiography

The District is highest in the northwest, around Meelpaeg Lake, where hills rise up to 450 meters above sea level (asl). The land surface generally falls off eastward and southward, although Mount Sylvester near Jubilee Lake reaches 390 meters asl. The coastal area is characterised by steep slopes and is much more rugged than the interior. The coastline is indented by numerous fjords, including La Hune Bay, Chaleur Bay, Hare Bay and Facheux Bay. They are generally narrow, and steep sided with side walls up to 275 meters. Elevation near the coast is commonly over 210 meters asl, and in places higher. Garrison Hills, between Hermitage Bay and Bay d'Espoir for instance, rise to over 370 meters asl. Coastal areas are bedrock dominated, except the valleys which may contain sand-gravel or marine muds deposited during inundation of coastal areas up to about 25 meters asl during deglaciation. Glacial deposits dominate the interior, except the area north of Meelpaeg Lake which is bedrock-dominated. Sediment thickness of 2 to 10 meters is common. Areas south of Meelpaeg Lake and between Meelpaeg Lake and Jubilee Lake contain large expanses of hummocky terrain, with hummocks 50 meters in diameter and 5-10 meters high. Elongated ridges are also common. They are mostly oriented north-south, up to 1500 meters long and 15 meters high. Sand and gravel is generally confined to valleys, and rare north-south oriented eskers are also found. Large areas of bog are common in the east, particularly north of Jubilee Lake.

### 1.2.2 Quaternary Geology

The whole area was glaciated during the last glacial period (Late Wisconsinan). Ice flow was generally southward, and is responsible for the orientation of ridges of glacial sediment common across the area. Large parts of the ice sheet stagnated in this area, shown by the areas of hummocky moraine. Coastal areas were likely ice-free about 12,000 years ago, based on comparisons with other areas. Areas below about 25 meters asl were covered by higher postglacial sea. This is shown by raised marine deltas around the coast, for instance at Harbour Breton, and marine muds found in some valleys. The combination of steep slopes and unconsolidated sediment around the coast causes slope stability problems. Landslides and rockfalls are common, and when they occur in communities they are occasionally fatal, e.g., the 1973 Harbour Breton landslide in which 4 people were killed. Surficial maps are available at 1:250,000 scale (Liverman and Taylor, 1994). Short reports on parts of the area have been written by Proudfoot (1988), and Proudfoot et al. (1990), and the reader is referred to these for more details.

### 1.2.3 Bedrock Geology

The Bay d'Espoir area straddles three tectonic zones of the Newfoundland Appalachians. These are the Avalon, Gander and Dunnage zones.

Rocks of the Avalon Zone occupy the southeastern part of the map area east of Hermitage Bay and an area in the vicinity of Grey River. This zone is characterized by thick successions of upper Precambrian volcanic, plutonic and sedimentary rocks that are overlain by fossiliferous mudstone, quartzite, limestone and shale of Cambrian age. These rocks are well exposed on the Connaigre Peninsula and in Belle Bay. The eastern part of the Connaigre Peninsula consists mainly of middle Devonian sandstone, conglomerate and limestone that overlie the Precambrian sequences unconformably and are intruded by late Devonian granite and gabbro. The Grey River area consists of an enclave of late Precambrian metamorphosed felsic and mafic volcanic and sedimentary rocks. These are intruded by fine to coarse-grained granite north and east of Grey River.

Rocks of the Gander Zone are exposed on the north side of Hermitage Bay and consist of metamorphic gneissic complexes composed of quartz, feldspar, mica and garnet. These are intruded by deformed medium and coarse-grained granitoid rocks. Gander Zone rocks also occur in the vicinity of Meelpaeg Lake where they consist of deformed sandstone and quartzite and their metamorphic equivalents. They have been intruded by large massive to intensely deformed granitic rocks.

Rocks of the Dunnage Zone occupy the area north of Bay d'Espoir and are composed of Ordovician marine mafic volcanic, intrusive and sedimentary rocks that represent remnants of oceanic crust. These are overlain by oceanic basalts and subaerial felsic volcanic rocks. The volcanics are interlayered with and grade laterally into clastic sedimentary rocks.

### 1.2.4 Soils

The Bay d'Espoir area is predominately underlain by sedimentary rock. The soil appears to be of excellent quality. The rock is in most places loose shale which breaks up very easily. Erosion has created some relatively flat areas on which grow vegetation seldom found anywhere else along the south coast.

The floor of the major valleys, particularly near St Alban's-Milltown, has a surface layer of topsoil or in some areas muskeg. Below this lie deposits of sand and gravel. Further upstream the valley floor consists of ground moraine containing clay and boulders. These conditions are particularly noted in the valley running north-west of St. Alban's and are assumed to occur in a similar manner in the other valleys.

### 1.2.5 Climate

The coastal region of Bay d'Espoir has a milder winter and colder summer than Newfoundland's interior. Its southern position and the effects of the ocean result in moderate winter temperatures but the exposure to the prevailing southwesterly winds off the sea produce cool summers. In St. Alban's the mean July temperature is 60°F or 15.5°C and the mean January temperature is 19°F or -7°C. The growing season, the number of days in the year on which the mean temperature is above 43°F or 6°C, is 150 to 160 days.

Average annual precipitation is between 50 inches (127cm.) and 55 inches (140 cm.) of which some 15% is snow. This means an annual snowfall, particularly along the coast, of some 75 inches (191cm.).

For additional information about the climate of the four districts refer to Meades and Moores, (1994).

### 1.2.6 Landbase Classification

Forest Management District 7 covers a total land area of approximately 1.2 million hectares. Of this area, about half (557,322 hectares), has been mapped as part of the provincial forest resource inventory. Only forested land in the inventoried portion is considered in the wood supply analysis and is reported in Table 2 below. Of the inventoried portion, 50.1% is forested. However, only 42.0% of the forested area is considered productive forest (i.e. capable of producing commercial timber volumes). This equates to 21.0 % of the total inventoried area having productive forest. Barrens, bogs, scrub and other cover types account for 36.8% and water accounts for 13.1% of the inventoried area.

Table 2 - Area Classification for Inventoried Portion of District 7

| CLASSIFICATION | TOTAL AREA (Hectares) |
|---|---|
| Total Land Area | 557,322 |
| Water | 72,850 |
| Non Forested | 205,201 |
| Forested | 279,272 |
| Productive Total (ha)<br>Class I<br>Class III<br>Class V<br>Regulatory | 117,161<br>41,381<br>10,473<br>47,379<br>17,928 |

### 1.3 Ecosystems

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.

### 1.3.1 The Forest Ecosystem

A forest ecosystem, as the term implies, is an ecosystem dominated by tree cover. At the coarsest level, the forests of Planning Zone 4, like all forests on the island, form part of the boreal forest ecosystem. The boreal forest is a green belt which spans much of the northern hemisphere. It stretches from the Atlantic shores of Scandinavia through Russia, across Alaska, through the mid latitudes of Canada until it reaches the Atlantic Ocean again in Newfoundland and Labrador. One of the distinguishing characteristics of the boreal forest is the phenomena of periodic, catastrophic stand-replacing natural disturbances such as fire and insect outbreaks which typically give rise to uniform, evenaged forests dominated by a few tree species. The landscapeof the boreal zone is characterized by the effects of glaciation with rolling terrain and rock outcrops interspersed with mantles of glacial moraine. Within Canada the zone is described as the Boreal Shield Ecozone under Canada's Ecological Classification System.

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

The morainal areas in District 07 support closed stands of conifers, largely black and white spruce *Picea mariana* (Mill.) B.S.P. and *Picea glauca* (Moench Voss), balsam fir *Abies balsamea*(L.)Mill. and tamarack (*Larix laricina*(Du Roi) K. Koch. White pine (*Pinus strobus* L.) occurs on sites scattered throughout the forest. Broadleaf trees, such as white birch (*Betula papyrifera* Marsh.) occur in pure stands on richer soils, but it is more prevalent in mixtures with conifers. Trembling aspen (*Populus tremuloides* Michx.), though common in Central Newfoundland, is relatively uncommon in Zone 4. Perhaps the most characteristic species of the forested lands in the immediate vicinity of Bay d'Espoir itself is yellow birch (*Betula alleghaniensis* Britt) which has a restricted distribution on the island of Newfoundland.

Soils of the boreal forests in District 07 are predominantly classed as podzols although brunisols are also present. Throughout the contrasting areas of exposed bedrock, morainal deposits and low lying sphagnum bogs, this mosaic of soils and non-soils tends to be occupied by a range of plant communities dominated by lichens, shrubs and forbs. Small to medium sized lakes are common. Major watersheds within District 07 include portions of the Bay du Nord River, Long Harbour River, Salmon River, Dolland Brook and Grey River systems.

Climatic conditions of this region are heavily influenced by the proximity to the southern currents which result in warm moist air along the coast. Fog is common along coastal areas.

Inland cold air masses are prevalent resulting in a cooler climate.

The primary natural disturbance factors associated with boreal forests are fire and insects. Forest fires are frequent and extensive in Central Newfoundland and result in specific successional trends depending on site type. More often than not, the spruce component is increased following fire, whereas other disturbance types such as insects and cutting often results in an increase in the fir component. Repeated burning and cutting of dry, coarse-textured black spruce-feather moss site types can result in ericaceous species such as sheep laurel (*Kalmia angustifolia* L.) invading the site to produce heath-like conditions. Successional patterns on other forest cover types vary with site and type of disturbance.

Forest development class, successional pattern and site influence the understory plant community present throughout the District. The species composition and structure of these plants significantly impact on the suitability of a site as wildlife habitat for various species. Some animals are very general in terms of habitat requirements and can occupy a wide range of site conditions, yet have specific seasonal requirements that can determine habitat quality. For example, the moose requires wintering areas with suitable combinations of available cover and food sources. It is widely accepted that a variety of forest age classes can provide increased habitat and sustainability for many wildlife species. Nonetheless, there are certain wildlife species with very specific age class requirements for habitat suitability.

Aquatic ecosystems of the boreal forest are heavily dependant on forest cover for temperature regulation, nutrient cycling and stream flow regulation. Consequently, forest harvesting activities in riparian areas around waterbodies, is 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 dependant on adjacent forest cover. For these reasons, maintenance of suitable riparian zones for protection of aquatic ecosystems and providing wildlife travel corridors is a primary consideration of this plan.

### 1.3.2 The National Ecological Land Classification System

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 the following table.

Table 3 Canadian Ecological Land Classification System

| Level | Description | Common Map Scale |
|---|---|---|
| ECOZONE | Areas of large land masses representing very generalized ecological units, based on the consideration that the earths 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., Island of Newfoundland). | 1:10 000 000<br>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., Avalon Forest Ecoregion). | 1:3 000 000<br>1:1 000 000 |
| ECODISTRICT | A part of ecoregion characterized by a distinctive pattern of relief, geology, geomophology, vegetation, water and fauna. | 1: 500 000<br>1:125 000 |
| ECOSECTION | A part of the ecodistrict throughout which there is a recurring pattern of terrain, soil, vegetation, water bodies and fauna. | 1:250 000<br>1:50 000 |
| ECOSITE | A part of the ecosection having a relatively uniform parent material, soil, hydrology, and chronosequence of vegetation. | 1;250 000<br>1:50 000 |
| ECOELEMENT | A part of ecosite displaying uniform soil, topographical, vegetative and hydrological characteristics. | 1:10 000<br>1;2 500 |

### 1.3.3 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. Fortunately, such a framework exists, in a publication entitled *Ecoregions and Subregions of Insular Newfoundland* (after Damman, 1983).

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, Newfoundland consists of nine ecoregions which can be further divided into twenty one subregions. Labrador has ten ecoregions. Each of the Newfoundland and Labrador ecoregions and subregions contain many of the same ecosystem variables. It is the dominance and variance of these variables (e.g., vegetation and climate) that determine their classification.

The Bay d'Espoir District contains three of the nine ecoregions that are found on the Island portion of the province. These are:

(1)Western Newfoundland Ecoregion
    Bay d'Espoir Subregion
(2) Central Newfoundland Ecoregion
    Twillick Steady Subregion
(3) Maritime Barrens Ecoregion
    (a) South Coast Barrens Subregion and
    (b) Central Barrens Subregion

The following descriptions are taken from the *Forest Site Classification Manual - A Field Guide to the Damman Forest Site Types of Newfoundland* (Meades and Moores, 1994).

#### 1.3.3.1 Western Newfoundland Ecoregion

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

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

**1.3.3.2 Central Newfoundland Ecoregion**
Central Newfoundland has the most continental climate of any part of insular Newfoundland. It has the highest summer temperatures and the lowest winter temperatures. Because of warm summers and high evapo-transpiration losses, soils in the northern part of this ecoregion exhibit actual soil-moisture deficiency. The *Hylocomium*-Balsam Fir forest type is characteristic of this area. Forest fires have played a more important role in this ecoregion's natural history than in other regions. Thus, much of the Balsam Fir-Feathermoss forest types have been converted to black spruce and some of the richer site types are dominated by white birch and aspen. In areas that have been burned repeatedly, dwarf shrub (Kalmia) barrens have replaced forest stands. Raised bogs are the characteristic wetland type.

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

**1.3.3.3 Maritime Barrens Ecoregion**
The Maritime Barrens Ecoregion extends from the east to the west coast of Newfoundland along the south-central portion of the island. This ecoregion has the coldest summers with frequent fog and strong winds. Winters are relatively mild, with intermittent snow cover, particularly near the coastline. The landscape pattern usually consists of stunted balsam fir broken by extensive open *Kalmia* barren which developed because of indiscriminate burning by European settlers. Good forest growth is restricted to the long slopes of a few protected valleys. Slope and basin bogs are the most common wetland type.

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

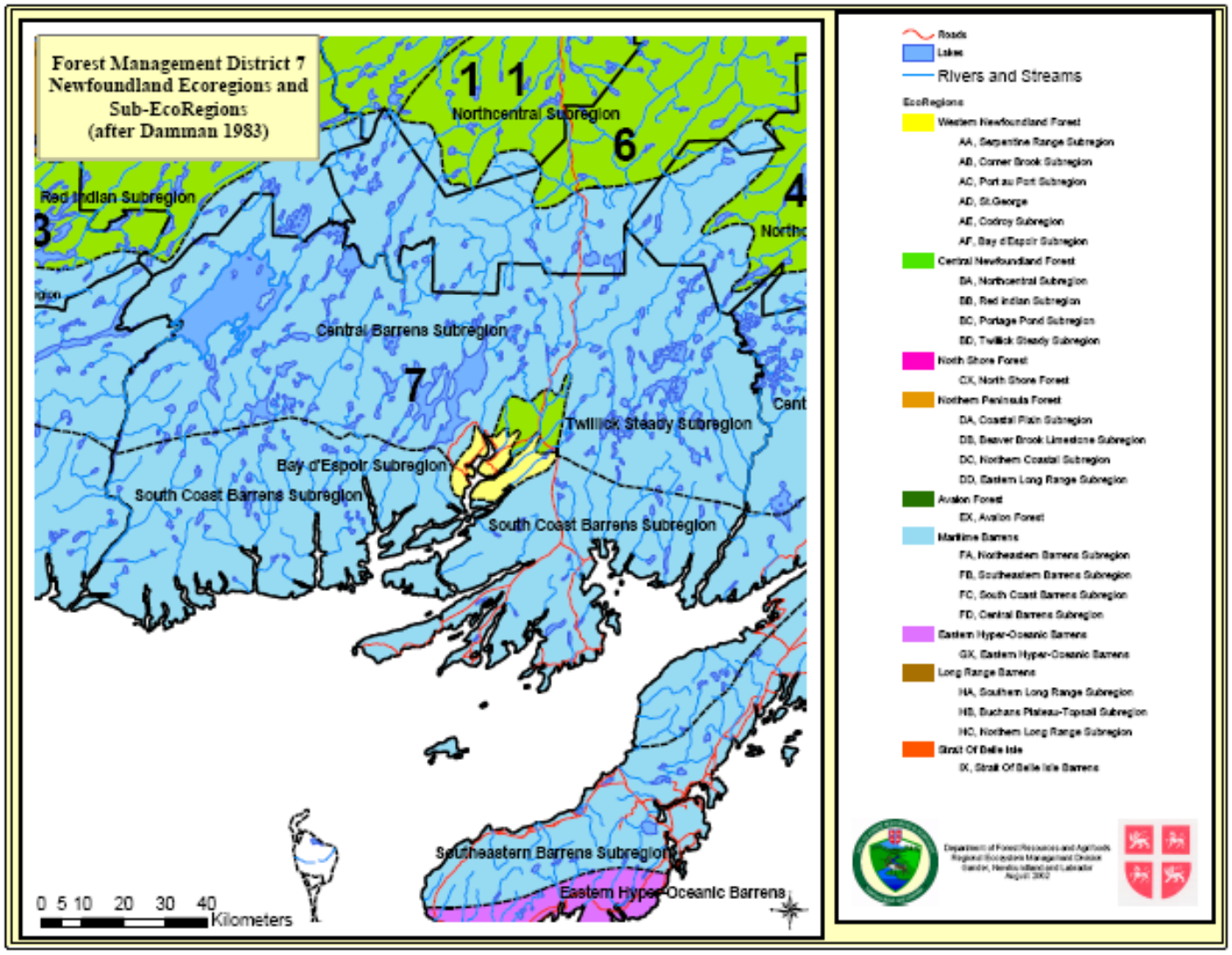
**Central Barrens Subregion**
This area occurs south of the Central Newfoundland Ecoregion and north of the South Coast Barrens Subregion. Residual forests that have not been destroyed by fire have moderate forest capability. The dwarf shrub heaths are robust and *Rhododendron canadense(L.)* is a conspicuous component suggesting deep snow cover. Arctic-alpine species are poorly represented. Yellow birch is absent from the forest.

**Table 4 Ecoregions Associated with District 7**

| | | |
|---|---|---|
| Central Newfoundland Ecoregion | 28,690 km² | |
| Twillick Steady Subregion | 190 km² | (0.66%) |
| Western Newfoundland Ecoregion | 9,980 km² | |
| Bay d'Espoir Subregion | 250 km² | (2.51%) |
| Maritime Barrens: | 38,120 km² | |
| South Coast Barrens Subregion | 9,190 km² | (24.11%) |
| Central Barrens Subregion | 15,260 km² | (40.03%) |

*(%) = % of Total Ecoregion*

Figure 2 Ecoregions and Subregions of District 7 (Planning Zone 4)



## 1.4 Ecosystem Dynamics

### 1.4.1 Ecosystem Condition and Productivity

As with other parts of Newfoundland's boreal forest, those of District 7 have evolved in concert with a history of fire, insect attack and subsequent disease and wind throw. Human intervention in this forest has been extensive and widespread with a resultant significant impact on current landscape patterns.

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

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

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

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

Succession involves changes in both community composition and in the ecosystem structure and process. Succession is the orderly change whereby the dominant species is replaced by another species, then another etc. until a new dominant species establishes a relatively stable community.

The following sections will discuss each of these concepts in more detail as they relate to the ecosystems of District 7. For the most part this section will be descriptive and explanatory in nature. Specific examples of strategies and linkages to the Provincial Sustainable Forest Management Strategy will be detailed in subsequent sections.

#### 1.4.1.1 Productivity

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

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

Overall, the total landscape in Planning Zone 4 has approximately 9 percent productive forest. This distribution of productive sites across the landscape and range of productivity within these sites is largely dependent on landscape patterns, climate, and soils. The more productive areas of the zone occur in the lowlands of the river valleys. These areas have deeper soils and less exposed bedrock. The landscape patterns are more consistent and the growing season is longer. In contrast, the southern part of FMD 7 along the coast, have soils that are shallower with bedrock at or near the surface. The terrain in southern and southwestern section is very rough and the growing season is shorter than in the valley lowlands (130 as opposed to 160 days).

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

#### 1.4.1.2 Resilience

Ecosystem resilience reflects the ability of the ecosystem to absorb change and disturbance while maintaining the same productive capacity and the same relationships among populations. Healthy forest ecosystems maintain their resilience and adapt to periodic disturbances. The renewal of boreal forest ecosystems often depend on these disturbances. Resilience is characterized by the forest's ability to stabilize vital soil processes and maintain succession whereby the system is returned to a community composition and the productivity level is consistent with the ecosystem's physical constraints. To a large degree, a forest ecosystems' resilience is controlled by properties such as climate, parent soil, relief and flora.

The potential for populations to recover from low levels following disturbance by having adequate regeneration capacity and a balanced distribution of forest types and age classes provides a reliable measure of resilience at the landscape level. Other measures include the percent and extent of area by forest type and age class and the percentage of disturbed areas that are successfully regenerated. Resilience is determined by measuring and monitoring these parameters. Forest activities must be carefully planned to not upset the natural balance and lower an ecosystem's resilience. An example is harvesting on the more fragile sites where steep slopes and shallow soil over bedrock increase the potential of site degradation beyond repair.

#### 1.4.1.3 Stability

Nature is constantly changing and going through the unending processes of disturbance, growth, senescence, and decay. Therefore, stability of a forest ecosystem does not refer to one fixed

position without variation. Ecosystem stability is more accurately defined as the maintenance of ecosystem changes within certain boundaries and the functional continuation of important potentials and processes such as energy capture.

There are three levels of stability; species stability, structural stability, and process stability. Species stability is the maintenance of viable populations or meta-populations of individual species. Structural stability is the stability of various aspects of ecosystem structure such as food web organization or species numbers. Process stability is the stability of processes such as primary productivity and nutrient cycling. To put stability in perspective, it must ensure that the system does not cross some threshold from which recovery to a former state is either impossible (extinction) or occurs only after long time periods or with outside inputs (loss of topsoil).

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

#### 1.4.1.4 Disturbance Regimes and Succession Patterns

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

1.4.1.4.1 Harvesting

Regeneration patterns in the black spruce type after harvesting is generally to the balsam fir type with a component of black spruce, on average. There is a higher regeneration failure in this forest type with average not sufficiently restocked (NSR) rates at 25-30 percent across all ecoregion and site types. Another general trend is that the poorer the site quality the higher the NSR rate. These sites would be candidates for planting with black spruce or red and/or white pine. In some instances where balsam fir does regenerate on black spruce sites it becomes very chlorotic at a young age and is highly susceptible to attack from the balsam woolly adelgid. It therefore has not been considered as an acceptable softwood regeneration species on these sites, thus planting has become the norm.

In the balsam fir types, regeneration failure is much lower than the black spruce types averaging 15-20 percent across all ecoregion and site types. The majority of these sites will regenerate back to balsam fir after harvesting. There is also some regeneration of these sites to mixed balsam fir/black spruce and/or mixed softwood/ hardwood types.

The typical regeneration pattern in the mixed wood types is generally back to mixed wood (i.e., dominated by white birch and balsam fir with a minor spruce component).There is a higher component of white birch regeneration after harvesting in types that had a higher percentage of

hardwood before harvest. Generally, the better the site class the more hardwood regeneration. Regeneration failure on the mixed wood types is highest on poor sites and lowest on the better sites averaging 10-15 percent.

There are two main white birch site types. The basic difference between them is terrain which impacts site quality. The good(G) and high(H) white birch sites are typically located on sloped terrain resulting in continual ground water movement or seepage slopes. These sites are prone to revert to alder dominated NSR sites in the absence of very hot ground fire as the disturbance mechanism. Consequently the management prescription to ensure productivity on these valuable sites is to plant fast growing softwood species. The medium(M) white birch sites are typically on more level terrain and will revert to white birch /balsam fir or white birch/black spruce after disturbance. Regeneration failure on these sites is low (10 percent). The management prescription to regenerate these site to white birch is to remove the overmature birch in a seed tree cut to provide a seed source for the next rotation of birch. Intermediate treatments of precommercial thinning, to maximize sawlog potential of these stands, are recommended in future.

Harvesting of white birch in this zone has traditionally been for firewood purposes with a limited amount used for value added purposes. Evidence from domestic cutting in these types indicates that they will regenerate to mixed wood types dominated by balsam fir and white birch.

1.4.1.4.2 Fire

Since black spruce is a fire adapted species, it is not surprising that it is the most prolific regeneration species after fire across all forest types, site types and ecoregions within the District. It regenerates as pure stands or in combination with white birch. Balsam fir is conspicuously absent after fire because most advanced regeneration in the understory is killed by the fire. Black spruce regeneration is somewhat correlated with the amount present in the prefire stand. Generally, the higher the component of black spruce in the original stand, the higher the percentage of regeneration to black spruce. In mixed wood stands a higher component of white birch and sometimes trembling aspen is present after fire. Regeneration after fire in white birch dominated stands is typically back to white birch, but can also include a black spruce component. Regeneration failure after fire is on average 20-25 percent across all forest types, typically being higher as sites get poorer and ground fire temperatures decrease. Generally, the poorer(P) site types will revert to Kalmia dominated not sufficiently restocked(NSR) sites and require planting to ensure adequate regeneration. When ground fire temperatures are lower, less of the humus layer is removed and regeneration failure increases due to lack of adequate seed bed.

1.4.1.4.3 Insect

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

Mature balsam fir types usually regenerate to balsam fir or to balsam fir hardwood mixtures. In recent history, however, many insect killed fir stands have reverted to NSR areas due to the high browse rate on fir regeneration by moose in sections of the District. Disturbance by insect kill in young balsam fir stands can also cause succession to white spruce. Regeneration patterns in mixed wood types usually depend on the type of mixture. If black spruce is a component then it

will persist and form part of the new stand. Otherwise balsam fir and balsam fir/hardwood mixtures regenerate after insect attack. Regeneration failure of fir sites after insect attack is low and only occurs approximately 15 percent of the time. Regeneration failure mostly occurs on sites where the immature balsam fir regeneration is killed by either insect attack or over browsing by moose.

### 1.4.2 Biodiversity

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

Some scientists estimate the total number of species on earth between two and 100 million, however, the best estimate is considered to be within the range of 10-30 million. This is remarkable considering only 1.4 million species have actually been given names. The largest concentration of biodiversity on the planet is found in the tropical areas of developing countries. Small areas of rainforest often contain species that are found nowhere else on earth. Mishandling even small tracts of land could lead to extinction of several species, one of which may hold the key for the prevention or cure of some disease.

While the boreal forest does not have the extent of biodiversity that some of the equatorial regions possess, Canada does have just over 70,000 species of plants, animals, and micro organisms in its boreal and other forest regions. An equivalent number remain undescribed 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 the Earth's biodiversity. Canada signed the United Nations Convention on Biological Diversity in 1992 at the Rio de Janeiro earth summit. All governments at both the federal and provincial level have agreed to meet these objectives through implementation of the 1995 Canadian Biodiversity Strategy: Canada's Response to the Convention on Biodiversity.

The three components of biodiversity are species diversity, genetic diversity, and ecosystem diversity.

#### 1.4.2.1 Species Diversity

Species diversity describes the overall range of species in a given area or ecosystem. Species are groups of animals, plants, and 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.

#### 1.4.2.2 Genetic Diversity

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

#### 1.4.2.3 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. Each ecoregion in the province should have representative areas protected which displays the diversity where such exists. With this in mind, Department of Natural Resources supports the development of ecological reserves in FMD 7. At the present time, the Bay du Nord Wilderness Reserve and the Middle Ridge Wildlife Reserve protect the three major ecoregions in the District: the Maritime Barrens, the Central Newfoundland and the Western Newfoundland ecoregions. The Devil's Bay Ecological Reserve (South of Francois) represents the Maritime Barrens/South Coast Barrens subregion. These areas can serve as a benchmark from which to measure and guide management decisions. These representative areas protect the wilderness of the ecoregion and are vital for guiding management actions. As benchmark areas, they will illustrate the multispecies mosaic that planning actions must maintain. One unique aspect of landscape diversity in Planning Zone 4 is the high representation of native white pine stands relative to other planning zones on the island.

Old growth forests are valued for their contributions to society in the sense of heritage, culture, aesthetics, and spirituality. Old growth forests are best understood within the general context of forest disturbance. Disturbance is ubiquitous in forest ecosystems and may be defined as any relatively discrete event in time that disrupts ecosystems, community or population structure and changes resources, substrate availability, or the physical environment. Disturbances occur over a

wide range of spatial and temporal scales and normally interact one with the other to produce the complexity of forest types found across our landscapes.

Theoretically, boreal forests not disturbed by fire, insect or wind disturbance for long periods of time will revert to multicohort, self perpetuating, gap driven forests. When viewed from the perspective of forest-level disturbance, it may be stated that old growth forests are common in areas not prone to recurrent or periodic stand replacing disturbance from fire, insects or wind. In situations where stand initiating events are rare, then old growth will tend to dominate. The disturbance forces which would naturally recycle mature forests are absent and therefore forests will tend to grow to the old growth stage. Old growth forests are thus composed entirely of trees which have developed in the absence of stand replacing disturbance. Old-growth fir-spruce forests will self-perpetuate through small-scale gap dynamics in the absence of large-scale disturbance.

Old growth conditions in the Canadian boreal forest are rare or uncommon. This is understandable given the ubiquity of landscape level fires and recurrent insect outbreaks. As well, logging is becoming an increasingly significant disturbance factor in the boreal forests. Wildfire is paramount in controlling the dynamics of the drier, continental boreal forests of western Canada and Alaska. In Newfoundland, fire tends to be important in the forests of central region, characterized by its continental like climate.

The occurrence of old growth forests on the Island of Newfoundland is unknown. Except for the old growth research conducted in the upper Main River watershed, empirical definitions of old growth according to forest types and edaphic conditions are not available. Furthermore, the frequency of natural forest disturbances and their role in shaping landscape level forest composition and structure of the Island's forests are little understood. However, given our general knowledge of the historic occurrence of fire, insect and wind disturbance in Newfoundland's forests, as well as recognition of a century of logging activity across the Island, it is reasonable to assume that primary old growth forests on the Island are not common. DNR does acknowledge that the older cohorts in the age class structure of a district are important from many ecosystem perspectives. Accordingly, during the 2006 wood supply modeling, the maintenance of 15 % of the overmature cohort (i.e. 81+ years) on the landscape over the forecast horizon was a requirement on a district basis. This will be discussed further in other sections.

## 1.5 Forest Characterization

### 1.5.1 Land Classification

There are four basic categories that currently represent how the land within a forest management district is classified; productive forest, unproductive forest, non-forest and freshwater. The total mapped area in the zone is approximately 557,322 hectares. Of this, 117,160 hectares is productive forest, 162,111 hectares is nonproductive, 205,201 hectares is non-forest, and 72,850 hectares is water.

Productive forest is defined as forested area that is capable of producing 60 $m^3$/ha at rotation. Essentially, this is the forested area that sustains industry in the province.

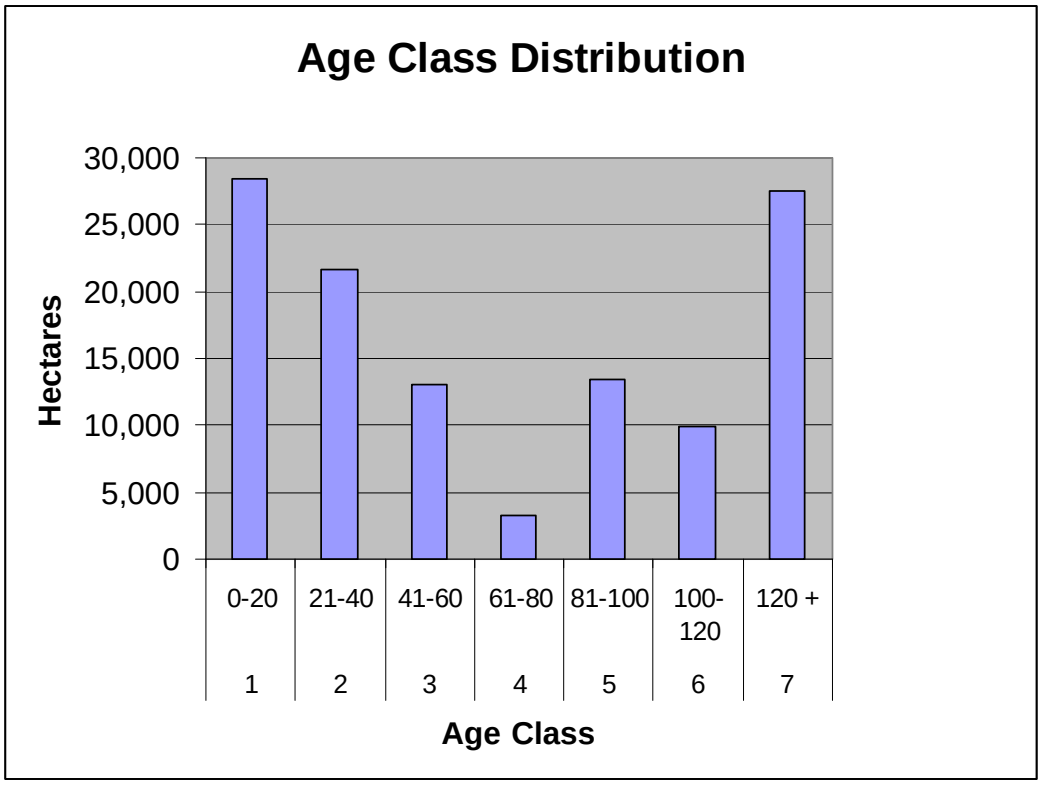
### 1.5.2 Age Class

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 age classes present in this zone are:

| Class | Age (years) | | Hectares |
|---|---|---|---|
| 1 | 0 - 20 | Regenerating | 28,376 |
| 2 | 21 – 40 | Immature | 21,700 |
| 3 | 41 – 60 | Semi-mature | 13,009 |
| 4 | 61 – 80 | Mature | 3,247 |
| 5 | 81 - 100 | Overmature | 13,403 |
| 6 | 100 - 120 | " | 9,856 |
| 7 | 120 + | " | 27,569 |

The combined age class distribution in Planning Zone 4 for the entire productive forest is shown in Figure 3. In general terms, the more balanced the age class distribution in a District, the higher the potential for an even flow sustained harvest of timber because continuous timber supply is limited by the age class with the lowest frequency of occurrence. A balanced age distribution in the forest would also allow for the highest biodiversity by making habitat available at all stages of development, with the equivalent proportions of the forest moving from one stage of development to the next over time. This would result in an ongoing renewal of habitat.

Figure 3 Age class distribution for Planning Zone 4



### 1.5.3 Site Class

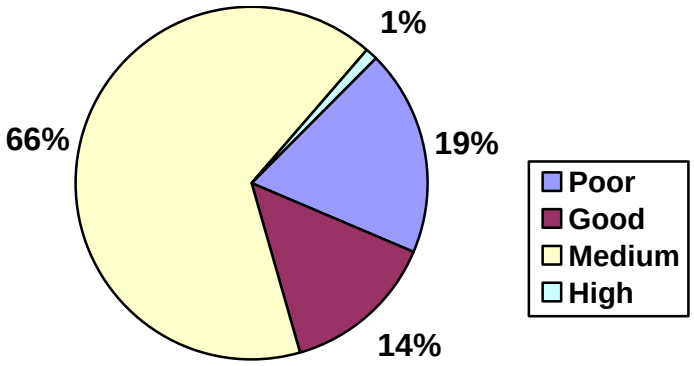
The Newfoundland Forest Service has identified four site classes that refer to the potential of a given site to produce timber. These are high, good, medium and poor. The classes are based on a number of factors, some of which are soil type, moisture content, slope, and fertility. Site class is determined through air photo interpretation supplemented with field checks. The classes indicate the volume of wood fiber a site has the capability of producing under natural conditions by the time the trees reach their rotation age (which averages, generally, between 60 and 80 years depending on the species and the location). On average, good sites are capable of producing greater than 2.6 $m^3$/ha/yr, medium sites 1.7 $m^3$/ha/yr, and poor sites 0.8 $m^3$/ha/yr.

The following table indicates the average potential in cubic meters per hectare for each site class at maturity (based on the provincial average).

| Class | $m^3$ /ha |
|---|---|
| High | 200+ |
| Good | 150 |
| Medium | 120 |
| Poor | 80 |

The medium site class is by far the largest within Planning Zone 4, holding 66% of the total productive area. The next largest class is poor (19%), followed by good (14%) and high (<1%).

Figure 4 Site Class Distribution for FMD 7




### 1.5.4 Forest Types (Species and Working Group)

Working group describes the dominant tree species present in a forest stand. This species may occupy 100 percent of crown closure of a stand or may be present in association with other species. The working group designation describes the stand in general terms based on the prevalent species whereby species composition describes specifically, the relative proportion of each individual tree species that make up a stand.

There are ten working groups associated with the District. The four major working groups are the balsam fir-softwood, black spruce-softwood, softwood-hardwood and the hardwood-softwood

working groups.
The total working groups in the District are the following:

1. bS -black spruce is the major species in this working group making up 75 to 100% of the basal area. This means that the black spruce component has the largest merchantable volume in the stand.
2. bF -The same description for bS applies, except the major species is balsam fir.
3. wB -as above, with white birch the major species.
4. tA –as above, with trembling aspen the major species.
5. SH –in this group, the major species is a combination of softwoods (usually balsam fir and black spruce) with the minor component consisting of hardwoods.
6. HS –the working group is essentially the same as the SH group, only reversed with hardwoods being the major component and softwoods the minor.
7. DI –this designation refers to areas that are classes as disturbed. The disturbance can be the result of wind damage, fire, insects, and so on. It is currently too early to tell if the site will regenerate for this planning period.
8. NS –this refers to areas that have been disturbed but are now insufficiently restocked with a preferred species. For example, a rich balsam fir site could have been harvested and then regenerated to an alder bed.
9. jP –as above, with jack pine (*Pinus banksiana* Lamb.) the major species.
10. jL –as above, with Japanese Larch (*Larix keampferi.)* major species.

Table 5 Breakdown of District by Working Group

| Working Group | Area | % FMD | Rank |
|---|---|---|---|
| bF | 51,566 | 44 | 1 |
| bS | 38,270 | 33 | 2 |
| hS | 3,336 | 3 | 5 |
| NSR | 4,092 | 3 | 4 |
| NSV | 2,181 | 2 | 6 |
| sH | 16,653 | 14 | 3 |
| wB | 727 | <1 | 7 |
| wS | 327 | <1 | 8 |
| Other (jP,tA) | 7 | <1 | 9 |
| Total | 117,159 | | |

The balsam fir and black spruce working groups account for 79.8% of the production forest area in the District with balsam fir accounting for 65.2% and black spruce accounting for 14.6%. The third major working group is the softwood-hardwood cover type which occupies 16.4% of the production forest. The remaining working groups are of limited area.

A look at the productive forest (Figure 4) by age class shows the vast majority of the timber stands being in age class 1 and age classes 5, 6, and 7. The unbalanced, uneven age class distribution can be attributed to the lack of major disturbances in the past (i.e. limited harvesting operations and the lack of fire history), thus the high percentage of overmature timber. The timber stands of age class 1 resulted mainly from recent cutovers and with the mortality caused by the spruce budworm in the late 1970-80's. This resulted in the breakdown and disintegration of the previous stands.

The Bay d'Espoir area, (St. Alban's-Milltown), which is characterized by soil of erosion origin has an above average amount of forest in comparison to the remainder of the coastal region. The major tree-species are balsam fir (*Abies balsamea*) (L.) Mill), black spruce (*Picea mariana*) (Mill BSP), white birch (*Betula papyrifera*) Marsh), yellow birch (*Betula alleghaniensis* Britt). Minor tree species include white spruce (*Picea glauca* Moench) Voss), tamarack (*Larix laricina* (Du Roi) K. Koch), and eastern white pine (*Pinus strobus* L.).These species occur in the four cover types.

**(a) Softwood**

This cover type occupies 79.8% of the production forest land in the district. The softwood cover type is composed of 76-100% softwood with the remaining 0-24% being hardwood. The softwood cover type is predominately balsam fir with the remainder of the softwood content consisting mainly of black spruce. White birch is the major hardwood constituent in the softwood cover type.

**(i) Balsam Fir**

Balsam fir is the most common and most prolific tree species of the Management District. Of the softwood cover type, 57% is occupied by balsam fir with the remaining 18% consisting of black spruce. The majority of the balsam fir is found in two capability classes: 43% in forest capability class 6 and 26% in forest capability class 4.

Pure stands of balsam fir are not common in the District. Usually black spruce and white birch are associated with the fir species. Balsam fir is a medium sized tree growing from 12-15 meters in height and 30-36 cm. in diameter. It is adapted to a variety of sites but grow best on moist, well drained soils. As mentioned earlier, balsam fir grows in association with black spruce and white birch. This softwood species is one of major economic importance to the Management District and is used for sawlog material and pulpwood material.

**(ii) Black Spruce**

Black spruce is a slow growing species ranging from 9-12 meters in height and from 15-30 cm. in diameter. It grows best on well drained sandy soils but is found on a variety of sites including sphagnum bogs. It is more abundant in the northern section of the district. Black spruce is not usually found in pure stands but grows in association with balsam fir. Black spruce is usually found around the fringes of softwood and softwood-hardwood cover types where the soil is boggy and wet. Approximately 44% of the black spruce is found in forest capability class 6.

**(b) Softwood-Hardwood and Hardwood-Softwood**

The softwood-hardwood and hardwood-softwood cover types occupy 16.4% and 2% of the forest production land in the District respectively. These two cover types are usually found on the richer sites which are considerably drier.

The softwood-hardwood cover type is comprised of 50-75% softwood with the remaining being hardwood. This cover type is predominately balsam fir with white birch being the major hardwood constituent.

The hardwood-softwood cover type is comprised of 25-49% softwood with the remainder being hardwood. Of the hardwood content in this cover type 55-60% of the volume is yellow birch. However, on a stem per acre basis, white birch is the predominant species. The yellow birch, which are for the most part large overmature trees, grow in association with balsam fir and white birch.

These two cover types are important to the Management District for they comprise 18.4% the production forest land. Three species are of economic importance to these cover types: balsam fir, white birch and yellow birch.

## SECTION 2 PAST ACTIVITIES PLANNING ZONE 4 – DISTRICT 7

### 2.1 Overview

As stated in the introduction, there has been a change in the planning process resulting in the combining of adjacent districts with similar ecological conditions into planning zones. In this case Forest Management District 7 is a stand alone zone because of location. This combining resulted in changes to the start and end dates of some existing five year plans so that they could be synchronized for the new planning process. The previous five year plan for FMD 7 (April 1, 2003-March 31, 2008) was reduced by three months to (December 31, 2007) for consistency purposes.

It should be noted that forest activities that were carried out during this planning period were compliant with the Five Year Plan. Amendments were channeled through the appropriate agencies and required approvals obtained before any work was initiated.

The description of the past five year activities will cover the period from 2003 to 2007 inclusive.

**2.2 Harvesting**

The timber harvest figures for the past five year period are presented in Table 7. The commercial harvest decreased over the past five years with the amount of sawlog material and the amount of fuelwood/pulpwood activity decreasing. This is a result of the markets for the various products being stagnated or reduced over the past several years. Historically, it was difficult at times for operators to sell pulpwood from this District and the same event has again occurred.

The production of the commercial sawmills in the District has decreased. Many of the sawlogs that are produced are being transported out of the District to larger sawmills that are located throughout the island portion of the province. This trend reduces the amount of employment available to the District residents from the sawmilling industry.

The total harvest, which includes the domestic drain has fluctuated but has remained within the allowable cut figures. Domestic harvesting was from a combination of hardwood, Class I and Class III softwood, isolated stands, and salvage timber sources. Table 6 identifies the permits issued in the District and the volumes associated with them.

Table 6 Summary of Permits Issued and Volume Harvested District 7 2002-2007

| | Commercial Permits | | | Domestic Permits | |
|---|---|---|---|---|---|
| Year | Number of Permits | Fuelwood/ Pulpwood ($M^3$ Solid) | Sawlogs (FBM) | Number of Permits | Fuelwood ($M^3$ Solid) |
| 2002-03 | 66 | 6,000 | 1,744,000 | 742 | 17,043 |
| 2003-04 | 74 | 4,861 | 977,620 | 738 | 16,952 |
| 2004-05 | 62 | 4,955 | 1,293,023 | 703 | 16,169 |
| 2005-06 | 65 | 5,665 | 2,049,614 | 700 | 16,077 |
| 2006 | 53 | 2,609 | 1,025,974 | 688 | 15,824 |
| 2007 | Not available | | | | |

Table 7 Summary of Harvesting and AAC's District 7 2003-2007

| Year | AAC ($m^3$) | Softwood Harvest ($m^3$) |
|---|---|---|
| 2003-2004 | 23,500 | 21,686 |
| 2004-2005 | 23,500 | 19,532 |
| 2005-2006 | 23,500 | 21,640 |
| 2006 | 24,500 | 15,372 |
| 2007 | 24,500 | Not Available |

**2.3 Silviculture**

The Silviculture program in District 7 during the past five years is presented in Table 8. The amount of area treated each year ranged from a high of 420 hectares to a low of 207 hectares, and averaged 290 hectares per year. Specific treatments have resulted in the following breakdown: 502 hectares of planting; 368 hectares of precommercial thinning; 35 hectares of plantation maintenance, 4 hectares of commercial thinning, 21 hectares of jack pine pruning, 25 hectares of stand reclamation and 15 hectares of white pine management. The treatments of white pine management assist in maintaining biodiversity of forest ecosystems in Central Newfoundland.

Table 8 Summary of Silviculture Treatments District 7 2003-2007

| | Treatment (ha) | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | PCT | Planting | Tree Pruning | Plantation Maintenance | Diameter Limit Thinning | W.P. Management | Stand Reclamation |
| 2003 | 87.64 | 95.54 | 7.84 | --- | 3.99 | --- | --- |
| 2004 | 90.02 | 65.26 | 9.96 | --- | --- | --- | --- |
| 2005 | 29.00 | 129.78** | 3.24 | --- | --- | --- | --- |
| 2006 | 46.22 | 172.40*** | --- | --- | --- | --- | --- |
| 2007* | 115.00 | 40.00 | --- | 35.00 | --- | 15.00 | 25.00 |
| TOTALS | 367.88 | 502.98 | 21.04 | 35.00 | 3.99 | 15.00 | 25.00 |

* Proposed Treatments
** 75.74 ha. Planting at Rifle Lake - District #6
*** 115.00 ha. Planting at Rifle Lake - District #6

## 2.4 Road Construction

The location of forest resource roads construction during the previous year period is presented in Table 9. A total of 5.5 kilometers were constructed and 10.75 kilometers of upgrading accomplished. The total capital roads program goes through the public tendering process.

Spur roads were constructed by several operators and were of C or D Class standards.

There was also one major bridge constructed. The bridge was located on the Godaleich Resource Road.

Maintenance funding was very limited during the past five years. Many of the resource roads in the District require considerable maintenance and upgrading. Regrowth of roadside alders which creates a dangerous situation by impairing visibility, the degradation of the road surfacing material, and the lack of regular maintenance are major concerns of the district. Commercial operators and the public, at times, complain about the condition of the resource roads.

Table 9 Summary of Resource Roads and Bridges 2003-2007

| Year | Road Name | Road # | Map # | Road Class and Length | Bridge |
|---|---|---|---|---|---|
| 2003 | Bear Lake | C-107c | 112 | C-2/1.0 km | --- |
| 2004 | Godaleich<br>White Hills | C-129a<br>C-132d | 112<br>112 | C-2/1.5 km<br>C-2/5.5 km Reconstruction | 16 ft. |
| 2005 | Godaleich<br>Diversion | C-129b<br>C-139a | 112<br>99 | C-2/1.5 km<br>C/1.49 km | --- |
| 2006 | Swanger Cove<br>Godaleich | C-58c<br>C-129c | 127<br>112 | C-2/3.6 km Reconstruction<br>C-2/1.65 km Reconstruction | --- |
| 2007 | Godaleich<br>Little River | C-129d<br>C-17i | 112<br>127 | C-2/1.54 km<br>C-2/3.5 km Reconstruction | --- |

## 2.5 Natural Disturbance

### 2.5.1 Fire

Planning Zone 4 has historically had a low fire history. During the period of 2003 to 2007, there were a number of small fires recorded that did not burn a significant area of forested land. In total there were 29 fires reported that burned a total area of 7.8 hectares. Information is presented in Table 10.

Table 10 Summary of Forest Fire Activities 2003 to 2007

| Year | Number of Fires | Area Burnt (Hectares) | |
|---|---|---|---|
| | | Productive | Non Productive |
| 2003 | 8 | 0.1 | 5.2 |
| 2004 | 9 | 0.1 | 0.0 |
| 2005 | 5 | 0.0 | 0.6 |
| 2006 | 6 | 0.0 | 1.9 |
| 2007 | 1* | 0.0 | 0.0 |

### 2.5.2 Insect

With the exception of the balsam wooly adelgid (aphid), there has been little insect activity in the Zone over the period 2003 to 2007. The majority of the balsam fir stands in the zone are now infected with adelgid. Operationally viable control measures for mitigation of this insect have yet to be developed. No other major insect infestations have been documented by the Forest Insect and Disease Branch of the Department of Natural Resources in Planning Zone 4.

## SECTION 3 TIMBER SUPPLY ANALYSIS

### 3.1 Introduction

The Province reviews its timber supply every five years in order to account for any changes in forest land base, growth rates, and management strategies. This schedule is consistent with the Forestry Act, 1990, which established management by Forest Management District and mandates that a wood supply analysis be completed every five years. The result of this analysis is a new set of Annual Allowable Cuts (AAC's) for each Forest Management District. These AAC's are defined as the maximum annual rate at which timber can be harvested at a sustainable level indefinitely into the future (in reality, the AAC figures are applicable for a period of 160 years into the future and not infinity). Annual allowable cuts must be calculated on a District basis, however when combined provide us with the annual allowable harvest level for the island.

### 3.2 Guiding Principles and Policy Direction

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

In concert with the policy of establishing sustainable timber harvest levels, Government's policy requires that harvesting not exceed the established AAC's. Likewise, Government's policy is to optimize forest industry opportunities from the sustainable fiber supply. Government also requires consultation be conducted during the timber supply analysis. In this analysis, public input was achieved through the District Managers and, in some cases, planning teams. The forest industry was consulted directly throughout the process. As well, there was a 30 day

consultation process whereby a draft of the gross AAC's and methodology was published on the Government web site for public review and comment.

### 3.3 Factors Affecting Timber Supply

The forests of insular Newfoundland are very variable in terms of age distribution. Typically, there are significant amounts of mature/over-mature forest and regenerating forest, and limited intermediate age forests. This imbalance is not unusual in a boreal forest where cyclic catastrophic disturbances are common.

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

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

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

### 3.4 Timber Supply Analysis

In 2003, the Forest Service began another review of the provincial timber supply which was completed in March of 2006. Consistent with the Department's vision, the analysis was structured to determine sustainable timber supplies while respecting a multitude of social, economic and environmental objectives. Timber supply, in this context, refers to the rate at which timber is made available for harvesting on a sustainable basis.

The determination of supply (represented as AAC's) involved the use of computer models that forecast the sustainability of possible AAC levels. These models require three basic inputs. First a description of the current state of the forest (forest characterization and availability), second the growth rates associated with the current forest, and third the management strategies applied to the forest. To arrive at these basic inputs requires careful and detailed consideration of a broad range of both timber and non-timber values. More specifically, the following was considered in determining the sustainable timber supply.

### 3.4.1 Forest Characterization

To get a current description of the forest resource (or stock), the Province has invested significant resources into creating and maintaining a Provincial Forest Inventory. Although the latest inventories used in the 2006 Wood Supply Analysis for FMD 7 were completed in 1997, the estimate of forest stock is kept as current as possible through an update program which is conducted each year to account for all natural and man-made disturbances such as fire, insects, and harvesting, and any enhancement programs such as tree planting and pre-commercial thinning. Also, each stand in the forest inventory is updated to reflect any yield changes that may have occurred since the previous inventory update.

### 3.4.2 Land Availability

The updated Forest Inventory was reviewed and classified at the stand level on the basis of the availability of each stand for harvest. The classification system consists of two broad classes; Class 1 - available for harvest under normal conditions, and Class 3 - has restrictions for harvesting due to economic constraints. The Class 3 has been further subdivided into (a) can be harvested with reasonable economic restrictions (expensive wood) and (b) highly unlikely to be harvested under current economic conditions. Only the former portion of Class 3 is used to calculate an AAC for that category. The categories associated with the portion of Class 3 land, which are deemed unavailable for harvest, incorporates a broad range of timber and non-timber values. These values include:

#### 3.4.2.1 Non-Timber Related

Consideration of these non-timber values had a direct impact on Provincial AAC's. It is obvious that as the amount of productive forest land available for timber management drops, so too will the AAC. With the current restrictions, the AAC land base (area where harvesting operations can occur) is only 17% of the total landmass on the island or 66% of the total productive forest land base. In any one year, less than 1% of the productive forest land base is influenced by harvesting operations.

##### 3.4.2.1.1 No-Cut Buffer Zones

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

##### 3.4.2.1.2 Pine Marten and Caribou Habitat

Habitat specialists are working in consultation with industry to ensure adequate habitat will be available for the pine marten and caribou into the future. This work is examining the quantity and quality of habitat as well as the connectivity of habitat. The team is also looking at how this arrangement of habitat would change over time. Once the marten and caribou Habitat Suitability Index models are fully operational, results can be incorporated into our land base designation process.

##### 3.4.2.1.3 Wildlife Corridors

As part of the evaluation process for harvesting plans, wildlife specialists recommend no-cut corridors to ensure the many species of wildlife have sufficient cover to move around the landscape. These corridors are temporal in nature and have little impact on timber supply. Both this section and the previous work toward achieving Value 1.3, Wildlife Habitat, of the

Ecosystem Diversity Element of Criterion 1, Biodiversity, in the Provincial Sustainable Forest Management Strategy.

3.4.2.1.4 Protected Areas

All established and proposed protected areas are removed from the AAC calculations. These include the Bay du Nord Wilderness Reserve and the Middle Ridge Wildlife Reserve.

3.4.2.1.5 Watersheds

The majority of the public protected water supply areas and watersheds were digitized and captured within the forest inventory. These watersheds were added to the database in order to address any concerns about forest management within these watersheds and to permit the Forest Service to report on proposed activities within these watersheds over time. This is in line with Value 3.1, Water, of the Soil and Water Element of Criterion 1, Biodiversity, in the Provincial Sustainable Forest Management Strategy.

**3.4.2.2 Timber Related**

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

3.4.2.2.1 Insect/Fire/Disease Losses

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

3.4.2.2.2 Logging Losses

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

3.4.2.2.3 Operational Constraints

Areas that are inaccessible (surrounded by bogs or hills), timber on steep slopes, and low volume stands are removed from the AAC calculation up front. Also, significant adjustments are applied to the Provincial Forest Inventory for stands deemed operable in the timber analysis but left not harvested within operating areas. The reasons for this are linked to the character of Newfoundland's forests; low volume, steep slopes, rough terrain, and excessively wet ground conditions etc.

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

**3.4.3 Growth Forecasting**

A key requirement for forecasting future wood supply is an understanding of how forest stands grow and develop through time. That is, as a forest stand develops, how much merchantable (i.e. harvestable) volume does it carry at any given point? These yield forecasts (referred to as yield curves) are required for each type of forest stand (called a stratum) comprising the forest under consideration. In Newfoundland there are dozens of distinct forest strata for which separate yield curves are required. These are defined by the tree species in question (e.g., balsam fir, black spruce), the site quality (e.g., good, medium, poor), the geographic region (e.g., Central Newfoundland) and other factors likely to affect yield.

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

### 3.4.4 Management Strategies

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

#### 3.4.4.1 Harvest Flow Constraints

An even-flow harvest constraint was used in the analysis to maximize the sustainable harvest level. This strategy produced the maximum even flow harvest but resulted in less than optimum economic use of the forest resource. If no even flow constraint is used and harvest levels are permitted to fluctuate in response to market value, the overall economic potential of the forest will increase. However, the lower economic potential is offset by stability in mills and employment. This is in line with Goal 1 of Value 5.1, Commercial Timber, of the Economic Benefits Element of Criterion 5, Economic and Social Benefits, in the Provincial Sustainable Forest Management Strategy.

#### 3.4.4.2 Spatial Analysis

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

Manual harvest scheduling has several major benefits. First, it fosters the long term sustainability of our AAC's by mimicking current harvest practices and accounting for actual on the ground conditions that delay or restrict the harvesting of stands. These restrictions which were previously unaccounted for have made our past AAC's higher than was realistically sustainable. Secondly, the mapped 25 year harvest schedules build credibility into the forest management process. Every stand that will be harvested over the next 25 years must already be in the second (20-40 years old) or third (41-60) age class and can be easily identity and highlighted on the harvest schedule maps. Being able to see the wood that will be harvested in the future will help reassure people that the resource is being used in a responsible manner. Also, harvest scheduling will help integrate the management of other forest resource values into timber management planning. All forest values can be typed directly to discreet forest areas, and these forest areas can be the link that allows the many different forest values to be managed simultaneously. The forested areas needed for each resource can be mapped and potential conflicts can be addressed before they become an issue. Finally, the harvest schedule maps developed for the wood supply analysis can be a starting point for the 5 year management planning process, especially the first two periods. The harvest schedule maps, if done correctly, can help reduce the work of the 5 year planning process. One point to note is that harvest scheduling is only done for the Class 1 land base. The Class 3 AAC, for the most part, is opportunistic at best and is harvested only if extra effort is applied. It is not scheduled because of the uncertainty of obtaining extra funding for access and harvesting.

#### 3.4.4.3 Planning Horizons

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

#### 3.4.4.4 Operable Growing Stock Buffer

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

#### 3.4.4.5 Targets for the Maintenance of Older Forest

Consistent with the Forest Service's ecosystem approach, the Province introduced into the analysis an old forest target that at least 15 percent of forests be older than 80 years. This was designed to provide a course filter approach to maintaining representative forest structure. It

ensures the presence of certain amounts of old forest across the landscape into the future. With advances in modeling, this target can now be tracked across a district rather than a single ownership. This has resulted in this strategy being less restrictive than the last analysis. As well, an attempt has made to connect these areas across the landscape for the first 25 years in the form of 81+ corridors. This is in line with Value 1.1, Representative Landscapes, of the Ecosystem Diversity Element of Criterion 1, Biodiversity, in the Provincial Sustainable Forest Management Strategy.

#### 3.4.4.6 Operability Limits

Operability limits are the time windows in which forest management actions such as harvesting can be undertaken with forest stands. Stand growth development as measured in stand merchantable timber volume and individual piece size of trees determine a stands readiness for harvest. In some young stands one can have acceptable harvest volumes, but still have trees that are too small to harvest. In the 2006 wood supply analysis both stand volume and tree size were used to determine the earliest age when a stand could be initially harvested. In addition to determining the absolute earliest age a stand can be harvested, it was recognized that not all stands on the same site develop exactly at the same rate. A small portion of a stand will develop at a faster rate, a small portion will lag behind, with the bulk of the stand type representing the average condition. Therefore, the first operability limit was staggered by 5 year intervals with the 10 percent, 60 percent, and 30 percent assigned to each availability class.

The ending operability limits or the last age in which a stand can be harvested before it becomes too old to harvest is solely determined on a minimum stand volume of between 60 to 80 $m^3$/ha, after which that stand does not have enough volume to make it economical to harvest. It should be noted that while the operability limits define the extreme end points of when stands can be harvested, very few stands are ever harvested at these extreme points. In order to meet other non-timber objectives and in order to maximize the total volume of wood harvested, the model schedules stands to harvest somewhere inside the operability limit window.

#### 3.4.4.7 Silviculture

Silviculture is one of the main forest management tools available to forest managers when they are analyzing the many different future forests that are generated using the wood supply modeling software. The main silvicultural actions used in the 2006 analysis include; precommercial thinning of balsam fir, black spruce, and softwood hardwood stands, and full plant of any areas that do not regenerate naturally mainly with either black spruce, white spruce and to a lesser degree with red pine, or Norway spruce and larch (both eastern and Japanese).

### 3.5 Inventory Adjustments

One of the limitations of the current wood supply model is its inability to account for volume depletions outside of what is reported for harvesting operations. The model produces a gross merchantable volume (GMV) figure which needs to be adjusted to account for volume losses as a result of fire, insects, disease, timber utilization practices and the presence of stand remnants. In previous analyses the lack of province wide digital stand information, the absence of computer tools and the small number of people involved with the wood supply analysis resulted in a high degree of uncertainty around values derived for each depletion. It was recognized that a need existed to study each component more intensely and to expand the time frame and staff

responsible for such an analysis. Such was the task of the Forest Engineering and Industry Services Division whose staff, over a seven year period, completed an analysis of the individual components.

### 3.5.1 Fire

An estimate of productive area loss as a result of fire was based on an analysis of the historical fire statistics maintained by Department of Natural Resources. The fire deduction for District 7 was 0.1%.

### 3.5.2 Insects

Forest mortality was documented by forest insect and disease surveys conducted by DNR in FMD 7 during the last five year period. Long term averages of area of timber mortality from insect defoliation were used as the deductions in Planning Zone 4. The insect mortality deduction was 3.0%.

### 3.5.3 Timber Utilization

Information for this adjustment was derived from a series of intensive on-the-ground surveys which measured the amount of wood remaining on cutovers following harvesting. This wood was comprised of solid merchantable wood (logging losses) and wood with inherent cull (butt/heart rot). Surveys were conducted province wide and on all tenures over a five year period. Information was analyzed by harvesting system and season. The utilization deduction for District 7 was 11.2 %.

### 3.5.4 Stand Remnants

Following harvesting operations, small fragments of stands often are left for a variety of reasons (operational constraints, low volume stands, terrain conditions). These often result in the inability of the operator to achieve volumes predicted by the computer models. A series of surveys were conducted across the province and the results analyzed to determine the amount of productive area attributed to remnants. The stand deduction for District 7 was 8.0%.

The total inventory adjustment for District 7 was 22.0%. The Class III inventory adjustment figure was the same. Hardwood inventory adjustment figure was the same as the Class 1 softwood figure noted above. Hardwood stands are resistant to fire and it is anticipated that there will be little utilization loss due to the high value for fuelwood.

## 3.6 Timber Supply

### 3.6.1 Methodology Overview and Results

Table 11 summarizes the results of the 2006 timber supply analysis for District 7. There are three major differences between the AAC's from 2001 to 2006. Firstly, inoperable areas (eg slope > 30 %) were removed from the Class 3 landbase and hence the available supply calculation. Secondly, the Class 3 AAC's for the 2001 analysis were calculated using a simple area to volume ratio. Thirdly, the 2001 white birch AAC's were calculated using the same methodology as with Class 3 softwood, and as well rudimentary yield curves for white birch were used. Conversely, in 2006 both Class 3 softwood and white birch AAC's were calculated in the same manner as for Class I softwood. Additionally, the yield curves for white birch were improved upon with some empirical data. For these reasons it is probably unfair to compare the white birch

and Class 3 AAC's for 2006 with those of the 2001 analysis.

Table 11 Summary of Annual Allowable Cut ($M^3$) Results for District 7 for Period 2006-2010

| District | Class 1 Softwood | Class 3 Softwood | Class 1 Birch | Class 1 White Birch(Residual) | Class 3 White Birch(Residual) |
|---|---|---|---|---|---|
| 7 | 24,500 | 8,000 | 360 | 3,960 | 860 |

### 3.6.2 District Discussion

#### 3.6.2.1 Forest Management District 7

The 2006 Class 1 softwood AAC for FMD 7 is 24,500$m^3$/yr which is up from the 2001 AAC figure of 23,500$m^3$/yr. The major reason for this change is the readjustment of land base from Class 3 to Class 1 and the effects of harvest scheduling. Similarly, the Class 3 AAC has decreased significantly from 30,000$m^3$/yr in 2001 to 8,000$m^3$/yr in 2006. This has mainly resulted from the change in landbase from C 3- harvestable to C3- unharvestable. The overall softwood AAC (on paper) has decreased from 53,500$m^3$/yr to 32,500$m^3$/yr. It is questionable whether all the Class 3 can be harvested, however, as was the case in the previous five year period.

The 2006 Class 1 white birch AAC for FMD 7 is 360$m^3$/yr from pure stands, 3,960$m^3$/yr from Class 1 residual stands and 860$m^3$/yr from Class 3 residual stands. There were no figures calculated for white birch for this District in 2001. As noted previously, there is a limited amount of white birch available from pure stands but a significant amount available from mixedwood stands (e.g. hardwood/softwood and softwood/hardwood).

### 3.6.3 Sensitivity Analysis

In the 2001 timber supply analysis, a number of new management objectives, like reserve of operable growing stock and 81+ forest targets were introduced. Since these were new, a significant effort was put into sensitivity analysis to determine the impact of these objectives on AAC. The more sensitive objectives were thoroughly evaluated and subcommittees were formed to gather more information to refine any assumptions used. These refined assumptions were used as a basis for the 2006 timber supply analysis.

The resultant AAC's for District 7 had limited sensitivity to the levels of silvicultural inputs tested in the wood supply forecast model. Although doing the maximum silviculture is an unrealistic option due to both operational and monetary constraints, it is anticipated that sliviculture treatments during this five year period will be beyond minimal levels. This will ensure AAC's increase beyond the shortfall period when even-flow harvest constraints can be relaxed. DNR also investigated the potential of increased yield from silvicultural prescriptions to positively impact AAC's, but it was concluded that the current yield curves have been constructed using the best available data, so a further increase in projected yield is unwarranted. Similarly, lowering the operability limits would also increase the AAC. Again, from the department's perspective, this would also represent a significant and unwarranted risk as some

stands situated at the lower end of operability will not be operationally ready when queued for harvest.

The old growth target was not constraining for this analysis. The 15 percent target will be maintained or exceeded throughout the 25 years as a result of planned forest management activities and it will also be maintained over the 160 forecast horizon.

The harvest scheduling was the most constraining objective. AAC reductions in the planning zone as a result of the implementation of manual harvest scheduling ranged from 3% - 6%. This is due mainly to the natural fragmentation of our forest and hence resultant harvest pattern. As noted in section 3.4.4.2, the forecast model provided forest planners with the ability to mimic realistic timber harvest schedules based on current practices and to identify other forest stands that are not as accessible for harvesting. Reductions from harvest scheduling also resulted from the limitations in our baseline data used to describe the forest. Basically to date, we have described the forest into 20 year age classes while the model uses 5 year age classes. A major initiative is required for the 2011 analysis to describe the forest into 5 year age and condition classes particularly at the lower operability limits.

There have been improvements to the inventory adjustments from the last analysis particularly in utilization. Since these adjustments are used to convert from gross to net AAC there is a direct relationship (e.g. a one percent drop in inventory adjustment represents a one percent gain in net AAC). For this reason a significant effort must be made on behalf of forest harvesters to keep this adjustment to a minimum.

### 3.6.4 Forest Composition and Structure Change

A positive advancement with the use of computer models is the ability to track the forest through time. This ability allows the user to evaluate the effects of management activities on the structure of the forest at any point in the simulation period. For this analysis, age and species composition through working group was tracked at three time intervals; time 0 (current forest), time 25 years (after the 25 year harvest schedule) and time 160 years (at the end of the simulation period). The change in the area of working groups in Planning Zone 4 as a result of forest management activities for the next 25 years does not appear to be significant. Essentially, the same forest tree species components will be represented in similar proportions as they are today. The model's capability to predict working group distribution (and hence its sensitivity) is based solely on our input assumptions which can change during the horizon. Some of these changes include outbreak of fire or insects. The inputs for these depletions are our best guess based upon historical patterns. Moreover the forecast of working group distribution is based upon the model inputs for silviculture, which are minimal in this district due to the low sensitivity.

Figure 5 shows the change in total forest age on the district in Planning Zone 4 by 20 year age classes for the simulation period. The age distribution in the district tends towards a more balanced distribution throughout the short term and long term simulation periods compared to today. The shifts in age classes from period to period are a result of a combination of interventions (i.e. harvesting and silviculture) as well as natural progression as stands age. Currently, the age class structure is skewed towards the overmature stands within the planning zone. These types of age class structures inherently give rise to a lot of risk to wood supplies as

the older stands are more susceptible to wind throw, fire, insect attack and the onset of rot. This imbalance is reduced over the planning horizon and should result in wood supplies with lower risk than today, while still ensuring that the overmature component of the district will be well represented. Generally the short term age class structures (i.e.25 yrs) are more equally distributed than at the end of the simulation period. (i.e. 160 yrs).

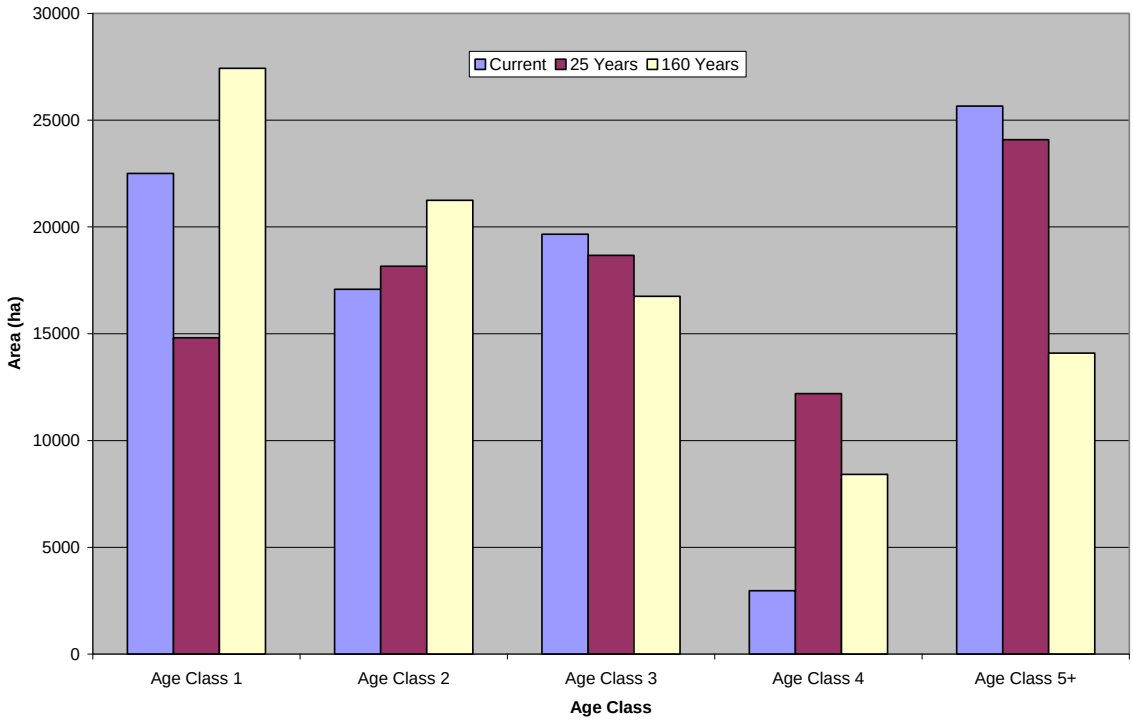



Figure 5 Change in age class structure in FMD 7 for the 160 year simulation period.

This stems from the model requirement to maintain an even flow of fiber in each period while managing the District's wood supplies through the projected fiber shortfall. Once the fiber shortfall period is over (approximately 25- 35 years time) the even flow constraint can be relaxed. This will result in higher future AAC's in the District and better balanced ending age class structures.

## SECTION 4 VALUES

### 4.1 Guiding Principles of Sustainability

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

Environmental sustainability looks directly at ecosystem health, both now and in the long run. Ecosystem health is determined by such factors as ecosystem integrity, biodiversity, productive capacity, and resiliency as previously discussed. The five year operating plan must ensure that these factors are intact or there would be very few values left to manage.

Economic sustainability demands that forest resources be managed and distributed efficiently

and equitably among the stakeholders, within the capacity and limits of the forest ecosystem. Economic development has been given top priority by many of Newfoundland's people and their representative, the government. This will probably remain the case until the economy improves.

However, economic development should not proceed without the incorporation of the other factors into the decision making process.

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

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

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

### 4.2 Value Description

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

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

**Characterization**

- Description: Why the value is important, types of activities, intensity, spatial extent, employment, etc.

- Data in support: Statistical references.

**Critical Elements**

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

**Guiding Principles**

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

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

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

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

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

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

In many instances, the Environmental Protection Guidelines **(**EPG, Appendix 12**)** form the guiding principles for a value. Quite often the spatial extent or location of all values is not known (e.g. raptor nests). Specific guidelines are still listed in order to provide a direction or course of action when and if these values are encountered.

### 4.2.1 Biotic Values

#### 4.2.1.1 Big Game

4.2.1.1.1 Moose

**Characterization**

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

Currently, moose are managed on an area/quota system in the province. The Island is divided into 50 management areas and license quotas are set annually for each area. Quotas are set based upon the management objective for each area (i.e., whether it is desired that the population increase, decrease or stabilize). Generally, if an area has too high of a moose population, managers will increase quotas to bring down the population in order to prevent damage to the habitat. However, if the habitat is in good condition, and the area could support more animals, future quotas may be increased. All or portions of seven moose management areas 17, 18, 20, 25, 26, 27 and 37 are located within District 7.

**Critical Elements**

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

4.2.1.1.2 Caribou

**Characterization**

Caribou is the only native ungulate species on the island. Biologists estimate that prior to the railway being built in 1898 the population on the Island was approximately 100,000 animals but by 1930 the population had declined to about 2,000 animals. Between 1980 and 2000 the number of caribou increased considerably on the Island with a population estimated at 70,000+ animals. In the past few years however populations have declined significantly with Planning Zone 4 being no exception. All or portions of three caribou management areas 63, 64 and 67 are located in the zone.

**Critical Elements**

Caribou are an important species in this District and travel the landscape in large concentrations in the west and east portions of the District. Past studies have shown that forestry activities in the immediate vicinity of calving areas during the calving period have an impact on caribou populations. Recent studies and anecdotal information has indicated that the harvesting restriction zone around caribou calving zones may be significantly larger than first thought. It has also been shown that as roads are constructed and access is improved into remote areas, there is generally an increase in the number of animals which are killed or injured due to vehicle accidents and through legal and illegal activity. The abundance and distribution of arboreal lichens has also been shown to impact caribou populations.

4.2.1.1.3 Black Bear

**Characterization**

The black bear is native to the Island and is found in forested areas. Currently, the number of black bears occurring on the Island is not known (due to difficulty in conducting a census) but is crudely estimated to be about 6 - 10,000 animals. All or portions of seven black bear management areas 17, 18, 20, 25, 26, 27 and 37 are located within the District.

**Critical Elements**

- Den sites for winter hibernation;
- Forest cover

**Guiding Principles**

**Big Game Management Strategy (Moose, Caribou and Black Bear)**

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

**Environmental Protection Guidelines**

Moose

- Where mature stands of timber are required for moose shelter and moose yards, they will be identified in consultation with the Wildlife Division.

Caribou

- To ensure the continued protection of these animals the following Environmental Protection Guidelines will be followed during forestry activities;
- In areas where caribou utilize lichens, a minimum amount of lichen forest must be maintained for caribou. (This amount is to be determined through consultation with (WD);
- Harvesting and road construction will be minimized during the May 15 to July 30 calving period in operating areas adjacent to known calving areas;
- Forest access roads, borrow pits and quarries shall avoid: known sensitive wildlife areas such as, calving grounds, post calving areas, caribou migration routes, caribou rutting areas and wintering areas.

Because the caribou population is in decline, the Wildlife Division have identified critical caribou habitat areas and have developed guidelines for forestry activities within these areas. These guidelines, "Forest Management Guidelines for Woodland Caribou (*Rangifer tarandus caribou*) for the Island of Newfoundland" presently in draft form will be reviewed and finalized cooperatively by WD, DNR and the pulp and paper companies. It will replace and/or enhance those guidelines listed above. Also, in 2007 the WD developed a publication entitled "Guidelines for the Protection of Caribou and Caribou Calves in or Around Forest Harvesting Operations" for areas that require mitigating measures to ensure minimal impacts on the caribou resource.

Bear

A 50-metre, no-cut, treed buffer must be maintained around known bear den sites (winter) or those encountered during harvesting. Den sites must be reported to the WD.

#### 4.2.1.2 Furbearers

**Characterization**

Nine species of furbearers occur in the District; lynx, red fox, beaver, otter, muskrat, short-tailed weasel, red squirrel, mink, coyote. Of these, red squirrel, mink and coyote are not native.

**Critical Elements**

- forest cover for protection;
- water quality maintenance;
- riparian buffer zones along aquatic areas;
- snags and coarse woody debris (denning sites, nesting sites, etc.)

**Guiding Principles**

**Fur Bearer Management Strategy**

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

**Environmental Protection Guidelines**

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

#### 4.2.1.3 Salmonids

**Characterization**

The Atlantic salmon and the brook trout are native to the Island and are found in waterways surrounded by forested areas. There are 12 scheduled salmon rivers in Planning Zone 4 and population counts are conducted on the Conne River system. The scheduled rivers include Conne River, Grey River, Long Harbour River, and Bay du Nord River. Table 12 provides a total list of the scheduled rivers.

Table 12 List of Scheduled Rivers in District 7

| River Name | River Number | Class |
|---|---|---|
| Long Harbor River & Tributary Streams, Fortune Bay | 110 | III |
| Bay du Nord River | 111 | III |
| Simmons Brook & Tributary Streams | 112 | III |
| Southwest Brook & Tributary Streams, Cinq Island Bay | 113 | III |
| Old Bay Brook, Bay de l'Eau | 114 | III |
| Taylor's Bay Brook, Bay de l'Eau | 115 | III |
| Conne River & Tributary Streams, incl. Bernard's Brook & Twillick Brook, Bay d'Espoir | 116 | III |
| Long Reach Brook, East Bay | 117 | III |
| Allen's Cove Brook, Facheux Bay | 118 | III |
| Bottom Brook, Facheux Bay | 119 | III |
| Hare Bay Rivers, Southwest Coast | 120 | III |
| Grey River, including Salmon Brook | 121 | II |

Source: N&L Angler's Guide 2007

**Critical Elements**
- water quality maintenance;
- riparian buffer zones along water systems

**Guiding Principles**
**Salmonid Management (Atlantic salmon and brook trout)**
Management of Atlantic salmon and brook trout in the Province is delivered by the Federal Department of Fisheries and Oceans (DFO). DFO annually sets bag limits, season dates, and river closure dates based on extreme water temperature.
**Protection**
- DFO recommends that a 100 metre no-cut buffer zone be left in designated sensitive spawning areas.
- Under the Environmental Protection Guidelines protected public water supply areas (PPSWA's) also provide protection for these species through existing Environmental Protection Guidelines that apply to these areas (i.e. increased buffers, usually 150 meters on intake ponds, 75 meters on main river stems, 50 meters on major tributaries and minimum 20 meter buffer regulated in the rest of the district).
- Minimum 20 meter no cut buffer on all water bodies in FMD 7
- Minimum 30 meter no-grub zone on road approaches to brook and river crossings

**4.2.1.4 Song Birds**
**Characterization**
The distribution of songbird species in a forest ecosystem is widely considered to be a relative indicator of ecosystem health. Many songbird species are distinct to specific habitats (Whitaker et al., 1997), therefore the presence, absence, or health of a specific songbird population, can indicate the health of its corresponding habitat. Songbirds are also the natural predators of our native Lepidoptera pests (i.e. looper and budworm) and help to keep these populations in check. Consequently, their value cannot be underestimated. The relative abundance of songbirds in our forest ecosystems, at different times during the year, and the maintenance of a tracking record for songbirds can help to indicate the overall quantity and quality of habitat in the District.
**Critical Elements**
- forest cover for protection;
- water quality maintenance;
- riparian buffer zones along aquatic areas;
- variety of forest serial stages and species (nesting sites, habitat, etc.)

As with the moose, protection of these species will mainly involve protection of their habitat through the various methods indicated earlier.

#### 4.2.1.5 Other Avian Species

**Characterization**

Other valued avian species include ptarmigan, grouse, migratory birds and raptors. The former includes important game species, while the latter (i.e. raptors) occupy higher trophic levels in the food chain. Higher level trophic feeders are considered important indicators of ecosystem health as they are sensitive to environmental stress. Population trends for these species as defined by the Wildlife Division and Canadian Wildlife Service (CWS) are available on a regional basis.

**Critical Elements**

- forest cover for protection;
- water quality maintenance;
- riparian buffer zones along aquatic areas;
- snags and coarse woody debris ( prey habitat.)
- buffer zones on nesting sites

**Protection**

- Under the Guidelines for Ecologically-based Forest Management, no forestry operations are to occur within 800 metres of a raptor nest during the nesting period and not within 200 metres in the off nesting season. These guidelines are attached as terms and conditions to all commercial operator permits.
- The locations of all known bald eagle and osprey nests will be identified on all cutting maps, and harvesters will be informed of their locations by Department of Natural Resources staff. Regular operator checks and routine patrols of domestic cutting areas by DNR staff will ensure compliance of these guidelines.
- Sensitive waterfowl habitat can be protected through the increase of buffers to 50 meters on certain ponds on recommendation by the CWS, and the establishment of municipal wetland conservation areas in the planning zone by the Eastern Habitat Joint Venture through stewardship agreements with municipalities.

#### 4.2.1.6 Rare and Endangered Species

##### 4.2.1.6.1 Pine Marten

**Characterization**

Before 1900, marten ranged over most of the forested areas of the island but, unfortunately, today is listed as an endangered species by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Habitat loss, predation, disease and accidental trapping and snaring are thought to be the primary reasons for the marten population decline in Newfoundland.

Marten still naturally occurs in three main areas on the island including the Main River watershed, Little Grand Lake and Red Indian Lake areas. Additionally, marten also now exist at Terra Nova National Park (TNNP) and surrounding landscape as well as in the Bay du Nord Wilderness Area around Lake St. John through a relocation effort by the Newfoundland Pine Marten Recovery Team. Representatives from TNNP, DNR Forest Service, WD, the paper companies, academia and others sit as stakeholders on the recovery team. The purpose of this team is to set short-term and long-term population goals for the species and to recommend ways which this may be accomplished. The Team has identified tentative marten critical habitat and is now in the process of using computer modeling and the best available scientific knowledge to determine how marten habitat requirements and forest harvesting plans can be integrated.

Approximately 16 marten have been relocated to establish an eastern Newfoundland population at TNNP-Lake St. John. This initiative has been highly successful and the population estimate today is approximately 30 or more. A portion of the Bay du Nord Wilderness Reserve is located within District 7 with the Bay d'Espoir Highway only 55 kilometers from Lake St. John. One marten was accidentally captured at Twillick Brook several years ago. It is anticipated over time that marten will inhabit this District.

It is important that marten habitat is protected and that suitable habitat is left throughout the zone with provision made to have connectivity (i.e., unbroken corridors of suitable habitat) between such stands.

**Critical Elements**

- sufficient habitat to support a viable population of marten;
- areas of known marten populations remain closed to snaring and trapping

**Guiding Principles**

Should marten become established in the District, DNR will work with WD and the Newfoundland Marten Recovery Team to ensure that population is protected and nurtured. Harvest schedules will be evaluated, and revised where appropriate, to ensure habitat of the appropriate quantity, quality and arrangement is provided.

4.2.1.6.2 Red and White Pine

**Characterization**

Provincially, the range of white pine is shrinking due to past harvesting practices and infection from blister rust. Significant concentrations of white pine, however, still exist in this District especially in the Upper Salmon area. Red pine is the rarest tree species in the province, with a distribution of some 22+ small scattered stands (<15,000 trees in total). Some of the provincial locations that are most familiar to the public are located at Grant's Pit (Gambo Area) and Sandy Lake (west of Baie Verte Junction). The Grant's Pit stand is the largest (5000 trees approx.) known to exist in the province (Roberts, 1985). Since both of these species occur in Planning Zone 4, local protection is required to maintain local and provincial biodiversity.

**Critical Elements**

- maintenance or enhancement of stands on the land base
- minimizing loss of trees/stands through public education
- minimize losses to fire, insect and disease
- enhancement of younger age classes through planting, thinning of natural regeneration and pruning to ensure continuance of the species
- maintenance of native genetic stock

**Guiding Principles**

- enforcement of Forestry Act, regulations, guidelines and policies
- gene preservation gardens for these species and a clonal orchard for white pine have been developed by DNR at the Wooddale Provincial Tree Nursery. It is the goal to produce seed from these gardens/orchards to grow pine seedlings of native origin.
- some native red pine stands are protected under reserve status.
- DNR has adopted a policy of no cutting of pine by non traditional users and initiated a phase out of cutting by traditional commercial users. Currently, no commercial operators harvest pine in Planning Zone 4.
- protection of these species in planning zone will be strengthened by public education, no-cut conditions on permits (both domestic and commercial).

- implementation of silviculture treatments designed to merge pine back into the landscape.
- DNR is collecting seed from red pine stands of native origin, and the collection of white pine scions for the clonal orchard at Woodale
- DNR also implements stand level silviculture prescriptions such as pruning of immature white pine to reduce the infection rate of blister rust, and cone production enhancement on red pine to ensure an adequate supply of native red pine seed.

4.2.1.6.3 Red Crossbill

The red crossbill is currently listed as endangered. The Department of Natural Resources, Forestry Branch, currently has a representative that sits on the recovery team for this species. Any recommendations on modified forestry activities for this species will be developed with input from all members and followed by the Forest Service.

4.2.1.6.4 Erioderma

**Characterization**

*Erioderma pedicellatum* (Boreal Felt Lichen) is an epiphytic lichen growing on trunks and branches of trees in moist, mature forests. Its preferred host is balsam fir. The leafy thallus is gray on the upper surface and white underneath. The edges of the thallus curl upward, giving the lichen a unique, white-fringed appearance when viewed from a distance.

Boreal felt lichen grows in sub-oceanic forest regions of Newfoundland. It is absent from the eastern parts of the Great Northern Peninsula and from the northern central parts of the island. The known population is concentrated in two areas, the central Avalon and Bay d'Espoir. Over 5000 thalli have been counted since 1994. Habitat loss from wood harvesting is considered the greatest threat to boreal felt lichen in Newfoundland. Other threats include air pollution, particularly acid rain/fog, forest pesticides, forest fires, climate change, land and industrial development, and impacts of moose on forest ecosystems. The life cycle of this lichen is complex and poorly understood.

This species is the only boreal member of an otherwise strictly tropical group of lichens of very ancient origin. It once had a global Amphi-Atlantic distribution with populations occurring in Scandinavia, and in New Brunswick, Nova Scotia, and Newfoundland. The species is now seemingly extirpated from Scandinavia and in the last few decades it has experienced drastic declines in the Maritimes. The health of the Newfoundland population is pivotal to the global survival of this species. In addition, boreal felt lichen can be an excellent indicator to monitor changes in air quality; it is one of our lichen species with the highest degree of sensitivity to air pollution (Wildlife Division, Department of Environment and Conservation).

The Province of Newfoundland and Labrador listed the Boreal Felt Lichen as Vulnerable under the Endangered Species Act in 2002 and as a result mandated the development of a management plan for the species. This management plan can be found on the Department of Environment and Conservation website. The report is entitled "A 5 Year (2006-2011) Management Plan For the Boreal Felt Lichen (Erioderma pedicellatum) In Newfoundland and Labrador."

Before the above report the Department of Forest Resources and Agrifoods in 1998 contracted a consultant to accumulate information on the Boreal Felt Lichen. Dr. Alexander Robertson produced a report entitled "The Boreal Felt Lichen (Erioderma pedicellatum (Hue) P.M.Jorg.) in Newfoundland" which has been a reference source for the Department since that time.

At present, formal protected areas, including Wilderness Reserves, Provincial Parks and Salmonier Nature Park, contain over half of the known Boreal Felt Lichen thalli. Additional thalli are located within two candidate ecological reserves on the Avalon Peninsula. The majority of the protected thalli are found in the Bay d'Espoir area in Jipujijkuei Kuespem (Little River) Park (3000 thalli) and 294 thalli within the Avalon and Bay du Nord Wilderness Reserves.

Other locations in District 7 where thalli have been recorded include Hermitage Bay, Salt Pit-Twin Brooks area, Harbour Breton Road, and a new location found in March 2006 at Bay d'Espoir Brook.

**Critical Elements**

Forest management activities such as road construction, use and maintenance, timber harvesting and silviculture may reduce the abundance and/or habitat of the Boreal Felt Lichen in the District. These factors alone or in combination with natural factors such as stand senescence, forest blow down, insect outbreaks and perhaps slug/mite herbivory, or factors of anthropogenic origin such as development, moose herbivory, fire, air pollution, pesticides, and climate change may threaten the populations of this species.

**Guiding Principles**

Habitat suitability models have not been developed for critical habitat and therefore a landscape approach discussed in the five year management plan for the Boreal Felt lichen is a logical approach. The Best Management Practices based on Robertson's (1998) recommendations have been employed by Department of Natural Resources as a stop gap measure and are superseded by the above mentioned landscape approach. They were put in place to provide guidance in the absence of detailed researched management strategies and are used on a site-by-site basis.

-Limit patch cutting to $\leq$ 5 ha on the Avalon Peninsula, which may be applicable to other areas of the province with Boreal Felt Lichen.

-Salvage operations in large wind throw areas (generally more than 5 ha) in the vicinity of Boreal Felt Lichen, especially in areas where the prevailing wind blows away from the phorophytes, should be carried out no closer than 10m stands which may become potential habitats for Boreal Felt Lichen 50-60 years hence.

-Routes for new extraction routes and roads should naturally avoid Boreal Felt Lichen sites.

-Leave a buffer zone of at least 20 m around Boreal Felt Lichen sites and restrict harvesting to trees greater than 12 cm diameter at breast height.

### 4.2.1.7 Water Resources

**Characterization**

The protection of water resources has emerged as a major issue in recent years both nationally and provincially. Events such as the *E. coli* 0157 outbreak in Walkerton, Ontario, our own Trihalomethane (THM) controversy, and numerous incidents of Giardia cysts in community water supplies have heightened public awareness on water issues. While much of the current focus is directed toward drinking water, it is also recognized that an equal importance must be attached to waters which have other beneficial uses. Human impacts both locally and globally have the potential to impair water for future uses.

In District 7, there are approximately 150,000 hectares of lakes, ponds, rivers, brooks and streams. This amounts to 11% of the total area of the District. In the zone, water is used

beneficially for numerous purposes. There are 13 communities within the zone which derive their potable water from Public Protected Water Supply Areas (PPWSA's).

Table 13 List of Protected Water Supplies in District 7

| | COMMUNITY | WATER SUPPLY AREA |
|---|---|---|
| 1 | Milltown – Head of Bay d'Espoir | Jersey Pond |
| 2 | Morrisville | Morrisville Pond |
| 3 | Conne River | Southwest Brook |
| 4 | Gaultois | Cluett's Pond + Piccaire Pond & Bottom Pond |
| 5 | Hermitage – Sandyville | Granfer's Pond |
| 6 | Seal Cove | Big Black Duck Pond |
| 7 | Harbour Breton | Connaigre Pond-Hutchings Pond |
| 8 | Belleoram | Rabbit's Pond |
| 9 | St. Jacques | St. Jacques Pond |
| 10 | St. Alban's | Well Field Protection Area (Groundwater) |
| 11 | McCallum | Wellhead Protected |
| 12 | Grey River | Big Charlie's Pond |
| 13 | Francois | Our Pond |

The Department of Environment and Conservation monitors the water quality of these protected areas. Recreational waters within this zone are used for activities such as fishing, boating and as a water supply source for numerous cabin owners. Industrially, waters within the zone are primarily used for hydroelectric production. Water bodies such as Victoria Lake, Granite Lake and Round Pond are examples.

Human activity on the land has the potential to alter water quality and water quantity. Commercial forest harvesting is the predominant industrial activity and occurs throughout the zone. There is a limited road system associated with this harvesting as well as a network of traditional access routes. Mining operations within the zone are limited to mostly small quarrying operations for gravels and dimension stone and are typically associated with road

construction. New mining potential exists in the District for expansion of that industry.

**Critical Elements**

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

**Guiding Principles**

There are numerous protective measures listed in the Environmental Protection Guidelines under the broad categories of road construction, stream crossings, road abandonment, fuel oil handling and storage, support services and structures, harvesting, silviculture, and protected water supply areas. The Environmental Protection Guidelines are listed in their entirety in Appendix 12 with specific guidelines under the above sections found there.

Other guiding principles include the Water Resources Act SNL 2002 c W-4.01 and the Environmental Protection Act SNL 2002 cE-14.2.

### 4.2.2 Human Values

#### 4.2.2.1 Timber Resource

**Characterization**

One of the major resource values of the forest ecosystem is the harvesting of timber to provide forest products. Historically timber has been harvested since the first inhabitants settled in the District. Initial uses were mainly domestic in nature to supply timber to build houses, fishing sheds and equipment and for heating and cooking. With the increase in population, more commercial uses have arisen to supply lumber and pulp and paper products. The District supports a combined annual allowable cut (AAC) of 24,500 $m^3$ of softwood and 3960 $m^3$ of hardwood.

Domestic harvesting still provides fuelwood to heat many homes and sawlog material for residential house construction in the District. In fact, the latter domestic use is one of the reasons why this Province has the highest rate of home ownership in the country. There are approximately 700permits issued in FMD 7 on a yearly basis.

Commercial harvesting activity accounts for approximately 42 percent of all harvest in the zone. There are on average 7100 $m^3$ of timber harvested commercially for sawlogs and 4800 $m^3$ for pulpwood in Planning Zone 4 each year. Commercial activities provide many jobs in harvesting, sawmilling, trucking, pulp and paper manufacturing and related spin off industries for local residents. There are approximately fifty direct jobs created by the industry in the District, with an estimate of nearly twice that many in spin off industries.

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

is approximately $200,000 spent on Crown conducted silviculture in the District each year, supporting approximately 25 seasonal jobs.

Timely access to timber is critical to planning any forestry operations. Primary, secondary and tertiary roads form an integral part of operating areas and are used after timber extraction is completed for recreational purposes. In excess of $50,000 is spent by the Crown to construct and maintain forest access roads each year in the District.

Protection of the forest from various disturbances is also a major characteristic of resource management. Because of the fire history in the District, protection through well maintained and/or upgraded initial attack equipment (i.e. water bombers, pumps, hose and trucks) and well trained fire management staff is required. A large fire today in the older softwood stands would be devastating to the industry. While insect kill has not been a major disturbance in recent years, protection is still critical since there is a significant area of balsam fir thinning in the District that is paramount to future AAC's. Protection of other resource values through modification of activities and enforcement is also important.

Spruce and Fir

Black and white spruce and balsam fir are the main sawlog and pulpwood species in the province. In the District, black spruce accounts for more than 60 % of the softwood harvest for these products. Black spruce fiber is valued for its strength properties in lumber and pulp and paper products. Recently, Newfoundland black spruce received the highest strength rating in North America for use in the production of wooden I- beams. Additionally, spruce and fir-dominated stands comprise more than 90% of the available forested habitat in the district. These species will be managed for maximum sustainable harvest levels though the harvesting and silviculture strategies referred to later in Section 6. Protection and long term sustainability of these species will be achieved through strict adherence to AAC's and refinements to current AAC's as the land base changes.

White Birch and Yellow Birch

Traditionally, white birch and yellow birch have been valued species for domestic fuelwood, today, they are emerging as important species in the sawmilling and value added manufacturing industries of the province. White birch has also recently been researched for its ability to produce sap, and the subsequent global marketability of this product. Additionally, white and yellow birch benefit the cycling of nutrients, the structure of forest soils, and can help in the reduction of insect infestations and in the decrease in spread rates of forest fires (Perry, 1994).

White birch-dominated stands comprise less than 1% of the forested land base in the planning zone. Recently, there has been a departmental policy shift to manage this species on a sustainable basis as with spruce and fir. In 2002, the first AAC's were developed for white birch and have been refined in 2005(Section 3). Paramount in sustainability of a species is its ability to regenerate. To ensure sustainability of white birch and yellow birch, silvicultural prescriptions designed to favour regeneration are being investigated (Section 7). This will ensure a birch component is maintained on the landscape, increase the diversity of both flora and fauna and maintain natural processes within managed stands.

**Critical Elements**

The overall objective is to ensure the AAC is maintained while taking into account other resource values and conducting environmentally sound operations. This is achieved by

- maintenance or enhancement of productive land base
- planting of non-regenerating areas
- maintenance of the white birch component in the land base
- minimizing loss of land base to other users
- minimize losses to fire, insect and disease
- timely access road construction
- enhancement of younger age classes through thinning to correct age class imbalance

**Guiding Principles**

- enforcement of Forestry Act, regulations, guidelines and policies
- maintenance of AAC's; adherence to harvest schedules
- minimize loss of productive land base through spatial and temporal compromises and continuous dialogue with other resource users
- education (staff, public, operators)
- aggressively conduct silviculture, access road, and protection activities
- implement best management practices. The Environmental Protection Guidelines for Ecologically Based Forest Resource Management outline courses of action and mitigative measures for forest activities. These EPG's are outlined in their entirety in Appendix 12 with some highlighted subject areas listed below:
- silviculture and harvesting activities
- mineral soil exposure
- buffer requirements
- road and bridge construction
- garbage disposal
- fuel storage

#### 4.2.2.2 Agriculture

**Characterization**

The majority of agriculture activity in the Bay d'Espoir area is that of home gardening and small subsistence livestock operations. Limited commercial development is concentrated in and around communities.

The major areas of arable soils and farm properties were designated as an Agriculture Development Area ADA in the 1970's; however, the area has not been legislated. This area is delineated on the Provincial Land Use Atlas and is used for planning purposes and is located along Route 361 as you enter the Milltown/Head of Bay d'Espoir area.

Within the (ADA) the majority of soils that are suitable for agriculture are also suitable for forestry work. Over the years, there has been considerable cooperation between the Forestry Branch and the Agrifoods Branch of the Department of Natural Resources in resolving issues associated with this particular area. It is recognized that agriculture development is the initial consideration in the ADA and that continued cooperation is required to ensure a viable agriculture presence.

The proposed commercial operations in this plan do not impact existing agricultural developments. In order to maintain this value within District 7, District staff will support the

expansion of existing farms in areas where soil resources are favorable. Also the blueberry industry and the Christmas tree industry are expanding throughout the province. The District will support these initiatives on suitable soils, in areas not currently silviculturally treated or completed during this period.

**Critical Elements**

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

**Guiding Principles**

Lands designated for forest management can include areas with high potential for agriculture. Consequently, the Forest Services will work with the Agrifoods Branch to determine if opportunities exist for an exchange between agriculturally viable forest areas with unsuitable agriculture land within the Agriculture Development Area.

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

### 4.2.2.3 Mineral and Energy

**Characterization**

Located throughout the District, there are sites of geological significance which are important to the tourism and recreation industry. These sites illustrate geological features, such as rock types and rock formations that indicate the processes and geologic ancestry of the parent material from which the soils of the District's ecoregions were derived. These Geostops can therefore be considered as important educational sites, and as well as points of interest for tourists. The Newfoundland and Labrador "Traveler's Guide to the Geology and Guidebook to Stops of Interest" lists three significant areas in District 7. These are located at Trout Hole Falls (Route 361), Hermitage Bay area (Route 362) and Simmons Brooks (Route 362). Any significant sites will be evaluated if operations are planned in close proximity to any strategic location.

As with agriculture, both mineral and energy developments have the potential to reduce the productive forest land base. The locations of the existing aggregate quarries in the District are known to staff. Should new developments occur during this planning period District staff will ensure that any merchantable timber associated with these developments is allocated to the existing commercial operators of the District. Furthermore, District staff will monitor ongoing mineral development activity within the district through the Dept. of Mines & Energy website. This will provide an adaptive base for the planning of future forest ecosystem management activities within the district.

Energy development and in particular hydroelectric development is an important issue in District 7. There are major hydroelectric generating stations at Bay d'Espoir (616MW), the Upper

Salmon (84MW), and Granite Lake (42MW) which is now completed. Although in the majority of cases the flooding of areas for hydroelectric development reduces the land base available for forestry purposes, the district is very fortunate in being able to access timber stands that are considerable distance from communities via main roads constructed by Hydro to generating sites and transmission lines.

Energy development derived through the utilization of waste wood bi-products (i.e. Bark and sawdust from sawmill production) could be beneficial to sustainable ecosystem management. These sawmill waste bi-product piled in large quantities can be a fire hazard, and as well detract from the aesthetics of the surrounding landscape from the tourism point of view. Should technologies be developed that utilize these waste products, it could virtually eliminate residue piles that exist throughout the district. The District staff will therefore support the development of energy or other products from waste wood bi-products during this planning period.

**Critical Elements**

Location of deposits close to markets is vital in controlling aggregate costs which often increase dramatically with increased transportation distances.

Hydro development important to the energy requires of the province.

**Guiding Principles**

Harvesting timber for prospecting lines must meet the same rigor as commercial harvesting. The mining industry should enact best management practices to ensure little to no impact on ecosystem values. Hydro development in many cases provides access to timber stands in this District.

#### 4.2.2.4 Historic Resources

**Characterization**

The Provincial Archeology Office (PAO) is the agency responsible for the management and protection of archaeological sites and artifacts in Newfoundland and Labrador. This program is carried out under the Historic Resources Act which ensures that developments with potential to have adverse impacts on historic resources are investigated and monitored by a qualified archaeologist through archaeological impact assessments.

Archaeology is very important for our tourist industry. Archaeological excavations and interpretive sites draw thousands of visitors each year to this province. The preservation and interpretation of archaeological sites will continue to benefit the tourism industry in this province for years to come. Thousands of tourists from all over the world visit our archaeological sites each year and the numbers continue to increase (e.g. Boyd's Cove and Burnside typically see approximately 8,000 visitors per year combined).

Each year archaeology projects provide many seasonal jobs. Boyd's Cove and Burnside, for example, employ approximately 15 people each year. Many of these people are successful in obtaining employment in archaeology and conservation for longer periods of time. By calling for archaeological impact assessments on projects which have potential to negatively impact historic resources the PAO is providing jobs for consulting archaeologists in the province. New businesses are created as a result of archaeological projects. These businesses include bed and breakfasts, boat tours, restaurants and gift shops.

Archaeological sites are nonrenewable resources and play a vital role in understanding our heritage. It is important to professionally record as much information as possible at an archaeological site in order that one may fully understand its history. In order to do this properly the site must not be disturbed. Very often, archaeological sites are small and are spatially bounded units. Protecting these resources usually does not have an adverse impact on forestry activities.

Archaeological surveys have been carried out in several areas within the zone over the past 20 years. There are a number of known archaeological sites within Planning Zone 4 which are protected under the Historic Resources Act. Many areas still remain to be surveyed so there is potential for other historic resources to be found in the zone.

Sites of archaeological significance, such as those located at Furby's Cove, Little Passage, Piccaire, Green Point and Grandy Rocks, also add to the maintenance of our heritage. These sites hold the key to our understanding of the native peoples, indigenous to this part of the Island in the past.

During this planning period, District staff will ensure existing buffers designed to protect heritage sites are adhered to, report any evidence of sites of archaeological significance as they are discovered, and will account for such sites in the planning of management activities to further conserve our heritage. Additionally, District staff will liaison with the Culture and Heritage Division of the Department of Tourism, Culture and Recreation to determine if adequate protection exists for these and any other sites contained within the District. A review of the domestic cutting policy was completed for the last five year plan and staff determined that very limited forest stands exist in the above noted locations. A 30 meter buffer was recommended, however the sites were not to be placed on maps but for staff to carry out patrols in these areas to ensure the protection of the sites. The District in conjunction with Culture and Heritage Division staff will determine if changes are required to existing domestic cutting boundaries to protect archaeological sites.

**Critical Elements**

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

**Guiding Principles**

Any project involving land-use has the potential to adversely impact historic resources. Therefore it is important that the Provincial Archaeology Office be involved at the planning stage in order to ensure that mitigation measures to protect historic resources are developed at the earliest possible time.

In order that known archaeological sites and potential unknown sites are protected from forestry activities, buffer zones will be necessary in some areas whereas archaeological assessments may be required in others. Known archaeological sites are avoided and no-cut buffers imposed. This also requires that the site and applicable buffers be removed from the operational forestry landbase. Archeological buffers are typically required along rivers and ponds, as well as along the coastline where there is potential for archaeological resources to be found.

Occasionally there are accidental discoveries made of historic resources. In the event that this does happen, activities will cease in this area and contact be made immediately with Provincial Archaeologists.

#### 4.2.2.5 Recreational Trails

**Characterization**

There are recreational trails that protect heritage and provide for expanded recreational opportunities within District 7. These trails are tradition walking links between the communities and now lead to vantage points to scenic ocean vistas, and in season, whale and bird watching and at one time provided vital links between smaller outport communities and larger centers for the movement of provisions and trade, medical attention, hunting etc., when sea routes were not useable. Today, they provide recreational opportunities for hiking, skiing, viewing of exceptional landscapes, and nature walks, as well as preserving out heritage of isolated fishing and logging communities.

Some of the more important hiking trails that provide excellent opportunities to view nature and wildlife species include those at Harbour Breton, Hermitage, Belleoram, Gaultois, Milltown and English Harbour West. Several winter-season recreational trails add to the variety of outdoor activities available in the district that make it an important year round tourism environment.

As with parks and natural areas, the greatest impact to scenic recreational trails from forestry operations is the visual impact to their surrounding aesthetics. District 7 staff has cooperated with community groups in the development and protection of some of these trails. "No-Cut" buffers of varying widths and specific "No Cut" areas (e.g. scenic hillside viewscapes) will be reviewed with appropriate organizations and added to commercial and domestic permits if necessary.

District staff will also liaise with the municipalities, community groups and development associations concerned with the development of other trails, to determine if adequate protection from forestry impacts is currently in place. As indicators of the maintenance of these values, District staff in conjunction with the associated municipalities, local service districts, development associations and Parks Division, will undertake to maintain a record of the number of kilometers of available recreational trails contained within the District.

**Critical Elements**

- protection of the historical landscape integrity of trail corridors
- preservation of the scenic quality along trail corridors
- control of land usage adjacent to trails

**Guiding Principles**

- coordinate and build partnerships with other stakeholders and user groups such as communities, industry and recreational organizations for the long term maintenance and development of the trails
- in an attempt to preserve the natural value of the trails maintain buffers along the right of way and consider viewscapes in harvesting and development plans. Buffers of varying widths have also been applied to trails in the planning zone by DNR.

### 4.2.2.6 Parks and Protected Areas

**Characterization**

The mission statement of the natural areas program is to protect in an unimpaired condition, large wilderness tracts of provincial ecoregions including their natural processes and features and rare natural phenomena, so as to preserve the diversity and distinctiveness of the Province's ecologically sustainable future for the benefits of present and future generations. Natural areas are store houses of natural diversity that exists in a wild, pristine state. They serve as ecological bench marks indicating the natural succession of forest ecosystems. They also preserve in perpetuity, provincially significant representative and special natural features and outstanding recreational environments.

There are many types of protected areas in the province. The Wilderness and Ecological Reserves Act enables the Province to establish the following; wilderness reserves (Component 1), ecological reserves (Component 2) and protected sites (Component 3). Component 1 reserves are defined using the critical habitat of high level, wide ranging species (e.g. caribou). They generally cross ecoregion boundaries, protect complete systems and are large (> 1000 km²). Component 2 reserves protect representative samples of ecoregions (not included in Component 1 reserves) and are mid-sized (50-1000 km²). Component 3 reserves protect exceptional natural features, such as, rare species or areas of unusual biological richness and are generally small (< 50 km²).

The benefits of protected areas are to preserve biodiversity, provide areas for scientific research, provide opportunities for environmental education and provide standards against which the effects of development can be measured.

**Parks, Natural Areas and Trails**

Special places include habitats that are essential to the well being of significant populations of one or more species. Additionally, they include areas that protect intrinsic values such as heritage and pristine environments. There are a number of special places within District 7 which add to their uniqueness and importance to the ecoregions concerned.

**Parks and Natural Areas**

Currently, there are no provincial parks within the District however a portion of a former provincial park exists as a nature park while several communities have small municipal parks. Other natural areas existing in the district range from the very large Bay du Nord Wilderness Area to the small viewing sites scattered throughout the District.

Jipujijkuei Kuespen (Little River) Provincial Park Reserve

Jipujijkuei Kuespen (Little River) Park Reserve is a portion of the former Provincial Park. The camp ground portion was leased to private operators, in this case the Conne River Band Council. The park reserve is the remaining land mass which consists of approximately 58 hectares. Park reserves protect areas with significant natural features and landscapes as part of a provincial initiative to protect representative portions of all the different ecoregions within the province. It is located on Route 360, 149 kilometers south of Grand Falls-Windsor. This park reserve is part of the traditional hunting grounds of the Mi'kmaq people. The community of Conne River is located 12 kilometers from the park. This reserve was created to protect examples of forested ecosystems, namely the Bay d'Espoir subregion of the Western Newfoundland Ecoregion (1F) and the Twillick Brook subregion of the Central Newfoundland Ecoregion (11D). The forests of the general area are important sites with regard to the endangered Erioderma spp. (Boreal Felt Lichen).

Bay du Nord Wilderness Reserve

The Bay du Nord Wilderness Reserve was established in 1990 to protect one of the last unspoiled wilderness areas on the Island portion of the province. The long term preservation of this vast inland expanse is guaranteed under the Wilderness and Ecological Reserves Act. It is 2895 km2 (289,500 ha.) of rugged country typical of southern Newfoundland with wild rivers, erratic boulders, boreal forests, bogs and fens. District 7 encompasses 129,648 hectares of this reserve which accounts for 44.8% of the total reserve.

Wilderness Reserves are extensive natural areas with minimal human disturbance set aside permanently to ensure protection of these natural values and features. These reserves protect native species of plants and animals, serve as study areas for researchers, educators and guarantee a natural wilderness environment for ourselves and future generations.

The Bay du Nord Wilderness Reserve was created with the goal of preserving the plants, waterways, animals and landscapes of this large, pristine natural area so that Newfoundland and Labrador could continue to enjoy high quality wilderness recreation, including hunting and fishing. The Reserve is of special significance because it protects representative areas of three provincial ecoregions; the Maritime Barrens, the Western Newfoundland and the Central Newfoundland Forest. It is home to the Island's largest population of caribou with an estimated population of 15,000 and one of the province's richest areas of Canada Goose habitat. The diversity of other wildlife adds to the Reserve's importance in protecting values of the District.

The heart of the Reserve is the rugged Bay du Nord River. This dramatic 90 kilometer waterway with its many lakes, steadies and rapids is considered to be the Island's finest remaining wilderness river. It was nominated as a Canadian Heritage River in July, 1992 – a prestigious national distinction that highlights this river's wilderness and recreational values and officially designated in 2006.

Middle Ridge Wildlife Reserve

The Middle Ridge Wildlife Reserve was established under the Wild Life Act and protects wild life habitat for various species. The reserve covers a total area of 60,800 hectares of which 43,891 hectares or 72.2% is located in District 7.

**Ecological Reserves**

Ecological Reserves provide a sanctuary for unique, rare or endangered plants, animals or natural history artifacts such as fossils. At the present time, there are no ecological reserves defined for District 7. A Protected Areas System Plan is being developed by the Wilderness and Ecological Reserves Council and Parks Division. The completion of this report may increase the protected area in the District. One area under investigation is located at Devil's Bay (east of Francois). This area will represent the Maritime Barrens/South Coast Barrens Subregion. It will protect the barren cliffs and forest valleys of the south coast. The highest parts of this area contain arctic alpine vegetation, while the sheltered valleys protect southerly species like yellow birch.

These areas are important in preserving various types of natural ecosystems. Cooperation and discussion with groups and organizations are important to continue the process of establishing reserves. For example, the District has cooperated with the Canadian Heritage River Project to protect the lower section of the Bay du Nord River System. Harvesting blocks have been amended to remove a section near the outflow of the river into the ocean. Staff will complete patrols of this area for compliance with this condition and to check on illegal activity. Also the

proposed reserve at Devil's Bay has been excluded from Domestic Harvesting Area 30.

The greatest impact to both parks and natural areas from forestry operations is the visual impact to their surrounding aesthetics. Additionally, pristine natural areas can be degraded with long term access road development. No Crown commercial operations are planned during this five year period in the vicinity of the Bay du Nord Wilderness Reserve, the Middle Ridge Wildlife Reserve, or Little River Nature Park. For municipal parks, District staff will liaison with the municipalities and agencies concerned to determine if adequate protection from forestry impacts are currently in place.

**Critical Elements**

- preservation of biodiversity
- maintenance of protected area integrity
- maintain natural processes and features

**Guiding Principles**

- the Province of Newfoundland's Natural Areas Systems Plan recommends that a minimum of 12% of the province's entire land base be protected.
- only allow traditional (hiking, berry picking, hunting etc.) activities, educational activities and scientific research within protected areas provided that they do not compromise the integrity of the reserve
- prohibit all forms of new development such as mining activity, hydroelectric projects, forestry activity, agriculture activity, roads and trails and cabins and new structures.
- where forestry operations are within one kilometer of provisional and ecological reserves, wilderness reserves or provincial parks, modified operations may be necessary

### 4.2.2.7 Outfitting

**Characterization**

An economic impact study conducted in 1995 by the Department of Industry, Trade and Technology suggests that a big game license has a net economic impact of $6,864. By approximating this value at $7,000 for 2006, it is possible to estimate the economic contributions of this industry to District 7: approximately 300 licenses @ $7000 / license = $2.1 million. An additional $135,000 is estimated to be brought in from fishing. Given that 85 percent of the hunting market comes from the United States of America, it follows that the above monetary figures are reflections of money entering the Province from elsewhere. It should be recognized that the outfitting industry provides this revenue to the Province each season and has the potential to do so indefinitely.

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

**Critical Elements**

Remote outfitting camps are dependent on their remoteness. Forest access roads inevitably impact the ability of a camp to maintain its remote status. Increasing accessibility through

increased access roads can also lead to increased hunting and fishing pressures in a given area. This can in turn lead to decreased success rates of tourists. This is of particular concern since Newfoundland is often the hunting destination of choice due to success rates upwards of 80 percent. An increase in access roads also tends to lead to increased cottage development that in turn can have an impact on both remoteness and game availability.

Removal of large areas of forest has the immediate effect of reducing big game habitat, particularly winter cover, although this impact has been poorly studied (particularly in remote areas). Forest harvesting also has the ability to impact negatively upon travel corridors, bear denning areas, and caribou feeding and calving areas.

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

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

**Guiding Principles**

It is necessary that “no harvest” buffer zones be left around outfitting camps that are agreed to by all parties involved. Buffer zones can be difficult to negotiate due to varying ranges of activity from operator to operator. Some operators make use of areas that are 8 to 10 kilometers away from their camps.

-consideration should be given to decommissioning roads and bridges (where possible) after harvesting is completed. This will eliminate damage to the hunting area by reducing the possibilities of increased hunting pressure. When roads are actively in use for harvesting purposes, access to hunters should be restricted or limited.

-cottage development should be prohibited in areas adjacent to outfitting operations. This requires more vigorous enforcement of buffer zones and development of buffers for spike camps.

-harvest in the winter whenever possible. Winter roads are less passable in summer and fall and will help to reduce traffic. These roads will also be cheaper and easier to decommission.

- construct new roads as far away from existing outfitting camps as possible. The benefits of this are obvious. Harvesting should be restricted around hunting and fishing camps during their season of operation. At these times, harvesting should occur as far away as possible from outfitters.

-forest operations should be carried out in compliance with existing regulations

-efforts should be made to ensure that the integrity of the view from outfitter cabins is maintained when conducting forest operations.

-forest operations should ensure that whatever is brought into an area is removed from the area once harvesting is complete.

#### 4.2.2.8 Recreation

**Characterization**

The Bay d'Espoir area has outstanding scenery, interesting topography, and opportunities for viewing wildlife and flora in a natural setting. These elements represent a small list of reasons why the zone is used extensively for recreational purposes. Hunting, sports fishing, hiking, skiing, kayak/canoeing and ATV/snowmobiling provide major recreational activities in the area. There are also a number of safe anchorages for boats touring in the Bay d'Espoir area. Non-timber recreational values are expected to play an increasing role in forest management practices.

**Critical Elements**

Wilderness

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

**A**ccessibility

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

Viewscapes

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

**Guiding Principles**

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

Wilderness

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

Limiting Accessibility

Decommissioning of forest access roads could be a possible option when harvesting operations are completed. Harvesting should be conducted using winter forest access roads where possible. Winter roads create less traffic and require less effort to decommission. If possible, the Crown Lands Division of the provincial government should implement a complete moratorium on cabin development on newly developed forest access. Cabin development will increase traffic in areas where many recreational activities occur. This in turn will negatively impact those recreational activities that require remoteness, and a pristine environment.

**V**iewscapes

In areas where forest operations must occur to sustain industry in association with high concentrations of recreational activities, aesthetic views should be maintained using landscape design techniques where possible when conducting forest operations. This is especially relevant in areas where the recreational activities are occurring because of the aesthetic view.

#### 4.2.2.9 Tourism

**Characterization**

The tourism industry in Newfoundland and Labrador is based on our natural and cultural resources. Protection of these resources is critical for our industry to survive and grow**.** We currently have the resources to compete internationally with other tourist destinations. However, competition for the international traveler is high in the tourism marketplace. The tourism industry in Newfoundland and Labrador has experienced significant growth since 1997. Tourism has been contributing between $580 million and $700 million annually to the provincial economy. There are many excellent tourist destinations in the zone such as the Bay du Nord Wilderness Area and the Bay du Nord Heritage River, the coastal communities and the Conne River Reserve.

**Critical Elements**

- viewscape
- accessibility
- wilderness ambiance
- remoteness

**Guiding Principles**

Work with Tourism Division, local tourism operators and local town councils in the District to implement strategies to minimize the visual impact of harvesting operations on the aesthetic values associated with viewscapes. Strategies can then be discussed, negotiated, and implemented to provide a balance between harvesting and the values associated with tourism.

## SECTION 5 PUBLIC CONSULTATION PROCESS

### 5.1 Planning Objectives

Resource managers in Canada in the 21st century are striving for a society that successfully integrates economic, environmental and social considerations into all resource related decision making. Since the early 1990's, there has been a country-wide shift from single resource management to a more comprehensive approach of forest management. In attempting to provide the greatest good for the greatest number of people for the greatest period of time, sustainable forest management (SFM) must be balanced in light of social, economic, and environmental issues. In the context of SFM this shift has resulted in a move from the traditional, narrow focus of timber management to incorporate non-timber values into the management planning framework. Another term that has become closely associated with SFM is "sustainable development." Sustainable development, or in this case "sustainable forests", not only takes into account the social, cultural, economic, and environmental benefits of the present, but those of future generations also. Public engagement is recognized by the Department of Natural Resources as a key component to achieving sustainable development and the Department is appreciative of the enduring level of interest and support demonstrated by stakeholders.

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

In the 1995 Environmental Preview Report the Newfoundland Forest Service adopted an adaptive management planning process. This process has three objectives.

1. Establish a productive planning framework to include all stakeholders. An effective planning framework must have information and issues defined at the beginning of the process.

2. Learn more about forest ecosystems while they are being actively managed (i.e., adaptive management). Adaptive management incorporates strategies which help us to learn about the forest ecosystem and to deal with uncertainties.

3. Establish an ecosystem approach to forest management which integrates the scientific knowledge of ecological relations and limits of growth with social values. This will help to attain the goal of sustaining natural ecosystem integrity and health over the long term.

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

**5.2 Planning Framework**

During previous planning processes there were planning teams established for each District. A strategy document was prepared for the entire District and separate five year operating plans were prepared for each major tenure holder within the District. With the recent legislative change to planning on a zonal basis, the decision was made to combine individual District planning teams into a single zonal team which would meet in one central location. This process did not affect the planning team process in District 7 because it is a stand alone District and is considered Planning Zone 4.

**5.3 Planning Team Participation**

An initial newspaper release was made by the Minister of Natural Resources, Kathy Dunderdale, on February 27, 2007 announcing a public meeting to form a district planning team to develop a new Five-Year Operating Plan for Forest Management District 7 for the period January 1, 2008 to December 31, 2012. It was emphasized in the initial ad and a subsequent one on March 20, 2007 the importance of the District planning team in providing input into forest management in the District. Through participation in the planning team, individuals and stakeholders could take part in an open, consensus-based forum to address a wide range of forest management issues. The Minister encouraged participation in the forest management planning process from the public, community leaders, environmental organizations, commercial wood harvesters, outfitters, other government departments or agencies and non-government organizations. Also the Deputy Minister of the Forestry Branch distributed a letter to his counterparts in government advising them of the process that had been initiated.

These releases were followed by emails sent to potential interest groups and individuals (from a list developed from previous planning exercises) that were circulated to inform potential participants of an initial meeting in Bay d'Espoir on March 27, 2007. A listing of all individuals and the interest groups they represented that actually participated during the consultation process is presented in Appendix 1. The initial meeting was designed to inform attendees of the change in the planning framework as a result of the new legislation, the ground rules for participation, and to invite stakeholders to form the new planning team. After discussions with the Department, Conrad Collier with the Coast of Bays Corporation agreed to facilitate the meetings. The Department of Natural Resources was responsible for gathering and maintaining minutes and providing the dissemination of resource material to the various stakeholders. Planning team membership was not restricted to those listed in Appendix 1; rather it remained open to anyone

who wanted to join the process at any time.

As outlined previously in the Timber Supply Analysis section, harvest scheduling was used to identify, on maps, where harvesting should take place for the next 25 years. They were used in subsequent meetings to give particular emphasis to harvest areas for the next 10 years. Each of the five meetings focused on a particular value or values, thus the maps were available to identify any particular area of conflict when the values were discussed. Through this approach, areas where conflicts exist were identified and any remedial action or process to mitigate the conflict could be developed for inclusion in the plan.

Changes to harvest areas or processes adopted to resolve conflicts, wherever possible, were adopted throughout the planning process and reflected in the final operating areas presented in this plan.

**5.4 The Consultative Process: Issues and Consensus**

Significant discussions revolved around; the harvest strategy for District 7, protection of fresh water resources, big game, endangered species habitat protection, protection and enhancement of valuable tourism assets, protected areas under the Natural Areas Systems Plan, agriculture development opportunities, alternative value added products (birch sap, manufactured wood products), riparian buffers, decommissioning of roads and cottage development.

The harvest strategy, which focuses on targeting the oldest and poorest condition stands in the District during the next 5-10 years, is detailed in Section 6. Altering from the prescribed harvest schedule in Zone 4 could result in a future reduction in the District's sustainable harvest level. The forest harvesting sector had good representation at the planning team table. There were no major dissenting positions from any team member with respect to the department's overall harvest strategy.

Protection of the freshwater resources in the planning zone as they related to their importance as fish habitat in addition to their use as public water supplies warranted discussion. The function of riparian buffers and the appropriate local management of these ribbons of landscape generated discussions during the planning process. At this time, the minimum (and by far most common) riparian buffer requirement in the planning zone is 20 metres.

The issues of road decommissioning was discussed and debated. All parties eventually reached a consensus on decommissioning of forest access roads. It was agreed that decommissioning can take many forms ranging from complete rehabilitation approximating pre-disturbance conditions to limiting access by particular vehicular traffic (e.g. automobiles) based on the value to be protected and the stakeholder objectives.

Agriculture development within the planning zone could be a significant competitor for productive forest land. However, DNR, Forestry Branch, will make best efforts to support agricultural development proposals provided they are approved and fully supported by the Agrifoods Branch and they do not encompass previously silviculturally treated areas.

It was acknowledged by the planning team that the cabin get-away offers a popular recreational opportunity to many Newfoundlanders and represents an important social value. Cottage

development and use also provides an economic stimulus in rural Newfoundland. On the other side of the debate, cottage development is a permanent fixture on the landscape. It can have negative ecological impacts by potentially impairing water quality; encroaching upon wildlife habitat; increasing hunting and fishing pressure; and, in some instances, leading to ATV access into remote ecologically sensitive areas. Cottage development can also have negative economic consequences by potentially leading to crowding of strategic fish and game resources (and potentially reducing tourism development opportunities) directly or, through its sphere of influence (i.e. protected buffers) indirectly removing productive forest land-base from access to the forest industry.

Forestry activities in the vicinity of clusters of tourism assets are recognized to have the potential to degrade the ambience of these assets in the short term and promote crowding through increased accessibility to remote areas. DNR, Forestry Branch, has committed to investigating the implementation of viewscape management strategies in applicable areas and will continue discussions aimed at minimizing potential impacts of road networks.

## SECTION 6 MANAGEMENT OBJECTIVES AND STRATEGIES

### 6.1 Harvesting

As previously stated, the forest in the District is part of the boreal forest which is characterized as being disturbance driven resulting in the formation of relatively even aged stands. The clearcut silvicultural system most closely emulates this natural disturbance pattern and therefore is the most preferred method employed for harvest. The size, shape, arrangement and juxtaposition of clear cut areas vary across the landscape depending on localized topography and terrain conditions. A modification of the clearcut system takes place in domestic areas whereby the cuts are relatively small and disbursed resulting in the creation of a range of age and development classes.

Operational trials on partial harvest are currently being conducted in the Main River area to address pine marten. The results of these trials will be monitored to determine applicability in other regions of the Province. The clearcut system is the only system being considered for commercial timber harvesting in the zone at this time.

#### 6.1.1 Commercial

Section 3 outlined in some detail the general approach for the timber supply analysis and specific results. The model used to calculate the wood supply is a maximization model which outlines a specific course of action and timing of such actions to maximize timber production. The harvest schedule is an example which indicates the specific forest stratums to be harvested and an indication on the timing of such harvest. The District must follow this schedule as closely as possible in order for the AAC to remain valid.

In general, the oldest timber that is in the worst condition and losing volume fastest is targeted as first harvest priority. Younger stands that have been damaged by insects and disease may also receive high priority. Once managed stands are eligible for harvest, this priority may change in some cases to allow for a faster rotation on good sites that are silviculturally treated.

Specific commercial strategies are as follows:

- utilize irregular cut block sizes that follow contours and natural boundaries where possible
- consider maintenance of unharvested corridors between harvest blocks to act as wildlife travel corridors
- vary buffer widths to protect other values (e.g. larger buffers on salmon rivers) if necessary
- where possible, utilize winter harvest on wet and sensitive sites
- maintain current size and distribution of clear cuts
- use landscape design techniques to mitigate viewshed impacts on areas of concern
- keep losses through timber utilization to a minimum (< 6 $m^3$/ha)

### 6.1.2 Domestic

The harvest of domestic fuelwood and sawlogs occurs from two main sources in the District; from designated domestic cutting blocks and from cutover, landing and roadside clean up. For the designated cutting blocks, the harvest scheduling and priorities apply, however it may not always be practical to follow. Domestic cutting blocks are generally established near communities where concentrations of timber that are eligible for harvest exist. Mixed within these blocks may be timber that normally would not be scheduled for harvest in the planning period. Ideally, each individual domestic cutter would be issued their own cutting block which would ensure an optimal harvest pattern. This is not practical however and domestic cutters are allowed to cut anywhere within the designated area provided that immature timber is not harvested. For this reason, the optimal harvest schedule may not always be followed in domestic areas. Utilization of cutover residue, dead timber and scrub areas which are not part of the timber supply analysis, more than makes up for this difference however.

Specific domestic strategies are as follows:

- target low volume stands that have poor commercial harvest chances
- encourage use of under utilized firewood species (larch, aspen and maple)
- target burned and insect damaged stands that are beyond commercial salvage
- where possible, target alienation Class 3 lands that have low commercial potential
- in areas of high domestic demand, limit volume allocation in designated cutting areas and encourage alternate sources (cutovers, landings, scrub etc)
- monitor stands harvested in domestic cutting areas for compliance with the harvest schedule

### 6.1.3 White Birch

The harvest of white birch occurs throughout the District in close association with the softwood harvest for sawlogs, pulpwood and firewood. Yellow birch is harvested in the coastal regions where the majority of the species exists. In many instances they are an integrated part of both commercial operations and domestic harvesting. In recent years there has been an increase in the commercial demand for birch sawlogs as a result of the development of several value added sawmills in the province primarily focusing on products such as cabinet stock, flooring, guard rails posts and pallet stock.
The amount of birch available in the District is limited and minor in comparison to other species. The lack of forest fires in the District limits the number of pure stands.
Specific harvesting strategies are as follows:
- encourage the use of sawlog sorting by commercial harvesters when markets dictate
- encourage the development of relationships between harvesters and value added white birch

sawmillers.
- target overmature white birch stands for harvest that are forecasted to succumb to mortality in the next 20 years.
- where possible, direct the domestic harvest to white birch stands that have low commercial potential
- in areas of high domestic demand, limit volume allocation in designated cutting areas and encourage alternate sources (cutovers, landings, scrub etc)
- monitor stands harvested in the District for compliance with the harvest schedule and AAC's for each fiber source

**6.2 Silviculture**

Section 1.4.1.4 describes the regeneration patterns of the major tree species by each disturbance type and generally by ecoregion. On average, there is a 20 percent natural regeneration failure rate (NSR) across all disturbance types. Generally, areas that do not regenerate naturally are renewed by some combination of site preparation and planting. Areas that are regenerated naturally are either left to develop naturally or they may receive an intermediate stand density management treatment. In the case of balsam fir, which is a prolific regenerator and usually forms an overstocked stand, some form of thinning is usually applied to improve the growth and development characteristics of the regenerating stand. In recent years however, particularly in FMD 7 there is concern about the type (species) of regeneration because of the increased presence of balsam woolly adelgid in the area. In these areas regeneration to balsam fir may not necessarily be acceptable on certain site types. As well, on certain sites balsam fir has been regenerating on black spruce sites and often forms the majority of available stocking. This regeneration is "off site" and often becomes chlorotic and stagnates at an early age. As a result of these concerns with natural balsam fir regeneration, there has been a marked shift towards a greater reliance on the planting of nursery-cultivated black spruce on harvested sites.

**6.2.1 Forest Renewal**

Since maintenance of the forestry landbase is crucial, forest improvement treatments are the most important silviculture technique in the zone. Forest renewal silvicultural treatments are designed to ensure that a new forest is established after disturbance by harvesting, insect, wind or fire. In most regions of the Province the prescriptions normally involve some form of treatment to prepare the site to accept planted seedlings. Planting, whether full planting or gap planting, is done to ensure stocking of desired species is at acceptable levels.

Treatment of black spruce and balsam fir sites that have been harvested normally, at times, involves the row scarification treatment of disc trenching the site one year prior to planting to produce an acceptable number of microsites (approximately 2,500 per hectare). Microsites created via row scarification are superior because they are a mixture of organic material and mineral soil. Disc trenching also breaks up Kalmia root mats when present and makes the site more accessible and suitable for planting through the alignment of harvesting slash. Kalmia is an ericaceous species that inhibits the growth of spruce seedlings, in particular, through the production of chemicals toxic to spruce and by "locking up" available nutrients on the site thereby depriving spruce of enough nutrients to grow.

The majority of the planting requirement in the zone is for full planting of disturbed sites. The seedling species planted is mainly black or white spruce and to a lesser extent Norway spruce,

larch (eastern and Japanese), red or white pine depending on the site capability. This treatment is designed to regenerate disturbed sites to a stocking level that will produce equal or better harvest volumes than the original stand on similar tree numbers and shorter rotation lengths. Gap planting is done with the same species as above and coupled with the natural regeneration already present on site results in a mixed softwood forest.

Where possible, seedlings are grown with seed from local seed sources. Seed orchards have been established at Wooddale Provincial Tree Nursery to produce seed from plus trees collected throughout the Province. Plus trees are normally selected because they have superior growth and physiological characteristics. First generation white spruce seed has already been produced at the nursery and some seedlings grown from this genetically superior source have already been planted in the zone. The ultimate goal is to establish plantations that have superior growth characteristics and thus increase yield and lower rotation lengths, while still maintaining genetic diversity.

Exotic species have been planted in operational trials at limited locations in the zone. These mainly include Japanese larch and Norway spruce because of their superior growth capabilities on particular sites. However, it is not anticipated that they will form any substantive proportion of the planting program in the future.

In some limited cases a herbicide treatment may be required. Herbicides, while used sparingly, are sometimes a necessary tool to help establishment of a new forest particularly on the better sites. In this planning zone, these sites are typically rated as “good or high” capability and are located on seepage slopes. These sites typically revert to Not Sufficiently Restocked status (NSR) dominated with alder after disturbance. Reforestation of these sites is important as they are the best growing sites, and placing them back into rotation will help maintain the productive forest land base. The herbicide treatment will allow the planted crop species to “get the jump” on the competition through suppression of the alders that occupy these sites. Non-crop species and other forest plants and shrubs typically rebound after suppression with herbicide, thereby ensuring that long term biodiversity is not impacted.

Natural regeneration of softwood species has typically relied on the excellent dispersal of balsam fir after clear cutting throughout this planning zone. However, as stated earlier balsam fir in this zone has become seriously infected with adelgid. As a result, natural regeneration of balsam fir will have to be reviewed in future silviculture projects.

### 6.2.2 Forest Improvement

Forest improvement prescriptions are designed to treat existing, established forest stands in an attempt to enhance development. These treatments usually involve thinning overstocked balsam fir stands at either a young age 10 -15 years (precommercial thinning), or an intermediate age 25 - 35 years (commercial thinning) or cleaning/maintenance of young plantations 10-15 years of age from balsam fir in-growth.

Precommercial thinning and plantation cleaning reduce density levels in overstocked areas in order to maximize volume increment and operability (piece size) in the shortest period of time. Trees removed are not of merchantable size and are left behind to return the nutrients to the site. In the planning zone, balsam fir is usually thinned to favour any spruce that may be in the stand.

In this way a mixed softwood stand is produced (depending on the original density of spruce) which is more diverse and less susceptible to insect infestation. As well, any hardwood species that are not in direct competition with spruce or fir are left to increase the biodiversity of the stand.

Commercial thinning is done on older balsam fir stands and is designed to capture any mortality that would normally occur in the stand through self thinning. The trees harvested are of commercial size and are extracted and utilized. The remaining trees are left to grow, free from competition and are harvested when mature. By salvaging this imminent mortality a higher yield can be obtained in these stands. As with precommercial thinning, spruce and hardwoods are left where possible to increase the stand diversity. This treatment has had limited use in the zone.

Both types of thinning will produce large diameter stems in a shorter time period which should increase the percentage of merchantable volume that is suitable for sawlog material.
Specific silviculture strategies:
- ensure regeneration of areas disturbed by harvest, insect, wind and fire to prevent loss of and/or increase the future productive forest land base
- use thinning/cleaning techniques in young stands to increase stand development, reduce rotation age, improve stand quality through removal of off site and/or adelgid attacked balsam fir regeneration and increase the percentage of sawlogs in stands
- where possible, promote species mixes particularly with spruce and hardwoods to reduce susceptibility to insect attack and increase biological diversity
- where possible, use seedlings grown from local seed sources to protect genetic diversity
- ensure levels of planting and thinning used in the wood supply analysis are achieved
- work towards pre-harvest planning to identify areas with potential balsam woolly adelgid problems so that alternate silvicultural prescriptions can be promptly employed
- continue development and implementation of silvicultural strategies designed to regenerate existing white birch dominated stands to white birch where applicable, as well as strategies designed to develop the white birch component of managed stands

**6.3 Forest Access Roads**
Timely access to harvesting areas is the key to successful implementation of harvest allocations. Roads also provide access for other recreational values such as hunting, fishing, skiing, berry picking and hiking. Roads can also have a negative impact both from an environmental perspective (loss of productive land base) and other value perspective (access near remote outfitting lodges).

As a general principle from both an environmental and cost perspective, the minimal amount of road required to effectively harvest available timber will be built. As well, roads are constructed to standards (e.g. width of right-of-way and driving surface etc.) that are the minimum required to access the timber in a safe and effective manner. Forwarding distances are maximized to the economic limit to minimize the amount of road constructed. These principles ensure that the loss of productive land base and environmental disturbance are minimized.

In sensitive and wet areas, winter harvesting and road construction are encouraged and are often the only option. This minimizes environmental disturbance and provides access to areas that would otherwise be left unharvested.

In many instances forest access roads open up new areas which are then subject to cabin development (often illegal). They also provide access to remote areas where outfitting businesses operate. This generally leads to competition for hunting areas between local and "sport" hunters and may detract from the "remote" designation of the lodge. In such instances cabin development should be controlled to limit local access. Road decommissioning may also be considered, depending on cost and mitigation of conflicting uses for that road.

The nature of the current wood supply is that harvestable areas or stands are becoming smaller and more scattered. Achievement of the allocated harvest is contingent on accessing these areas and stands, therefore more roads are needed to access this timber. It is imperative that additional funding sources become available to construct these roads if harvest allocations are to be maintained. Failure to secure additional road monies will result in potential decreases in commercial timber allocation.

Specific strategies:

- where possible, build winter roads to access sensitive and wet areas
- minimize amount of road built by maximizing forwarding distances
- use minimum road standard to safely and effectively match the logging chance
- work with appropriate agencies (Crown Lands) to control cabin development
- consider road decommissioning in areas of concern for other values (e.g. near remote outfitting lodges, PPWSA's) where possible
- explore all avenues to secure funding for road construction and encourage operators to build their own roads in exchange for royalty reductions

### 6.4 Forest Protection

#### 6.4.1 Insects and Disease

Insects while having been a major natural disturbance factor historically in the zone are now of lesser importance. The main tree species, balsam fir, is susceptible to most of the major insects and is in lower proportion throughout the zone than in the past. The budworm and looper damaged fir stands of the 1970's and 1980's were salvage harvested. Also, in recent years, quality standards at local pulp mills have changed to require a timely supply of fresh, green timber. As a result, the window to salvage insect damaged timber is now one to two years after mortality. On a positive note, access to most areas has increased and improved, thereby allowing for quicker reaction to salvage insect mortality.

The major insect in the District today is the balsam woolly adelgid. It seems to be moving further inland to the far central reaches of the Planning Zone, causing growth problems in young balsam fir stands.

As outlined in the harvesting and timber supply analysis sections the timber supply is based on following a rigid predetermined harvest schedule and minimizing inventory deductions (of which insect damage is a portion). In the event of a major insect infestation, salvage efforts may change harvest priorities and thus the optimal harvest schedule may not be followed. If insect damaged

stands cannot be harvested in a timely manner, an additional harvest in the form of unsalvaged mortality may occur resulting in inventory deductions that are higher than anticipated. In both eventualities, deviations from harvest schedules and inventory adjustment levels will have to be closely monitored to ensure that the validity of the AAC calculations is not compromised.

Specific strategies:

- use silvicultural techniques at the stand level to alter species mix and increase stand vigor to make stands less susceptible to insect attack (e.g. planting and cleaning).
- where possible, use harvest scheduling techniques to alter species mix across the landscape to avoid "setting the table" for severe insect infestation
- use species conversion techniques, where possible, to convert adelgid susceptible balsam fir to other less susceptible species
- in conjunction with Provincial and Federal initiatives, use pertinent and approved biological and chemical insecticides such as BTK, Mimic, Neemix4.5 and NeabNPV (virus) if required
- in cooperation with Provincial Insect and Inventory Divisions, monitor and measure adelgid infested stands to help refine yield curves to be used in the next timber supply analysis

**6.4.2 Fire**

Fire has been a limited natural disturbance factor historically in the District. There has been a low fire history (see section 2.5.1) due to the coastal climate in a large portion of the District. The northern, more inland portion is more susceptible to fire occurrences. A fire in an unusually dry year can have devastating effects on the forest and can exacerbate a wood supply situation. The District can minimize the risk of a serious fire by maintaining a highly trained, efficient and effective fire control program and by minimizing the risk in forest stands through maintenance of health and vigor.

Specific strategies:

- ensure harvest schedule is followed targeting oldest/worst condition (and high fire risk) stands
- maintain fire control capabilities
- where possible, promote species mixes (white birch) in stands to minimize risk

**6.4.3 Windthrow**

Wind throw or blowdown occurs in stands that are old and decrepit or in stands that have been predisposed by some other disturbance such as insects and disease. Blowdown can also be increased in high risk stands when unnatural edges are left on cutovers such as in the case of buffers. To minimize the effects of blow down, stands will be managed to promote health and vigor mainly through silvicultural treatments and protection from insects.

Specific strategies:

- avoid thinning in areas with high wind damage potential (hilltops on high elevations etc.)
- maintain forest in healthy vigorous condition through silvicultural treatments and protection from insects
- design cut blocks to follow contours and natural boundaries to minimize risk of windthrow to residual forest
-investigate techniques to minimize the risk of blowdown in buffers (i.e. buffer management).
- ensure harvest schedule is followed to target the oldest/worst condition (and hence risk) timber first
- continue to sample overmature stands for signs of imminent breakup (e.g. windthrow and butt

rot) and update harvest schedule on a 5 year basis accordingly to capture mortality.

### 6.5 Information and Education

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

Many comments were made during the planning team meetings about the good exchange of information and ideas that occurred. It is through such forums that information can be shared which will provide a basis for more effective and informed participation in such processes. Other such vehicles for information and education which will be actively pursued are listed below.
Specific strategies:
- field trips
- school visits
- open houses
- commercial operator environmental training programs
- information meetings
- training courses
- seminars
- general day to day contact

## SECTION 7 PROPOSED ACTIVITIES

### 7.1 Overview

This section will outline all forest activities that are proposed to occur in Planning Zone 4 from 2008-2012. More specifically, all proposed harvest, silviculture and access road construction activities, as well as environmental protection measures and activities inside protected water supply areas, surveys, and information and education initiatives will be presented and discussed in detail.

### 7.2 Allocation of Timber Supply

The current Crown tenure softwood AAC is 24,500 solid cubic meters per year as determined by the 2006 Wood Supply Analysis. The analysis completed for this District used the spatial analysis for the majority of the area with other methods used for the area with limited map and photography coverage. Generally, in the allocation of the wood supply to the major commercial operators, the first priority is given to damaged and diseased stands where feasible. The second priority is to harvest merchantable, overmature stands. Most scheduled operating areas will consist of stands in the 80+ year age class. The third priority is to harvest merchantable mature stands.

In keeping with Departmental policy, harvesters with integrated sawmills will receive priority for any additional allocation of commercial timber that becomes available. Adherence to this policy will help improve fiber utilization in harvesting and primary manufacturing.

### 7.2.1 Commercial

Table 14 indicates the Crown's proposed commercial harvest by operating area in District 7. These areas are shown on a 1:250,000 scale overview map in Appendix 3 and on individual 1:50,000 scale maps in Appendix 5. Operating Area forms are found in Appendix 4. The table indicates approximately two times the area required for Class 1 and 3 softwood and hardwood annual allowable cuts. The additional area is included so as to provide for operational flexibility over the planning period.

Table 14 Summary of Proposed Crown Commercial Harvest Areas from 2008-2012

| Project # | Project Name | Map # | Available Harvest Volume ($m^3$) | Area (ha) |
|---|---|---|---|---|
| C-7-1 | Great Burnt Lake | 12A1 | 18750 | 375 |
| C-7-2 | Bailey Bridge | 12A8/12A1 | 2800 | 40 |
| C-7-3 | White Hills | 12A1 | 11200 | 160 |
| C-7-4 | Tangle Pond | 12A1 | 2800 | 40 |
| C-7-5 | Old Pauls Pond | 12A1 | 3150 | 45 |
| C-7-6 | Bear Lake | 12A1/11P16 | 7000 | 100 |
| C-7-7 | Bernards Brook | 2D4 | 4000 | 50 |
| C-7-8 | Godaleich Tower | 12A8/12A1 | 20000 | 400 |
| C-7-9 | North Salmon Dam | 12A8 | 10500 | 210 |
| C-7-10 | St. Joseph's Cove | 1M13 | 2100 | 300 |
| C-7-11 | Granite Lake | 12A2/12A7 | 14000 | 200 |
| C-7-12 | Woodcat Pond | 12A1 | 2800 | 40 |
| TOTAL | | | 99100 | 19240 |

This is within the acceptable variance for planned harvesting since the 2006 Wood Supply Analysis was designed to ensure that operable growing stock would be maintained at a minimum of two times the AAC throughout the 160 year planning horizon. That is to say, there will always be at least twice as much merchantable timber available on the landbase than will be cut in any one period. The actual total harvest volume for each class of AAC, however, for the next five years will not exceed the allowable cut.

Generally, in the allocation of the wood supply to the major commercial operators, the first priority is given to damaged and diseased stands where feasible. This precedent has limited potential because only a small portion of the production forest currently shows evidence of insect or disease damage and it is interspersed throughout the district. The second priority is to harvest merchantable, overmature stands. Most scheduled operating areas will consist of stands in this 81 + year old age class.

Also, included in domestic blocks are areas where small commercial permits may be issued. The stands have mainly resulted from previous commercial harvesting and because of their small size (i.e. ranging from 2 ha to 20 ha) proposed commercial operations will more closely approximate domestic harvesting. These areas are difficult to define on maps, however, staff will evaluate all requests to harvest blocks that are considered to have commercial potential.

Some of the proposed operating areas contain merchantable timber that is currently designated as Class III (i.e. operationally constrained). Stands in this category are typically difficult to access and/or harvest from both physical and economic aspects. As a result, they have been removed from the landbase used to calculate the sustainable Class I AAC. The designation of these stands has been set for the period 2008 to 2012, after which time the landbase will be reviewed in preparation for the next wood supply analysis. It is the intent of the department that this designation of timber will also be harvested in a sustainable manner.

Several operating areas contain merchantable birch volumes made up from a combination of pure birch stands and mixed softwood/hardwood stands. The priority of harvest for commercial birch allocations will be met first with remnant birch in mixed softwood/hardwood stands as a part of integrated harvesting operations. Utilizing this strategy, it is anticipated that approximately 50 % of the proposed commercial birch harvest will result from mixed stands primarily targeted for softwood harvest. Currently several commercial operators harvest only firewood (birch and burnt timber), while several other operators have firewood allocations as integrated components of their operations. The birch species of timber is therefore essential in sustaining commercial operations within the district. As with other designations of timber, it is the department's position that birch is to be harvested in a sustainable manner.

**7.2.2 Domestic**

District 7 has twenty-six domestic harvesting areas, the majority of which were originally created along the coastline around the scattered communities. Appendix 8 provides an overview of these areas and Appendix 9 gives a more detailed view. A listing of areas is provided in Table15. These areas were designed to provide a supply of fuelwood and sawlog material close to the communities. They consist of both commercial and non-commercial stands, but as timber demand increased and AACs were developed, many of the commercial stands were removed from the domestic fuelwood areas were restricted to commercial permit holders. Observation of these areas on the overview map indicates a significant landbase. However, the opportunity to obtain fiber from any block is very limited. This is especially true along the coast in Areas 6, 23, 25, 26, 27, 29, and 30.

Domestic and small scale commercial operations will follow the same priorities for harvest as stated earlier, efforts will be directed in placing the domestic harvest (fuelwood) into low volume stands, and non-AAC stands. All permits have various restrictions attached to them such as

utilization standards, environmental concerns, and no-cut areas. These points are highlighted when permits are issued.

Generally, the traditional domestic areas near have been expanded into harvested commercial areas to provide residents access to additional fuelwood supplies. Over time, these expansions into commercial areas will have to be closed to prevent the illegal harvest of immature stands. This is evident in a number of the domestic blocks where silviculture areas are designated as no-cut areas.

There are a number of important issues which need to be addressed with regard to the domestic cutting sector. The most prominent and timely of these is the concern with utilization of commercial sawlogs and pulpwood as firewood. A second issue which has also surfaced, and will continue to gain prominance during the next decade, is the harvesting of young sub-merchantable trees on old cutover areas. These problems point to the need for increased control over domestic cutting. The goal of protecting the provincial short-term commercial wood supply is of primary concern with respect to maintaining the existing forest industry in Newfoundland during the next several decades. This will involve a complete review of all domestic blocks for their commercial value and where appropriate the allocation of valuable, operable stands to commercial operators.

To help offset any losses to the domestic land base that may occur as a result of allocation of stands to commercial status, extensions/additions to domestic areas will be investigated in current commercial areas, as timber management objectives are met, to provide alternative sources for domestic timber consumers. This will also facilitate silvicultural operations through the cleanup of commercially sub-marginal stands. Additionally, the concept of removing fuelwood and any merchantable pulpwood, produced as bi-products from proposed diameter limit thinning treatments, for both public and industrial use will be investigated during this five year period.

To sustain a middle and long term wood supply, growing stock arising from older regenerating stands (i.e. age class 2) and precommercially thinned areas must be protected. Many domestic blocks contain areas that have been silviculturally treated in the past, and still contain potential areas for future treatment. These areas will be evaluated during this planning period and amendments will be made to the respective domestic cutting blocks to reserve appropriate areas for silvicultural treatment for enhancement of the future growing stock. The specific treatment areas will be identified on domestic cutting maps. These areas will be closely monitored and strictly enforced for no-cutting or trespassing.

Table 15 Summary of Proposed Domestic Harvest Areas in Planning Zone 4 from 2008-2012

| Block Name | Block Number |
|---|---|
| Tangle Pond | 2 |
| Seven Island Pond | 4 |
| Salmon River | 5 |
| St. Alban's | 6 |
| St. Joseph's Cove | 7 |
| Burnt Jacket | 8 |
| Hd. Bay D'Espoir | 9 |
| Woodcat Pond | 10 |
| Twin Brooks | 11 |
| Twillick Brook | 13 |
| Spruce Pond | 14 |
| Camp One | 18 |
| Milltown | 19 |
| Arron Cove | 20 |
| Conne Ridge | 21 |
| Little River | 22 |
| Hr. Breton Road | 23 |
| Pool's Cove | 24 |
| Rencontre East | 25 |
| Belleoram | 26 |
| Harbour Breton | 27 |
| Hermitage | 28 |
| Gaultois | 29 |
| McCallum – Grey River | 30 |
| Steady Bottom | 7A |
| Carpit Road | 11A |

**7.3 Silviculture**

In order to sustain the current AAC, enhance the growing stock for possible AAC increases in the future and sustain ecosystem processes, a steady reforestation program will be conducted with the objective to plant all sites disturbed through harvesting that are not regenerating to a satisfactory stocking level.

Reforestation of current cutovers through scarification and planting is a priority of the silviculture program during this planning period. Also, there is a considerable amount of non-sufficiently restocked (NSR) areas occupying productive sites in the District that resulted from past disturbances, including harvesting. These sites need to be converted to a more vigorous useful state by re-establishing forest cover. Reclamation of backlog, non-sufficiently restocked sites (NSR) through planting will: (1) result in an increase in the productive forest land base, thereby assisting the goal of maintaining 20 % old growth on the future landscape; (2) account

for future losses to the landbase from permanent disturbances; and (3) result in the production of successional habitat that will aid in the maintenance of landscape connectivity for wildlife.

From a silviculture perspective, the only potential treatment to lessen the projected timber supply shortages is precommercial thinning (PCT) in the 21/40 year age group, and a variation of PCT in larger diameter stands of the same age group known as diameter limit thinning (DLT). Thinning, over a number of years, will advance the development of those treated stands, so as to essentially bump the age/development up a class, and can help to fill the shortfall in supply.

Thinning treatments (PCT/DLT) in natural fir/spruce stands and plantations (PM - plantation maintenance) in the District, however, also have merit from the perspective of promoting the development of high quality timber stands. These thinning treatments will allow natural and planted spruce/fir to grow more vigorously through the removal of competing, low quality ingrowth. These treatments will ensure that such stands remain tracking along projected yield curves, resulting in protection of the future growing stock, and a cost benefit to future harvesting through gains in piece size compared to untreated areas.

Silviculture treatments designed to promote management of the District's hardwood component at both the landscape and stand levels will be conducted during this period to achieve the ecosystem management initiatives described earlier in Section 4.2.2.1. Treatments will involve two stages of stand development; (1) immature stand density management and (2) stand regeneration management. In the former case a hardwood component will be left where possible in all precommercial thinning, diameter limit thinning and plantation maintenance areas. Density management treatments are proposed for hardwood dominated immature stands. Both yellow birch and white birch areas are targeted.

Silviculture treatments designed to promote management of the District's white pine component at both the landscape and stand level will be conducted during this period to achieve the ecosystem management initiatives described earlier in Section 4.2.1.6.3. White pine pruning is proposed for immature stands to minimize white pine blister rust infection rates. On appropriate sites, a minimum of 4-5 % pine seedlings will be mixed in with black and white spruce planting stock. Cone collections will be carried out as required and in consultation with the Provincial Tree Nursery to ensure sufficient seed supplies are available for the silviculture program.

The silviculture treatments proposed for the period 2008-2012 in District 7 are outlined on a 1:250,000 scale overview map in Appendix 10 and detailed in Table 16 and on individual 1:50,000 scale topographic maps in Appendix 11**.** The silviculture treatments having the highest priority are planting and precommercial thinning. A program of 300 ha of planting and 400 ha of precommercial thinning is scheduled for District 7 during this planning period. Also 30 ha of pine management and 100 ha of stand reclamation, 120 ha of site preparation and 150 ha of plantation maintenance are planned. The minimum areas needed to comply with the requirements of the 2000 Wood Supply Analysis are 50 hectares of precommercial thinning and 50 ha of planting per year.

Table 16 Summary of the Proposed Silviculture Treatments in Planning Zone 4 for 2008-2012

| Treatment Type | Area (Ha.) |
|---|---|
| PCT | 400 |
| Planting | 300 |
| Plantation Maintenance | 150 |
| Site Preparation | 120 |
| White Pine Management | 30 |
| Stand Reclamation | 100 |
| TOTAL | 1100 |

**7.4 Forest Access Roads**

Proposed primary forest access road construction for the next five years in District 7 is outlined on the 1:250,000 scale overview map in Appendix 6, and detailed in summary Table 17, and on individual 1:50,000 scale topographic maps in Appendix 7. A total of 23.5 kilometers of road is planned for construction during this five year period along with 40.4 kilometers of reconstruction. All capital roads constructed in the district are funded by the Department of Natural Resources while several operators construct their own operational roads. Departmental roads, being main trunks, will either be constructed to Class C or C-2 standard and are designated as primary road systems. Road construction by Crown operators will mainly be spur roads constructed to a Class D standard and are designated as operational roads.

The majority of the road construction will be directed into overmature and mature wood, for the primary purpose of accommodating commercial cutting operations. A secondary forestry use will be to provide access for silviculture operations. Other uses include domestic cutting, and recreation (i.e. hunting, fishing and berry picking). At this time, no road is planned solely for domestic use.

Consideration of a host of tourism/recreation values that exist within the boundaries of District 7 were discussed by the planning team and the topic of road decommissioning was proposed as a means to alleviate some of the conflicts that exist when roads are constructed into an area. Decommissioning is to be considered on an area specific basis. It was agreed that the decommissioning of specific roads to protect other ecosystem values could take the form of removing bridges and culverts, in addition to replacing excavated material from adjacent embankments back into the roadway to restore the areas as close as possible to their natural state. The scheduling of road decommissioning must be done in concert with the completion of harvesting and silviculture activities in the areas of concern. At that time, the Department of Natural Resources will convene a meeting of all interested stakeholders to determine the timing and details of decommissioning activities. While the Department can adopt this approach as a goal of the plan, the implementation of this strategy will be entirely dependant upon our ability to prevent the establishment of permanent structures such as cabins along the proposed road routes. While the District can commit to refusing approval of cabin sites in areas to be decommissioned, the actual authority rests with the Crown Lands Division of the Department of Government

Services and Lands. During this planning period District staff will continue to liaison with Crown Lands Division in identifying operational roads that may require decommissioning.

Table 17 Summary of Proposed Access Road Construction in Planning Zone 4 from 2008-2012

| Project # | Road Name | Map # | Road Class | Road Length (kms) | Bridge |
|---|---|---|---|---|---|
| C-7-16 | Godaleich | 12A1 | C-2 | 7.5 | Nil |
| C-7-17 | North Salmon | 12A1 | C-2 | 5.0 | Nil |
| C-7-18 | St. Joseph's Cove | 1M13 | C-2 Reconstruction | 6.0 | Nil |
| C-7-19 | Twin Brooks | 1M13 | C-2 Reconstruction | 4.0 | 30 ft. |
| C-7-20 | Millpond | 1M13 | C-2 Reconstruction | 5.0 | Nil |
| C-7-21 | Twillick | 2D4 | C-2 Reconstruction | 5.0 | Nil |
| C-7-22 | Little River | 1M13 | C-2 Reconstruction | 8.2 | Nil |
| C-7-23 | Cox's Landing | 1M13 | C | 2.0 | Nil |
| C-7-24 | Goodyears | 1M13 | C | 3.0 | Nil |
| C-7-25 | Woodcat Pond | 2D4 | C-2 Reconstruction | 9.0 | Nil |
| C-7-26 | Swanger Cove | 1M13 | C-2 Reconstruction | 3.2 | Nil |
| C-7-27 | Granite | 12A1<br>12A7 | C-2<br>C-2 | 3.0<br>3.0 | Nil<br>Nil |

**7.5 Activities in Protected Water Supply Areas**

In total there are 13 protected public water supply areas in Planning Zone 4 in which some forestry activity may occur in the period 2008-2012. Approval to operate in these areas over the next five years will be requested annually from the Water Resources Division of the Department of Environment and Conservation and the appropriate municipalities. The terms and conditions of approval will be applied to all Crown permits and contracts and strictly enforced by District staff.

**7.6 Environmental Protection**

**7.6.1 Fire**

Wildfire has not been prevalent in the District in the past number of years and as a result there have been few timber losses. Despite this fact the District must remain vigilant in its fire

suppression program to ensure any future losses are minimized. There is a fire crew and equipment stationed at the Milltown District Office during the fire season whose direct responsibility is fire protection. Permanent staff are available for emergency purposes. In addition, support, equipment and manpower at both the regional level in Gander and provincial level in Corner Brook is available should the need arise. Gander houses the bank of provincial fire equipment and, as well, is the base for 3 Cl-215 air tankers and a helicopter with a crew of fire fighters for initial attack.

### 7.6.2 Insect and Disease

Monitoring and protection for insects and disease is provided through the Forest Engineering and Industry Services Division of DNR in Corner Brook. District staff are available to provide assistance in detection, monitoring, and protection against insects and disease.

As stated, District staff will be conducting reconnaissance surveys to monitor the extent and rate of spread of the balsam woolly aphid.

### 7.6.3 General Environment

The environmental protection guidelines form the basis for protecting the environment from the effects of forest activities. Forest activities have the potential to impair water quality, create soil erosion and compaction, destroy fish and wildlife habitat, impact viewscape, and disturb sensitive and rare sites etc. The guidelines are designed to provide site specific measures to ensure that these impacts are avoided. Highlights of measures to avoid these impacts include no activity buffer zones, modification of harvesting design and equipment, avoidance of sensitive sites during critical periods, consultation with other regulatory agencies and of course, monitoring. Specific measures that govern each forestry activity are detailed in Appendix 12.

### 7.6.4 Surveys

Utilization surveys will be conducted on both commercial and domestic cutovers to insure losses of merchantable timber is minimized. The District will work in conjunction with the Forest Engineering and Industry Services Division in Corner Brook to implement a yield comparison study to compare the expected volumes in operating areas to those actually attained. The results of these surveys will help refine the inventory deduction described in Section 3.

As previously mentioned, reconnaissance and intensive regeneration surveys will be conducted on commercial cutovers created during the next five years as well as those created in the past five years to determine the need for planting. As well, reconnaissance surveys for balsam woolly adelgid will be done to determine suitable areas to conduct silvicultural treatments.

### 7.6.5 Information and Education

The District will continue to attempt to educate the general public to ensure meaningful and effective consultation and input can be attained. This will be accomplished through planning team field trips and meetings, school presentations, open houses, meetings and National Forest Week activities.

## SECTION 8 MITIGATIONS

A limited number of concerns arose from the planning team meetings. Listed below are several of the more important issues for the District.

1) DNR agrees with the WD regarding mitigations designed by the WD as precautionary steps to protect habitat for caribou whose population is currently in decline. Existing guidelines for caribou will be followed by DNR for all affected areas and any new guidelines developed as a result of ongoing research and monitoring will be adopted as they become available. These guidelines include maintaining minimum amounts of mature forest habitat within calving, post calving and wintering core areas and buffers and avoidance of these areas during the calving and post calving seasons.

3) DNR has agreed to review future operations along the Bay d'Espoir Highway to provide a more aesthetically pleasing viewscape.

4) Buffers will be maintained around potential archaeological sites and important seascape vistas.

5) DNR will continue to implement the guidelines for operations within PPWSA as per the EPP guidelines (Appendix 12)

6) DNR will support the development of agricultural sites that are not silviculturally treated and are approved by the Agrifoods Division of DNR.

7) Existing guidelines for pine marten will be followed by DNR for any affected areas and any new guidelines developed as a result of ongoing processes will be adhered to.

8) The guidelines established for the protection of the Boreal Felt Lichen will be followed.

## SECTION 9 PLAN ADMINISTRATION

### 9.1 Monitoring

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

#### 9.1.1 Operational Level

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

### 9.1.2 Planning Level

The planning team has established a monitoring committee (which is the planning team) whose primary role is to monitor implementation of this Five Year Operating Plan. This is a crucial role, as many implementation commitments are stated in the plan. The primary function of the monitoring committee is to:

- monitor plan implementation for consistency with commitments in the plan
- identify concerns with plan implementation to team members
- review annual operating plan before implementation
- provide recommendations for plan changes
- establish protocol for concerns reported to and/or identified by monitoring committee

The monitoring committee should meet at least once a year to review the annual operating plan. Additional meetings may be required to review amendments or provide recommendations should changes be required as a result of a catastrophic event such as fire which may precipitate changes to the plan. Field trips to view on the ground activities has proven effective by monitoring teams in the past and will be encouraged during the implementation of this 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 Newfoundland Forest Service and one that must be submitted to the Environmental Assessment Division for public review.

Changes to this plan can be approved by the Newfoundland Forest Service if they are:
-within one kilometer of an operating area described in the five year operating plan, an additional area for timber harvesting that is, in total, not more than 50 hectares in each year of the plan
- within a forest management district, an additional areas for silviculture treatment of not more that 20 percent of the total operating area described in the five year operating plan over the five year term of the plan
- within an operating area described in the five year operating plan, not more than one kilometer, in total, of new primary forest access road in addition to existing and proposed primary forest access road in each year of the plan
- adjacent to an operating area described in the five year operating plan, not more that half a kilometer, in total, of new primary forest access road in each year of that plan.

Changes that are not covered by the above must be submitted for Environmental Assessment (EA) in the form of an amendment to the Five Year Operating Plan. 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. Other amendments may also be reviewed by the monitoring committee if the District Manager deems that they represent a significant change to the plan.

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