FIVE YEAR OPERATING PLAN

FOR

FOREST MANAGEMENT DISTRICT 20
(SANDWICH BAY, LABRADOR)

OPERATING PERIOD
JANUARY 1, 2005 - DECEMBER 31, 2009

AUGUST 26, 2004

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF MAPS

EXECUTIVE SUMMARY

Forest management planning sessions were initiated by the Department in 1996. Over time many stakeholders including local residents have contributed both scientific and local knowledge, which was used to develop this plan. In addition to the public consultation sessions, in October of 2002, the Provincial Government signed a Memorandum of Understanding (MOU) with the Labrador Metis Nation (LMN) to facilitate their participation in the process. This MOU which expired on March 31, 2004, was succeeded by a Forestry Management Agreement. This agreement, which is effective until March 31, 2006 and subject to annual appropriations, is designed to enable the LMN to provide advice to the Minister of the Department of Natural Resources into preparing and implementing the Forest Management Plan in District 20.

Results of the public consultation process yielded a five year operating plan (2005-2009) and an ecosystem strategy document. These plans outline the various management activities which are to take place in the district during the specified planning period. Further refinements of operational activities are made in the annual work schedule.

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

Commercial activity in the district has been inconsistent in the past; with domestic activities remaining relatively consistent. Residents of Cartwright, Paradise River and Black Tickle/Domino harvest fuelwood and sawlogs for domestic use.

The existing forest inventory of the district was done in 1992. This inventory did not cover the entire district, but it did cover the majority of the non-isolated commercial forest in the district. During the planning process the district was further refined into management units. The current annual allowable cut for the district has been calculated to be **30,085 m^3** for a total harvest of **150,425 m^3** over the five year planning period. This figure is based only on the commercial forest of one area, namely the southside operating area, south of Paradise River (Figure 4). Access to the majority of this timber will require the construction of 16 kilometers of Crown and/or operator built forest access roads. Due to the lack of disturbed area (fire or harvesting), silviculture efforts will focus mainly on monitoring and research activities.

Fourteen commercial operating blocks are proposed for harvesting over the next five years. These blocks contain sufficient volumes to support commercial allocations of approximately 25,000 m^3/year. In addition, an area between Cartwright and Paradise River has been identified as a selective commercial harvest area. Domestic harvests, estimated to be approximately 4,285 m^3/year, will take place in several blocks located near the communities. In all cases, permit conditions and the Environmental Protection Guidelines will govern all operations.

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

Extensive areas have been identified to preserve ecological, cultural* and local values. Approximately 91% of the total district landbase was excluded from the allowable cut calculation. Consequently, this has resulted in vast areas in the District which will not be considered for commercial or domestic harvesting in this plan. These areas, which are identified at three scales, landscape, watershed and stand, provide for habitat for various native animal species and act as scientific benchmarks.

Although large fires have not been common in the district in recent years, large fires have been recorded. Fire staff are located in Cartwright during fire season with additional support located at the North West River District office. Fires causing no threat to life, property or commercial resource will be allowed to burn.

There is an increase in the risk of insect and/or disease outbreaks due to the mature and over mature age classes of the forests. To reduce the risk of major forest fires, and insect and disease outbreaks, harvesting of the oldest stand first will be promoted. During this planning period, no chemical of insect control agent is scheduled to management purposes.

* Further reference should be made to disclaimer on Page ii.

1.0 INTRODUCTION

Forest Ecosystem Management planning began in Newfoundland and Labrador in 1995. The process is based on the input and consensus of the various stakeholders who participate in the public meetings and who continue to provide input during and after the time the scheduled management activities take place.

In October of 2002, the Province of Newfoundland and Labrador signed a memorandum of understanding (MOU) with the Labrador Metis nation (LMN) with the intention to further their participation in the forest management process. The MOU provided a framework for effective communication, information sharing and an opportunity for the LMN to provide their advice on forest management issues in District 20 to the Minister of Natural Resources. A Forestry Management Agreement, recently signed between the Province and the LMN, succeeded the 2002 MOU and is designed to enable the LMN to provide input into preparing the Forest Management Plan in District 20.

The results of the planning process in Forest Management District 20 (FMD 20) are the ***Five Year Operating Plan for Forest Management District 20 (Sandwich Bay) (Operating Plan)*** and its companion document, ***Forest Ecosystem Strategy Document for Forest Management District 20 (Strategy Document)***. The participants are acknowledged for the time and effort put into the process in the District, which was initiated in Cartwright in 1996 (Appendix I). A summary of the concerns and mitigations taken from the meetings can be seen in Appendix II.

The strategy document outlines the broad framework with goals and objectives for the plan and also gives a detailed outline of the planning process, while the five year operating plan provides details of various management activities that are scheduled to occur between January 01, 2005 and December 31, 2009. These activities, which include harvesting, silviculture, road construction, ecosystem protection, surveys and monitoring, are designed to ensure that forest resources are developed in a sustainable manner and with minimal environmental impact . Further refinements of the individual planning activities are complied into an Annual Work Schedule on a yearly basis and are subject to public review.

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

Forest Management District 20 (FMD20) is situated on the south coast of Labrador (Figure 1). It is generally bound to the North by Lake Melville, to the West by the Etagaulet and Paradise rivers, to the South by the Main and Hawke rivers and to the East by the Labrador Coast. A legal description of the area is appended to the strategic document.

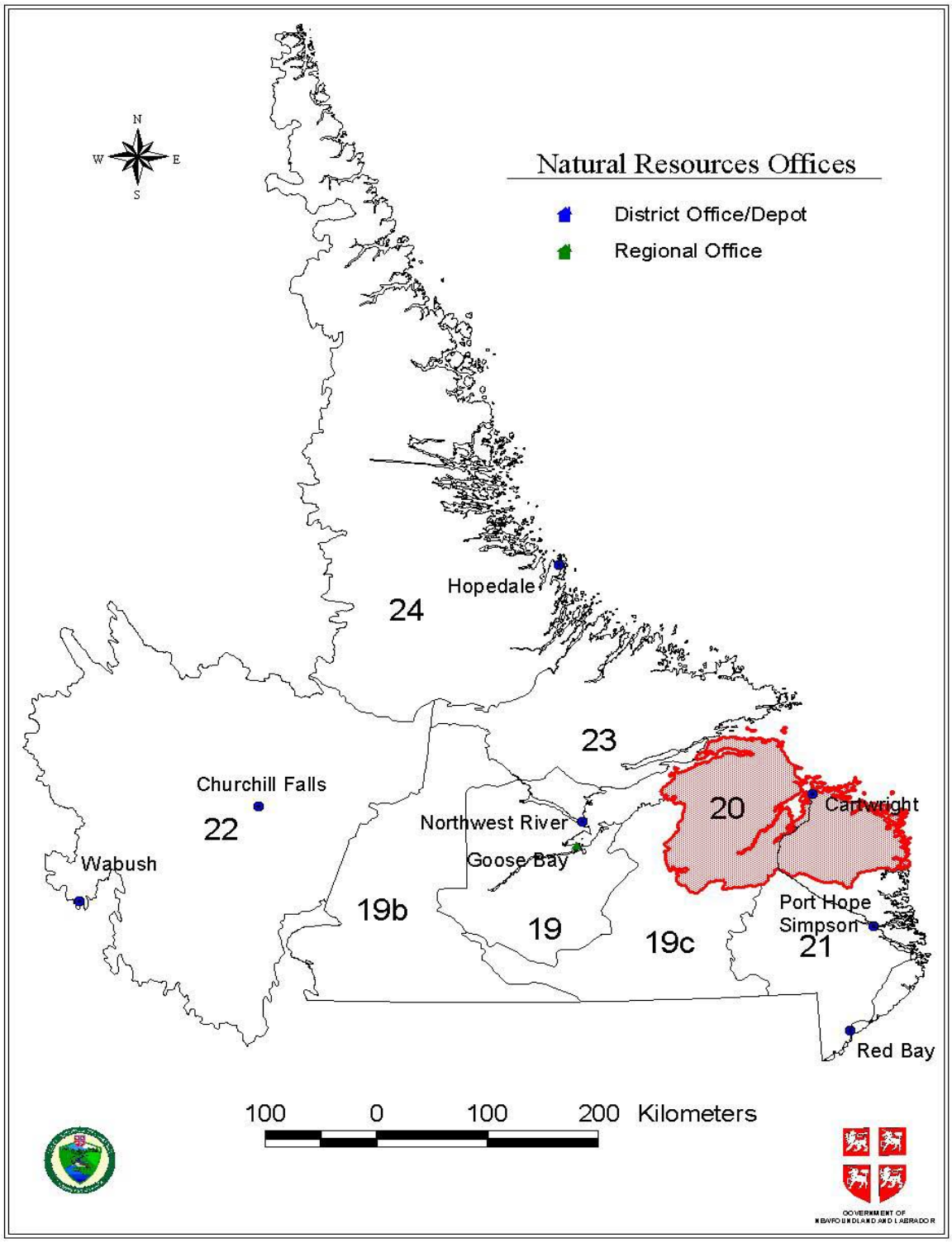

Figure 1. Forest Management District boundaries and office locations in Labrador.

1.1 Past Activities

There were a number of significant developments in forest management during the past five years. The most significant were:

- The move from timber management to ecosystem based management.
- The revival of commercial harvesting in the Cartwright area.
- The signing of an MOU and a Forest Management Agreement with the LMN to provide advice on forest related issues.

Early accounts of commercial harvesting and sawmill operations in the Sandwich Bay area are vague. Several attempts were made to establish operations in the district. Land leases were common in the early 1900's but many were surrendered or canceled due to non-payment of annual rental charges. Most harvesting of materials and sawing of lumber was used for the local commercial salmon industry and general building needs around Sandwich Bay. Several operations were attempted in the area but were unsuccessful. Early attempts of establishing harvesting operations were susceptible to numerous problems; some of them forest managers' struggle with today. They were believed to include: lack of infrastructure; transportation issues; lack of experienced labor; high logging costs and financial problems.

Overall, harvesting activity in District 20 was essentially limited to the domestic harvesting of firewood, sawlogs and construction material for local use. Based on the previous annual allowable cut of 100,000 m^3, it was recognized that an opportunity existed for commercial development.

In 1993, a loggers training program was conducted in Cartwright to give local residents additional training and experience in harvesting techniques. Sandwich Bay Timber Ltd. began operations in 1994 and by the fall of 1996 had shipped two barge loads of pulpwood, totaling 9795 m^3 (solid) to the Abitibi-Price mill located in Stephenville (this volume included 498 m^3 cut during the loggers training program in 1993).

During the summer of 2002, under a previous "Expression of Interest", Cottles Island Lumber Company began its commercial operation in Cartwright. The operation lasted for four months in which approximately 7000 m^3 of timber was harvested. The majority of this timber was shipped the next summer and fall, via barge, to their mill located in Summerford, NL, for processing with plans to commission a sawmill in Cartwright the following year. These plans later fell through.

Domestic harvesting has essentially remained consistent in the past five year period with the number of permits averaging around 166 per year (@ 23 m^3 per permit). Since domestic permit holders were not consistently sending back their harvesting returns, a survey was sent out to 1998-99 domestic permit holders in the winter of 1999 to collect more substantial data on domestic harvesting activity. A total of 41% of the surveys were returned and the results indicated that 63% of the domestic allocation was being harvested. Since this, district staff have been diligently ensuring domestic returns are recorded for future use.

The majority of domestic harvesting took place near the communities of Cartwright, Paradise River, and Reeds Brook (by residents of Black Tickle). The locations of both the commercial and domestic harvesting areas are illustrated in Figures 2 & 2a.

Table 1. Summary of estimated volume harvested (domestic and commercial) (m^3 solid) for the period April 1, 1999 to March 31, 2004.

YEAR	PULPWOOD	SAWLOGS	FUELWOOD	TOTAL
1999-00	----	1,537	2,835	4,372
2000-01	----	990	3,341	4,331
2001-02	----	1,228	2,965	4,193
2002-03	1,420	6,929	2,866	11,215
2003-04	----	1,054	2,956	4,010
5 yr. Total	**1,420**	**11,738**	**14,963**	**28,121**

A summary of the road construction activity in FMD 20 over the last 5 years is given in Table 2. The majority of road that currently exists in the district was constructed in 1987 by the Department of National Defense (DND) to provide access to the radar site located on the White Hills, 24 kilometres southeast of Cartwright. In addition to this road system, the Department of Natural Resources (DNR) has constructed approximately 6.5 km of class C-2 primary forest access road to accommodate local commercial operations. No new road construction has been done by private operators during the last 5 years.

Table 2. Summary of Road Construction Activity for the period of April 1, 1999 to March 31, 2004.

YEAR	NEW CONSTRUCTION	RECONSTRUCTION	TOTAL (KM)
1999-00	--	--	--
2000-01	3.0	--	3.0
2001-02	2.0	--	2.0
2002-03	1.5	0.350	1.5
2003-04	--	--	--
Total	**6.5**	**0.350**	**6.5**

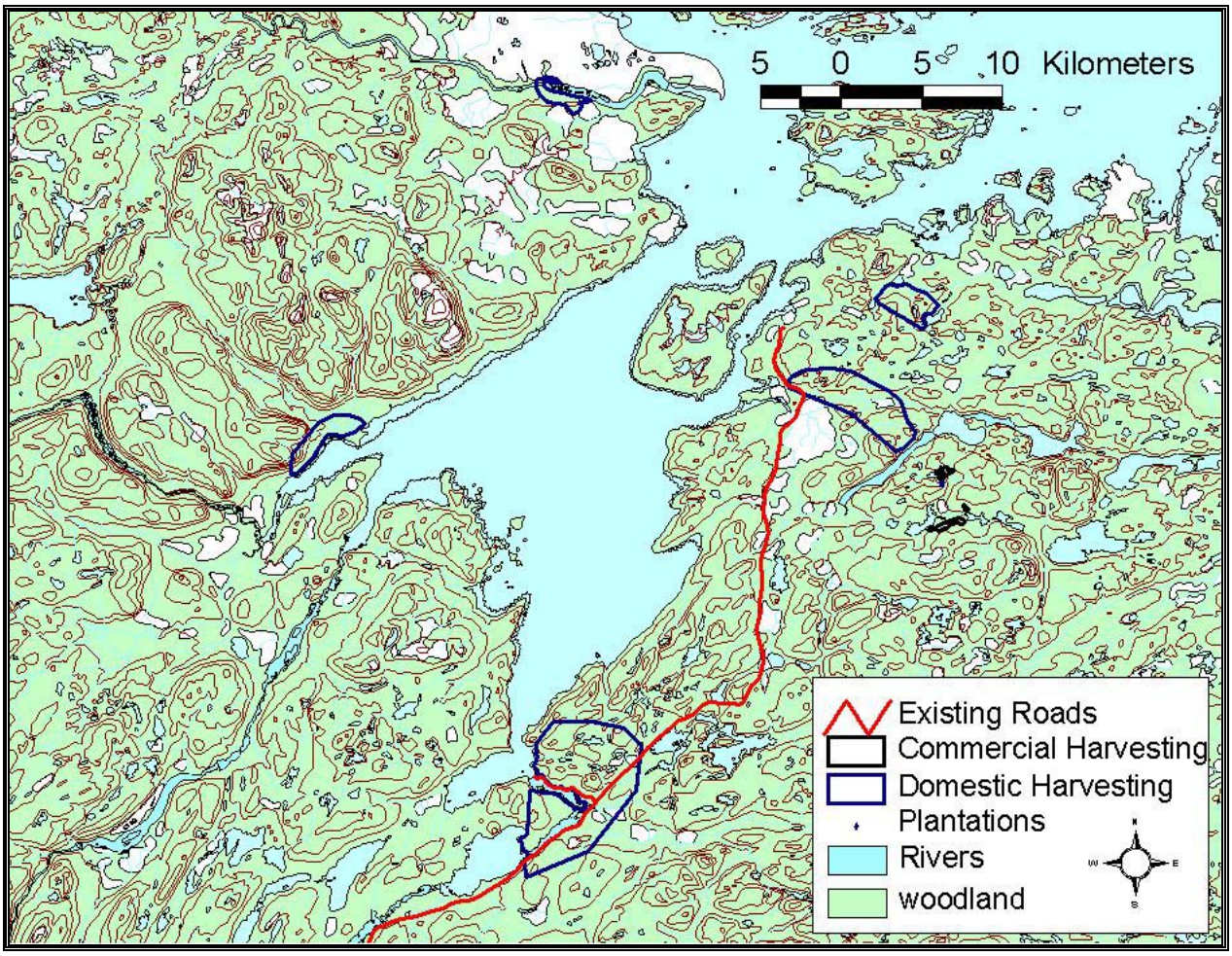

Figure 2. Approximate locations of harvesting (domestic and commercial), silviculture and road building activities in FMD 20 from 1999 to 2004(Cartwright area).

The first silviculture planting contract tendered in the District was in August of 1996. Approximately 75,000 black spruce (*Picea mariana*) seedlings were planted over a 30 hectare area that had been previously harvested. Since this effort, an additional 25 hectares was planted in 2002 with approximately 65,500 black spruce and white spruce (*Picea glauca*) seedlings. A larch (*Larix laricina*) planting trial was also established in 1996.

Seven forest fires have been reported during the past nine years. In 1995 a fire burned approximately 20 hectares between Paradise and Eagle rivers. The second fire occurred in the White Bear River area and it resulted in 200 hectares being burned. On June 25, 1999 after an extended dry period, five fires ignited within a 65 km radius of Cartwright burning a total of 138 hectares. All fires were caused by lightning. The 1995 fires as well as two of the 1999 fires were contained by District staff from Cartwright and North West River, and required water bomber and/or helicopter support from Goose Bay.

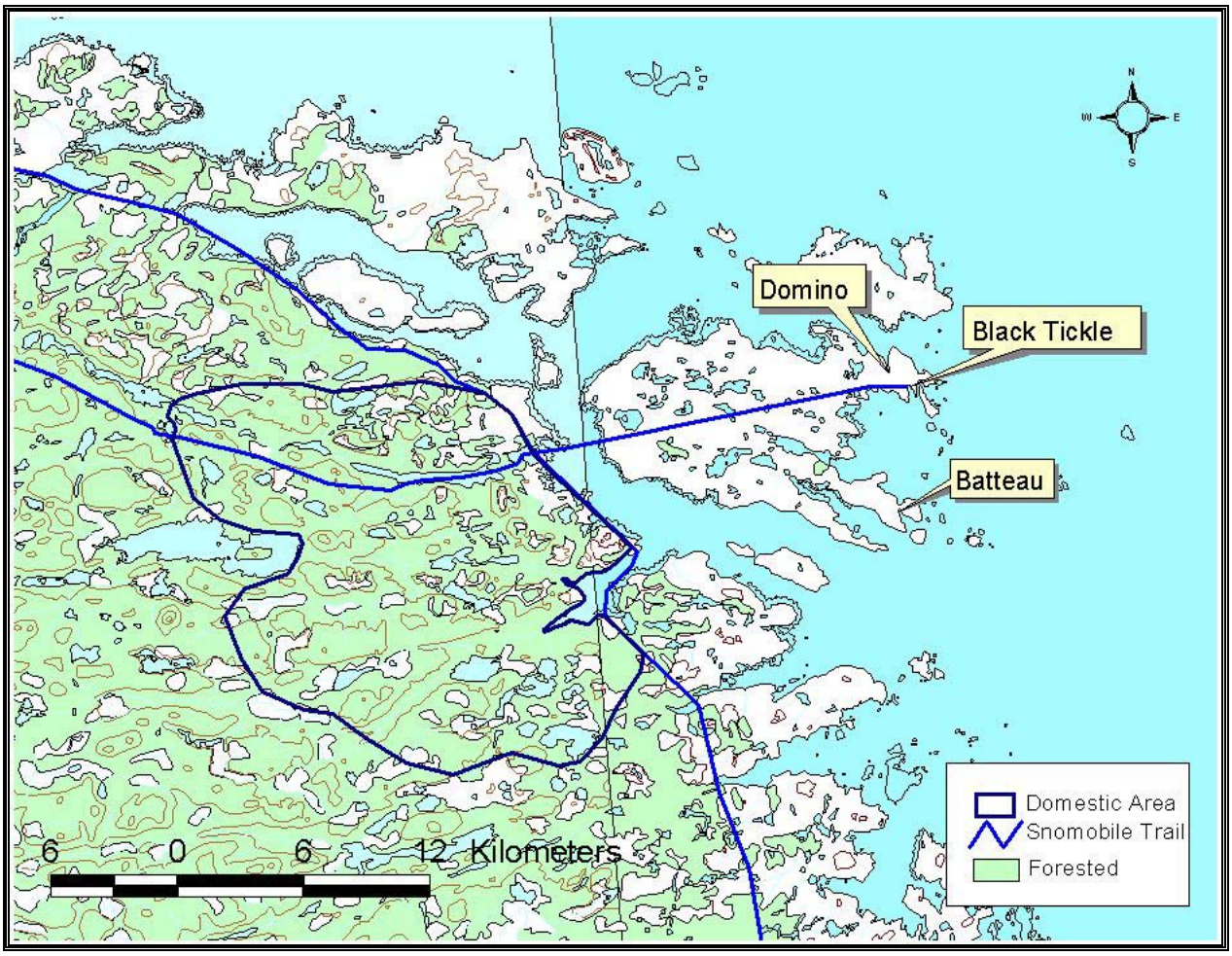

Figure 2a. Approximate locations of harvesting (domestic and commercial), activities in FMD 20 from 1999 to 2004 (Black Tickle Area).

In summary:

- Domestic harvesting activities have remained at relatively consistent levels in the district
- Commercial harvesting activities have maintained their sporadic nature over time.
- Silviculture activities have followed the sporadic nature of the harvesting activities, primarily due to the availability of treatable area.
- Forest access road construction has tapered off, primarily pending the completion of the operating plan.

1.2 Overview of Proposed Activities

An overview of proposed forest management activities scheduled for this five-year period (2005-2009) is presented in the appended maps (Map 1). Activities include: i) harvesting, ii) silviculture, iii) road construction.

A total of 150,425 m^3 solid is proposed for commercial and domestic harvest during the 5 years under this plan. Commercial operators will be allocated 129,000 m^3, which is scheduled to be harvested from fourteen commercial areas identified south of Muddy Bay Pond (Dykes River) and in the selective commercial area identified.

Domestic harvesting is expected to continue at current levels (less than 4285 m3/year) consequently; approximately 21,425 m^3 is estimated to be sufficient to meet district domestic requirements for the next five years. The majority of domestic cutting will occur near the one of the three communities in the district, Cartwright, Paradise River and Black Tickle.

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

Approximately 16 kilometers of Crown and operator built primary access road has been proposed for this planning period. This road system will originate from the DND access road, which connects the community of Cartwright to the North Warning Radar Site located on the White Hills. This access will be required in order to maintain the scheduled commercial harvest and aid in post harvest silviculture treatments.

Various operational surveys, monitoring activities and environmental protection strategies will be discussed in the strategy document.

1.3 Management

Further refinement of the 14 proposed commercial harvest blocks outlined in this plan will be administered through the development of an annual work schedule by April 1 of each year and will be made available to the planning team. In addition, a report on past operations will be completed after March 31 of each year.

Any amendments to the operating plan will be processed through Forest Ecosystem Management Division in Corner Brook and, where appropriate, will be registered as undertakings with Environmental Assessment Division of the Department of Environment and Conservation. Amendments that require EA registration will be subject to environmental assessment and further public review.

2.0 OPERATIONS

The operational activity is reported on in the following four sections and should be considered within the context of the strategy document for Forest Management District 20.

2.1 Allocation of Wood Supply

The annual allowable cut (AAC) is the maximum volume that can be harvested on an annual basis while maintaining a sustainable supply of timber and providing a landscape, which supports non-timber values for future generations. Since the necessary growth and yield data required to run linear wood supply models (such as FORMAN + 1) are absent for the district, the AAC was calculated using a basic area/volume formula. The total AAC for the south side management area in District 20 is calculated to be **30,085m^3/yr**.

This represents a significant reduction from the previous (1993) analysis, which was based on the Global Inventory (1975) and set the AAC at 100,000 m^3. The primary reason for this is directly related to the land base determination. Essentially a smaller area figure was used in the current calculation. Two factors that contributed to this are:

(1) The 1992 Inventory did not survey as large an area as the Global Inventory.

(2) More deductions were made during the land base analysis, which reduced the net commercial area.

It should be noted that, while the 1992 inventory did not survey the entire District, it did survey the majority of the non-isolated commercial forest in District 20 (Figure 3). Further discussion can be found in the Forest Ecosystem Strategy document (FMD 20). It is anticipated that the Trans-Labrador Highway will provide access to some commercial forest, which was not included in the 1992 inventory analysis. Efforts will be made to inventory these areas prior to the next wood supply analysis. The 1992 inventory was incorporated into a Geographical Information System which was used in the development of this plan.

During this five year period, only a portion of the South side of Sandwich Bay is considered for harvesting (Figure 4). Consequently, the AAC calculation is based solely on this area. The South side operating area, in which all commercial harvesting is scheduled to take place, does not intersect Labrador Inuit Association (LIA) land claims areas nor the proposed Mealy Mountains park study area (Map 2). In future operating periods, alternate sources of commercial timber may be explored. Current inventory data indicates that the North side of Sandwich Bay has the potential for commercial harvesting (Figure 5). The current operable landbase excludes the Mealy Mountain National Park study area as well as the area between the Paradise and Eagle Rivers. Both areas are excluded provisionally, until the final boundaries of the National Park are established by Parks Canada, and further work can be completed with stakeholders to determine the significance of any other land uses in the area. A further summary of the resources in the

Mealy Mountain National Park study area can be seen in the FMD 20 Forest Ecosystem Strategy Document. A summary of the wood supply analysis is provided in Appendix III. As indicated in Table 3, 150,425 m^3 has been scheduled for harvest over the next five years. A total of 129,000 m^3 has been allocated for commercial and selective commercial operations and 21,425 m^3 has been estimated for domestic use.

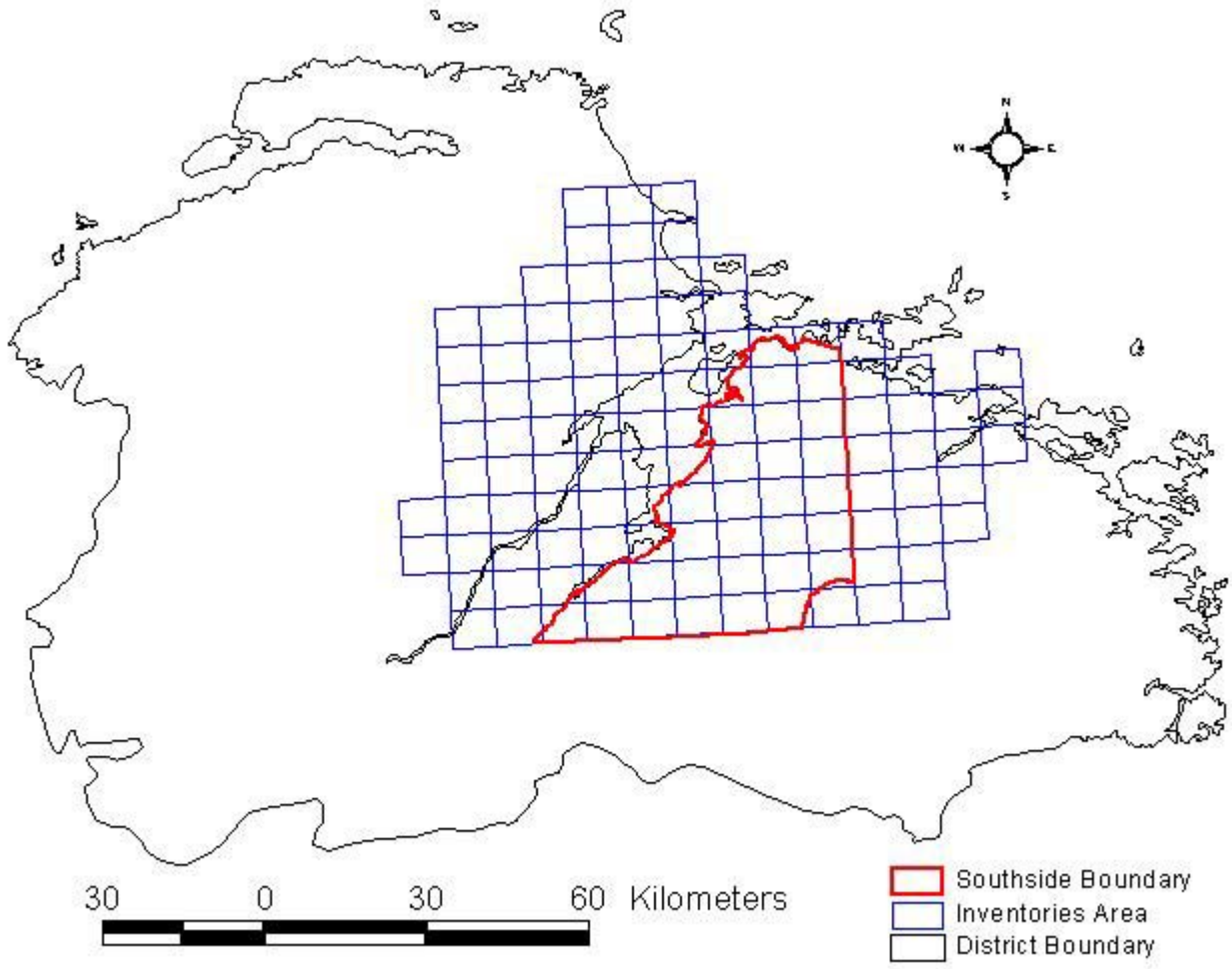

Figure 3. Map of Forest Management District 20 illustrating current inventory area.

Table 3. Summary of proposed harvesting activity for each of the next 5 years in FMD 20.

YEAR	COMMERCIAL (m^3)	SELECTIVE COM. (m^3)	DOMESTIC (m^3)	TOTAL (m^3)
2005	25,000	800	4,285	30,085
2006	25,000	800	4,285	30,085
2007	25,000	800	4,285	30,085
2008	25,000	800	4,285	30,085
2009	25,000	800	4,285	30,085
TOTAL	**125,000**	**4,000**	**21,425**	**150,425**

Fourteen commercial operating areas have been proposed for harvesting over the next five years. Appended in the maps are the locations of these areas are outlined on a 1:25,000 cover type and 1:50,000 topographic maps (Maps 3-13). A summary of the commercial harvesting blocks is provided in table 4.

As described, 125,000 m^3 has been scheduled for commercial harvest. The proposed commercial areas contain an estimated 173,185 m^3 Net Commercial Volume (NCV) of timber. This additional volume, which is approximately 28 % greater than what has been scheduled, will provide operational flexibility. This is to ensure that the interim harvesting guidelines (Appendix IV) are met and that any additional land removed from the harvesting areas as a result of the pre-harvest surveys for the annual operating plans can be accommodated. All harvesting operations are also be governed by the *Environmental Protection Guidelines* (EPG) which have been developed by the Department in consultation with various government departments and industry (Appendix V).

Table 4. Summary of commercial harvest blocks for 2005-2009.

Harvest Block Number	Gross Volume (m^3)	Commercial Volume (m^3)	Net Commercial Volume (m^3)	Commercial Area (ha)
C20-1	44251	39242	31393	276
C20-2	17020	16531	13224	118
C20-3	17407	16934	13547	105
C20-4	24781	24003	19202	140
C20-6	21680	21107	16885	132
C20-7	10203	10178	8142	69
C20-8	17963	17076	13660	116
C20-9	9618	9372	7497	63
C20-10	14846	12925	10340	90
C20-11	9020	8640	6912	70
C20-12	4325	4117	3293	30
C20-13	8484	8483	6786	63
C20-14	13480	13134	10507	107
Harvest Block	Gross Volume	Commercial Volume	Net Commercial	Commercial

Number	(m^3)	(m^3)	Volume (m^3)	Area (ha)
C20-15	16985	14747	11797	107
Total	230063	216489	173185	1486

Commercial Operations

Commercial operations will be confined to the fourteen identified blocks in the plan with the exception of some trial assignments to the selective-commercial reserve area. In general mechanical harvesters and conventional harvesting methods will be used. It is anticipated that, with the exception of the selective-commercial reserve area, all commercial harvesting will be through the clearcut silvicultural system.

Selective Commercial

Selective operations will generally use chainsaws and most likely operate during the winter months. Access road construction in the selective commercial area is not required. For this five year period the commercial selective area will be located between the two domestic areas identified near Cartwright and Paradise River on the north side of the Trans-Labrador highway as shown in Map 1.

Domestic Operations

The harvest of fuelwood, sawlogs and building materials for domestic use will be carried out under permit in identified harvesting areas throughout the District. These areas are generally located in close proximity to communities such as Cartwright and Paradise River (Figure 2). Residents of Black Tickle fulfill their domestic requirements in the Porcupine Bay area (Figure 2a). Small volumes are also harvested at various locations throughout the District by cabin owners. Requests for domestic harvesting blocks outside the approved domestic area, as indicated in the appended maps (Maps 14-17), will require prior approval from District staff. They will be closely monitored and subject to review on an annual basis. Modifications to this practice may be recommended and enforced as required.

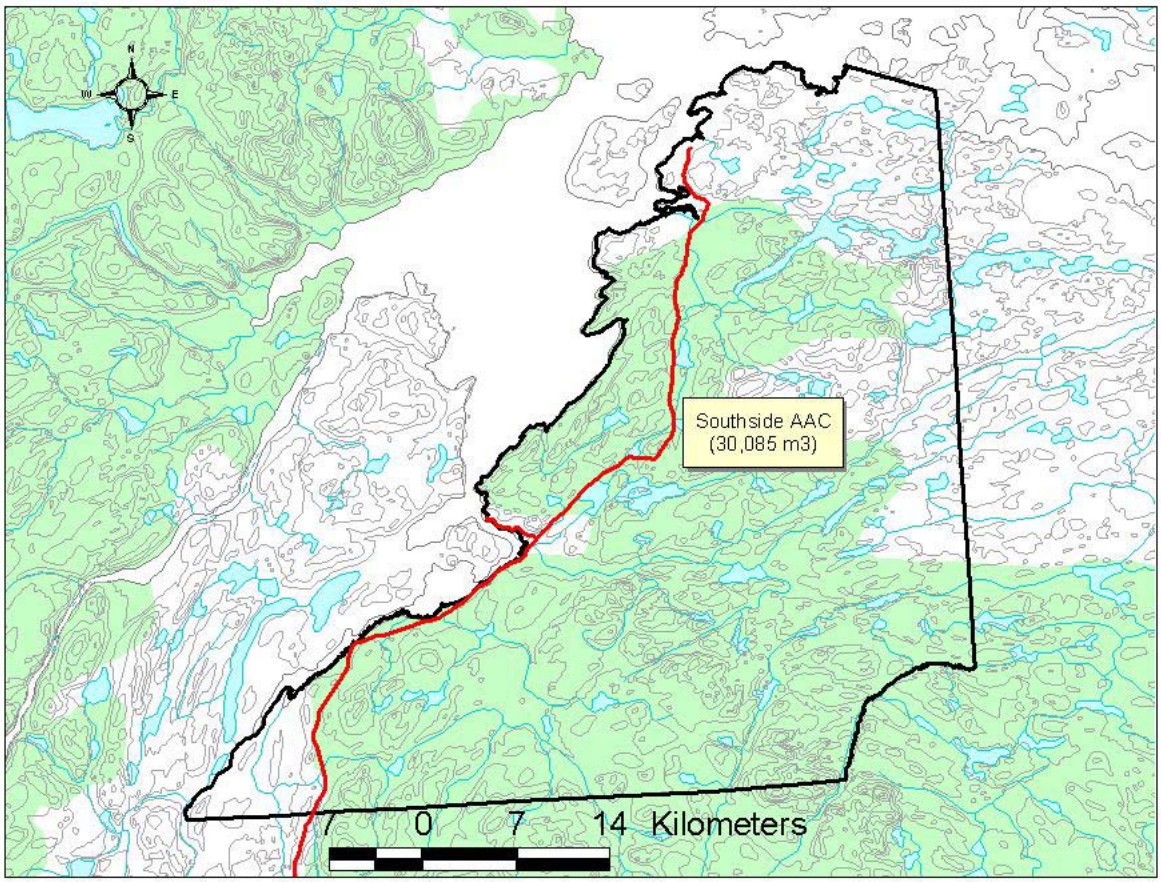

Figure 4. Location of Southside allocation area with corresponding AAC.

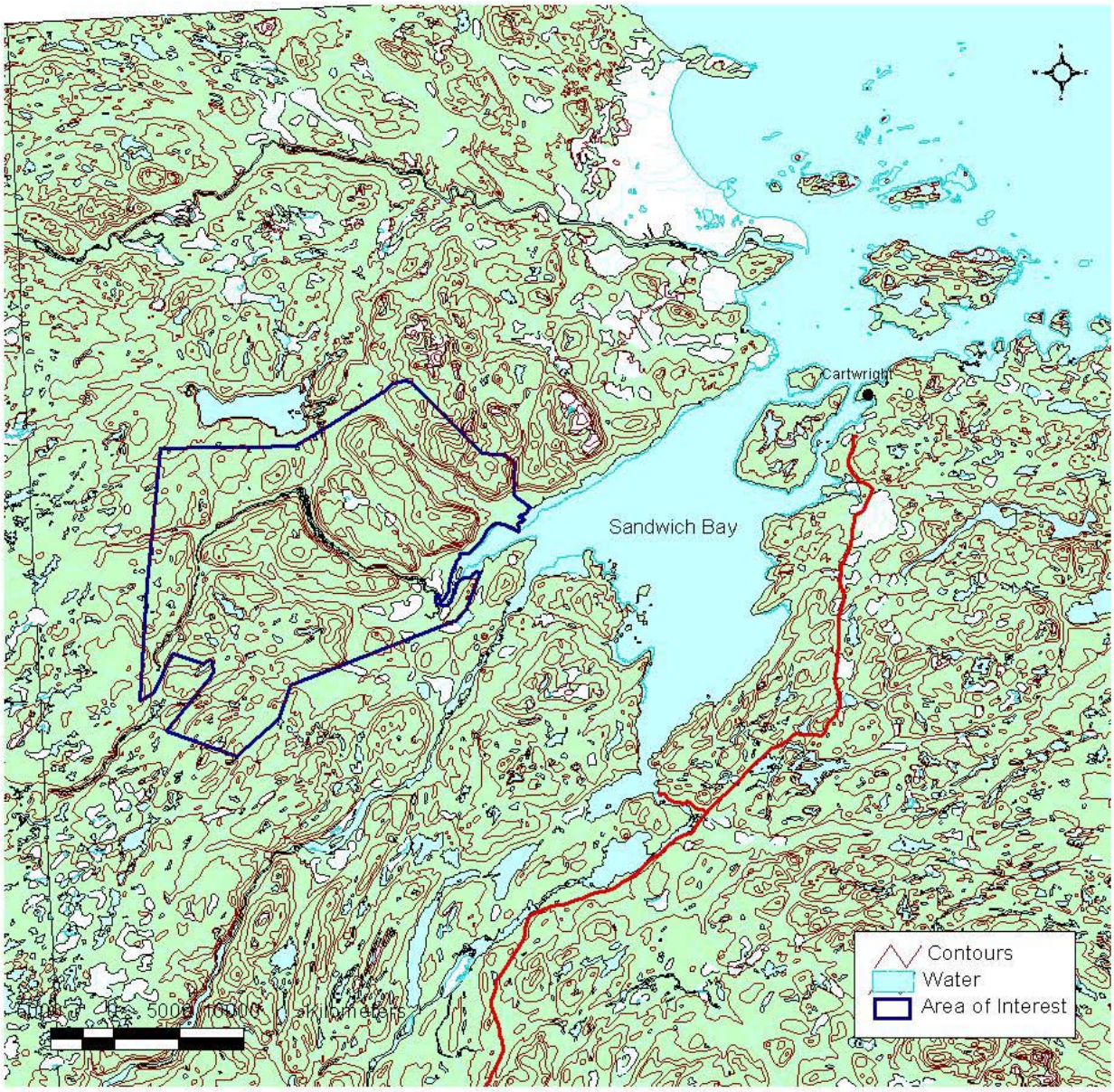

Figure 5. Area of interest on Northside of Sandwich Bay.

Domestic harvesting will not be permitted in the commercial area, which is located south of Muddy Bay Pond (Dykes River) while commercial operations are present. However once commercial operations cease in an area, domestics may be allowed to harvest or clean up commercial areas. Over time this will reduce the pressure on the green tree resource and increase the utilization. Harvesting is also restricted in various buffers that have been established

for roads (100m) and snowmobile trails (30m). A minimum of 125m no harvest buffer will be applied to all major waterbodies with an additional 50m of modified harvest, when required, to be determined in the field by District staff (Map 18). Consensus was reached and major water bodies were defined by local stakeholders during public consultation sessions. All other waterbodies identified on a 1:50,000 map or have a width greater that 1 meter, will have a minimum no harvest buffer zone of 30m. In any instance, when field conditions require, additional buffer distance may be applied. Consensus was reached among local planning team members that the following exceptions should apply to domestic harvesting in buffers:

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

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

Black spruce, is the common fuelwood species in FMD20, will most likely account for 90% of the domestic fuelwood harvest. The remaining volume, balsam fir (*Abies balsamea*), will be sawn in local sawmills. Local residents also use white birch (*Betula papyrifera*) for fuelwood and value added products such as snowshoes. For this, and other domestic uses, white birch within the defined domestic harvesting areas is available for harvest, providing all other conditions (ex. buffers) are adhered to. It is requested that straight stemmed trees with clear boles not be harvested for firewood and left standing for future value added opportunities. Supplementary information regarding the other land uses can be viewed in the Forest Ecosystem Strategy Document.

2.2 Silviculture

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

The forests in District 20 have not been subjected to any large scale disturbance in recent years. Fires have been relatively small and isolated and harvesting activity has been limited. This lack of disturbance has resulted in a relatively old forest. As illustrated in Figure 6, approximately 95% of the forest is greater than 100 years of age. Additional information on land and forest statistics can be seen in the FMD 20 Forest Ecosystem Strategy Document. Forests in the 0-20 year age class account for less than 1% of the total, thereby limiting the immediate potential silvicultural opportunities in the District.

The silviculture program in District 20 will focus on monitoring and research. However, suitable areas which may be identified for planting during the operating period are identified in (Map19). These areas are either previous cutovers or older burns which are not regenerating as expected. Softwood stands in the age classes of 0-20 and hardwood stands in the age classes of 20-40 are identified in Map 20. These areas may become suitable areas for pre-commercial thinning and hardwood management in the operating period covered by this plan. Further refinements to each project will be described in the Annual Work Schedules developed each year.

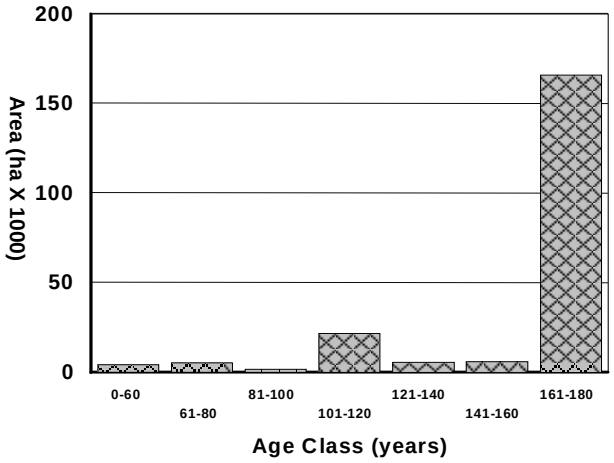

Figure 6. Summary of productive forest area (ha.) by age class in FMD 20.

Based upon past observations, it is anticipated that a majority of the areas harvested will regenerate naturally within a five year establishment period. Harvested areas will be monitored for regeneration and detailed surveys will be conducted in areas where regeneration appears to be inadequate. Harvested stands (or portions of harvested stands) that are not adequately regenerating will be scheduled for planting. The planted species will be determined on a site specific basis but will be highly dependent on the pre-disturbance stand structure. Subject to funding, cone collections will also be initiated within the District to provide a local planting stock of native tree species. All planting projects are supported by the Regional Tree Nursery in Goose Bay.

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

(1) Retention of groups of seed trees.
(2) Modification of harvesting patterns.
(3) Investigation of various site preparation techniques.

2.3 Access Road Construction

The construction of an effective road network is essential to ensure the success of commercial operations in the area. To ensure this success, 16 kilometers of primary access road have been proposed for construction during this planning period. Based on current costs this will require a funding commitment well in excess of one million dollars. A summary of this program is provided in Table 5.

Table 5. Proposed primary access road construction for the period January 1, 2005 – December 31, 2009.

YEAR	CLASS	APPROX. LENGTH (km)
2005	C-2 (Primary)	3.0
2006	C-2 (Primary)	3.5
2007	C-2 (Primary)	2.5
2008	C-2 (Primary)	3.5
2009	C-2 (Primary)	3.5
TOTAL		**16.0**

With the exception of the 2 km of road located near Quarry 10, the remaining 14 km will be an extension to the existing forest access road. Both road systems will originate from the DND road, which links the North Warning Radar Site to the community of Cartwright. The location of the proposed primary road construction activity is illustrated on the 1:50,000 cover type and 1:50,000 topographic maps provided in the appended maps (Map 21 - 22). This road network will potentially provide access to approximately 168,000 m^3 (NCV) during the first four years of this plan. An additional 1.0 km is scheduled for construction during the fifth year in order to access sufficient timber for the initial year of the subsequent five year plan. All roads constructed by the Department will be of class C-2 standard (Appendix VI).

Operational roads (secondary and tertiary) are not identified in the five year plan. However, they may be necessary in order to ensure that the timber scheduled for harvest can be fully accessed. Royalty reductions, as per regulations, will be offered as incentive for commercial operators to construct their own access roads. These roads must adhere to established construction and environmental standards and will be subject to approval by District staff and identified in annual plans. Considering the limited access that currently exists within the District, decommissioning (barring or rehabilitating of access roads) has not been scheduled for this planning period. It will be considered when it is in the interest of protecting sensitive wildlife or fish habitat. Road construction activity will be carried out as per the Environmental Protection Guidelines, which are provided in Appendix V. Certificates of approval must be obtained from the Department of Environment and Conservation for any stream crossing.

2.4 Monitoring and Research

A public monitoring and research committee will be established in the district during the implementation phase of the five year plan. The adaptive management approach will afford the opportunity for participants to continually improve the plan and set the stage for the next planning period.

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

The LMN will also participate in field research through a Forest Guardian Program which is to be established under the Forest Management Agreement.

Pre-harvest Surveys

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

Regeneration Surveys

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

Utilization Surveys

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

While these surveys are necessary to measure the immediate impact of activities on the ecosystem, mechanisms to monitor change over the long term are also necessary. During the summer of 2001 approximately 30 PSP (permanent sample plots) were established in District 20 by the inventory branch of DFRA. These permanent sample plots will be an important component of long term monitoring. A five to ten year measurement cycle is expected in District 20. In addition to obtaining growth and yield information, data pertaining to site, coarse woody debris and the presence of small mammals and songbirds will be recorded and monitored

over time. After two cycles of measurement, growth trends can be observed and preliminary data analyzed. More measurements are required to ensure that more representative results are obtained. These results will prove helpful in future planning period.

Site Disturbance Surveys

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

Information and Research

All stakeholders including DNR acknowledge the information gap, which exists in Labrador. Currently, little to no research has been conducted in the immediate area thus making management decisions cumbersome. Other areas of concern relative to forest development are discussed further in the FMD 20 Forest Ecosystem Strategy Document. In consultation with stakeholders, subject to funding, DNR plans to initiate several smaller research projects over the next five year period. These projects will provide relevant site specific information, which can be used, for management decisions and processes during the next planning period. These projects will be developed with input from the regional ecologist.

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

Finally, District Conservation Officers will routinely monitor harvesting, road construction and silviculture operations. This will ensure that activities are being carried out in a manner consistent with various legislation, guidelines and the objectives and goals of the strategy document. Labrador Metis Nation Forest Guardians may also be assisting with some of the aforementioned monitoring, however, the roles and responsibilities of the LMN Guardians will be defined further by the forest management committee.

3.0 PROTECTION

This section is intended to address issues that concern the protection of aquatic and terrestrial habitats, biodiversity and ecosystem health. This strategy will be based on the Environmental Protection Guidelines, which are appended to this document.

3.1 Management Units

Extensive areas have been identified for District 20 for the protection of ecological values and to ensure the sustainability of domestic activities. The LMN have identified several management units as having cultural* significance; however this has to be refined further for the next planning period. Landscape, watershed and stand level scales are used as successive scales to filter and identify protected ecosystem functions within each level. Individual management units are discussed further in the strategy document.

Protected areas at the landscape scale are designed to protect large representative areas of major ecosystem and habitat types as well as ensuring the connectivity of the landscape remains and habitat fragmentation is limited. Broad scale management units (mapped at the 1:500,000 or 1:250,000 scales) were identified across the district. At this level large areas, such as the Mealy Mountain National Park Study area (including IBP sites), entire protected watersheds, ecological reserves (such as the Gannet Islands) and a Federal reserve radar site are considered. The landscape management units are briefly described in table 6 below and illustrated in Map 23.

Management Unit	Included in Operable Landbase (Y/N)	Forest Management Activities
1	Y	Commercial and domestic harvesting
2	Y	Potential commercial and domestic harvesting
3	Y	Potential commercial harvesting; silviculture treatment areas
4	Y	Domestic harvesting
5	N	Inventory
6	N	Domestic harvesting
7	N	Possible silviculture treatment area; operable area buffer; inventory
Domestic Harvest Blocks	Y	Domestic harvesting
Selective Commercial Block	Y	Selective commercial harvesting
MMNP Study Area	N	None

Table 6. Management unit description table including operability and proposed forest management activities.

At the next level, watershed features such as recreational cabin areas, transportation routes such as Provincial highways, recreational areas including groomed snowmobile trails, steep slopes, and wildlife corridors are protected. At this scale (1:50,000), several portions and entire

* Further reference should be made to disclaimer on Page ii.

watersheds including the Eagle River, Black Bear River, North River, White Bear River and a portion of the Paradise River are also protected.

The final filter is at the stand level. Features at this level will be identified as a result of the pre-operational surveys and identified in the annual work schedule at the 1:12,500 scales. Identifiable stand level protected features include riparian buffers, water fowl staging areas, wildlife dwellings, raptor nest buffers, isolated stands and slopes, snag and green tree retention on harvest blocks, additional Provincial highway and snowmobile trail buffers, protected water supplies and town buffers. An additional 15% reduction to the net commercial forest area is applied during the annual allowable cut calculations for such areas.

Results of a survey conducted by the Labrador Metis Nation have revealed that at the landscape level the following features are important:

-Traditional hunting*, gathering* and berry picking*
-Important visual landscapes
-Travel routes and high use areas
-Cultural* heritage values.
-Domestic forest harvesting.
-Recreational activities

3.2 Habitat Protection

Mature forests provide important habitat for a variety of plant and animal species. Examples range from various lichens to economically important fur bearers such as American Marten (*Martes americana*). Large contiguous forested areas have been excluded from the current wood supply analysis. Approximately **53%** of the commercial forest was not included in the AAC calculation (FMD 20 Forest Ecosystem Strategy Document). At the landscape level, entire watersheds (i.e. Eagle and Black Bear Rivers) or significant portions of watersheds have not been considered for harvesting. There is also a federal reserve at the White Hills radar site, which is excluded from harvesting. These areas can provide important bench marks for scientific study and long term monitoring of ecosystem health. At the stand level, interim harvesting guidelines (Appendix IV) will provide for unharvested areas and connectivity. These wildlife corridors will ensure that wildlife species have the ability to move across the landscape. Where possible these corridors will incorporate riparian areas and follow the natural topography. Corridors will be identified in the annual work plans.

Watercourse buffers are important in the protection of aquatic ecosystems and the maintenance of water quality and quantity in general. They provide shade, act as filters against excessive sedimentation and stabilize soils when properly planned. Buffers also serve as important travel corridors and habitat for wildlife. Current guidelines require a minimum 30 metre treed buffer be maintained on all water bodies that are one metre in width or greater. Guidelines also permit for an increased buffer when required (i.e. steep slopes, sensitive spawning areas, etc.). In the

* Further reference should be made to disclaimer on Page ii.

case of major rivers, a minimum of 125 metres will be maintained with an additional area of modified harvest when required. Waterfowl staging areas will require a 30 meter buffer. The harvesting of hardwoods within 30 meters of a water body occupied by a beaver will not be permitted.

Coarse woody debris, which includes both standing snags and downed woody material, are also important to a variety of plant and animal species. In recognition of its value, whole tree logging will not be permitted under this plan. Logging systems that leave limbs and tops on the harvesting site will be favoured. Guidelines also require that a minimum of 10 snags per hectare remain after an area has been logged. When appropriate, efforts will be made to retain green trees to prevent snags from blowing down. Larger trees (>50cm dbh) will be preferred. In order to provide a future source of coarse woody debris, efforts will be made to maintain green trees (green tree retention) in harvested areas. Clusters of trees will be preferred over single trees. Where ever possible snags should be maintained in association with green tree retention. Efforts will be made to follow patterns of natural disturbances, such as irregular and feathered edges.

There are no known black bear dens within the proposed operating areas. In the event that an active raptor nest is identified in the annual plans, guidelines require an 800 meter buffer be maintained during the nesting season (March 15 to July 31). These dates may vary in Labrador due to weather conditions. Once the young have left the nest, a 200 meter buffer is required. A 50 meter buffer will be maintained on any black bear denning sites that are found within the proposed operating areas. Annual pre-harvest surveys will be conducted to identify these areas.

3.3 Wildfire Protection

Large fires have not been common in District 20 in recent years. Wildfire, however, is documented as a natural occurrence in the Labrador Region. Large fires have occurred in Southern Labrador (Port Hope Simpson); therefore an effective fire suppression program is necessary to ensure that losses to fire are minimized. Fires, which pose no threat to life, property or commercial resources, will be allowed to burn. The priority fire suppression zones within Labrador are outlined in the appended maps (Map 24).

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

3.4 Insect and Disease

Over mature stands increase the risk of insect and /or disease outbreaks. Harvesting of the oldest stands first will reduce the potential risk for such outbreaks and also reduce the risk of major forest fires. No chemical or insect control agents will be utilized for management purposes in the District.

3.5 Hunting and Trapping

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

3.6 Cabin Development

Representatives of the Inland Fish and Wildlife Division expressed concerns that increased road access may facilitate increased cabin development. They requested that the construction of cabins near sensitive wildlife areas be discouraged. Current environmental guidelines require a minimum of 50m treed buffer between operations and approved cabin development areas. As sensitive wildlife areas are identified, this concern can be addressed through the Crown Lands Referral process.

3.7 Historical Resources

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

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

3.8 Trans-Labrador Highway

Construction commenced on the south coast portion of the Trans-Labrador Highway (TLH) in June, 1999. Currently the TLH connects the communities of Cartwright and Paradise River to several other communities on the south coast. Proposed harvesting activities are not scheduled to occur within the right-of-way for the section of highway that is scheduled to connect Paradise

River with Cartwright. A minimum of 100m no cutting buffer will be implemented for all domestic and commercial harvesting along the highway.

However, harvesting activity may be visible from the route. In order to minimize the visual impact of these operations, the proposed harvesting areas have been modified. Skyline reserves will be maintained and roads will be located on the lower slope and buffered so as not to be seen from the highway. A detailed discussion on the Trans-Labrador Highway project is provided in the strategic document.

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APPENDIX I

Planning Team Members and Correspondents

The following is a list of participants who have attended sessions since the planning process began in 1996. Minutes for the final 8 sessions can be found online at **www.gov.nl.ca/forest/district20.ca**

Name	Community	Representation
Alyward, Paul	HV-GB	Gov't Services and Lands
Ashini, Daniel	Sheshatshiu	Innu Nation
Barbour, William	Nain	LIA
Bird, Gary	Cartwright	Public Member
Bird, Jessie	Cartwright	Public Member
Brown, Alvin	Cartwright	Public Member
Burton, Ron	HV-GB	DFO
Butler, Charlie	St. John's	DFRA
Cabot, George	Cartwright	DFRA
Cabot, Pat	HV-GB	Agriculture
Chubbs, Lydia	HV-GB	Dept. of Environment and Labour
Clark, Aden	HV-GB	Gov't Services and Lands
Clinton, Stan	St. John's	Municipal & Provincial Affairs
Colbert, Ken	HV-GB	DFRA
Curl, Jim	Cartwright	Public Member
Davis, Doris	Cartwright	Public Member
Davis, Lewis	Cartwright	Public Member
Davis, Patrick	Cartwright	Public Member
Davis, Phoebe	Cartwright	Public Member
Deering, Keith	HV-GB	DFRA
Drake, Martha	St. John's	Historic Resources Division
Dyson, Allan H.	Cartwright	Public Member
Dyson, Charlie	Cartwright	Public Member
Dyson, Cylar	Cartwright	Public Member
Dyson, Gaden	Cartwright	Public Member
Dyson, Wade	Cartwright	Public Member
Earle, Fred	St. John's	Gov't Services and Lands
Elson, Anthony	Cartwright	Public Member
Ettinger, Steve	Cartwright	RCMP - Public Member
Flynn, Roy	Red Bay	DFRA
Forsyth, Jay	Sheshatshiu	Innu Nation
Gilliland, Scott	St. John's	Canadian Wildlife Service
Gillis, Blair	Cartwright	Eagle River Development Association

Name	Community	Representation
Goudie, Joe	HV-GB	Parks Canada
Goudie, Rex	Goose Bay	L.A.A
Green, Raymond	Cartwright	Public Member
Hamel, Leslie	Cartwright	Public Member
Harnum, Jackie	St. John's	Dep't Tourism, Recreation and Culture
Heard, Edwin Sr.	Cartwright	Public Member
Hearn, Brian	St. John's	Canadian Forest Service
Holwell, Shawn	Cartwright	Public Member
Hopkins, Shirley	Cartwright	Town Manager - Cartwright
House, Colin	St. John's	Environment Canada
Hudson, Jeff	Black Tickle	Public Member
Hughes, David	St. John's	Native Policy
Innes, Larry	Sheshashiu	Innu Nation
Learning, Rosyln	Cartwright	Mayor
Learning, Stewart	Cartwright	Public Member
Lebourbon, Derek	Goose Bay	DFRA
Lethbridge, Brendon	Cartwright	Public Member
Lethbridge, Norman	Eagle River	Public Member
Lethbridge, Robert	Cartwright	Public Member
Lethbridge, Woodrow	Cartwright	Trappers Association
March, Lorie	Corner Brook	NF & LB Environment Network
Martin, Diane	Cartwright	Public Member
Martin, Harry	Cartwright	Table Bay Conservative Committee
Martin, Heather	Cartwright	Public Member
Martin, Jeff	Cartwright	Public Member
Martin, Jim	Cartwright	Public Member
Martin, John	Cartwright	LMN
Mesher, Ken	Paradise River	Public Member
Messieu, Leo	Cartwright	Public Member
Michel, Ben	Sheshashiu	Innu Nation
Mitchell, Greg	Corner Brook	NF & LB Environment Network
Moores, Len	HV-GB	DFRA
Morris, Richard	Cartwright	Public Member
Mullins, Max	HV-GB	Dept. of Development and Rural Renewal
Nuna, Richard	Sheshatshiu	Innu Nation
Oliver, Stanley	HV-GB	DFRA
Pardy, Judy	Cartwright	South Eastern Development Association
Pardy, Manuel	Cartwright	Public Member
Pardy, Max	Cartwright	Sandwich Bay Timber Ltd.
Phillips, Frank	HV-GB	DFRA
Pilgrim, Todd	Cartwright	DFRA

Name	Community	Representation
Riche, Len	Clarenville	Labrador Outfitters Association
Roberts, Clarence	Cartwright	Public Member
Roberts, Graham	Cartwright	Public Member
Roberts, Wade	Cartwright	Public Member
Russell, Todd	HV-GB	LMN
Ryan, Edmund	Red Bay	DFRA
Sampson, Don	Port Hope Simpson	South Eastern Development Association
Schaefer, Jim	HV-GB	DFRA
Schlossek, Tanya	Cartwright	DFRA
Simon, Neal	HV-GB	DFRA
Smith, Hubert	Cartwright	DFRA
Smith, Natasha	Cartwright	Public Member
Taylor, Ford	Cartwright	DFRA
Thomas, John	North West River	DFRA
Toomashie, David	Cartwright	Public Member
Way, Patty	Cartwright	Public Member
White, Barry	Cartwright	DFRA

APPENDIX II

Summary of Meeting Minutes from April 1996 to April 2002

In November of 2001 the planning process for District 20 was re-initiated in the Cartwright area. From this time until April 2002, eight sessions were held with participants to discuss outstanding forestry issues relating to the district 20 five year operating plan and strategy document. An initial meeting was held to discuss the draft document. The succeeding meeting was facilitated by Tanya Schlossek (District Ecosystem Manager) as a "brain storming" exercise to identify public concerns. These topics were used to draft agendas for subsequent meetings. The topics identified were:

- Domestic hunting and trapping
- Cabin development
- Waterway access/ public access
- Local resource access
- Harvesting methods – clear cutting
- Ecosystem health – general
- Buffer widths
- Protected areas
- Experimental areas
- Wildlife corridors
- Endangered species
- Rotation age
- AAC calculation – poor sites
- Pre-operational planning
- Research
- Local opportunities – sawmilling and harvesting
- Mealy Mountain National Park Study Area
- Text changes to draft document
- Maps to include local, cabins and recreational areas
- Forest industry
- Community consultation

In summary some concerns and questions raised during the meetings were;

Local domestic harvesting needs for firewood and sawlogs was identified. Residents were concerned about where they could harvest and if domestic licenses would be still available. Domestic blocks near Cartwright and Paradise River were identified in the plan as domestic areas only. In some meetings it was discussed that maybe the TLH could be open to domestic harvesting. After numerous discussions, most everybody agreed that for management and control purposes, it would be beneficial to concentrate domestic harvesting in specific areas.

However, it was agreed by all that a domestic cutter could identify a harvesting area outside the block outlined in the plan, to the department for consideration. There was also concern that in light of the large-scale commercial operation setting up in District 20, the domestics would lose the privilege of domestic cutting. The department indicated that no local resident would be turned down for a domestic cutting permit.

Locals were concerned about water buffer widths and which waters would be buffered. After an exercise, during a planning meeting, all participants agreed that the rivers identified in "Rivers of Labrador" as accessable Atlantic Salmon (*Salmo salar*) parr rearing areas would be considered a major waterway and an increased buffer applied. Previous plans identified a 100m buffer on all scheduled salmon rivers. This plan, all rivers and waterbodies identified as major waterways were buffered 125m for both the AAC calculation and during field operations. This resulted in approximately 50% more waterbodies and rivers being buffered with 125m than previous plans. All other streams would be buffered 30m. This is a 10m increase from buffer widths suggested in the Environmental Protection Guidelines. It was also mentioned that if the field conditions warranted, additional buffer could be layed out if required. Not all planning team members agreed to the 125m buffer and thought additional buffer width was necessary for environmental protection. However, no participant or forestry official could provide supporting literature.

Consensus was reached among planning team participants that the harvesting of dead, blown down green timber or boat timbers in buffers was accepted, provided good harvesting practices are practiced. These activities require prior approval from district office and will be closely monitored and subject to review on an annual basis.

Harvesting along the TLH was a concern. This 5 year plan does not have any harvesting or roads scheduled near the highway. Also, landscape design was used in laying out the proposed operating areas. This was to ensure minimal visual impact from the TLH.

Protection of a fresh water spring (approximately 20km) along the DND road was a concern raised. The department scheduled all commercial harvesting activities including road construction out of the watershed which feeds the spring.

Cabin development in the area was raised. All cabin development areas legally existing in the operating area (of which there are none) will have a 50m treed buffer from any harvesting activity. Construction of new cabins would be subject to Crown Land reviews.

The proposed Mealy Mountain Park Study area was a major issue raised during meetings. Past draft plans included a potential AAC area near White Bear River on the north side of Sandwich Bay. The current draft of the 5 year operating plan was revised to not include this area and its associated AAC as potential AAC. The draft recognized that the Mealy Mountain National Park steering committee is holding meetings and any AAC's available will be dependant upon the outcomes.
All parties involved in District 20 planning process acknowledged a large information gap. The department agrees with this and will try to seek funding through either departmental programs or

partnerships to conduct research in the immediate area. A meeting was scheduled to discuss this topic, however turnout was poor. Those present offered suggestions for research initiatives which will be taken into account.

Concerns over large discrepancies in the calculated AAC between the current and past draft plans was raised. The plan explains well what happened.

Local domestic harvesters were concerned about harvesting white birch for cultural values such as firewood and snowshoe making. The department acknowledged this value and stated that white birch could be harvested under a domestic harvesting permit within the identified domestic cutting areas provided any other conditions (ex. buffers) were followed.

Watershed level protection was raised. It was noted by the department that in the current plan the Eagle, White Bear, Black Bear and a significant portion of the Paradise River watersheds are protected from any harvesting in this 5 year plan.

10% cull and rot deductions used in AAC calculations was challenged. Some participants stated that there was more rot in the trees, however some argued that there were some stands with very little to no rot present. All agreed a true figure would be the balance of both. No one present or through out the planing process could provide evidence to support this. In light of this, consensus was reached to apply the 10% deduction for rot and cull in this operating plan. Utilization surveys along with scaling reports from the 2002 harvest season could possibly be used to gauge an approximation of rot. It was agreed that if a +/- 5% difference was found, then the AAC would be recalculated using the new rot/cull figure.

Inclusion of additional maps was raised. Local stakeholders requested that maps of past fires, major waterbodies and the Mealy Mountain Nations Park study area be included in the plan. All these maps were added and referred to as figures in the text.

Rotation age (120 years) used in AAC calculations was raised. Various stakeholders claimed that due to different climate conditions, a rotation age of 120 years was not representative of the area. Again, research in this area is limited and non-existant for District 20. Black spruce discs were taken from regenerating trees on a snowmobile trail harvested in the early 1970's. Ages were found to be between 30 and 80 years old. Disc diameters at breast height ranged from 6.0 cm (30 yrs old) to 9.5 cm (80 years old). A literature search was completed and turned up nothing except rotation age information presented in the "Silvics of North America" volume 1 conifers. The table (pg. 233) was created from various samples of black spruce stands in three site classifications (poor, medium and good) on the boreal forest of Canada. It was also noted that the south side operating area was located in the boreal forest region.

Complete minutes are available online at www.gov.nl.ca/forest/district20/

APPENDIX III

Wood Supply Analysis

The annual allowable cut (AAC) is the maximum volume that can be harvested on an annual basis while maintaining a sustainable supply of timber and providing a landscape, which supports non-timber values for future generations. Since the necessary growth and yield data required to run linear wood supply models (such as FORMAN + 1) are absent for the district, the AAC was calculated using a basic area/volume formula.

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

Where:

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

Net Commercial Forest Area Determination

Landbase	Area (ha)	Swd. Volume (m^3)
Total Area (1992 inventory)	612,337	23,928,973
Total Area (southside management area)	174,640	9,005,661
Productive Forest	50,933	6,899,254
Commercial Forest	50,125	6,882,947
Un-alienated Commercial Forest	38,612	5,330,052
Net Commercial Forest	32,820	4,530,544

Definitions and assumptions

Productive Forest Stands that are capable of producing 35 m^3/yr at rotation.

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

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

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

Rotation Age

Rotation age is the age at which the mean annual increment of merchantable volume reaches its peak and yields the most volume per unit area per year. Normal yield tables show that rotation age increases as site quality decreases. They also show that the corresponding merchantable volume and mean annual increment decrease greatly from good to poor sites (USDA 1990). Averages for black spruce stands of three site classes in the boreal forest of Canada are as follows:

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

Approximately 78% or more of the area in District 20 are black spruce stands. The proportion of site classes of forest stands is approximately 46% poor, 45% medium and 9% good. The average gross merchantable volume is approximately 140 m^3/ha. Considering these figures a best estimation of the rotation age for District 20 is **120 years**.

Net Merchantable Volume Determination

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

commercial land base area are determined. The Gross volume/hectare is found by using the following formula:

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

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

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

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

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

	Gross Volume (m^3)	Gross Area (ha)	Commercial Volume (m^3)	Commercial Landbase Area (ha)
Southside Area	9,005,661	174,640	4,530,544	32820

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

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

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

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

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

AAC Calculation

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

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

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

APPENDIX IV

Interim Harvesting Guidelines

Size of Area

1) Size of clearcuts will be limited (50-80 ha), with expected average between 50-60 ha, depending upon environmental circumstances. Maximum contiguous clearcuts will not exceed 100 ha in any management period (20 years).

2) Harvest areas that follow natural topographic features and curved edges, are feathered where possible.

3) Harvest areas with varied dimensions and maximum cover-to-cover distances of <300 m are expected.

4) Harvest areas with maximum edge ratios are preferred.

Location of Proposed Harvest Area

1) Buffer areas or uncut blocks are required between cut areas or natural non-forested sites.

2) Appreciable areas of uncut timber will be left as residual forest by block and watershed. Actual leave-areas may vary from 25-50%. Leave areas will be maintained during the current management period.

3) Blocks with low potential for alternate use or resource conflict may be harvested within the management period (or operating period) at an accelerated pace if other circumstances permit (i.e. Forest conditions).

4) Various factors (environmental, topographic, forest conditions, etc.) may restrict or require harvest modifications.

5) Generally, harvest areas will be staggered with green belts and wildlife corridors will be maintained, particularly on major access routes.

Other Factors

1) Generally, oldest stands (or those in deteriorating condition) will be harvested first. Stands less than 90 years will not be considered.

2) Accessible stands of quality sawlogs will be reserved for that product. General harvest allocation will reflect a proportionate degree of good and poor areas from a harvest perspective to maintain an adequate balance of harvest opportunities.

3) Harvest modifications or restrictions will be employed in areas of high potential alternate use, watershed areas, sensitive sites, and critical habitat locations.

4) Silvicultural requirements on a site specific basis may modify harvest practices. These will be dealt with on an individual (or generic) basis as they arise.

5) Buffer zones, particularly on designated lakes, river, and ponds may be required. These will vary in width from 30 m to 300 m, depending upon circumstances.

APPENDIX V

Environmental Protection Guidelines for Ecologically Based Forest Resource Management (Stand Level Operations)

ENVIRONMENTAL PROTECTION GUIDELINES

"Forests are interconnected webs which focus on sustaining the whole, not the production of any one part or commodity. Trees, the most obvious part of a forest, are critical structural members of a forest framework. However, trees are only a small portion of the structure needed for a fully functioning forest." (Hammond, 1991)

This ecologically based approach to forest resource management requires that resource managers shift their focus from managing components of the ecosystem to managing the three-dimensional landscape ecosystems that produce them. Primary concern becomes the maintenance of landscapes and waterways as complete ecosystems because the only way to assure the sustained benefit of forest values, now and in the future, is to keep them and all their parts in a healthy state. This is the foundation for an ecologically based approach to forest management. It means that everyone attends to the conservation and sustainability of ecosystems instead of sharply focusing on the productivity of individual or competing resources which has been our traditional mode of operation.

The Newfoundland Forest Service is committed to the concept of forest ecosystem management, which is captured in the Twenty-year Forestry Development Plan (1996-2016) vision statement:

> "To conserve and manage the ecosystems of the Province which sustain forests and wildlife populations and to provide for the utilization of these resources by the people of the Province under the principles of sustainable development, an ecologically-based management philosophy, and sound environmental practices."

There are five strategic goals in the Twenty-year Forestry Development Plan (1996-2016) which provide the foundation upon which ecologically based resource management will be developed.

1. Manage forest ecosystems so that their integrity, productive capacity, resiliency, and biodiversity are maintained.

2. Refine and develop management practices in an environmentally sound manner to reflect all resource values.

3. Develop public partnerships or networks to facilitate meaningful public involvement in resource management.

4. Promote adaptive ecosystem management and conduct research that focuses on ecosystem processes, functions, and ecosystem management principles.

5. Establish and enforce conservation and public safety laws with respect to managing ecosystems.

The environmental protection guidelines provide specific "on the ground" tasks for loggers and gives management direction to planners. Individually, the guidelines appear as specific rules; however, when implemented collectively they will facilitate ecologically based forest resource management.

1.0 GENERAL GUIDELINES

These guidelines are generated from impacts described in the literature and from discussions with resource managers. As new information and management techniques become available the guidelines will be changed to reflect this improved information base. Consequently, the guidelines will be reviewed on an annual basis to incorporate any necessary changes. The "General Guidelines" applies to all forestry activities (i.e., silviculture, harvesting, and road construction). These guidelines form Schedule IV of the Certificate of Managed Land. They are conditions of Crown commercial permits and they form the basis for the voluntary compliance program.

1.1 Planning

1. The location and type of all waterbody crossings must be submitted to the Department of Environment and Labour and the Department of Fisheries and Oceans. Certificates of Approval are required from both departments for waterbody crossings. A waterbody is defined as any water identified on the latest 1:50,000 topographic map. Appropriate protection is still required for streams greater than 1.0 m in width (at its narrowest point from the high water mark) not found on the 1:50,000 topographic map.

2. All waste disposal sites require a Certificate of Approval from the Minister of Government Services.

3. Excessive bulldozing is not permitted and no more than 10% of the total forest within an operating area can be disturbed. In situations where specific operating areas require more than 10% disturbance to capture available timber, the operator is required to rehabilitate the area to reduce the total net disturbance to the 10% maximum. Where disturbance has been excessive, a rehabilitation plan will be developed with the Forest Service District Manager. Disturbance is defined as per the Ground Disturbance Survey Guidelines developed by the Newfoundland Forest Service.

4. When an archaeological site or artifact is found, the *Historical Resources Act* requires that all development temporarily cease in the area and the discovery be reported to the Historical Resources Division (709-729-2462).

   The Historic Resources Division will respond immediately and will have mitigation measures in place within seven days as agreed to by the Historical Resources Division and the operator. Forestry activity can then continue.

   The Historic Resources Division will be contacted during the preparation of five-year operating plans to determine the location of historic resources and appropriate mitigation measures will be designed. These measures will include such things as buffer zones and modified operations or surveys.

5. Should an oil or gas spill in excess of 70 litres occur, the operator must make every effort to first contain and second clean up the spill after reporting the spill to the appropriate authorities:

   Government Services Centre
   Spill Report Line
   (709)772-2083 or 1-800-563-2444

6. The Parks and Natural Areas Division will be contacted during the preparation of five-year operating plans. Where operations are within one kilometre of provisional and ecological reserves, wilderness reserves or provincial parks, modified operations may be necessary.

7. In areas where caribou utilize arboreal lichens during the summer and/or winter, and terrestrial lichens during the summer, a minimum amount of lichen forest must be maintained for the caribou. Forestry activity will be designed in consultation with the Wildlife Division where this situation has been identified.

8. Areas identified as containing rare and/or unique flora (through literature review) are to be protected from forestry activity by avoiding these areas.

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

10. The impacts of forest operations on pine marten have been an ongoing issue. Until appropriate guidelines are developed for pine marten habitat, forestry activities within high-density pine marten areas and dispersion areas required for pine marten recovery will require consultation with the Wildlife Division.

11. During the preparation of five-year operating plans, areas identified as "Sensitive Wildlife Areas" in the Land Use Atlas require consultation with the Wildlife Division prior to any forestry activity.

1.2 Operations

1. A 20-metre, treed buffer zone shall be established around all water bodies that are identified on the latest 1:50,000 topographic maps and around water bodies greater than 1.0 metre in width that do not appear on the maps. Where the slope is greater than 30% there shall be a no-harvest buffer of 30 m + (1.5 x % slope). All equipment or machinery is prohibited from entering waterbodies; thus, structures must be created to cross over such waterbodies. Every reasonable effort will be made to identify intermittent streams and they will be subject to this buffer requirement. The District Manager of Forest Ecosystems is permitted to adjust the specified buffer requirements in the following circumstances:

    - the no-cut, treed buffer can exceed the 30 m for fish and wildlife habitat requirements.

    - a 50-metre, no-cut, treed buffer will be maintained around known black bear denning sites (winter) or those encountered during harvesting. These den sites must be reported to the Wildlife Division.

    - no forestry activity is to occur within 800 metres of a bald eagle or osprey nest during the nesting season (March 15 to July 31) and 200 metres during the remainder of the year. The location of any raptor nest site must be reported to the Wildlife Division.

    - all hardwoods within 30 metres of a waterbody occupied by beaver are to be left standing.

    - a minimum 30 metre, no-cut, treed buffer will be maintained from the high water mark in waterfowl breeding, moulting and staging areas. The Canadian Wildlife Service and/or the Wildlife Division will identify these sites.

2. Heavy equipment and machinery are not permitted in any waterbody, on a wetland or a bog (unless frozen) without a Certificate of Approval from the Department of Environment and Labour and without contacting the DFO Area Habitat Co-ordinator.

3. No heavy equipment or machinery is to be refuelled, serviced, or washed within 30 metres of a waterbody. Gasoline or lubricant depots must be placed 100 metres from the nearest waterbody. All fuel-storage tanks (including JEEP tanks) must be registered with the Department of Government Services and Lands and installed in accordance with the *Storage and Handling of Gasoline and Associated Products Regulations*. Fuel storage

within protected water supplies are more stringent. Please refer to "Guidelines for Forest Operations within Protected Water Supplies" for more information.

4. Used or waste oil shall be collected either in a tank or a closed container.

5. Above ground storage tanks shall be surrounded by a dyke. The dyked area will contain not less than 110% of the capacity of the tank. The base and walls of the dyke shall have an impermeable lining of clay, concrete, solid masonry or other material, designed, constructed and maintained to be liquid tight to a permeability of $25L/M^2/d$. There shall be a method to eliminate water accumulations inside the dyke.

6. Wherever possible, place slash on forwarded trails while forwarders are operating in an area. Skidding timber through any waterbody (as defined in Section 1.2.1) is prohibited.

7. Any forestry operation that directly or indirectly results in silt entering a waterbody must be dealt with immediately (a government official must be notified within 24 hours). Failure to comply will result in the operation being stopped.

8. Woody material of any kind (trees, slash, sawdust, slabs, etc.) is not permitted to enter a waterbody. Woody material on ice within the high water floodplain of any waterbody is prohibited.

9. To minimize erosion and sedimentation, waterbody crossings shall:

    i) have stable approaches;
    ii) be at right angles to the waterbody;
    iii) be located where channels are well defined, unobstructed, and straight;
    iv) be at a narrow point along the waterbody;
    v) allow room for direct gentle approaches;
    vi) have all mineral soil exposed during bridge construction and culvert installation seeded with grass.

10. Garbage is to be disposed of at an approved garbage disposal site. Prior to disposal it must be contained in a manner not to attract wildlife. All equipment is to be removed from the operating area where operations are completed.

11. Where safety is not an issue, a minimum average of 10 trees or snags per hectare (average on a cut block) or a clump of trees is to be left on all sites (harvesting and silviculture). Preference will be given to trees over 50 cm dbh.

2.0 TIMBER HARVESTING GUIDELINES

2.1 Planning

1. There will be corridors to connect areas of forest that will not be harvested (isolated stands within cutovers are not considered forested areas). These corridors connect wildlife habitat, watersheds and minimize fragmentation. Acceptable corridor vegetation includes productive forest areas (all age classes) and softwood/hardwood scrub. These corridors do not have to be continuous (i.e., breaks in vegetation are permitted) and will be determined in the five-year operating plan and identified in the annual work schedule.

2. Complete utilization of harvested trees is required. (Complete utilization is harvesting trees to a top diameter of 8 cm and stumps to a height of 30 cm). The District Manager can modify the stump height requirement to accommodate snow conditions. Where markets exist, non-commercial tree species that are harvested should be brought to roadside. This will be determined in consultation with the District Manager.

3. Preplanning is required on all forest operations (Industry/Crown) at the request of the District Manager (for Industry) and the Section Head i/c Management Planning (for Crown). Preplanning will include:

    - boundaries of protected water supplies (if applicable);
    - existing and proposed access roads;
    - skid trails and landing locations;
    - areas sensitive to erosion;
    - buffer zones around water bodies;
    - approved stream crossings;
    - fuel storage locations;
    - wildlife corridors.

4. Harvesting is not permitted within caribou calving areas from May 15 - June 15 (calving period). Harvesting is not permitted within post-calving areas from June 15 to July 31. These areas will be identified by the Wildlife Division.

5. Harvest scheduling should be modified during the migration of wildlife (e.g., caribou) and during temporary wildlife concentrations (e.g., waterfowl staging). Wildlife Biologists will identify the areas of concern, and in conjunction with district or company foresters, aid in the modification of forestry operations.

2.2 Operations

1. When skid trails and winter roads are to be constructed, soil disturbance and impacts on waterbodies are to be minimized. The operator will use culverts and/or log bridges depending on the conditions. The objective is to minimize erosion and sedimentation to

avoid restricting streamflow, and to ensure fish passage in fish-bearing streams. Erosion control measures (e.g., laying down brush mats and the construction of diversion ditches for water run-off) are to be maintained while the skid trail is in use. All temporary crossings are to be removed at the end of the operating season unless the District Manager agrees to extend the life of the crossing for more than one season.

2. A minimum 50 metre, no-cut buffer is to be left between operations within approved cabin development areas.

3.0 FOREST ACCESS ROADS GUIDELINES

3.1 Planning

Forest access roads, barrow pits and quarries shall avoid:

i) wetlands, deltas, and floodplain or fluvial wetlands;
ii) terrain with high erodibility potential;
iii) known sensitive wildlife areas such as;
- calving grounds, post calving areas, caribou migration routes, caribou rutting areas, and winter areas,
- waterfowl breeding areas and colonial nesting sites,
- established moose yards by one kilometre,
- eagle and osprey nest sites,
- where site conditions and engineering permits, main haul roads should be one kilometre from permanent water bodies and all other roads by not more than 100 metres,
- endangered or endemic species or subspecies of flora or fauna and other areas to be determined by qualified authorities;

iv) known sensitive fish areas such as:
- spawning and rearing grounds;

v) historically significant areas such as:
- archaeological sites;

vi) existing reserves such as:
- parks (municipal, provincial, national);
- wilderness areas and ecological reserves;
- rare and endangered plant sites and habitats.

2. With respect to borrow pits and quarries, the operator shall:

i) minimize the number of new borrow areas opened for construction and/or maintenance;
ii) use existing barrow areas whenever practical.

iii) be in possession of a valid quarry permit from the Department of Mines and Energy prior to aggregate extraction activities;
iv) not locate pits and quarries in sensitive areas as identified by planning processes.

3. Forest access roads will not obstruct wildlife migration routes. The following guidelines will be followed to ensure the road is as unobstructing as possible:

i) roads should be of low profile (less than 1 m above the surrounding terrain);
ii) slash and other debris shall be removed;
iii) the slope of ditches and road banks should not exceed 1½ horizontal to vertical.

4. Culverts and bridges are to be installed in accordance with the manufacturer's specifications and the specifications attached to the Certificates of Approval received from the Department of Environment and Labour and from the Department of Fisheries and Oceans. Culvert ends will be properly riprapped.

5. Where road construction is to occur around identified waterfowl breeding, moulting and staging areas the Canadian Wildlife Service is to be consulted.

6. Road construction is not permitted within any buffer zone except with the permission of the District Manager.

7. When a skid trail is on steep ground and is no longer in use, cut-off ditches and push lanes must be created. The frequency will be determined by the District Manager.

8. When disturbance is over 10%, the conditions in 1. 1.3 will apply.

9. There shall be no bulldozing of standing merchantable timber or poor utilization of merchantable softwoods and hardwoods during cutting of the right-of-way.

10. Excavations required for the construction of piers, abutments or multi-plate culverts shall be completed in the dry. (Where exceptions occur, consultation with District Manager is required).

11. On a site specific basis, roads can be decommissioned and/or rehabilitated as directed by the District Manager. Decommissioning is defined as barring access; rehabilitation means to re-vegetate the road.

3.2 Operations

1. A "no-grub" zone of 30 metres of undisturbed ground vegetation must be maintained around any water body crossing to minimize the damage to the lower vegetation and organic cover, thus reducing erosion potential. Manual clearing at waterbody crossing

sites should be used to remove or control vegetation. Right-of-way widths at waterbody crossings should be kept to a minimum.

2. Fill materials for road building must not be obtained from any waterbody or from within the floodplain of any waterbody.

3. Trees are to be felled away from all waterbodies, and slash and debris should be piled above the high water mark so that it cannot enter waterbodies during periods of peak flow.

4. Equipment activity in water crossing areas is to be kept to a minimum. Whenever possible, any work is to be carried out from dry stable areas.

5. Unnecessary side casting or backbiting in the vicinity of waterbodies is not permitted. Where topographical constraints dictate that the roadbed must be constructed adjacent to a waterbody, road slope stabilization is to be undertaken at the toe of the fill where it enters the water (an area where active erosion is likely). The placement of large riprap or armour stone is recommended in such areas.

6. Side casting must be carried out in such a manner that sediment does not enter any waterbody.

7. Where borrow pit or quarry activity is likely to cause sediment-laden runoff to contaminate a waterbody, sediment control measures such as filter fabric berms or sedimentation ponds are to be installed. Contact is to be made with the District Manager prior to construction where such conditions exist.

8. Stabilize cut banks and fill slopes in the vicinity of waterbodies.

9. When using ditches, especially on long slopes, baffles and culverts are to be used at frequent intervals.

10. When constructing ditches near streams, the ditch itself is not to lead directly into the stream.

11. Keep ditches at the same gradient as the road.

12. In side hill and similar areas, install ditches on the uphill sides of roads to intercept seepage and run-off.

13. Borrow pits are to be located 50 metres from the nearest waterbody.

4.0 SILVICULTURAL PRACTICES AND FOREST REGENERATION GUIDELINES

4.1 Scarification

1. Select scarification methods best suited for preparing the area for planting and for minimizing ground disturbance.

2. Where slash is piled into windrows, ensure the windrows are placed where slash cannot be washed into streams at peak flooding conditions.

3. To minimize erosion, do not direct scarification equipment straight down slope.

4. Where safety is not an issue, a minimum average of 10 cavity trees or snags per hectare, or a clump of trees, will be left on all sites.

5. Whenever possible, white pine regeneration will not be disturbed.

4.2 Planting

1. Landings will be stabilized through seeding (grass) or planting at time of plantation establishment.

4.3 Pre-commercial Thinning

1. Where possible, do not carry out pre-commercial thinning in important wildlife areas during the period of birth and/or hatching. These areas and times will be identified by the Wildlife Division.

2. Where white pine regeneration is present, the District Manager will determine how the pine will be thinned.

3. Trees cut will not be felled into waterbodies.

5.0 FOREST PROTECTION GUIDELINES

1. A pesticide application licence must be obtained from the Department of Environment. This licence will determine planning and operational requirements.

6.0 GUIDELINES FOR FORESTRY OPERATIONS WITHIN PROTECTED WATER SUPPLY AREAS

The primary function of a protected water supply area is to provide the public with an adequate quantity of safe and good quality water on a permanent basis, to meet its present and future

demands. Any other activity within water supply areas is considered secondary, arid if permitted, must be strictly regulated and monitored to ensure that the water supply integrity is not threatened and the quality of the water is not impaired.

In Newfoundland, forestry operations are permitted in protected water supply areas on a limited and controlled basis provided the proposed operations have no, or minimal, water quality impairment potential.

The following permits and approvals are required prior to the beginning of forestry operations within a protected water supply area:

1) Approval of the forest operating plan by the Newfoundland Forest Service.

2) Approval of the forest operating plan by the provincial Department of Environment and Labour and issuance of a Certificate of Approval under *Section 10 of the Department of Environment Act.*

3) Quarry permits from the provincial Department of Mines and Energy for all borrow areas and ballast pits on unalienated Crown lands and alienated Crown land (i.e., leased and licensed land).

4) Stream crossing permits under *Section 11 of the Department of Environment Act* and from the federal Department of Fisheries and Oceans.

5) Other permits or approvals as required by natural resource management and regulatory agencies.

6. 1 Planning

1. Prior to beginning any work, a forest operating plan must be prepared and approved by the Newfoundland Forest Service and the Department of Environment and Labour, and a Certificate of Approval must be obtained under Section 10 of the Department of Environment Act for site specific activities such as road construction, commercial harvesting, silvicultural operations, and other activities associated with forestry operations.

2. In addition to the information normally contained in a forest operating plan, the plan must include maps to show:

    - the boundary of the protected water supply area;
    - existing and proposed access roads;
    - proposed harvesting areas;
    - areas sensitive to erosion;
    - buffer zones around water bodies; approved stream crossings,

- proposed landing and skid trail locations;
- proposed fuel storage locations;
- peatland and other wetlands;
- nearby communities;
- other relevant information.

The plan must also contain a written section describing the harvesting techniques to be used, the equipment required for the operation, and the schedule of the operation.

3. Locate roads to avoid all waterbodies and areas of sensitive terrain.

4. The forest operating plan must identify an Operations Manager who shall have the responsibility for ensuring that the special protection measures are followed. The Operations Manager is responsible for co-ordinating clean-up efforts in the event of a fuel or oil spill.

6.2 Forest Access Road Construction

1. A "no-grub" zone of 30 metres of undisturbed ground vegetation must be maintained around any waterbody crossing to minimize the damage to the lower vegetation and organic cover, thus reducing the erosion potential. Manual clearing at waterbody crossing sites should be used to remove or control vegetation. Right-of-way widths at waterbody crossings should be kept to a minimum.

2. Clear-cutting up to the perimeter of any waterbody is not permitted. In all areas where road construction approaches a waterbody, a buffer zone of undisturbed vegetation must be maintained on both sides of the right-of-way using the buffer zone criteria outlined in Section 6.6.

3. Fill materials for road building must not be obtained from any waterbody or from within the floodplain of any waterbody.

4. Provide adequately designed arid constructed drainage ditches along forest roads to allow for good road drainage.

5. Take-off ditching can be used on both sides of the road, or in conjunction with culverts, to divert the ditch flow into the woods or into stable vegetated areas above the no-grub zones. Where take-off ditches are unstable or cannot be constructed, the use of check dams and settling basins in the ditches is required until the ditches become stabilized.

6. Trees are to be felled away from all waterbodies, and slash and debris should be piled above the high water mark so that it cannot enter waterbodies during periods of peak flow.

7. Equipment activity in water crossing areas shall be kept to a minimum. Any work will be carried out in dry, stable areas.

8. When working near sensitive areas such as streams or lakes, road building operations causing erosion or siltation are to be followed as per Section 1.2.7.

9. Unnecessary side casting or backfilling in the vicinity of water bodies is not permitted. Where topographical constraints dictate that the roadbed must be constructed adjacent to a water body, road slope stabilization is to be undertaken at the toe of the fill where it enters water, an area where active erosion is likely. The placement of large riprap or armour stone is recommended in such areas. Contact is to be made with the District Manager prior to construction when such conditions occur.

10. Side casting must be carried out in such a manner that sediment does not enter any waterbody.

11. Maintenance support sites must be located outside the protected water supply area.

6.3 Forest Access Road Stream Crossings

1. Stream fording is prohibited in protected water supply areas.

2. All stream crossings, whether culverts or bridges. require written approval under *Section 11 of the Department of Environment Act.*

3. The operator must comply with all terms and conditions of a Certificate of Approval for stream crossings.

6.4 Harvesting

1 . Harvesting or other heavy equipment will not be used on wetlands or bogs.

2. Steep areas with high potential for erosion should not be harvested.

3. Wherever possible, skid trails should run along contours and never cross wetlands and waterbodies.

4. Landings will be few in number with a maximum size of less than 0.25 ha. All landings should be located at least 100 metres from a waterbody.

5. In sensitive areas prone to erosion, equipment must have wide tires, or harvesting must occur. during the winter when the ground is frozen.

6. Harvesting equipment shall not enter a buffer zone or any waterbody without permission of the District Manager.

7. The operator must implement erosion control and rehabilitation measures in areas where soils have been unduly disturbed by harvesting activity. In addition to general erosion control measures presented in other sections of these guidelines, the following should also be considered in protected water supply areas:

- undertake contour furrowing;
- construct diversion ditches to lessen the possibility of forming new drainage channels;
- seed or plant areas that are difficult to stabilize by other means;
- plough or rip prior to seeding any surfaces which have been compacted

6.5 Buffer Zones

The Newfoundland Forest Service on unalienated Crown land and the appropriate company on leased, licensed, private or charter land will provide the operator with a map indicating the harvesting area and no-cutting buffer zones, and will ensure that the operator is familiar with the boundaries.

No forestry activities are permitted within the following buffer zones.

Water Body	**Width of Buffer Zone**
1. Intake pond/lake/reservoir	A minimum of 150 m
2. River intake	A minimum of 150m for 1 km upstream and 100 m downstream
3. Main river channel	A minimum of 75 m
4. Major tributaries/lakes/ponds	A minimum of 50 m
5. Other water bodies	A minimum of 30 m

6.6 Fuel/Oil Handling and Storage

Fuel storage and the operation of fuel storage equipment is regulated by the *Storage and Handling of Gasoline and Associated Products Regulations* (1982) under the Department of Environment and Lands Act. According to the regulations, the owner or operator of a fuel storage system must submit a Schedule "A" Storage Tank System Application to the Department of Environment. The applicant must be in receipt of a Certificate of Approval for the system before the system is used for fuel storage. Section 9 of the above Act states: *"No owner or operator shall directly or indirectly cause pollution of the soil or water by causing, suffering or permitting leakage or spillage of gasoline or associated products from a storage tank system or vehicle."*

In addition to the above regulatory requirements, the following guidelines are to be followed:

1 Bulk fuel is to be stored outside the protected water supply area. If fuel must be stored in the protected area, it must be in the least sensitive area and be approved by the Water Resources Management Division of the Department of Environment and Labour.

2. Fuel must be stored in self-dyked, above-ground Jeep Tanks, which have been approved by the Department of Environment arid Labour.

3. A maximum of seven days fuel supply can be stored within a water supply area.

4. Refuelling must not take place within 100 metres of a waterbody.

5. Daily dipping of tanks and weekly reconciliation are mandatory. Visual inspection of the dykes and the surrounding area must be carried out daily and inspection records must be maintained.

6. Each unit must be fitted with a locking valve system for the elimination of water inside the outer tank. The valve must be closed and locked except to drain precipitation.

7. Each person involved with fuel handling must be cautioned that any spillage is to be cleaned up immediately.

8. Each person involved with fuel storage must exercise extreme caution when refuelling equipment.

9. All waste materials and waste oil on the site must be collected in enclosed containers and removed to an approved site, at least weekly.

10. Contaminated soil or snow must be disposed of at an approved waste disposal site.

11. Any spill in excess of 70 litres must be reported immediately through the 24 hour Spill Report Number (709-772-2083) or the Government Services Centre (1-800-563-2444).

12. All self-dyked Jeep Tanks must be located at a minimum distance of 500 metres from any major waterbody.

13. A fuel or oil spill cleanup kit must be kept on site within the protected area to facilitate any cleanup in the event of a spill. This kit must include absorbent pads, loose absorbent materials such as dried peat, speedy-dry or sawdust, and a container such as an empty drum for recovering the fuel or oil. If there is a bulk fuel storage facility within the protected area, the cleanup kit must include the following list of fuel or oil spill cleanup equipment:

-Fire pump and 100 metres of hose

-Two hand operated fuel pumps
-Six recovery containers such as empty drums
-Four long handled shovels
-Two pick axes
-Ten metres of containment boom
-Twenty-five absorbent pads
-One hundred litres of loose absorbent material.

When any fuel spill occurs, stop the fuel flow immediately. This may entail repairing a leak, pumping out a tank, or shutting off a valve. If fuel or oil is spilled onto soil, dyking may be necessary. If fuel or oil enters water, absorbent booms or barriers such as fencing or netting with loose absorbent or straw must be used to contain the spill. If necessary, culverts may be blocked off by earth or wooden barriers to contain the fuel or oil provided the threat of flooding is addressed.

All recovered fuel or oil must be stored in containers. Contaminated soil must be removed and placed in containers for transport and disposal. Extensive soil removal may cause problems such as erosion and the subsequent siltation of waterbodies- therefore, the affected area must be backfilled and sloped and revegetated as required by the Department of Environment and Labour.

Recovered fuel or oil should be reused or collected by a waste oil company for recycling. Oily debris and contaminated soils must be disposed of at an approved waste disposal site with the approval of the disposal site owner or operator. Contact must be made with the appropriate regional office of the Department of Environment and Labour before disposal.

6.7 Support Service and Structures

1. Storage of any type of pesticide, chemical or other hazardous material is prohibited within a protected water supply area.

2. Dormitory camps, garages or any other structures are prohibited within a protected water supply area.

3. The establishment of new sawmills is not permitted in protected water supply areas.

4. Wherever possible toilet facilities must be provided in all work areas.

5. Garbage cans must be located in all work areas and garbage is to be collected regularly and disposed of at an approved waste disposal site outside the protected area.

6.8 Silviculture

1. Chemicals are to be used within a protected water supply area only under the approval of the Division of Water Resources.

2. Scarification must be minimized and restricted to the trench or spot types.

3. If scarification leads to erosion or sedimentation of small streams or water bodies, scarification operations must be suspended and remedial measures must be taken.

6.9 Abandonment

When forestry operations in a protected water supply area have been completed, an abandonment plan for the area should be developed. This will involve input from the Newfoundland Forest Service, the Community involved, and the Water Resources Management Division of the Department of Environment and Labour. In general, the purpose of the plan is:

(i) to ensure that the post-harvest conditions do not lead to water quality impairment, and
(ii) to discourage activities or use of the area that could lead to water quality impairment.

An important question will be whether access roads will remain open. This will be decided on a case-by-case basis in consultation with the municipality, Water Resources Management Division and the operator. Issues such as the rehabilitation of cutover areas, landing sites, skid trails, and the abandonment of roads are to be discussed during the consultation process to control post-harvesting environmental impacts and activities.

The following are recommended precautionary measures if roads are to be closed to control post-harvesting access to the area:

Use water bars (trenches 8-1 0" deep dug across the road) to intercept and deflect surface roadside ditches rather than have it flow into a waterbody. Water bars can be placed 500 metres apart in gentle to moderate terrain (up to 10% slope), but should be no more than 150 metres apart in terrain greater than 10%. In most cases, it is sufficient to limit water bars to one kilometre on each side of a stream crossing.

Roadside ditches should flow into the woods or into stable, vegetation covered areas.

Stable bridge abutments and erosion protection works at crossings need not be removed.

Bridge decking, culverts and other easily removable structures should be transported out of the watershed area.

All disturbed areas of river banks will be stabilized and seeded.

6.10 Monitoring and Inspection

1. Forestry operations approved under Section 1 0 of the Department of Environment Act will be inspected from time to time by the staff of the Water Resources Management

Division to ensure the operator's compliance with the environmental protection guidelines and the terms and conditions of the approvals.

2. In case of an oil spill, the sedimentation of a water body, or any other water quality impairment related issue, the operator might be required by the Department of Environment and Labour to undertake water quality monitoring to assess the extent of the damage and to select appropriate mitigative measures to correct the harmful conditions.

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

7.0 PROCESSING FACILITIES AND SUPPORT SERVICES GUIDELINES.

1. If possible, use previously disturbed sites (e.g., barrow pit).

2. Minimize the size of the area cleared for the establishment of any camp, processing or support structures. Wherever possible, these facilities should not be established within 100 metres of a waterbody.

3. All sumps containing effluent from a kitchen or washroom facility must be properly treated on a daily basis in compliance with Department of Health regulations.

4. Sewage disposal must be carried out in compliance with the Public Health Act.

5. A permit to occupy is required for Crown Land developments.

6. Facilities will not be located within known sensitive wildlife areas. These areas will be identified by the Wildlife Division.

7. A permit is required for a firearm.

8.0 PLANNING AND MUNICIPAL AREA GUIDELINES

1. Timber harvesting, resource road construction, silviculture, processing facilities, and support services are developments under the Urban and Rural Planning Act. Where these activities occur within a planning area boundary or within 400 metres of a protected road, a development permit is required before any activity takes place.

2. Consultation with the planning agency (usually municipality, but also the Development Control Unit of the Department of Municipal and Provincial Affairs) is to be made at the planning stage so that regulatory requirements can be made known and taken into

account. This should occur three months before the desired commencement of the development and the permit obtained about one month before the development is to start.

APPENDIX VI
Resource access road – classification standards and specifications

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