

FIVE YEAR OPERATING PLAN

for

FOREST MANAGEMENT DISTRICT 1

(The Avalon Peninsula)

February 14, 2002

ACKNOWLEDGEMENT

Multi-stakeholder, consensus-based planning is a voluntary process. Mutual concern for the future of our forest resources brings Stakeholders with various interests to one table to discuss strategies and plans in an open forum. Respect, deliberation and a spirit of co-operation are key to any success that this process can achieve. This is the second such exercise on the Avalon and has benefitted from technological advances since the initial plan (produced over a period from 1995 to 1997). However, the experience of the Stakeholders continuing with planning and monitoring from the first plan, combined with the ideas and interest of those joining the exercise in the current plan, have provided the impetus for this plan. Appreciation is due Planning Team members and others participating in the process, as listed individually later in this document, particularly those who helped the discussion and process through difficult times and helped the group to keep focused. Recognition is also due several staff of the Department responsible and the facilitator in the many efforts and tasks required to produce such a plan. The challenge now is to continue to build on the efforts and intent of the plan to improve the actual conditions on the ground and the constructive pursuit of ecosystem management.

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1.0 INTRODUCTION

Forest management planning began in the province in 1975 and forest ecosystem management planning in 1995 through an open, multi-stakeholder, consensus-based process as outlined in the companion document entitled the “Forest Ecosystem Strategy Document for Forest Management District 1 (The Avalon Peninsula)”. In contrast to the strategic document which presents the broad framework or philosophies, the operating plan presents specific activities or interventions providing locations on the ground and accompanying detail. The Five Year Operating Plan is the document registered with the Department of Environment and is subject to public review. The period of this Five Year Operating Plan is from April 1, 2002 to March 31, 2007. Using the approach begun in 1995, the current Five Year Operating Plan is produced by a Planning Team (consensus membership as shown in Appendix I) for the period 2002-07 which had considerable overlap with the team for 1997-2002. The Strategic Plan revised in 2002 and Five Year Operating Plan for 2002-2007 represent continued progress toward ecosystem management.

1.1 Past Activities

The five year period April 1, 1997 to March 31, 2001 has seen continued change in forest resources management in the district. The merger of forestry and wildlife sections and hopes for more integrated management at the beginning of the last plan period were diminished with the removal of several scientific and wildlife management positions from the Department in 2001. That group, currently residing with Tourism, Culture and Recreation, has been further divided and it may be considerable time before meaningful progress on integration again becomes a priority.

The annual allowable cut for the district was recalculated in 2001 at 73 000 m³ gross merchantable volume down slightly from the previous period due mainly to changes in the forest landbase. Significant gains were made over the five year period in the elimination of the overcut on Crown Land overall in the District (as shown in Table 1) through continued management actions and, particularly in the last two years, unfavourable weather conditions for much domestic cutting which accounts for approximately 80% of the timber harvest in the District. Despite a significant reduction in overall harvest in the District, four of the thirteen zones in the District are still in an overcut position. The annual situation and measures are detailed in annual reports of monitoring committees listed in Literature Cited.

Table 1. District 01 Crown Timber Harvest 1997 - 2002(m³ gmv)

Year of harvest	Commercial	Domestic	Total
1997 - 98	14, 114	61, 704	75, 818
1998 - 99	16, 541	54, 176	70, 717
1999 - 00	13, 776	48, 104	61, 880
2000 - 01	11, 570	31, 039	42, 609
2001 - 02*	<u>11, 980</u>	<u>37, 686</u>	<u>49, 666</u>
Five year total	67, 981	232, 709	300, 690

* estimated to March 31, 2002

Amendments or refinements to domestic and commercial cutting areas were in accordance with principles of the strategic plan and followed procedures established at the time of plan implementation. These procedures were revised in 2000 to follow changes in the new Environmental Assessment Act and Regulations of 2000. Amendments over the period are shown as Appendix II.

As shown in Table 2, silviculture treatments continued to concentrate on planting, thinning of natural forest regrowth, with decreasing amounts of clearing of degraded stands funded under silviculture to enable planting or future thinning of regrowth. Thinning is divided into pre-commercial thinning and commercial thinning depending on the size of stems thinned.

Table 2. Silviculture Treatments (ha) 1997 - 2002

Treatment year	Planting	Pre-commercial thinning	Commercial thinning	Clearing	Other*	Yearly total
1997 - 98	40	236	15	5	91	387
1998 - 99	144	73	82	18	35	352
1999 - 00	20	73	28	0	23	144
2000 - 01	77	45	0	0	0	122
2001 - 02	<u>98</u>	<u>54</u>	<u>0</u>	<u>0</u>	<u>10</u>	<u>162</u>
Five year total	379	481	124	23	159	1,167

*includes plantation maintenance, moose exclosures, white pine gene preservation garden, cone collection & road reclamation.

Silviculture was funded through a number of sources including the Newfoundland and Labrador Forestry Training Association, Emergency Response Programs, the Job Transition Fund, Social Services and regular forestry funding. Several changes were made between projects proposed in the previous operating plan and those completed in order to access irregular funding as it became available. Projects undertaken were in accordance with regulatory procedures and were monitored by the Wood Supply Advisory Committee called for in the previous operating plan. The level of silviculture was consistent with that proposed, particularly in relation to planting and thinning. Innovative projects were, however, underfunded. Additional detail on silviculture projects during the past five year period is provided in Appendix III. A review of progress on more innovative items cited in plans produced in 1997 for District 1 is contained as Appendix IV.

Table 3 summarizes road construction and decommissioning by the Forest Resources section of the Department and by private operators (commercial cutting permit holders) combined over the past five year period. Appendix V provides information on new construction, reconstruction and decommissioning undertaken in the last plan period, bridges and the standard of road constructed by forestry and by private operators. Three of the ten roads proposed for new construction by the Department in the last plan period, and both reconstruction proposals, were funded and completed. Seven of the nine road decommissioning proposals (ie. all where scheduled operations were complete) were funded and decommissioning completed. The length of former road decommissioned (ie the driving surface buried with soil, boulders and debris so as to be both plantable and impassable) actually exceeded

the length of new road constructed during the plan period. Construction, reconstruction and decommissioning jobs were visited and evaluations of the Forest Access Road, Domestic and Commercial Harvesting Monitoring Committee included in annual reports. In 1993, it became a requirement for all operators to obtain authorization from the Forest Service prior to construction of roads or bulldozed works. This authorization is in addition to that required by the Department of Fisheries and Oceans, and Water Resources Division of the Department of Environment and Labour. In 2000, it became a requirement of the new Environmental Assessment Act and Regulations that within an approved operating area more than one kilometer, in total, of new road (not already approved through previous Environmental Assessment) required registration through Environmental Assessment. This was different from principles agreed to in the last plan with respect to temporary private roads in approved operating areas and, hence, a proposal for two kilometers in the Tower Road approved operating area was registered in the Environmental Assessment process. A two kilometer section of temporary road built by a private operator in 1998-99 in an approved operating area was decommissioned in 2001 in accordance with the strategic and operational plans.

Table 3. Access Road Construction and Decommissioning, (km) 1997-2002

Year of construction	New construction Forest Resources	New construction private operator	Decommissioning Forest Resources	Decommissioning private operator
1997 - 98	3.5	-	4.1	-
1998 - 99	2.0	2.0	2.2	-
1999 - 00	2.5	-	2.5	-
2000 - 01	-	-	1.0	-
2001 - 02	=	=	<u>2.0</u>	=
Five year total	8.0	2.0	11.8	0

Burning in Blueberry Management Units continued throughout the last plan period although no burning was done for improvement of partridge habitat during the period. Table 4 shows the number of wildfires and area burned over the past five year period. Over 80% of fires were contained to less than one hectare in size, while over 95 % of the fires were less than ten hectares, and just one fire greater than two hundred hectares in size at 402 ha. at Spread Eagle in 1999.

Table 4. Wildfire Summary 1997 - 2002

Year of fire	# of Fires	Area Burned (ha)
1997 - 98	22	22
1998 - 99	86	264
1999 - 00	67	557
2000 - 01	81	31
2001 - 02	<u>95</u>	<u>43</u>
Five year total	351	917

1.2 Overview

Four 1:250 000 scale topographic maps provide an overview of areas and activities and are referenced in the text. The 1:250 000 scale maps contain information on submanagement zones, commercial and domestic harvesting areas, silviculture areas and location of roads to be constructed and roads to be reclaimed or decommissioned. These overview maps have areas coded for reference to corresponding 1:50 000 topographic or finer scale maps (over 300 maps in all) which are available on request from the District Office.

2.0 RESERVES

The Forest Ecosystem Strategy Document commits the Department of Forest Resources & Agrifoods to the protection of native ecosystems and biodiversity through a system of reserves and protected areas. Appendix VI provides information in relation to proposed reserves. Areas proposed for forest management activities in this operating plan avoid all existing reserves and reserves currently proposed for Ecological Reserve status, as advocated by the Parks and Natural Areas Division of the Department of Tourism, Culture and Recreation and the Wilderness and Ecological Reserves Advisory Council. Recognizing the potential for discovery of additional significant biological features in the course of surveys, Forest Resources will continue to identify such features and bring to the attention of appropriate agencies. If necessary, harvest planning measures will be adjusted to afford adequate protection of such features in accordance with Endangered Species Act and other legislation. Revision in operations may be made through appropriate processes as determinations are made on proposed protected areas and reserves. It is strongly recommended that the determination process on proposed ecological reserves be expedited (Whitaker, 2001).

A Forestry Reserve proposed to the Interdepartmental Land Use Committee in the last plan period is under review. The area of the proposed Forestry Reserve may be included as part of an initiative by the Lands Division. If a forest reserve or land use management area is created in the Central Avalon area of District 1, all commercial operator/sawmillers in District 1 would have equal opportunity to access allocations specified on permits in areas which may be designated for timber harvest.

3.0 OPERATIONS

For the purposes of this plan, operational activity is reported on in the following four sections within the overall context of the strategic document.

3.1 Allocation of Wood Supply and Harvesting

The overall thrust of the allocation of wood supply is maintenance of the harvest at sustainable levels. The principles on allocation of wood and strategies for addressing the overcut are included as Appendix VII and summarized below;

- To continue to refine the maximum sustainable yield (ie. the AAC or annual allowable cut) for subdivisions of the Avalon district (ie. submanagement units or zones).

- To bring the cut to no more than the maximum sustainable yield in all zones.
- For domestic permits, to reduce the number of permits and volume per permit in zones that are overcut relative to the sustainable level.
- For commercial permits to reduce permit volumes in areas that are overcut by the same proportions as domestic permits. The balance of the regular commercial permit volume can be acquired in zones that are not overcut.

Following these principles, the District was subdivided in the last plan period based on eco-region, sub-region and topographic division into thirteen sub-management units or zones as shown on the 1:250 000 topographic map attached as Figure 1. Division of the annual allowable cut by zone was based on the proportion of productive forest land in the zone cross-referenced with growing stock and age class structure at that time. Table 5 shows the situation in each zone with respect to sustainable harvest and average demand from 1997 - 2001. Four of the thirteen zones are in an overcut situation while, overall throughout the District, total harvest is just below the sustainable level.

Table 5. Average demand (1997 to 2001) and sustainable supply of Crown timber by ecoregion and submanagement unit (zone) in Forest Management District 01.

Ecoregion/ submanagement unit (Zone)	Demand (m ³)		Total harvest (net m ³) ¹	Total harvest (gross m ³) ²	AAC (m ³)	Surplus/ deficit (m)
	Domestic (net m ³)	Commer- cial (net m ³)				
<u>Avalon Forest</u>						
A. Central Avalon North	2,116	461	2,577	3,427	4,130	703
B. Central Avalon South	1,118	4,379	5,497	7,310	15,850	8,540
<u>Maritime Barrens</u>						
C. Eastern Shore St. Mary's Bay	2,200	11	2,211	2,941	3,075	134
D. Southern Shore	3,554	920	4,474	5,950	4,420	(1,530)
E. Northeast Avalon	2,407	800	3,207	4,265	3,940	(325)
F. Eastern Shore Conception Bay	2,220	561	2,781	3,698	5,860	2,162
G. Eastern Cape Shore	776	22	798	1,060	2,210	1,150
H. Western Cape Shore	2,276	340	2,616	3,478	8,740	5,262
I. Bay de Verde Peninsula West	9,334	1,304	10,638	14,149	11,140	(3,009)
J. Bay de Verde Peninsula East	7,137	189	7,326	9,743	1,825	(7,918)

K. Isthmus	2,868	975	3,843	5,111	9,410	4,299
<u>Eastern Hyper - Oceanic Barrens</u>						
L. Trepassey	1,643	0	1,643	2,185	2,210	25
M. Cape St. Mary's	0	0	0	0	190	190
Totals	37,647	9,962	47,611	63,317	73,000	9,698

¹ Net cubic volume of wood before adjustment for poor utilization and under-reporting

² Gross cubic volume of wood adjusted for poor utilization and under-reporting

³ Stands harvested on the Avalon generally yield in the range of 60 to 140 m³/ha.

The annual allowable cut (AAC) of 73,000 m³/yr corresponds to approximately 1,000 hectares harvested per year. Refinement of the AAC, gains in utilization and a slightly decreasing demand should alleviate the relatively low overcut in the Northeast Avalon and Southern Shore zones in the plan period. Overcuts in the Bay de Verde Peninsula West and Bay de Verde Peninsula East zones are more significant and will likely require further intervention in the plan period. Redirection of domestic cutting from the two latter zones to adjacent zones not experiencing an overcut is preferable to further permit reduction early in the period. A targeted information and education program in the Bay de Verde East and Bay de Verde West zones is proposed beginning prior to the commencement of domestic cutting in 2002. Components of such a program would include improved utilization, drying and burning techniques to improve heating value of wood, possible redirection of harvest, and a comparison of continued harvesting in the zone with using hardwoods from other areas. This effort should be evaluated (in combination with possible trends in demand and any refinement of the AAC in each zone) by the end of the second year of the plan. Permit reduction beyond the measures of the last plan period may be the only other option at that time for these two zones of significant overcut.

Redirection of the harvest to areas of remote blowdown is less of an option to avoid permit reduction than at the start of the last plan due to increasing distances involved and the deterioration of the quality of the timber effected, much of which dates to severe storms in 1994 and 1995. However, there may be portions of some zones where it may be possible for permit holders to continue to avoid reductions in the short term by providing their own access to designated remote areas of blowdown. In zones which are not overcut, remote areas of blowdown may provide a temporary increase in permit volumes to operators who provide their own access. Any such operation must be to an approved pre-harvest plan in a designated area.

Harvesting and scheduling of areas for harvest follows principles attached as Appendix VIII. Figures 1 and 2 attached provide overviews of areas scheduled for domestic and commercial harvest at a 1:250 000 scale. Domestic areas are relatively large, but have been reduced from those initially designated in the 1970's. Maps are available at 1:50,000 scale for all domestic cutting areas and 1:50 000 and 1:30 000 for all commercial harvesting areas for the plan period at the Paddy's Pond office. These maps and other information are available for viewing or distribution (of all or selected areas) and are referenced by a code or number on the overview topographic map. Appendix IX contains a list of domestic cutting areas and Appendix X a list of commercial cutting areas. Changes from the last plan period have been made in the location and sizes of domestic and commercial areas. Pre-harvest plans will continue be prepared for all commercial cutting blocks and for as many domestic cutting blocks as logistically possible given the size and nature of domestic cutting areas.

3.2 Silviculture

Silviculture is practised primarily to ensure all forest sites have adequate regenerating trees following disturbance and that the trees are in a condition to provide optimum growth for fibre and habitat production. As most forest stands on the Avalon regenerate profusely, various thinnings of natural regrowth are the main silvicultural treatments over the five year period. Table 7 shows silvicultural treatments proposed over the five year period while Appendix XI provides additional detail.

Selection thinning, although not successful in the last plan period, is again proposed on a trial basis as an alternate to other thinnings with the hope of eventually being able to schedule a portion of the domestic harvest through this means of silviculture treatment. The four hectares fertilization in year one is proposed again in this plan period (unable to obtain funding in the previous plan) as a trial to test effects on terrestrial (forest and wildlife) and aquatic production. Planting and plantation maintenance includes work on heathland trials as a means of increasing forested area and fibre production particularly in areas of heavy overcut and includes the judicious use of non-invasive exotic tree species. Other innovative projects which may not have areas explicitly shown on maps are also proposed for possible funding under silviculture.

Proposed silviculture areas are shown on the 1:250 000 scale topographic map of Figure 3 and are available at 1:50 000 and 1:30 000 scale from the Paddy's Pond Office.

Table 6. Silviculture Treatments (ha) Proposed 2002 - 07

Treatment Year	Planting	PCT*	CT*	DLT*	PM*	Fert*	SL*	Other	Yearly Totals
2002-03	186	85	-	125	3	2	5	18	424
2003-04	160	125	25	65	20	4	5	60	464
2004-05	212	116	-	55	35	-	5	20	443
2005-06	180	77	-	137	-	-	7	23	424
2006-07	-	100	25	143	-	-	7	-	465
Five Year Totals	928	503	50	525	58	6	29	121	2,200

* PCT - Pre-commercial Thinning, CT - Commercial Thinning, DLT - Diameter Limit Thinning, PM - Plantation Maintenance, Fert - Fertilization, SL - Selection Thinning

** Other includes yellow birch exclosures, local scarification, peatland restoration, soil stabilization and demonstration work.

3.3 Road Construction and Decommissioning

Appendix XII contains principles on forest access road construction and decommissioning. Restriction of access while operations are ongoing in an area and various levels of decommissioning are proposed on an individual road basis.

Roads are constructed into priority areas for harvest such as blowdown in the Central Avalon in Kirk's Ridge and Fox Marsh. Table 8 shows roads proposed by private operators and the Crown for construction, re-construction and decommissioning over the five year plan period.

Table 7. Proposed Road Activity* 2002 - 2007

Year of action	Code	Length (km)	Location	Activity	Stream crossings
2002 - 2003	RR-1	4.4	Country Pond	Reconstruction	3
	RC-1	1.8	Joyce's Trail	Construction (private operator)	1
	RC-2	2.0	Tower Road	Construction (private operator)	0
	RC-3	1.5	Kirks Ridge extension	Construction	0
	RD-1	1.0	Fox Marsh spurs	Decommissioning	0
2003 - 2004	RC-4	2.5	Hanging Hill	Construction	1
	RR-2	8.0	Hender's Road	Reconstruction	3
	RR-3	3.0	Joyce's Trail	Reconstruction	1
	RD-2	1.0	Joyce's Trail	Decommissioning	0
	RC-5	2.0	Foxtrap Weigh Scales	Construction (private operator)	0
2004 - 2005	RC-6	3.0	Fox Marsh Extension	Construction	0
	RR-4	5.2	Hanging Hill	Reconstruction	2
	RC-7	1.5	Hender's Road Extension	Construction	0
	RD-3	1.7	Chance Cove	Decommissioning	0
2005 - 2006	RC-8	2.0	Spread Eagle Peak	Construction	1
	RC-9	1.5	McGrath's Pond (Placentia)	Construction	0

	RD-4	2.0	Clam River Road	Decommissioning	1
	RD-5	2.0	Tower Road	Decommissioning	0
2006 - 2007	RC-10	2.0	Level Pond (Penny's Pit)	Construction	0
	RC-11	1.0	Patrick's Path	Construction	1
	RD -6	1.8	Joyce's Trail	Decommissioning	2
	RD-7	2.4	Tower Road **	Decommissioning	1
	RD-8	2.5	Clam River Road	Decommissioning	1
Total	RC = Road construction = 21.0 km				
	RD = Road decommissioning = 14.4 km				
	RR = Road reconstruction = 20.6 km				

*Unless otherwise specified, road construction, reconstruction and decommissioning are to be done by the Crown

** To be decommissioned in a manner to permit ATV access

It is anticipated that only a fraction of road proposed will actually be funded and constructed, and that the actual ratio of road constructed to decommissioned will approach 1:1 with actual roads to be decommissioned considered individually. It is recognized that the Central Avalon is of particular concern to several stakeholders and the permanence of roads in this area will be considered an integral part of a land management strategy for the area. The standard and ratio of roads constructed and decommissioned will be addressed in the annual field trip and meeting of the Planning Team to monitor the Five Year Operating Plan.

The construction technique will continue to be modified as in the last plan period to allow the option of future road decommissioning. Unless otherwise specified, decommissioning is by topsoil replacement or preparation, planting, and denial of access to the road. Stream crossings greater than fifteen feet would be by Bailey or other sectional or portable bridges. The construction or removal of a culvert or bridge requires approval under Section 11 of the Environmental Act.

Locations of road activity are shown on the 1:250 000 topographic map of Figure 4, and 1:50 000 and 1:30 000 scale maps available at Paddy's Pond office. Skid trails will continue to be reclaimed as necessary to enable natural revegetation or planting.

3.4 Surveys

Surveys are usually done to determine the presence or quantity of particular values such as timber, habitat or sensitive values in an area or to determine the regeneration status or utilization on an area that has been harvested or otherwise disturbed. The data obtained are used as input to develop plans and to make necessary adjustments to the existing plan during its execution. Surveys are to be conducted in all major areas scheduled for harvest in preparation of a pre-harvest plan. Values are to include such features as moose yards, salmonid habitat and rare lichen. In areas which have been harvested, regeneration surveys will continue to determine silviculture requirements such as planting or thinning. Similarly utilization surveys will be continued to determine the extent of utilization and impact on supply/demand projections. Key areas are the Northeast Avalon, Central Avalon, Bay de Verde West, Carbonear Watershed and other areas of the Bay de Verde East zone.

4.0 PROTECTION

4.1 Water Supply Areas

Guidelines for forest operations within Protected Water Supplies are as described in the Environmental Protection Plan for Ecologically Based Forest Resource Management (DFRA, 1998) which specify details on road construction, buffers, stream crossings and other activity. In the Five Year Operating Plan fifty-three cutting areas are partially or completely within protected water supplies as identified in the Atlas of Protected Public Water Supply Areas - Eastern Region. Six of these areas are commercial cutting areas with activity in less than 5% of the watershed area and forty-seven are domestic with activity in up to 100% of the water supply area. Twelve silviculture projects and no road projects overlap protected water supply areas. Appendix XIII provides a list of protected water supplies and activities proposed in each. Maps at the District office provide detail at 1:50,000 scale.

Any activity in a protected water supply area requires approval under Section 10 of the Environment Act. To this end, a detailed four page application is required by Water Resources Division requiring information on activity, location, size, access, stream crossings and other particulars. Approvals would be necessary before any pre-harvest plan could be recommended or activity begin, and conditions of the environmental approval would be binding on all activity in a protected or unprotected water supply area.

4.2 Habitat Protection

Habitat conservation, preservation and provision affect the viability and success of our flora and fauna. For some species such as moose, hares and caribou the maintenance of certain habitat types within a geographic range will provide adequate yearly habitat. For other species such as great-horned owls, bald eagles and salmonids with definite affinities for particular sites detrimental intrusion into these sites should not be allowed and any activity in the vicinity conducted under strict guidelines. With flora the successful reproduction of native plants following disturbance determines management actions during this planning period. It is impossible to manage on a species by species basis. However, by maintaining a variety of habitat types those species that need these habitats will have adequate cover. For example, by maintaining shelterwood areas those neo-tropical song birds which need mature coniferous cover will be provided with adequate habitat.

The location of raptor nesting sites have been provided by the Wildlife Division which will continue to be updated. Any management activities shall be directed away from sites where possible and any activity in the vicinity shall maintain a minimum buffer on bald eagle and osprey nest sites of 800 meters during nesting season and 200 meters during non nesting periods. As well activities in the vicinity shall be conducted at non-nesting times.

Aquatic and marshland habitat requires adequate buffering to ensure maintenance of integrity. Aquatic habitat buffers are specified in the Environmental Protection Plan for Ecologically Based Forest Management which have been approved by the Department of Fisheries and Oceans. In addition, stream crossings avoid spawning areas (see Jones and Winter, 1995). Field staff laying

out harvest blocks will ensure that a minimum 5 m buffer is left around bogs and marshes. This will ensure animals and birds can travel through this zone to nearby cover with relative safety.

Riparian areas are important habitat for a myriad of plant and animal species. This is especially true for a number of furbearers which travel and utilize these areas extensively. To aid in determining the most appropriate buffer width to maintain habitat and permit partial harvest and reduce windthrow, a number of trials will be set up with commercial operators and domestic woodcutters to determine the feasibility of having different widths of buffer zones with partial logging within. Merchantable timber may be harvested in these areas but machinery travel will be prohibited within specified distances.

Throughout the District, field staff have been ensuring that coarse woody debris is being left on our harvested sites. Snags and a number of hardwoods are left to ensure additional structural heterogeneity following cutting. A rule of a certain number of snags per hectare has not been used because past experience has revealed that wind may blow down all or many of those left, thus defeating part of the objective. During this planning period, group snag or clump management will be further refined based on wildlife guidelines developed in Nova Scotia which consider cut sizes and equipment buffers.

The Inland Fish & Wildlife Division (IFWD), and Science and Research Divisions, in co-operation with Conservation Officers and the Regional Ecologist, will continue moose and caribou census work. In consultation with DFO and the Inland Fish section of TCR, various waterbodies throughout the Avalon will be monitored for fish productivity and the results analysed for changes over time.

Furbearers are difficult animals to census and monitor. Notwithstanding this there is a large trapping fraternity in the District. Seasonal trapping results will continue to be analyzed by the IFWD and Science and Research Divisions for District trends. Supplementary to this Conservation Officers will continue to inspect water bodies throughout their patrol areas where consideration is being given to altering the status of beaver trap lines.

The successful reproduction of a new forest stand following harvesting is pivotal to the maintenance of habitat throughout the District. Today's young forest is tomorrow's shelterwood area or lichen forest. As well, reproduction of a variety of species following disturbances ensures a biodiverse forest which benefits all creatures. In management Districts however, successfully reproducing a biodiverse forest is impinged by various herbivores which utilize young shrubs and trees, often to the detriment of biodiversity. During this planning period the biodiversity of cut overs and insect killed areas will be monitored and mitigative measures recommended if biodiversity is being reduced through browsing. This is of vital importance to the Avalon Forest Ecoregion where yellow birch - balsam fir is the climax forest species but successful growth of young trees is severely limited through browsing. It is recommended that the two moose enclosures constructed which have been used mainly to illustrate comparison with browsed areas should be expanded upon to provide more scientific information. Initial observations indicate that significant effects may be due to avifauna or squirrels. Size of harvested areas and other possible factors should be investigated in relation to herbivory and effects on natural succession, and recommendations made to various agencies.

In commercial operations protection of habitat values will be achieved through continuance of pre-harvest plans. Development and monitoring of wildlife and fish population indices is crucial to effective, timely and sound management.

4.3 Biodiversity

Biodiversity is the wellspring of life. Maintaining ecosystem, genetic and species diversity will ensure that the ecosystems of the Avalon long outlive our mortal selves. Forest practices should not impinge upon either type of diversity. As an example, specific recommendations for the conservation of a rare lichen were developed during the last plan period (Robertson ,1998).

Two management actions that have the potential to impact diversity are planting and pre-commercial thinning. No herbicide treatments are planned for the next five years. Planting in the District will be where there are insufficient young trees to form a new stand. As an example, Mitchell's Brook in St. Mary's Bay was burned in 1985 and planted in the last plan period. Areas detrimentally affected by repeated browsing have also been planted with a variety of species. All trees planted in the District are from local seed sources where possible.

Pre-commercial thinning of young forest stands will strive to maintain tree and shrub diversity. In many areas of the District, hardwoods are favoured in thinning operations. As well, where feasible, field staff will ensure that untreated control blocks will be left in areas proposed to be thinned so that comparisons can be made.

Within Management District 01 white pine is an extremely rare species. Preliminary observations of the few isolated stands and individual trees that remain indicate that young pine regeneration is virtually absent. Seed collected from mature white pine on the Avalon is being processed at the Provincial tree nursery and scions have been collected for grafting in propagation programs. The white pine gene preservation garden established at Paddy's Pond will be maintained, and cutting of natural white pine on Crown Land in the District will be strictly forbidden.

Within the forest, stand biodiversity is maintained by having a mosaic of age classes and stand types throughout each submanagement unit. As forest stands age, the compliment of flora and fauna within that stand changes. For example, arboreal lichens, terrestrial mosses and bryophytes increase in abundance as stands age but are virtually absent in a young stand. By ensuring we have a mosaic of forest stands on the landscape we will maintain the diversity of flora and fauna. The best tool to evaluate this diversity is the age class distribution of forest stands. Review of updated age class distribution reveals inconsistencies in age classes and indicates where concern over conservation habitat should be warranted.

4.4 Wildfire

Wildfire protection continues to be primarily through ground crews with aerial support. As mentioned in the section on past activities, most fires have been contained to less than a one hectare burn size on the Avalon. Trained forest fire ground crews have been stationed at five locations on the Avalon (Cape Broyle, Heart's Desire, Paddy's Pond, Salmonier and Whitbourne) for a number of years. Regular staff at all locations in the District have experience and training in wildfire suppression and investigation. There has been increased co-operation in

blueberry ground burning in recent years. Preventative patrols and effective public information remain major tools in fire prevention as most fires on the Avalon are still human caused with 16% through illegal burning.

Despite the use of prescribed burning in other parts of the Province, this technique has not widely been used for forest site preparation or reforestation on the Avalon. Although it may be considered in the plan period, there is none proposed at present. It is anticipated that prescribed burning will continue to be practised for Agriculture and for berry production for wildlife purposes, and staff will continue involvement in training techniques, review of burn plans and other assistance in these areas.

5.0 MONITORING AND RESEARCH

5.1 Monitoring Using Criteria

The purpose of monitoring is to evaluate the actions of the management agency, resource users, the forest ecosystem itself and to compare the results of this evaluations against the goals and objectives that have been stipulated in the strategic and five year operating plan. In the previous plan, three ongoing committees and one ad hoc committee were recommended. The ad hoc committee (to make recommendation to existing appropriate processes mandated to deal with reserves) did not continue past the first year. The Forest Ecosystem Health and Research Monitoring Committee did not function in the second year of the plan and certain aspects (eg. in relation to silviculture) were taken over by the Wood Supply Advisory Committee which reported each year despite only a minor fraction of the group being active. The Forest Access Roads, Domestic and Commercial Harvesting Monitoring Committee similarly continued for the duration of the plan with active membership at less than half of those initially self selecting for that ongoing committee. At a meeting of the original Planning Team in May of 2001 to deal with the first four years of the 1997-2002 Operating Plan, it was recommended to replace the existing monitoring structure in the next plan. Other Planning Teams have held an annual meeting to review the year and propose any modification deemed necessary.

The Canadian Council of Forest Ministers developed a set of criteria (listed in the strategic document) which define the values that can be sustained and enhanced in forest ecosystem management planning. The Council also defined scientific factors, called indicators, to assess the state of the forest and measure the progress of the execution of the operating plan over time. According to the latest report of the Council "in Newfoundland and Labrador the government is drafting a 20-year forestry development plan that will contain specific reference to a provincial set of criteria and indicators, and is considering having the indicators integrated into legislation" (Canadian Council of Forest Ministers, 2000). Using the indicators established by the Department of Forest Resources & Agrifoods, the execution of the five year operation plan for District 01 is to be monitored by personnel of this agency and reported yearly to the planning team. Other very important criteria, which are not covered by the Department of Forest Resources & Agrifoods, should be established and monitored by monitoring committees of the planning team. Various Provincial and Federal agencies (including research-granting councils) should support this essential monitoring. An example of monitoring which should be supported relates to carbon cycling and is included as Appendix XIV. The specific indicators to be measured and evaluated should be based on the nationally accepted indicators listed in the above quoted report.

The criteria established by the Canadian Council of Forest Ministers are subdivided into twenty-two elements and eighty-three indicators. It is obvious that all of these cannot be monitored in District 01. The Department of Forest Resources and Agrifoods is in the process of selecting criteria considered to be important for that agency. This will be followed by the selection of other criteria by the Planning Team. This should be a continuous process during the life of the Five Year Operating Plan. The result of the monitoring will be evaluated yearly by the entire Planning Team and as the result of this evaluation modifications to the plan (if required) will be requested. A combined field trip and annual meeting is proposed for each year of the plan. Additionally any amendments proposed to the plan requiring Environmental Assessment will be simultaneously circulated to consensus Planning Team members and to the Department of Environment. As other amendments are submitted to Forest Ecosystem Management Division for consideration, they will also be circulated to consensus Planning Team members.

5.2 Research

Science provides information for the decision making process in ecosystem management. It is also the basis of 'adaptive' management. The provided information is used to define boundaries, options within boundaries, consequences of those options, and to evaluate the effect of the chosen options: changes in ecosystem structure and function. Information is provided to decision-makers on alternative management approaches so they develop reasonable methods to manage risks at biologically and socially acceptable levels. The scientific understanding of forests and related ecosystems might and should influence management policies. It is most important to understand that fundamental to management is the recognition that the management of natural and processes is based on incomplete knowledge. The most difficult thing is to balance biological science with social science and with the philosophical views of how society values renewable and non-renewable resources. Scientific concerns defining ecosystem management principles (such as forest health, bio-diversity, etc.) could be selected as goals of ecosystem management besides the actual usage of the forest. To obtain a balance, the desired outcomes and goals are determined through the established democratic and institutional process. The ecosystem management planning for District 01 is such a process. This process indicates that it is extremely difficult to obtain consensus on all aspects of the plan between diversified interest groups (Bajzak and Roberts, 1998). It is also obvious that minimal scientific information is available at the present to resolve conflicts concerning the various uses of the forest ecosystem on the Avalon Peninsula. It is most important to fill this scientific knowledge gap and at the same time this would contribute a great deal to the understanding of the various ecosystems of this area on which proper management decisions could be made for everybody's satisfaction. The monitoring process of the execution of the plan also makes it necessary to obtain adequate information on the various ecosystems and to establish a proper framework for it including reporting.

5.3. Proposed Research

The management process requires appropriate input data to forecast the development of dynamic units over a long period of time. In the case of the forest ecosystem the basic unit is the 'forest stand' defined as "a group of trees, occupying an area of any size, which together develop through their various life stages in a specific and predictable manner". Within an administrative area the forest ecosystem contains many distinct stands, each at different stages of development.

The administrative unit can be very large or small, therefore, a proper classification and mapping system must be developed and applied to it which reflects the natural occurrence of the ecosystem which is appropriate at that particular level. It was stated in the Strategic Document that the Canadian Committee on Land Classification developed such a system having various levels of mapping units from the very general to very detailed to identify spatially uniform areas based on geomorphology, soil, vegetation, climate, water, and fauna. The lowest level of this system is the 'ecoelement' which represents uniform forest stands, the basis of detailed forest ecosystem management planning. To date the Avalon Peninsula Forest District area has only been mapped to 'ecoregion' and 'eco-subregion' levels with uncertain boundary lines. Some detailed information is given on the various forest types (ecoelements) in the Forest Site Manual (Meades and Moores, 1989), however, these units are not mapped and 'growth curves' are not available for them which are very important for the determination of yield on which the forecast is made. Some suspected errors in the Site Manual, concerning the definition of some forest types, their distribution and site ecology must be investigated and updated.

The establishment of levels between Ecoregion and Ecoelements (as specified in the Strategic Document) with the necessary corrections is proposed. Applying the developed classification the Avalon Forest Ecoregion (Central) area will be mapped (using aerial and satellite imagery, existing land capability maps and ground observations) at each level. In addition an attempt will be made to develop yield curves for the most important forest types (as defined by Damman). This will involve the analysis of previously collected data (including measurements of permanent sample plots). These yield curves are only useful to express the developmental pattern of a particular forest stand concerning wood production for harvest. In order to evaluate the dynamics of the forest for other uses (wildlife habitat, recreation, etc) other expressions of stand development must be established. This would require research carried out by other scientists in related disciplines.

The use of the forest ecosystem on the Avalon Peninsula is very diversified. The long-term effect of the various uses is not known which is essential for proper management planning. In order to obtain information on these effects reserve areas must be established with no interventions what so ever and other areas having various levels of interventions (research areas). Extreme care must be exercised in choosing and delineating these areas with careful well-developed experimental designs. The forest ecological land classification and mapping will provide a basis for this undertaking.

Other trials and research recommended in the District would include fertilization of a small portion of a headwaters to test aquatic and terrestrial responses, a study on the extent and mitigation of browsing by introduced herbivores particularly in relation to disturbance size, a study of songbird usage in relation to different harvest and silviculture intensities, research into carbon cycling for monitoring purposes and a study on partial removal in wider stream buffers. Alternate uses of forest products (such as burls, specialty craft woods/products or medicinal uses) should also be investigated.

5.4 Baseline Measurements

Baseline data on air temperature and humidity, soil temperature, and of stream chemistry are presently being collected in the Salmonier Nature Park. It is proposed that comparative data be obtained (monitored) in selected harvested and silviculturally treated areas, and in reserves. The water chemistry measurement would be done in periodic (seasonal) sampling. The temperatures and humidity would be recorded using inexpensive dataloggers.

The measurements provide quantitative data for monitoring the effect of harvest and silviculture in comparison with uncut and untreated areas.

6.0 EDUCATION

Education of the public concerning the effect of ecosystem management activities is a very important part of the planning process and the execution of the plan. The awareness and appreciation of modern forestry practices should be promoted. There are various programs in existence and development stages through by the Provincial Department of Forest Resources and Agrifoods. These will be supplemented by various activities carried out within the Memorial University Teaching and Research Forest at Paddy's Pond. An ecological interpretation trail was already established to demonstrate the effect of no interventions and different forestry interventions on some forest types. A plantation arboretum of various species is also in existence. Typical understorey flora and the forest structure can be viewed as well as soil profiles. The changes in soils with slope and drainage properties and different humus characteristics will also be demonstrated. A summary of the proposed management activities on this woodlot is presented in Appendix XIV.

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