

7.3 Biodiversity Strategy

The biodiversity strategy for Management District 2 has two components. The first outlines the actions necessary to protect representative ecological regions and unique/sensitive ecological features. Section 2.2.4 outlines a strategy to achieve these objectives. It is also necessary that mitigative measures are taken to reduce the impact of biodiversity of forest on forest management activities such as harvesting and silviculture. This section will outline the strategy that will be followed to achieve this latter objective.

Silvicultural Considerations:

White Pine used to be broadly spread across the Newfoundland landscape but is now in danger of disappearing. White Pine is very scarce in District 2. Red Pine occurred in scattered isolated stands throughout the island. It is very rare in District 2. The following measures will be taken to increase the presence of White and Red Pine in the District:

- White Pine will be planted at a density of 200-500 trees per hectare on suitable sites during future plantations.
- White Pine will be gap planted through existing under-stocked plantations and naturally growing stands on suitable sites as funding permits.
- A ban is in effect which prohibits commercial and domestic harvesting of White and Red Pine in the district.
- ALL White Pine will remain uncut in stands which receive pre-commercial thinning treatment.
- Red Pine will be planted at a density of 2000-2500 trees per hectare on suitable sites.
- Where available, local seed sources will be used in reforestation of Red and White Pine.

Reforestation will continue in the District. The following measures will be taken to help maintain the ecological integrity and biodiversity of plantations:

- Areas that have adequate acceptable stocking will be allowed to reforest naturally.
- Where available, local seed sources will be used in planting stock in this District.
- During reforestation, species will be matched to their ecological site - following the Damman site classification system.

- Hardwoods and other natural species that co-exist on plantations will be allowed to add diversity to managed stands.

Pre-commercial thinning will also continue in dense young stands where there will be wood supply benefits from this practice. However, given the prevalence of balsam woolly adelgid throughout the District, thinning will be a low silvicultural priority in this District in the foreseeable future. If thinning does occur, the following measures will be followed to maintain biodiversity within thinned stands:

- Hardwoods will remain uncut in pre-commercially thinned stands. The hardwood component in stands will be as great or greater post-treatment than pre-treatment.
- Pre-commercial thinning will not be conducted in stands known to be moose yarding areas.
- White and Red Pine will be left standing in pre-commercially thinned stands.

Harvesting Considerations:

- a minimum of ten stems per ha will remain on all cut overs to provide perching/nesting sites for various avian species. This will also provide diversity of vertical structure in future developing stands.

7.3.1 Ecosystem and Biodiversity Health Plan

Section 5.1 of this document presents a number of strategies to deal with biodiversity issues within District 2 during the coming decade. The intent of this section is to further outline specific activities that will occur within the District during the next five years that complements the approach introduced in the earlier section.

Section 2.2.4 presents a strategy to protect representative samples of the Districts ecoregions through existing ecological reserves and the province's protected areas initiative. All of the four major ecoregions/subregions, including the Northeastern Barrens and Central Barrens Sub-regions of the Maritimes Barrens Ecoregion; the Northcentral Forest Sub-region of the Central Newfoundland Forest Ecoregion; and the North Shore Forest, have existing or proposed ecological reserves within or immediately adjacent to District 2. There is also a commitment to protect unique and/or vulnerable ecological features within the District, such as raptor nest and rare plant sites.

Goals and objectives are set in Section 5 which, if achieved, will help preserve biodiversity within the District. For example, in addition to goals which are intended to capture important and representative ecological features within ecological reserves, the Strategy Document aims to further preserve diversity and wildlife habitat through maintenance of a variety of forest conditions across the landscape; by means of establishing riparian buffers and

wildlife corridors; through careful management practises in important ecological attributes such as caribou calving areas and waterfowl staging areas; through protection of sensitive ecological niches like fens and wetland areas; and through reintroduction of endangered or uncommon species such as native pines and the pine marten. The harvesting and silviculture strategy outlines measures which will help maintain species composition, vertical structure and other important ecological elements at the stand level.

These measures are, in many ways, precautionary in the absence of an in-depth understanding of the intricate and very complex natural world around us. A number of activities are planned for implementation during the next five year period to improve the understanding of the bio-diversity within the District's limits; to increase the level of understanding of the impact of some key management activities on biodiversity; to identify and protect the special and unique places and the ecologically sensitive and/or critical areas within the District; and to gauge the health of the ecosystem.

Prior to this discussion, it is worthwhile to revisit a perspective on the portion of the landscape in District 2 that is forested relative to the total area and to that portion which is likely to have some forest management activity during the rotation of the forest. There is a total land area of 4810 square kilometres (481,000 ha) in District 2. Sixty-nine percent (or 291,000 ha) of the District is forested with either scrub type forest (25% or 121,000 ha) or forest with merchantable volumes of timber (40% or 170,000 ha - known in forestry circles as productive forest). Twenty-five percent (or 121,000 ha) of the District contains forest that is classified as production forest, which means it is that portion of the District which is used to calculate the sustainable supply of commercial and domestic timber. It is this portion of the District that will likely have some degree of forest management activity during the rotation of the forest. In most instances this means it will receive a harvesting pass and possibly a silviculture pass once in a 60-80 year period. The production forest comprises forty-one percent of the total forested land in the District. The impact that harvesting/silviculture activity will have on the long term biodiversity within the portion of the District that is managed for wood production and on the District as a whole is a complex question.

It is true that the impact of Newfoundland's industrial and domestic forestry activity on biodiversity is difficult to predict and measure. However, a general comparison of the impacts of this industry on ecological health and biodiversity compared to some other local land uses can be drawn. Also, a statement can be written about the broad ecological impacts of using wood products compared to using wood substitutes such as steel and plastic.

Each year in District 2, as in jurisdictions around the globe, productive forest land is cleared to make way for other progresses of our modern society. Land is cleared of healthy trees and stripped of fertile topsoil to accommodate municipal expansion or non-renewable mineral/aggregate exploitation - replacing once lush forest with huge expanses of sterile asphalt or bare uninhabitable rock. Ecosystems are drastically and permanently disrupted to allow development of new golf courses (golf being America's fastest growing recreational sport) or to promote growth in the agriculture industry - both of which require annual, frequent and sometimes copious applications of herbicides, pesticides and fertilizers to keep fairways green and free from weed and crops bountiful and protected from insect. Still more once- productive forest land is flooded in pursuit of hydroelectric power to fuel societies endless appetite for energy - and ecosystems eternally buried beneath fathoms of water. Industrial/domestic forestry

use of the land is not immune to ecological change or damage - however, most change is of a temporary nature; most damage leaves a scar that heals with the advent of a new forest. Through industrial/domestic forestry, old senescent vegetation is removed; topsoil is, for the most part, left intact; new vigorous forest are born. Pesticides have not been used on the forest in Management District 2 since 1980. Herbicides were last used in this District in 1994 and then on only a very limited scale. Fertilizers were used on an experimental basis on a few hectares of forest during the 1970's. Disturbance patterns in industrial forestry come far closer to simulating natural disturbance regimes than do residential growth, mineral exploitation, agricultural expansion, golf course creation or hydroelectric development. Of course, there are ecological differences in forest succession following harvesting versus natural disturbances - but they are far subtler and far less drastic than other forms of modern day land use. Industrial forestry is drastic from a visual perspective and it does impact a broad portion of the landscape. However, the aesthetically displeasing appearance of a cut-over is temporary and changes with the regeneration of a new forest. The scale of clear-cut logging emulates natural disturbances such as forest fire, wind/ice storms, or insect outbreaks – normal driving forces of forest renewal in the boreal forest.

Industrial/domestic forestry is planned, on a local scale, to provide forest products to 40,000 human beings; and, on a global scale, to provide goods to 6 billion (and growing) people. Our society will continue to demand that basic needs be fulfilled from forest products: like housing materials and heat. Considering the demographics and growing affluence of western societies and the improving economies in eastern societies, there will likely be increased demand locally as well as globally for newsprint, other paper products, and a multitude of value added softwood and hardwood goods. With wise management practises these demands can be met on a sustainable basis. However, some will argue that we are destroying our great forest ecosystems and, ultimately, destroying our planet by exploiting forest to supply these products for human consumption and that we should substitute steel, plastic and fossil fuels for these forest products. Well, steel and fossil fuels are non-renewable. The production of steel and plastic consumes fossil fuel and contributes to the most serious environmental problems that we currently have on this planet: build-up of green-house gases; global climate change; emissions/expulsion of highly toxic waste. In the interest of conservation and environmental protection, society is demanding the growth of recycling many products from non-renewable, as well as renewable, resources. In addition to recycling, expanded use of forest products on a global scale will also help reduce the most serious environmental concerns that face today's society - in two ways. It will reduce the emissions of green-house gases and environmental toxins by substituting wood for steel and plastic products. In addition, good forest management will remove older sluggishly functioning forest and replace them with fresh active vigorous forest with more rapid photosynthetic rates and a greater ability to cleanse our air of green-house gases and other air-borne environmental toxins.

The above rationale is not meant to suggest that forest resource managers or users should be smug with the knowledge that forestry development is less harmful and disruptive to the ecosystem – at least on a stand scale - than many other forms of human development activities. Nor should it nullify our collective responsibility to consider other values - economic, ecological and social - on the landscape; to better understand how the ecosystem functions with or without industrial/domestic forestry; and to minimize or mitigate harmful aspects of forest management

activity.

District staff do not have the expertise, nor the personnel resources, to conduct the research necessary to advance ecosystem health and biodiversity thinking and understanding within the District at a rate that is acceptable in today's world where maintaining biodiversity is a key component of ecosystem management. Therefore, the District will attempt to forge partnerships with other divisions of this organization and with outside agencies to undertake research or conduct bio-resource surveys that will provide information upon which to base ecosystem management decisions in the future. A number of projects are already on-going in this regard in conjunction with a number of sections with the Wildlife and Inland Fish Division of the Department of Forest Resources and Agrifoods; with Terra Nova National Park; and with the Memorial University of Newfoundland. These projects will continue in the future and the District will seek new projects through the period of this plan.

7.3.1.1 Moose/Snowshoe Hare Exclosures

The Ecosystem Strategy Document discusses the impact of moose herbivory on stand dynamics and forest development. Extensive moose browsing is causing some fir sites to remain in early successional stages for extended periods. Heavy browsing also has a dramatic impact on under-story structure and vegetative composition. Reconnaissance field observations provide ample evidence that some vegetative species are browsed to very low levels in areas which have high moose populations. In an effort to observe and quantify these impacts the District is involved in an extensive moose exclusory study in co-operation with the Management and Research Section of the Wildlife and Inland Fish Division, Memorial University of Newfoundland and Terra Nova National Park. A series of 18 exclosures have been set up in managed and unmanaged landscapes throughout Terra Nova National Park and Management District 2. In District 2, exclosures have been established in large and small clear-cuts in burned area and in areas that have had selective harvesting. This project should help quantify the impact of moose browsing in managed and un-managed forest. In time, these exclosures will provide a very visual (refer to Figure 7.33 and Figure 7.34) as well as quantifiable record of the effect that moose can have on forest composition and structure and may enable wildlife researchers the opportunity to measure or extrapolate the resulting influence on forest avian and mammalian fauna. It will provide information and knowledge that will assist resource managers in making future big game and forest management decisions. The exclosures are also designed to prevent snowshoe hare access to a portion of each study site. This will allow an evaluation, quantifiable as well as visual, of the impact of snowshoe hare browsing on the forest floor vegetation composition.



Figure 7.33. Moose/hare exclosure: five years after establishment; softwood



Figure 7.34. Moose/hare exclosure: five years after establishment; hardwood

7.3.1.2 Moose Yarding Areas

Moose have habitat requirements that cause the species to occupy certain areas in high concentrations during winter seasons with snow depths greater than 70 cm. This phenomenon is known as moose yarding. The District has identified all known areas of high annual moose concentrations as well as all known moose yarding areas on the map series in (Appendix 1.0). Moose yarding areas are usually dynamic on the landscape. The District will monitor the movement of these areas and map new areas as they become known. The District will advocate moose management measures, including within known moose yards, which will balance moose populations with social, ecological and economic values for the area.

7.3.1.3 Rare Plant Surveys

District 2 has a staff person who works in close corporation with the Endangered Species and Biodiversity Section of the Inland Fish and Wildlife Division. One of the mandates of this section is to identify rare plants found in this province and to survey for existing sites. During the next five years, this resource person will lead the effort to identify the rare plants currently known to be in District 2, search for rare plants currently unknown to exist here and locate rare plant sites. Rare plant sites will be mapped as they become known using the District's geographic information system. Currently known rare plant sites are shown on the Map series in Appendix 1.0. All rare plant sites will be protected from development activity, including damage from commercial or domestic logging activity.

7.3.1.4 Avian Surveys

District Staff will continue with the avian surveys throughout the forth-coming planning period. This will include the Christmas Bird Count, the interior forest song-bird survey and the shorebird survey. The Audubon Society's Christmas bird Count, initiated in 1900 and currently conducted throughout the western hemisphere, is one of the largest and longest running ornithology studies in the world. A study circle was initiated in District 02 during 2001. The purpose of this survey, of which the District 02 survey circle is a small part, is to monitor the status and distribution of birds in the western hemisphere (Audubon).

The district has initiated its own interior forest songbird survey which will evaluate the diversity and relative abundance of songbirds in mature black spruce and balsam fir forest. These surveys will be conducted through to post harvest to evaluate the change in songbird diversity and relative abundance as a result of harvesting.

Finally, the District is also participating in an international shorebird survey. District staff monitors shorebird abundance on select beaches and forwards the data to a national and international data-bank. The information is ultimately used to help in planning and developing national and international conservation and management initiatives. Results of surveys conducted during the past five years are shown in Appendix 2.0.

7.3.1.5 Newfoundland Marten Recovery Program

The Newfoundland marten (*Martes americana atrata*) is currently listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as an endangered species. The Province has initiated a marten recovery program which involves the re-introduction of animals into eastern Newfoundland. This impacts the western portion of Management District 2 - more specifically, the Northwest River valley. It also impacts adjacent area in Management District 4 which is also under the administration of the Clarenville office.

The Endangered Species and Biodiversity Section of IFWD has the provincial mandate to ensure that the Newfoundland marten recovery program is delivered in insular Newfoundland. The recovery program calls for the establishment of three distinct and viable populations of at least 50 animals on the island of Newfoundland by the year 2010. An area encompassing the Terra Nova National Park and adjacent Crown and licensed forests in Management Districts 2, 4 and 5 is one of the three areas which is targeted for the establishment of a population of marten. District 2 has a resource person designated to work closely with the endangered species section in the delivery of the marten recovery program in this area. Terra Nova National Park will also be committing personnel and other resources to this effort.

Two of the key elements of the Newfoundland marten recovery program are maintaining adequate habitat to accommodate the target population and maintaining protective corridors to allow dispersing young marten to move throughout the landscape in search of suitable habitat. The Terra Nova National Park and the headwaters of the Terra Nova and Northwest River systems (including portions of the Bay Du Nord Wilderness Reserve) contain substantive tracts of mature and over-mature forest that make prime marten habitat. A wildlife corridor will be maintained along the Northwest River that will link the Terra Nova National Park with the Bay-Du-Nord Wilderness area and the headwaters of the Terra Nova River system (see Appendix 1.0). This corridor will work in conjunction with an adjacent corridor being planned for the main stem of the Terra Nova River. This corridor will have wider no-cut buffers along water-ways than are normal throughout the District. Also, modified harvesting practices will be applied in the forest throughout the wildlife corridor in an effort to maintain suitable habitat for marten. These practices will consider current information on the species. All access roads built within the corridor will be decommissioned after logging is completed and the areas are reforested through either natural or artificial means (regeneration surveys will be conducted two seasons after harvesting and reforestation, if necessary, will occur during the next available planting season.) Decommissioning means that a section of road will be de-constructed to a point that all vehicular traffic will be unable to use any portion of decommissioned road. This section will be returned to a reforested state.

While the establishment of corridors on the landscape is a positive step for marten recovery, it is important to recognize that extensive areas need to be managed for supporting territorial animals. There's been a shift in understanding of what marten require and there seems to be strong evidence that marten will extensively use non-productive forest (i.e. taller SCS), younger productive forest, insect disturbed sites etc., in addition to late successional conifer forest. However, marten have been shown to use this habitat at the stand scale or within the home range. Use of these other forest types at this scale don't imply that landscapes dominated by young forest or scrub are suitable for marten. Research is currently being conducted in the

Province to more clearly define the relative composition of forest types found within Newfoundland marten home range.

This wildlife corridor will also help protect a number of other ecosystem values. For example, Boy Scouts of Canada operate a provincial summer camp on the north shore of Northwest Pond. They have expressed concern about extensive logging immediately adjacent to their facility and surrounding Northwest Pond. Girl Guides of Canada operates a summer camp on the south shore of the pond. The section of Northwest River included in the wildlife corridor forms a waterway link between two of the Provinces more important protected ecological areas - Bay Du Nord Wilderness area and the Terra Nova National Park. This waterway is a popular canoe route that flows through two of the provinces ecoregions - the Northcentral Subregion of the Central Newfoundland Forest and the Central Barrens Subregion of the Maritimes Barrens Ecoregion. It is teeming with wildlife: mammalian; migratory waterfowl; raptors-and is highly suited for adventure tourism development. The salmon population was weak and declining in the Northwest River for a number of years prior to 2003. The population has shown signs of recovery during the past two years. Wider no-cut buffers will provide habitat protection for the Atlantic Salmon.

A third key component of the Newfoundland marten recovery initiative in the Terra Nova area is the institution of a modified snaring program. Traditional snow-shoe hare snaring techniques are known to be deadly on pine marten, and particularly on dispersing juvenile marten. One of four marten introduced into the Mollyguejeck Lake area succumbed to snaring mortality shortly after it was released in the fall of 1999. The improved success rate in marten escaping from the modified snare has been well demonstrated by wildlife studies. The District will continue to implement the modified snaring program as a priority compliance issue in its jurisdiction within the recovery area.

District staff will be involved in a number of other activities in support of the A new snaring initiative introduced in this years hunting guide is encouraging the use of two other wire types (in addition to the modified snare). These wire types are 6-strand picture cord and 22 gauge brass wire. Trials from the testing compound in Alberta showed that >80% of hares were retained in these new wire types and all marten which were captured subsequently escaped. The advantage of this wire type to the resource user is that the coil device, which is difficult to use, does not have to be used. The wire types referenced above must still be attached to a solid anchor. Newfoundland marten recovery effort during the next five years. These will include radio-collaring/monitoring to assist in the study of the movements/range habits of the sub-species; live-trapping to help determine the population density and distribution of the animal; back-tracking surveys to help determine pine marten habitat use; participation on a pine marten education committee to help develop an effective public relations campaign that will educate local resource users about the value and importance of the species; and help with future re-introductions of marten from western Newfoundland. District staff will also attempt to remain current with the scientific knowledge base regarding pine marten and pine marten habitat requirements.

7.3.1.6 Bio-resource Inventories

District staff will work in co-operation with the Management and Research Section of the

Inland Fish and Wildlife Division to conduct a variety of bio-resource inventories throughout the District. District 2 has a staff person designated as contact with this section. This person will work closely with the Management and Research Section and will provide a lead role in the implementation of bio-resource surveys in the District.

Two initiatives carried out during the previous planning period will be continued during the next five years. These include a survey of raptor nesting sites (bald eagle and osprey) along the coastal areas of District 2 in the southern portion of Bonavista Bay and the northern portion of Trinity Bay. A survey of otter activity will be conducted in the same areas. These surveys will be repeated as necessary in the future to collect additional data to substantiate population densities/distribution or to evaluate changes in these population dynamics. Other sources (local knowledge for example) will also be used to help identify the locations of raptor nesting sites and areas of otter concentrations. The District will conduct an awareness campaign to inform local residents about the importance and vulnerability of raptors and about the guidelines that have been established to protect these creatures. The District will also be very pro-active in its attempt to collect public knowledge regarding the location of raptor nesting sites. The local media, the local education system, and the annual bird count will be used to help identify the location of these sites.

It is felt that these species may be important as indicators of the health of the coastal areas in the District. Studies have been done or are on-going to gather base-line information about toxicity levels in the eagle and otter populations in neighbouring Placentia Bay. This information can be used in the future as a basis for comparison with populations in Bonavista and Trinity Bays.

All known raptor sites are indicated on the map on Appendix 1.0. All newly discovered raptor sites and areas of otter activity will be incorporated into the Districts GIS system. It will be maintained in an electronic data base and will also be available for viewing in the District office.

7.3.1.7 Riparian Zones

Riparian zones contain the vegetation along streams and ponds and are important landscape attributes that provide significant ecological functions. These sensitive areas contribute to a diversity of wildlife habitat as well as flora and fauna. Riparian areas provide connectivity throughout the landscape and often act as wildlife corridors. The standing vegetative cover is critical to fish habitat, shading streams and moderating stream temperature. Fallen trees also provide shade, in addition to creating pools, further enhancing fish habitat. Over hanging vegetation provides protection for fish from predators and provides food in the form of insect and leaf drop. Decaying woody and leaf debris is also important to the aquatic food chain. Riparian vegetation helps maintain water quality by preventing erosion and by filtering out sediment laden run-off from upland harvested areas.

The Department has Environmental Protection Guidelines which calls for the observance of un-cut buffers along the shores of all streams, ponds and lakes within the province. The District will adhere to the Department's Environmental Protection Guidelines (refer to Appendix 2.5), which requires that a minimum of a twenty metre treed buffer be left un-cut on all water bodies and permanent year round streams. The District office has involvement in the approval

process for other land-use activities such as new cabin development areas, quarry permits, agricultural development and a variety of other Crown land uses. It also has the responsibility of issuing authority, through commercial cutting permit, for wood removal from various crown land leases. In the future, the District will exercise its authority in the Crown land-use approval process to ensure that environmental guidelines that are designed to protect sensitive habitat from unnecessary damage due to commercial and domestic logging activity will also protect sensitive habitat from unnecessary damage due to other forms of crown land development.

The District has the discretion to increase the width of stream buffers. The District is exercising this authority in three situations. (1.) All larger river systems in the District will have a larger riparian buffer left intact to conserve the ecological uniqueness of these niches. All river systems that are designated as scheduled salmon rivers or known to carry local salmon runs will be included under this guideline and will be afforded a minimum of a fifty metre treed buffer. This measure will serve to help mitigate loss of or damage to Atlantic salmon habitat. The Atlantic salmon is considered by many to be a vulnerable species, even though it has not been considered for designation under COSEWIC. Recent estimates have indicated that there may only be 500,000 wild adult Atlantic salmon left in the North Atlantic. Returns to Newfoundland rivers have been declining during the past 6-8 years. Also, larger river systems are more diverse than small stream habitats - and provides habitat for a large host of flora and fauna. These rivers and their associated valleys also perform a more significant role at the landscape scale than do small streams. Larger streams and rivers offer a useful landscape attribute that allows ecosystem planners to establish connectivity throughout the landscape. Protected uncut riparian buffers create a sheltered vegetative corridor that is very beneficial in allowing the movement of wildlife throughout the landscape. (2.) The second divergence from the minimum water buffer standard is the wildlife corridor that is being established along the Northwest River (see above for details of this corridor and the rationale that justifies its designation; also refer to Appendix 12. (3.) The third scenario in which larger buffers are left is to observe protocol for conducting forestry activity within protected water supplies (refer to section 2.5 - Other Ecosystem Values and to Appendix 12).

There is still much debate regarding the value of establishing riparian buffers throughout the landscape. Some stakeholders argue arduously that buffers should not be left at all on the District's streams and ponds and that these buffers will just blow down and become wasted fibre. Others argue just as strenuously that twenty metres is not nearly wide enough to offer erosion protection and temperature control for fish habitat and to provide other wildlife benefits like landscape connectivity and wildlife habitat. Various studies have been initiated in Newfoundland and in other jurisdictions to investigate and provide answers for those who view riparian buffers from both diverse perspectives and to assist ecosystem planners in making informed decisions about this aspect of landscape planning. District staff will attempt to keep current with new information relevant to the riparian buffer debate, as it becomes available. In the meantime, it is prudent to err on the side of caution and implement wider stream buffer protection at least on the larger streams and rivers in the District as out-lined in this section.

It has been proposed that trials should be conducted in this District to determine the economic feasibility of extracting timber from 20 metre buffers; to gain experience in this procedure; to established managed buffers; and ultimately, to increase wood supply in the District. There is a much wider gap in knowledge regarding the ecological function of riparian

buffers then there is with respect to the economic feasibility of harvesting these bands of timber. Operational trials have been conducted in western and central Newfoundland which have answered the question on the economic side. Riparian buffer studies have also been conducted to answer ecological function questions, but the ecological function of these areas and how it inter-relates with other ecosystems and the broader landscape is much more complex than the economics of removing the timber. The argument that it is beneficial to establish multi-aged stand conditions within riparian buffers appears to have merit. However, harvesting entries into these relatively narrow strips will create openings which will likely accelerate break-up during wind storms. In the absence of harvesting, break-up will occur over a longer period of time, allowing a multi-age condition to occur through natural progression. Finally, the timber supply gain through partial harvesting the riparian buffers is relatively small compared to other opportunities to improve the sustainable forest supply. It is estimated that less than 2% incremental volume can be gained by harvesting in the District's riparian buffers. By comparison, implementing a policy to harvest the oldest wood first in the District has a 16% impact on the sustainable harvest level; maintaining a strong reforestation program has a 9% impact on the long term wood supply for the District.

Given the ecological importance of riparian buffers, albeit un-quantified, the District is not prepared to accept the risk of creating harvesting disturbance within these areas at this time. The District also recognizes that managing a harvest within riparian buffers would be very challenging given declining staffing levels and increasing work loads, which further exacerbates the level of risk associated with the proposal. The District would entertain a trial to explore managing a riparian buffer with an increased width.

7.3.1.8 Fire in the Ecosystem

Fire has been an integral part of most portions of the boreal forest ecosystem since time infinitum (or at least since the retreat of the last ice age some 8000 or so years ago). However, man's fire suppression effort of the past 50 years is reducing the influence of fire at the stand as well as the landscape level. Forest succession in the Central Newfoundland Ecoregion and to a lesser extent in the Northshore Forest Ecoregion have normally been driven by catastrophic wildfire disturbance, but now is driven to a much greater degree by harvesting or a combination of wind/insect/harvesting disturbance. The reduced presence of fire is affecting species composition in these ecoregions. Black spruce has evolved to regenerate successfully following fire disturbance – requiring heat to open its buds and release showers of seed. Balsam fir, being much more shade tolerant, can live for many years beneath a forest canopy. Wildfire would destroy this advanced regeneration, whereas clear-cutting provides release to grow. Therefore, there has been a shift in forest composition in post-harvest regenerating stands towards balsam fir. Even though fir was once favoured in the local sawmill industry, there are a host of problems in managing balsam fir as a commercial crop species. Balsam fir is susceptible to moose browsing, balsam woolly adelgid and other forest insects and to stem rot at a relatively early age in its rotation. Hot fire is also an effective way of suppressing kalmia, an aggressive ericaceous shrub which can dominate softwood sites and delay forest establishment for long periods of time. Consequently, the current successional pattern presents a silviculture challenge to forest managers. Forest in the District's other two major ecoregions, the Northeastern

Barrens Subregion and the Central Barrens Subregion, have not been as dependent on fire for succession.

Section 5.2 discusses issues with mounting a prescribed fire program in District 02. However, the District will attempt to use slash burning as a silvicultural tool to achieve more vigorous stand establishment. The District will use other silvicultural techniques (refer to Section 7.5 - Silviculture Strategy) to deal with managing the forest in the reduced presence of fire.

Terra Nova National Park has been pursuing the introduction of prescribed fire within its boundaries for the past number of years. The District will follow closely the TNNP effort to implement a prescribed fire. If they are successful, it will provide a good opportunity for District 2 staff to receive first hand experience with the technique.

Prescribe fire has been used before by the Department of Forest Resources and Agrifoods in the Province's Western Newfoundland Ecoregion, but this is a region where fire has not had a significant history and forest succession normally occurs through insect disturbance. Prescribed fire has not been used to date by foresters in the Central Newfoundland Ecoregion, in which the frequent historical occurrence of wildfire was a distinguishing ecological feature. It is for this reason that District 2 is keenly interested in following and becoming involved in the prescribed fire program in Terra Nova National Park. Also, there is a need to collect information on forest succession following fire compared to scenarios where the forest is disturbed through other natural causes (ie wind or insects) or through harvesting. In addition to receiving hands on experience with the Park's fire program, the District stands to gain knowledge from ongoing scientific research that will follow this project. Parks personnel will study successional patterns in the burned area compared to surrounding areas which will likely be subject to wind/insect disturbance patterns. The park has greater access to scientific resources to conduct applied research than does its provincial counter-parts across Clode Sound. It would be scientifically useful to expand this research project to District 2 and also study, in greater detail than has occurred in the past, succesional patterns, and ultimately biodiversity, in forest that are harvested and/or harvested and prescribed burned.

7.3.1.9 Protected Areas Plan

As mentioned earlier in this plan, District 2 has major extensions of four ecoregions within its boundaries: (1) Northshore Forest Ecoregion - 74,691 hectares or 18% of the District; (2) Northcentral Subregion of the Central Newfoundland Forest Ecoregion - 123,617 hectares or 29% of the District; (3) Northeastern Barrens Subregion of the Maritimes Barrens Ecoregion - 155,525 hectares or 37% of the District; and (4) Central Barrens Subregion of the Maritimes Barrens Ecoregion - 95,353 hectares or 23% of the District. In addition, smaller portions of two other ecoregions occur within the District, including: (1) Southeastern Barrens Subregion of the Maritimes Barrens Ecoregion - 24,060 hectares or 6% of the District and (2) Eastern Hyper-Oceanic Barrens Ecoregion - 4540 hectares or 1% of the District. The protected areas plan for the Province is being directed by the Parks Division of the Department of Tourism, Culture and Youth. Its strategy calls for the establishment of protected areas that represent each of the ecoregions that exists in the Province. The main criteria to be used in choosing candidate areas for development as a protected ecological reserve are:

1. They must capture the representative features of the ecoregion.
2. They must be no smaller than 10 square kilometres (100 ha) and preferably be larger than 50 square kilometres (500ha).

The four major ecoregions that comprise 93% of Management District 2 have substantial areas either in an ecological protected status or designated as a candidate for ecological reserve status immediately adjacent to or within the District. The Bay Du Nord Wilderness Area has 2657 hectares protected within the Northcentral Subregion and 459,566 hectares within the Central Barrens Subregion. This protected area extends into the southwestern corner of District 2. Lockston Provincial Park contains 773 hectares of protected land within the Northeast Barrens Subregion. An additional ecological reserve in this sub-region, with a total area of 11,000 hectares, is being considered for designation on the eastern portion of Random Island. Terra Nova National Park provides ecological protection to a significant expanse of both the Northshore Forest Ecoregion (13,100 hectares) and the Northcentral Subregion (280,100 hectares). In addition, there are two other significant land packages that are alienated from heavy forestry or agriculture development in the District. The White Hill Ski Resort comprises a land package totalling 362 hectares and the Terrence Pond/ Thorburn Lake cabin development area includes 525 hectares. These two areas have significant wooded portions which will not be developed. Of greater ecological significance is the fact that a large portion of the landscape in District 2 is remote, is not considered to be part of the production forest land-base and will, albeit by default, play an important role in maintaining large portions of the landscape in an undeveloped state. Nearly seventy percent of the District's total land-base and sixty percent of the District's total forested area will not be subject to forest management activities due to biological limitations or to logistical/economic constraints.

7.3.1.10 Decommissioning of Resource Access Roads

A debate is on-going in many jurisdictions within Newfoundland and abroad regarding the value of resource access roads post forest harvesting. Though it is well recognized that resource roads provide many economic and social benefits, many also recognize that untethered resource road development will have negative ecological impacts as well as some negative economic impacts.

Resource access roads provide resource management benefits such as access for silviculture and forest protection activity. However, permanent access is not required to meet silvicultural implementation demands. Silviculture work can be carried out through provision of temporary access. The development of a forest access road system presents a catch 22 scenario from a forest protection perspective. Even though resource roads provide access for protection activity, they also create a forest hazard by increasing the risk of human caused wild-fire.

These road systems also provide many recreational opportunities for Newfoundlanders, who are steeped in a long-standing tradition of hunting, fishing, berry-picking, domestic wood-cutting and week-end cabin get-aways. From a social perspective, it is important that Newfoundlanders continue to enjoy the recreational pleasures that is provided through access to our great out-doors from the industrial forestry access road infrastructure. Newfoundland has a deeply entrenched

gathering society. This is an important value that ought to have strong recognition in resource management planning. However, responsible ecosystem management dictates that the provision of these recreational services should be balanced with the ecological requirement to maintain some inaccessible tracts of landscape post-harvest. Pressure to develop cottage areas often follows access road development. Cottage development should only occur in the District in full consultation with the Forestry branch and other stakeholders. The impact of continued adhoc cottage development and subsequent long-term pressure on resources should be given due consideration. Cottage development is permanent. Decommissioning of strategic access roads can help reduce long term pressure on resources and associated crowding which can diminish other potential development opportunities such as out-fitting and adventure tourism. Again, the practise of true holistic resource management involves a balanced approach when addressing these potentially conflicting land-use values.

Decommissioning road will also help meet the objective to maintain the productive forest land in the District, as set out in Section 5.4 of the plan. A significant portion of productive forest land is removed from production as a result of the construction of resource roads and landings. These are often the better quality sites. Many of these roads are in the category of spur roads and have a very short useful life-span (1-5 operating seasons).

The District will initiate an access road decommissioning program during the 2006-10 planning period. Proposals for access road decommissioning are included in Appendix 10.

7.3.1.11 Caribou Habitat

The woodland caribou are known to depend on forest lichens during winters in some parts of its range. This feeding habit is more common during winters with high snow accumulations when other food sources are less available. The western edge of the Central Newfoundland Forest Ecoregion in Forest Management District 02 borders on the Maritime Barrens Ecoregion. Anecdotal information from Conservation Officers and the public indicate that caribou calving extends to the transition zone between these two ecoregions and that some over-wintering does occur. In consultation with the Inland Fish and Wildlife Division or other experts in woodland caribou science, the District will attempt to establish a monitoring program to quantify the relative use of this area by over-wintering caribou. This includes a band of timber which is approximately 5-10 kilometres wide and runs west of and parallel to the Trans Canada Highway between the Northwest River and Tug Pond. Information gathered in this program could be used to assist in future resource management decisions in the District.

7.3.1.12 Creel Surveys

Creel surveys have not been conducted historically in District 02. The District will attempt to establish a creel survey program, in co-operation with the Inland Fish and Wildlife Division, on a select number of ponds on the Bonavista Peninsula. This program will target ponds that were recently accessed by forest resource roads or will be accessed during the coming five year plan. Creel surveys will be conducted for an extended period of years in an effort to create a data set which will help quantify the impact on trout populations of increased fishing pressure as a result of

improved access for recreational fishing.

7.4 Agriculture/Forestry Land-use Strategy

One of the primary guiding principles of this planning process is that the forest be managed for a full range of uses - social, economic as well as ecological. In some cases, these uses may conflict - such is the case with agricultural/forestry development. Indeed, some of the goals and objectives included in the previous section appear, at first glance, to contradict each other.

As an example, in Element 2 under Global Impacts: Forest Land Conservation (Section 5.4), it is included as an objective that there will be no net loss of forest area during the implementation period of the strategy document and in Value 5.1 under Benefits to Society, it is stated as an objective that there will be no net loss of Alienation Class I land during the same period (Section 5.5). These objectives appear to contradict with Values 5.2 (Employment) and 5.3 (Revenue from non-timber forest/land-use products and services) also under Benefits to Society, which include objectives to increase both employment and revenue from the agriculture industry during the next five - ten years. This section outlines the strategy that will be followed to ensure that one objective can be achieved in harmony with the other.

The objective to maintain the current net forest land base is important for environmental, social as well as economic reasons. From an environmental perspective, maintaining the forest land base will allow this District to maintain its role in contributing to the carbon cycle on a global scale and help maintain ecological functions at the local scale. From a social perspective, maintaining the forest land-base will allow local residents to enjoy their recreational/gathering/spiritual pleasures from the forest. From an economic perspective, maintaining the forest land base will allow the continued provision of tangible forest goods - to help maintain the forest industry and its associated employment/economic spin-offs.

There are other demands for the lands which grow the District's forest. There is a substantial agriculture industry on the Bonavista peninsula - an industry with considerable potential to expand and to provide increased economic benefits to the local area. Agricultural expansion requires access to new land and presents the greatest foreseeable demand on the forested land base on the peninsula. In the spirit of managing the ecosystem for multiple benefits, provision must be given for the agriculture industry to expand. However, a process must be put in place to rationalize the impact of agricultural expansion on other ecosystem values. Also, a strategy must be sought which will allow for the maintenance of the total area of forest land-base, irrespective of other land developments.

The Agrifoods Branch of the Department of Forest Resources and Agrifoods and the local agricultural community have requested that the following five statements and supporting rationale be included with the strategy document for Management District 2:

- (1) Statement I - "It is recognized that agriculture development is the initial consideration in the Lethbridge - Musgravetown Agriculture Development Area (ADA)".

To ensure a viable agriculture industry in the area, any forestry projects (i.e. silviculture, road access) within the Agriculture Development Area shall be submitted

to the Agrifoods Branch. After consultation with the agriculture community, the Agrifoods Branch will submit a recommendation to the Forestry/Wildlife Branch. Likewise, any agricultural development proposal that would require the clearing of land outside the ADA shall be submitted to the Forestry and Wildlife Branch for its recommendation. The Forestry and Wildlife Branch will table a report of all proposals for agricultural development at the monitoring team meetings. Disagreements will be forwarded to the Department of Forest Resources and Agrifoods as stated in Statement # 5.

- (2) Statement II - "Existing farm operations be permitted to expand. This expansion may be adjacent to the existing farm or on soils suitable for development at a distance from the main operation."

It is essential that existing farm operations can expand and adjust their business to react to market opportunities. It is generally acknowledged in the planning process that businesses, even non-conforming use, are permitted to expand. This is necessary to improve the economic viability of the enterprise. Other values will be given due consideration when reviewing proposals for agricultural expansion.

- (3) Statement III - "New entrants be permitted to develop on Class I land as defined by forestry."

Generally, Alienation Class I lands, as defined by forestry, can include areas with high potential for agriculture (eg. Jack's Pond Road). Sometimes these are in areas with very few conflicts with other resource users and have soils suitable for agriculture development. Consequently, the Agrifoods Branch cannot accept that these areas are reserved solely for forestry purposes.

It is not always possible to plan specific agriculture expansion areas. Although a suitable land base is critical for profitable land based agriculture, markets and the interest of individuals are also prime factors in the development/location of farms. Consequently, it is not possible to plan/identify all sites for future agricultural use. Good access to services is important for agricultural development. In particular, new farming ventures require access to all weather roads and to electricity. It is common, that individual farmers wish to develop near their communities. In addition to the availability of necessary services, there are considerable logistical and time efficiencies and greater security obtained from establishing an enterprise close to ones community. Frequently, these areas may be on Alienation Class I land and may be outside currently designated Agricultural Areas.

The Agrifoods Branch has encouraged the development of specific areas by providing some of the services mentioned above: notably roads, electricity and planning (lot location). These farmland development projects have been planned with the input of other Departments and Agencies through the Inter-departmental Land Use Committee.

This process ensures the assessment of applications based on the input of other interests. The Department hopes to continue this process as one aspect of farm development in Management District 2 and throughout the province. However, this policy cannot address market driven aspirations of individuals throughout the study area.

The agricultural leasing policy initiated in 1976 ensures that any new land allocated for agriculture continues to be used for agriculture. The leases have no provision for fee simple grants and use of the lease is restricted to agricultural development. This is an important consideration in the development of the study area as it helps to substantiate that agriculture development should not be inferred as a step to more extensive developments not related to the agriculture industry (cottage development as an example). Furthermore, if the lease is not developed or has been developed but is no longer used for agriculture purposes, the land will revert back to the Crown after review by the Agrifoods Branch.

- (4) Statement IV - " Christmas tree farming be permitted on all classes of forestry land."

In 1995, the Economic Recovery Commission released a Christmas tree strategy. This strategy was prepared in consultation with Government Departments and the industry. The strategy recognizes the potential for an expanded Christmas tree industry and an opportunity to develop a Christmas wreath industry. Subsequently, the Province is proceeding to develop a policy to encourage the development of these industries. It is clear that a suitable land-base is critical to the development of Christmas tree farming.

- (5) Statement V - " A committee be established to review and resolve agriculture/forestry conflicts with balanced representation from both groups."

It is recognized that there will be occasions when forestry and agriculture stakeholders will disagree on the land use of a specific area. A committee will be established with representatives from the Forestry/Wildlife and the Agrifoods Branches to review and determine alternatives to resolve land-use conflicts. If a resolution is not reached, it will be forwarded to a higher level of authority within the Department for consideration and resolution.

Statements I through IV address the concerns that agriculture stakeholders have in ensuring that available land-base is provided for the expansion of their industry. Statement V provides a mechanism to ensure that forestry and other ecosystem values are considered during the land acquisition process

¹The classification system for land alienations for the purpose of calculating harvest levels has been changed from a 3 class system to a 2 class system. This will come into effect April 1, 2001.

for agricultural development. The following strategy outlines measures which will be taken during this planning period to ensure that the forest land-base will not be diminished and to replace potential loss of forest growing capacity through agricultural expansion:

(1) Idle agriculture land: Staff with the Forestry/Wildlife branch will work closely with staff from the Agrifood's branch to identify idle farmland and ensure compliance with the agricultural leasing policy. Idle farmland that is not in compliance with leasing policy will be reverted back to the crown and, if necessary, be reforested.

(2) Unsuitable agriculture land within an Agriculture Development Area: Some lands within ADAs are not suited, or poorly suited, for agricultural development but may be suited for forest development. Forestry/Wildlife branch will work co-operatively with the Agrifoods branch to identify marginal agricultural land within ADAs with a view of reducing restrictions on these lands to permit long term forest management. These areas could be used to replace Class I land, located outside approved ADAs, removed from forest production for agricultural development.

(3) Not suitably stocked (NSR) areas: In management District 2, there is a large accumulative area of forest land that has a classification of NSR. These sites are normally productive forest land which have been invaded by scrub species and consequently do not currently have a forest cover. In many cases, the invasion of scrub species has occurred because of alterations of natural ecological processes. As an example, forest Fire suppression efforts during the past several decades has effectively removed one of the primary forces of forest succession from the ecosystem and contributes to the invasion of kalmia on many forest sites. Harvesting patterns have altered the natural disturbance patterns in the District and also contributes to the current low occupation of tree cover on many productive forest sites. In the future, NSR sites will be identified, mapped and, where silviculturally feasible, brought back into forest production.

(4)Alienation Class III land: Class III land is not part of the District's production forest due primarily to spatial or operational constraints. Incentives (royalty reductions and additional volume) will be provided to commercial operators to encourage access to some of these lands. Once access becomes a reality on Class III land, then it can have its designation changed to Class I. These changes will be reflected in future wood-supply analysis and will counter losses of production forest due to other development activities and environmental/social values.

(5) The Department will pursue an aggressive silviculture program to increase productivity within the Class I forests (Refer to Section 7.5. Silviculture Strategy.)