Nisbet Provincial Forest
Integrated Forest Land Use Plan

Background Document

Prepared by:
Saskatchewan Environment and Resource Management
Forest Ecosystems Branch

December, 2000

Table of Contents

CHAPTER 1
INTRODUCTION

The Nisbet Provincial Forest (also referred to as the Nisbet forest in this document) is approximately 83,000 hectares (320 square miles) in size. It is a major component of the Prince Albert region's landscape, and enriches the lives of many local citizens and visitors. The Nisbet Provincial Forest provides a habitat for numerous plant and animal species. It has a role in absorbing carbon dioxide, providing oxygen, and purifying the water that we drink. Human activities in the forest include hunting, trapping, various forms of recreation, finding solace, gathering forest products for both personal use and income, cattle grazing, forest harvesting, and gravel extraction.

Human activities have impacted the natural ecosystems of the Nisbet Provincial Forest. We need to recognize the relationships between people and the environment, and to understand the long and short term implications of our actions upon the carrying capacity of the various components that make up the ecosystems of the Nisbet Provincial Forest. Ensuring a healthy forest ecosystem, while allowing economic and recreation activities for the people who live, work and play within it, is an ongoing challenge.

The purpose of this document is to provide a basic understanding of the current activities in the forest, the issues related to forest resources, and why we are starting an integrated forest land use planning process.

1.1 INTEGRATED FOREST RESOURCE MANAGEMENT

Integrated Forest Resource Management is based on the following principles:

- The health of the forest ecosystem must be most important when making management decisions;
- All forest values, both economic and non-economic, must be considered when management decisions are made;
- All those who may be affected have the right to be involved in forest management planning in a meaningful way; and
- Planning must be flexible to allow for changing circumstances.

Integrated Forest Resource Management means managing the whole forest ecosystem, including soil, water, trees, animals, and plants, to meet a variety of objectives. It allows for a broad range of resource uses and gives all affected parties the opportunity to be informed and involved in management planning. It is different from traditional methods of forest management in three major ways:

- **S** The various elements that make up the forest ecosystem have traditionally been administered individually, as separate from each other, and from the ecosystem;
- **S** The elements that bring direct economic benefits have traditionally been considered more important than those elements which provide less measurable benefits; and
- **S** Input from the public was limited, and was often not sought until after management decisions were made.

An integrated forest land use plan for the Nisbet Provincial Forest will consider all values of the forest - environmental, economic, social and cultural - and merge them into a comprehensive land use management plan. The planning process will need to identify what the desired future state of the Nisbet Provincial Forest is to be, and develop forest land use management strategies to achieve it. The strategies of the plan will balance the values of different users to ensure a healthy forest ecosystem and sustainable natural resources for future generations.

1.2 PLAN AREA (See Map in Appendix 1)

The planning area covers the entire Nisbet Provincial Forest. The forest is located in the southern half of the province in the Boreal Transition Ecoregion, and is often referred to as an "island forest" because it is completely surrounded by agricultural and urban development.

1.3 WHY ARE WE PLANNING?

The Nisbet forest is small in area, and it is perhaps the most accessible and extensively used provincial forest in the province. It is readily accessible in all seasons for recreation and economic use, and within easy reach of two major centres - Prince Albert and Saskatoon.

At any given time, a number of activities can occur simultaneously in many places within and adjacent to the Nisbet forest. The impact of any one individual, business, organization, or development in or adjacent to the forest may not, in itself, be considered significant. However, the cumulative effect of these activities on the forest ecosystem can be significant over time.

Development for human values, such as roads, utility corridors, recreation and economic activities has had an effect on the extent and distribution of the plants and animals of the forest. Not only has the natural range of much of the wildlife been severely restricted by human activities outside the forest, ongoing pressures for more economic and recreation activities within the forest continue to affect the range, habitat and diversity of species which make up the forest ecosystem. The result of human activities is that the forest is now extensively fragmented. The forest consists of five small "islands" with irregular outer boundaries, and most of these "islands" are further fragmented by internal developments such as utility and road corridors, dispositions for sand or gravel extraction, and the sale or lease of land. The pressure to develop the provincial forest for human values continues. Managing the forest resources sustainably means managing them so that the forest can recover not only from the stresses that nature provides, but also from the stresses from human activities. In many instances, the consequences of our actions are not recognized for decades.

Although the major responsibility for the management of Nisbet Provincial Forest is with Saskatchewan Environment and Resource Management (SERM), everyone involved in the use or management of the forest must work together to determine the appropriate forest land use management strategies, and recognize their own role in the health of the Nisbet forest. This includes all levels of government, forestry workers and companies, Aboriginal communities, environmental organizations, recreation organizations, hunters, trappers, the mining industry, universities and schools - and individual members of the public, to whom the Crown forest belongs.

We need to develop sustainable, adaptive forest land use management strategies that take into account our present needs, while not jeopardizing the needs of future generations. While we plan based on present knowledge, we must accommodate new knowledge as it applies to the forest, and recognize uncertainties regarding the future. Climatic change, new environmental issues, new demands from all sectors of the forest, new technology, and new scientific knowledge - all have the potential to change the way we think the forest should be managed. An integrated forest land use plan for the Nisbet forest will need to be modified as new information on forest management and boreal forest ecosystems becomes known.

1.3.1 The Planning Process

What is the Integrated Forest Land Use Planning Process?

***Step 1*: Plan Initiation and Information Gathering**
A planning team, made up of staff from Saskatchewan Environment & Resource Management (SERM) and other government departments, is formed to identify information on the current uses and related issues in the forest. This information is compiled into a draft background information document, and distributed to known stakeholders of the area prior to a series of introductory public meetings throughout the region. The public meetings will provide individuals with the opportunity to provide additional information on current use and issues, as well as to provide advice on which interests should be represented on a public advisory committee.

***Step 2*: Advisory Committee Formation**
A critical part of the planning process is ongoing public involvement. A public advisory committee, made up of representatives of a wide range of interests, will be formed to help SERM in the development of forest management strategies.

Any interested body can have a representative on the advisory committee. For example, there can be representatives from the rural municipalities, Indian bands who have traditionally used the Nisbet Provincial Forest, nearby urban municipalities, recreation groups, tourism agencies, environmental groups, mining associations, independent forest operators, grazing permit holders, and the forest industry.

***Step 3*: Draft Plan Preparation**
A draft plan that includes resource management and implementation strategies to resolve issues and to achieve the plan's goals and objectives will be developed by both the planning team and the advisory committee.

During the development of the draft plan, a second round of public meetings will be held to provide an update on progress, and to seek further direction from the public.

***Step 4*: Draft Plan Review**
Once the draft Integrated Forest Management Plan is completed, it will be reviewed by an independent panel appointed by the Minister to ensure that the plan meets the requirements of *The Forest Resources Management Act* and regulations.

The plan will also be reviewed by the advisory committee, government and the public.

***Step 5*: Plan Revision and Approval**
The plan will be revised based on suggestions from the review processes, then submitted to the Minister for approval.

Copies of the approved Nisbet Provincial Forest Integrated Forest Land Use Plan will be available to the public.

***Step 6*: Plan Implementation and Monitoring**
Those responsible for the administration of the various strategies identified in the plan will implement the plan. The plan will include mechanisms for monitoring, problem identification, and changes that may be needed over time. Information collection will be ongoing. As new information becomes available, it will be incorporated into the plan, and strategies may have to be revised.

1.4 VALUES

People value the forest differently, depending upon their interest and activities. Such values are usually economic or non-economic. While it is fairly easy to determine the commonly accepted economic value (e.g. jobs, monies generated) of a forest, it is much more difficult to estimate its non-economic value (e.g. elk habitat, aesthetics).

1.4.1 Economic Values

Economic values are easiest to measure, as they usually can have their worth established through the market. They are normally associated with “use”, and they include:

1. Timber value - People derive income from cutting trees mainly for fence posts, rail ties, fuel wood, saw timber and pulp wood.

2. Wild fur harvesting - Trapping in the Nisbet forest provides income for a few trappers.

3. Grazing and haying - A significant amount of land is allocated by annual permit for cattle grazing and haying activities in the Nisbet forest.

4. Other forest products - The forest is a source of non-timber products such as berries, mushrooms and craft supplies (bark, mosses, lichens, etc.)

5. Mining and quarrying - There are several sites in the Nisbet forest that have been, or are now used for gravel extraction.

6. Ecotourism - Ecotourism is defined as “respectful, environmentally responsible travel to relatively undisturbed and uncontaminated natural areas, with the objective of studying, admiring and enjoying the scenery, wild plants and animals, and cultural features. It does not disrupt the wildlife or its habitat. It is nature centred, generally non-consumptive and promotes conservation and economic benefits to local communities” (McGilp, 2000). Ecotourism is a growing industry in Saskatchewan, and is relatively new to the Nisbet forest.

7. Tourism - People from outside the immediate come to Prince Albert for recreation activities in the Nisbet, and economic benefits are realized by area businesses.

1.4.2 Non-Economic Values

Non-economic values are amenity values, not usually established by the markets, and their worth is more difficult to determine. As such, it is more difficult to measure changes in their supply or impact on the ecosystem.

1. Environmental Values - These are the values associated with the functioning of a healthy forest ecosystem and include, but are not limited to, natural biodiversity, air, water and soil quality.

2. Education and Scientific Values - The forest is a living laboratory for students and scientists to learn about ecosystem functions. The forest can make us aware of the forces and cycles of nature, and the effects of our activities on forest ecosystems. A number of scientific monitoring sites are established in the forest by SERM and the Canadian Forestry Service for scientific research. The MacDowall Bog Protected Site and the Mouse Meadows interpretive trails are two areas that are frequently visited for educational purposes.

3. Aesthetic Values - Society derives value from the existence of the forest, regardless of whether we interact directly or indirectly with the forest land base. Visual value is part of the public’s use and enjoyment of the forest.

4. Subsistence, Social and Cultural Values - Aboriginal people maintain a special association with the forest through economic, spiritual and subsistence values associated with their land-based culture. Treaty Indians have special, legal rights to fish, and hunt wildlife in the forest. The forest contains archaeological heritage sites that have human, scientific and economic value. Some sites may have special traditional or other cultural value, and may be considered sacred to Aboriginal people. Some sites have economic development potential as educational and cultural tourism resources. People use forest resources for fuel, fencing or building material, gathering other plants and berries and hunting for food.

5. Recreation Values - Active living is essential to personal health and quality of life. Consequently, the forest is increasingly being used for a number of forms of recreation, such as motorized recreation vehicle use, sport hunting, wildlife watching, hiking, biking and cross-country skiing.

CHAPTER 2
ADMINISTRATION

2.1 REGIONAL DESCRIPTION (See Map in Appendix 2)

The Nisbet Provincial Forest is within six rural municipalities and one urban municipality. The greater part of the forest is within the RMs of Buckland, Shellbrook Prince Albert and Duck Lake. Smaller portions of the forest are within the RMs of Garden River and Leask, and the City of Prince Albert.

The Wahpeton Dakota Nation and the Hamlets of Holbein and Crutwell, are on the immediate border, or are surrounded by the Nisbet Provincial Forest. The forest is close to four other First Nations communities - One Arrow First Nation, Beardy's and Okemasis Band, Sturgeon Lake First Nation, and Muskoday First Nation. Two towns, Shellbrook and Duck Lake, and the Hamlet of MacDowall are also located near the forest boundary.

Besides being within several municipalities, the Nisbet Provincial Forest is administered by both the federal and provincial governments. Within the federal and provincial levels of government, different departments have administrative responsibility for particular components of forest activities. Further, within SERM there are several branches responsible for managing different resources or uses.

Many of our current laws which define administrative responsibilities were developed before there was an understanding of the relationships among the economy, the environment, our health and community well being. Communication among the various branches, departments, and levels of government is not always optimal, and sometimes legislation and policies are at odds with each other. The result of dispersed administrative responsibilities is that the effects of some activities together can be overlooked, and the overall health of the forest can sometimes suffer.

2.2 MUNICIPAL RESPONSIBILITIES

Municipalities have an important role in the health of the Nisbet Provincial Forest, in their control over municipal land uses within and adjacent to the forest. Allowed uses for residential, industrial, commercial or agricultural use close to the forest - individually and together - have an impact upon the water, air, soil, plants and animals of the forest.

The rural and urban municipalities, responsible for administering the Planning and Development Act, can adopt a basic planning statement or detailed development plan which sets land use policies for the lands, including the forest, within their jurisdiction. A zoning bylaw can control the use of land for providing for the amenity of the area, and for the health, safety and general welfare of the inhabitants of the area.

The RM of Buckland, the RM of Prince Albert and the City of Prince Albert are members of the Prince Albert Planning District, and each of these member municipalities has adopted, by bylaw, the Prince Albert Planning District Development Plan (1991). The district development plan identifies development policies for the three member municipalities. The RM of Buckland adopted Zoning Bylaw No. 2 of 1991, and the RM of Prince Albert adopted Zoning Bylaw No. 2 of 1991 in conjunction with the Prince Albert Planning District development policies. Besides adopting the district development plan, the City of Prince Albert has its own development plan and zoning bylaw (Bylaw Nos. 1 and 2 of 1987).

Basic planning statements and zoning bylaws have been passed by the RM of Duck Lake (Bylaw Nos. 4-85 and 5-85), the RM of Leask (Bylaw Nos. 5-92 and 6-92) and the RM of Garden River (Bylaw Nos. 2-87 and 3-87). The RM of Shellbrook has a zoning bylaw only (Bylaw No. 8-81).

Municipal development plans and zoning bylaws do not apply to the harvesting of forest products and forest management activities carried out in a provincial forest.

2.3 PROVINCIAL RESPONSIBILITIES

The Provincial Lands Act provides the authority for SERM to administer provincial lands within the boundaries of provincial forests established pursuant to *The Forest Resources Management Act*. The Nisbet Provincial Forest is identified as a provincial forest under *The Forest Resources Management Regulations*.

Under *The Forest Resources Management Act*, SERM is responsible for the "acquisition, promotion, conservation, development, enhancement, maintenance, management, protection and utilization of forest resources". Saskatchewan Environment and Resource Management's mandate is for:

- Protection of primary resources including air, water and soil;
- Management and protection of natural resources including forests, fish, wildlife, lands, parks and their natural and cultural resources, to ensure their sustainability and biological diversity;
- Assessment, regulation, minimization, and mitigation of the impact of alterations to the natural environment by development activities through the environmental impact assessment program;
- Maximization of economic and social benefits from renewable resources and programs while maintaining resource sustainability;
- Promotion of public and stakeholder involvement in environmental and resource management through developing and enhancing public involvement programs and partnerships;
- Promotion of respect and a sense of stewardship for the environment and its natural, recreational and cultural resources through interpretive programs and partnerships; and
- Cooperation in the development of inter-jurisdictional, national and global initiatives aimed at enhancing environmental and resource conservation and management.

In carrying out those responsibilities, SERM has a number of divisions that are responsible for different aspects of resource management of the Nisbet Provincial Forest:

Division	Responsibility
Operations	- Provides regional planning and delivery of the department's programs and services. The East Boreal Ecoregion and area management offices provide front-line assistance and management of the resources in the Nisbet forest.
Programs	- Develops and coordinates implementation of environmental and resource management (fish, forests, wildlife, Crown lands) policies, programs and legislation.
Policy and Assessment	- Coordination of policy and legislative processes, develops policies and processes regarding public involvement and Aboriginal liaison, environmental impact and ecosystem based management planning.

Other provincial departments and agencies involved in resource management and land use:

Department	Responsibility
Municipal Affairs, Culture & Housing	- Provides technical and advisory support to municipalities for community planning and governance - Administers the subdivision approval process and use of dedicated lands - Manages and develops heritage resources
Tourism Saskatchewan	- Plans and develops tourism destination areas
Energy & Mines	- Manages mineral resources
Highways & Transportation	- Manages and develops provincial highways and road infrastructure
Agriculture & Food	- Promotes sustainable use of lands and resources used for agricultural production
Saskatchewan Conservation Data Centre	- Gathers, interprets, and distributes information on the ecological status of provincial wild species and communities
Economic and Cooperative Development	- Develops, coordinates, promotes and implements policies and programs that encourage development and diversification of the Saskatchewan economy
SaskPower	- Develops and maintains power generation facilities and power lines
SaskEnergy	- Develops and maintains gas lines
Sask Tel	- Develops and maintains telephone lines
Saskatchewan Water Corporation	- Reviews all activities that affect water and related land resources; develops management plans for water basins

2.4 FEDERAL RESPONSIBILITIES

While the Nisbet Provincial Forest is managed by the province, the federal government is responsible for many forest-related matters. These include responsibility for Aboriginal peoples, as well as responsibility for the protection of endangered species, migratory birds, navigable waters, fisheries, and forest research and technology development. Its role in many international agreements is also related to forest resources. Federal government departments and agencies involved in resource management and land use are:

Department	Responsibility
Environment Canada	- Preserves and enhances the quality of the natural environment and renewable resources, including migratory birds, other non-domestic flora and fauna, and water; coordinates federal environmental policies and programs.
Canadian Environmental Assessment Agency	- Administers the Canadian Environmental Assessment Act.
Fisheries and Oceans	- Administers policies and programs in support of Canada's economic, ecological and scientific interests in freshwater fish habitat. Has jurisdiction for navigable waters.
Indian and Northern Affairs Canada	- Meets the federal government's constitutional, political and legal responsibilities to First Nations, including sustainable development of natural resources.
National Round Table on the Environment and the Economy	- Identifies, explains and promotes principles and practices of sustainable development in all regions of Canada.
Natural Resources Canada	- Provides scientific and economic expertise to Canadians, and promotes sustainable development and use of Canada's natural resources and competitiveness of the energy, forest, mining, geomatic and geoscience sectors.
Transportation Canada	- Ensures high standards for a safe transportation system, contributes to Canada's prosperity, and protects the physical environment by evaluating the impacts of policy and regulatory decisions on the environment and promoting and meeting environmental standards.

2.5 PROVINCIAL, NATIONAL AND INTERNATIONAL COMMITMENTS

A number of commitments made by the Province and the Government of Canada may affect future forest management strategies for the Nisbet forest. Although not all inclusive, the following list gives an overview of some of these commitments:

2.5.1 Provincial

- The *Conservation Strategy for Sustainable Development in Saskatchewan* (1992) made several recommendations related to integrated land and resource management. It identified the need to prepare integrated forest land use plans.

- *State of the Resource Report* (April, 1993) was developed by the province in response to the World Commission on Environment and Development's 1987 report "Our Common Future" (The Brundtland Report). The Brundtland Report advanced the idea

of sustainable development, which generally means utilizing today's resources in such a way that future use of resources is not compromised.

- *Saskatchewan's Environmental Agenda, Securing a Sustainable Future* (1994) was intended to serve as a guide to action to affirm the government's commitment "to achieve a sustainable environmental future for Saskatchewan through the implementation of policies and programs that integrate environmental needs with human activities".

- *Saskatchewan's Forest Management Policy Framework* (1995) recognizes that forests must be understood as ecosystems performing a variety of interrelated functions. As such, it commits to the sustainable management of all of the province's forest resources. It recognizes a need for a balance of various economic, social and cultural uses with the protection of the long term health of forest ecosystems. Eight strategic directions are identified for ecosystem-based forest management. They are: Stewardship of Forest Ecosystems, Sustainable Use of Forest Resources, Multiple Benefits, Environmental Protection, Public Involvement, Aboriginal Participation, Sustainable Management of Forest Resources on Private Lands, and Improved Decision Making and Information Management.

- *Saskatchewan's Long-Term Integrated Forest Resource Management Plan* (1995) was developed as a result of the Conservation Strategy, and is one of the key steps in Saskatchewan's Forest Management Policy Framework. Combined with the Forest Management Policy Framework, it sets the direction for the sustainable management of forest ecosystems. The plan is divided into eleven strategies, each with objectives and actions. The eleven strategies relate to: Renewable Resource Management, Protected Areas, Urban Forestry, Economic Development, Tourism and Recreation, Administration and Legislation, Funding, Public Involvement, Local Planning, Inventory, and Research.

- *Saskatchewan's Representative Areas Network Program* (1997) was developed as a result of international, national and provincial initiatives to protect biological diversity. The goal of the program is to conserve Saskatchewan's native biological diversity and natural features by protecting and managing a system of areas that represent the full range of provincial ecological systems.

- *Saskatchewan's Biodiversity Action Plan* is being developed by the Government of Saskatchewan to guide provincial government activities from 2001-2005. This action plan is the result of Saskatchewan's efforts to live up to our commitment to conserve our native biodiversity. There are five goals identified in the draft action plan which include: Conservation and Sustainable Use, Ecological Management, Education and Awareness, Incentives and Legislation, and Inter-jurisdictional Cooperation.

2.5.2 Federal-Provincial Harmonization

- Mutual Aid Resource Sharing (MARS) facilitate mutual assistance in forest fire protection between provinces, and between Canada and the United States.
- Agreement with the Department of Indian Affairs & Northern Development outlines responsibility for and implementation of a fire prevention plan for Indian Reserves.
- On November 30, 1999 the Governments of Canada and Saskatchewan signed an agreement to cooperate in the environmental assessment of projects subject to both the Environmental Assessment Act (Saskatchewan) and Environmental Assessment Act (Canada).

2.5.3 National

- *The Canada Forest Accord* (1992), had 25 signatories that included the federal government, provincial and territorial governments, and labor, industry, Aboriginal peoples, environmental groups, academics and private wood-lot owner organizations. The signatories confirm that "our forests will be managed on an integrated basis, supporting a full range of uses and values including timber production, habitat for wildlife and areas allocated for parks and wilderness" (The Senate, 5). Some outcomes of this accord:
  - The Prince Albert Model Forest was developed by the Canadian Forest Service to help implement integrated sustainable resource management, to develop and apply innovative concepts in forest management, to test sustainable forestry practices, and to foster partnerships to achieve environmental, economic, social and cultural objectives.
  - A Canadian framework of criteria and indicators to guide the sustainable development of forests *Defining Sustainable Forest Management: A Canadian Approach to Criteria and Indicators* was released in 1995.
  - Statement of Commitment to Complete Canada's Networks of Protected Areas (1992), signed by the chairs of the Canadian Parks Ministers' Council, the Canadian Council of Ministers of the Environment and the Wildlife Ministers' Council of Canada.

- *Canadian Biodiversity Strategy, Canada's Response to the Convention on Biological Diversity* (1995). One of the obligations of the nations that supported the United Nations Convention on Biodiversity was to develop a national strategy. The strategy "provides a framework for action at all levels of government that will ensure the productivity, diversity, and integrity of our natural systems, and, as a result, our ability as a nation to develop sustainably" (Supply and Services Canada. 1995).

  The Strategy's five goals are to:
  i) conserve biodiversity and use biological resources in a sustainable manner;
  ii) improve our understanding of ecosystems and increase our resource management capability;
  iii) promote an understanding of the need to conserve biodiversity and use biological resources in a sustainable manner;

iv) maintain or develop incentives and legislation that support the conservation of biodiversity and the sustainable use of biological resources; and

v) work with other countries to conserve biodiversity, use biological resources in a sustainable manner and share equitably the benefits that arise from the utilization of genetic resources (Supply and Services Canada. 1995).

S *National Forest Strategy (1998-2003)* - is a renewed plan of action to deal with the connectedness among the ecological, economic, social and cultural aspects of forest use and conservation. It followed the 1992 National Forest Strategy, *Sustainable Forests: A Canadian Commitment*. Both were developed to advance the principles of sustainable forest management. The goal for the forest strategies is to "maintain and enhance the long term health of our forest ecosystems for the benefit of all living things, both nationally and globally, while providing environmental, economic, social and cultural opportunities for the benefit of present and future generations" (Canadian Council of Forest Ministers, 1998). There are nine strategic directions identified in the 1998-2003 National Forest Strategy.

S *Canada Forest Accord* (May, 1998) - is a result of the 1998-2003 National Forest Strategy. It is a commitment to healthy forest ecosystems, and is signed by representatives of 42 organizations which includes federal and provincial governments, members of the forest industry, Aboriginal groups and environmental associations.

2.5.4 International

S Canada was one of the first industrialized nations to ratify the 1992 *United Nations Convention on Biological Diversity*. The three objectives of the Biodiversity Convention are: the conservation of biodiversity; the sustainable use of biological resources; and the fair and equitable sharing of benefits arising from the use of genetic resources.

S Canada supported the *Statement of Principles on Forestry,* and the *Framework Convention on Climate Change* at the 1992 United Nations Conference on Environment and Development.

S In 1995, the *Santiago Declaration*, in which Canada participated with 10 other countries, endorsed a comprehensive set of criteria and indicators for conservation and sustainable management of forests. The criteria and indicators are intended to provide common understanding of sustainable forest management, and to provide a common framework for evaluating progress toward sustainability.

CHAPTER 3
SOCIAL ASPECT

3.1 ABORIGINAL USE

The Nisbet Provincial Forest is an historical area for two of Canada's three Aboriginal peoples, First Nations and the Métis. The earliest accounts of the fur traders in the mid 1700's show evidence of scattered Cree groups along the Saskatchewan River (Russell, 1991). Aboriginal people have over generations developed efficient interaction with the land, making use of forest vegetation and wildlife for food, medicine, clothing and building materials. Evidence indicates the Aboriginal people who frequented today's Nisbet Provincial Forest traveled the grasslands to hunt bison, and returned to the more northerly forested regions where the bison sought shelter (Russell, 152). The First Nations traditional territory was much larger than current Indian reserves.

The Métis of the area originally were part of the fur trade, and remained after the fur trade era ceased. Some immigrated from Manitoba during the late 1800's.

In Saskatchewan, Treaty Indians may hunt, fish and trap for food in a safe manner at all times of the year on unoccupied Crown land, except in areas closed for conservation reasons. Aboriginal rights for Métis hunting and fishing are still evolving.

3.2 HISTORICAL USE

There are approximately 20 recorded sites of heritage value in the Nisbet Provincial Forest. The few recorded sites of heritage significance are likely only a very small fraction of the total number of archaeological sites in the forest. The forest has not been subject to a systematic archaeological survey.

The majority of the known sites date to the pre-contact period and consist of isolated artifact finds such as ceramic shards or stone tools, likely indicating ancient encampments or hunting locales. No "sites of a special nature", such as human burials or other sacred or ceremonial sites are presently known. South Branch House, on the banks of the South Saskatchewan River was a North West Company fur trading post occupied between 1786 and 1794. The site is to be excluded from the One Arrow First Nation treaty land entitlement claim area south of MacDowall, with title to remain with the Province. This site is a prime candidate for provincial heritage property designation and development.

Although information on the total area of the forest is not well documented, it is known that additions and withdrawals were made over time. Documentation to indicate when the Pines Forest Reserve, the Nisbet Forest Reserve and the Steep Creek Block were joined to become the Nisbet Provincial Forest could not be found. By 1974, the Steep Creek Block of the forest was part of the Nisbet Provincial Forest which included both the Pines and Nisbet forests. In 1974, the area of the forest was identified as being 84,916 hectares (327.85 square miles) in size, which is 1,480 hectares larger than the present forest boundary area of 83,436 hectares

(the current boundary area includes 1,962 hectares for recreation sites and 56 hectares for a protected site).

Selected Chronology of Events

Mid- 1700's:
- Fur trading activities were being carried out along the North Saskatchewan and the South Saskatchewan Rivers (Russell, 1991) in the area of today's Nisbet Provincial Forest.

Late 1800's:
- Métis families from Manitoba settle in the area.

1860-1870:
- Early Prince Albert area settlers used the forest for building homes and fuel. The forest was a major factor in attracting early settlers. (Smiley)
- James Nisbet arrived in Prince Albert in 1866.

1870:
- The Dominion of Canada assumed ownership of the lands in Rupert's Land - this included lands now known as the Nisbet Provincial Forest. The Hudson's Bay Company had owned it under its charter of 1670 from Charles II (Lambrecht, 1991).

1876:
- Representatives of the Dominion of Canada and several First Nations groups in the Prince Albert are signed Treaty 6 to reduce conflicts and to assist with settlement.

1877:
- The earliest known Prince Albert commercial lumber mill was erected. More lumber mills were constructed shortly thereafter (Smiley).

1883:
- Most townships, sections and 1/4 sections were surveyed in the area, and the rate of settlement increased dramatically (Lambrecht, 1991).

1885:
- The North West Rebellion (the Riel Rebellion) occurred;
- Logs were being floated down the Sturgeon (Shell) and Spruce (Little Red) Rivers from more northerly locations to Prince Albert sawmills (Smiley).

1890:
- The railroad from Regina to Prince Albert was completed (Morton,1938).

1905:
- Saskatchewan became a province, but the Dominion of Canada retained ownership of resources (lands, mines and minerals) (Lambrecht, 1991);
- Prince Albert Lumber Co., the largest planing mill in Canada was in operation, employing 600 people during summer and 1200 during winter (Smiley);
- The Pines Forest Reserve (now the MacDowall Block of the Nisbet Provincial Forest), 37,556 hectares (145 sq. miles) in area was created (Department of the Interior, 1910);
- The Prince Albert Forest Reserve (now part of the Nisbet Provincial Forest north of the North Saskatchewan River), 55,428 hectares (214 sq. miles) in area, was set aside by Minister's Order and recommended as a forest reserve (Department of the Interior, 1910).

1910: - The railway through the Nisbet from Prince Albert to Shellbrook began operating. (Wild Rose and Area History Book Committee).

1911: - The Nisbet Forest Reserve (now part of the Nisbet Provincial Forest north of the North Saskatchewan River), 2,331 hectares (9 sq. miles) in area, was established (Department of the Interior, 1911).

1912-1914: - The Pines Forest Reserve (now the MacDowall Block of the Nisbet Provincial Forest), and the Nisbet Forest Reserve (now part of the Nisbet Provincial Forest north of the North Saskatchewan River) had additions (Department of the Interior, 1912, 1914). By 1914, the total forest reserve area, for both forest reserves was 81,753 hectares (315.6 sq. miles).

1930: - The Natural Resources Transfer Agreement transferred administration of the Nisbet and Pines Forest Reserves, among other natural resources, to the Province of Saskatchewan.

1970's - Domtar had a forest management licence agreement in 1956 (with subsequent agreements signed in 1961 and 1967) to remove trees from approximately 12,900 hectares (50 sections) in the MacDowall Block. The trees were trucked to their Saskatoon fibre processing plant, and the company ceased cutting in the Nisbet forest in the mid 1970's.

3.3 POPULATION

The ethnicity, age and income of the people of the region - and their needs and interests - have an impact on the forest's resources for food, shelter, recreation and economic gain. Age and income influence housing demands in the region. Over the past 25 years there has been a great deal of rural residential development along the edges of the forest. With growth in rural residential development, came increased expectations for use of the forest (e.g.: recreation).

An analysis of the regional population was done for the Nisbet forest plan area, using Saskatchewan Health Services Plan (SHSP) covered population as a basis. For the purpose of analyzing the region population, the following communities and rural municipalities were used:

- **City**: Prince Albert
- **Towns and Villages**: Birch Hills, Domremy, Meath Park, Shellbrook, Canwood, Leask, Parkside, Duck Lake, St. Louis, Marcelin, Weldon, Weirdale, Albertville
- **Rural Municipalities**: Prince Albert No. 461, Duck Lake No. 463, Leask No. 464, Garden River No. 490, Buckland No. 491, Shellbrook No. 493

- **Indian Reserves**: James Smith 100, Muskoday 99, Wahpeton 94A, Little Red River (Lac La Ronge) 106, Montreal Lake 106B, Sturgeon Lake 101B, Ahtahkakoop 104, Mistawasis 103, Muskeg Lake 102, Beardy's and Okemasis 96 and 97, One Arrow 95.

3.3.1 Regional Population

TYPE	1981	% OF TOTAL	1991	% OF TOTAL	1999	% OF TOTAL
City (Prince Albert)	32,100	55	32,453	51.3	41,636	64.2
Towns & Villages	5,532	10	5,300	8.4	6,006	9.3
Rural Municipalities	9,919	17	10,093	16	7,999	12.3
Indian Reserves	10,569	18	15,329	24.3	9,209	14.2
Total	**58,120**	**100**	**63,175**	**100**	**64,850**	**100**

Base data source: SHSP Covered Population

It should be noted that over the period 1981 to 1999, SHSP changed the structure of the way they record First Nations populations. Until 1997, SHSP recorded all members of a band as living on reserves, regardless of where they resided. From 1998 onward, they reported band members by place of residence.

The overall regional population is increasing, with a general decrease in the rural areas. Based on the period 1981 to 1999, growth as a percentage of the total population appears to be mainly occurring in the City of Prince Albert.

The regional population has a high Métis population, the data for which is not yet available. There are eleven First Nations bands in the immediate area, the majority being of Cree descent. The population of the City of Prince Albert has a relatively high Aboriginal population, as 26% of its residents reported in 1996 they were of Aboriginal descent (Statistics Canada, 1996).

Appendix 3 and 4 illustrate population numbers by age group over the period 1981 to 1999 for the city, towns and villages, rural municipalities and First Nations communities in the region surrounding the planning area. These graphs illustrate the change in reporting structure used by SHSP in 1998, and that the City of Prince Albert's population has increased by about the same amount as the First Nation reserves populations have dropped.

There is a relatively steady decline in the overall rural populations, mostly in the rural municipalities themselves. The towns and villages show a mixed pattern, with some village populations both declining and showing an aging population as the youth leave. Generally, in Saskatchewan the towns and villages within commuting distance from major urban centres are growing.

The population of the City of Prince Albert has remained fairly stable, except for the recent recognition of First Nations populations within the city.

The total population of First Nations in Saskatchewan continues to grow, but at a slowing rate. The slowing rate of growth pattern is reflected in this area. At any point in time, it would appear from the census comparison that between one third and one half of the First Nations population in this area live on reserve and one third to one half live in Prince Albert, with the rest living elsewhere (mostly in Saskatoon or Regina).

The average age (1996) of the people in the City of Prince Albert is 33.6; for the area towns and villages, 41.6; for the rural municipalities, 35.8; and for the Indian reserves, 23.7. (Base data source: Statistics Canada, 1996)

A general review of the data showed that there are too many inconsistent variables to produce meaningful population projections.

CHAPTER 4
NATURAL ASPECT

4.1 CLIMATE

The climate of the Boreal Transition Ecoregion is more typical of a humid continental climate at lower elevations in the southern part, being warmer and drier than other more northerly regions in the Boreal Plain Ecozone, but cooler than the aspen parkland ecoregion to the south.
At Prince Albert (1942 - 1988):

- mean July temperature is 17.6EC
- mean January temperature is -20.5EC.
- mean annual precipitation is 405.3 mm, with 294.3 mm of rain and 119 cm of snow (source: <http://www.citypa.com>)

Average frost free days per year (Prince Albert, 1961 - 1990): 149
Average last spring frost (Prince Albert, 1961 - 1990): June 1
Average first fall frost (Prince Albert, 1961 - 1990): September 7
(Fung, K. et al. 1999)

4.2 ECOLOGICAL REGION

The Province of Saskatchewan is divided into four ecological zones, called *ecozones*, and the Nisbet Provincial Forest is located within the **Boreal Plain Ecozone**. It is characterized mainly by northern boreal forest, but approximately 25% of the area is used for agricultural production.

The Boreal Plain Ecozone is further divided into three *ecoregions*. The Nisbet forest is located within the **Boreal Transition Ecoregion**. This ecoregion is the most southerly region of the Boreal Plain ecozone, and is a transitional area between boreal forest to the north and grasslands to the south. Unlike the other two ecoregions of the Boreal Plain Ecozone, nearly 50% of the land is cultivated for agricultural use. This region marks both the southern advance of the boreal forest and the northern limit of arable agriculture.

The ecoregion contains a series of nearly level to gently sloping glacial till, glaciolacustrine, and glaciofluvial plains interrupted by hummocky morainal uplands. The bedrock layer of this ecoregion is silt and clay shales of late Cretaceous age, and has an elevation of 540 m in the south to 360 m in the north. The topography of the region mirrors the slope of the bedrock surface, and most of the region has a cover of glacial deposit 100 metres or more that covers the underlying bedrock (Canadian Plains Research Centre, 1998).

Within the Boreal Transition Ecoregion, there are 22 *ecodistricts* (landscape areas) that reflect unique ecological areas based on land form composition, surface shape, textural group, soil development, and land cover. Most of the Nisbet forest is within the **Nisbet Plain Ecodistrict**, and the Steep Creek Block is within the **LaCorne Plain Ecodistrict** (See Appendix 5).

The Nisbet Plain Ecodistrict is primarily a level, sandy glaciofluvial plain. It includes places where sediments have been reworked by wind into dunes. The majority of the soils are Eutric Brunisols and Regosols, which are associated with extremely sandy sediments. Black Chernozemic soils are associated with finer textured materials. Fens and bogs occupy about 5% of the ecodistrict (Acton, et al. 1998).

The land elevation ranges from 490 m to 500 m, with local highs above 520 m. There is little surface runoff and limited external drainage, given the high permeability of the soils (Acton, et al. 1998).

The extremely sandy areas are dominated by relatively open stands of jack pine with an understory of lichens and shrubs. Also characteristic of this area are many open stands of scrubby trembling aspen, occasionally mixed with jack pine and some isolated white spruce. Cultivated land, which occurs mostly along the southern boundary of the ecodistrict on the Chernozemic soils, account for about one-third of the area (Acton, et al. 1998).

The LaCorne Plain Ecodistrict is mainly an undulating fluvial-lacostrine plain, with gently sloping topography. Where soil deposits are extremely sandy, they have often been reworked by wind into dunes, resulting in a hummocky appearance having short steep slopes and, at times, high local relief (Acton, et al. 1998).

The coarse, sandy deposits are characterized largely by Brunisolic soils. The finer textured sands and silty deposits are characterized by the Gray Luvisolic soils. Dark Gray Chernozemic and Organic soils each occupy about 10% of the area (Acton, et al. 1998).

4.3 AIR

The primary air quality concern in Saskatchewan is particulate matter, mainly because of dust from wind erosion of soils and smoke from burning of crops and forests (Environment Canada, 2000). Natural sources such as forest fires or windblown dust from agricultural lands, unpaved roads or construction sites have caused ambient concentrations above the province's standards.

Forests vegetation produces oxygen, improving the quality of the air we breathe. Conifers produce essential oils, also helping to purify the air by eliminating unwanted bacteria such as streptococci and the tuberculosis bacillus.

Although there is no monitoring for acid rain in the area of the Nisbet Provincial Forest, it is felt that some effects from industrial developments in Northern Alberta are present.

4.4 WATER

Water is a renewable resource upon which all living things depend. It lies beneath the surface of the earth as ground water, and on the surface of the earth in lakes, rivers and other water bodies.

Nearly all the surface water in the Nisbet forest relies on runoff from local precipitation, with the exception of the North and South Saskatchewan Rivers. These two major rivers originate from melting snow and ice, and rainfall in the Rocky Mountains and foothills of Alberta. They then flow through fairly flat agricultural lands of Alberta and Saskatchewan where they collect surface waters and groundwater containing calcium, magnesium, sulfates and other ions before reaching the Nisbet forest. The water is generally hard by the time it reaches the Nisbet forest.

Ground water is the source of potable water for most of the surrounding rural residential development and hamlets, as well as for Nordale within the City of Prince Albert. The ground water flow direction and quality is of particular concern to residents of Nordale, mainly due to the close location of the Prince Albert landfill within the Nisbet forest. The ground water flow is in the south - southwesterly direction from the landfill, and Nordale is between it and the North Saskatchewan River.

The **North Saskatchewan River** is the source of drinking water and the destination for municipal storm water and municipal and industrial effluent for the City of Prince Albert. However, before it reaches the City of Prince Albert, it serves the same purpose for the Cities of Edmonton and North Battleford, as well as for many smaller upstream communities, free ranging cattle operations, intensive livestock operations, and domestic uses.

Although the North Saskatchewan River does not have any upstream dams in Saskatchewan, there are two in Alberta. The Brazeau Reservoir and Lake Abraham are formed by the Brazeau and Bighorn Dams.

There are two upstream dams on the **South Saskatchewan River** in Saskatchewan, the Gardiner and Qu'Appelle River Dams which form Lake Diefenbaker.

Hydroelectric dams upstream have significantly altered the natural cycle of spring flooding and flushing of both river systems. The dams cause higher winter flows and lower spring and summer flows than would naturally occur for both rivers as they pass through the Nisbet forest. The effects of this are apparent downstream in the Cumberland Delta.

The North and South Saskatchewan Rivers join just east of the Steep Creek Block of the Nisbet forest to form the **Saskatchewan River**. The Saskatchewan River then flows easterly into the Cumberland Delta and to Manitoba into the Nelson River system, ultimately draining into the Hudson Bay.

Tests done in the 1980's indicated a high level of mercury in the fish from the North Saskatchewan River, and consumption was not recommended. Since that time, mercury levels have dropped, but the presence of other pollutants continues to be a problem.

The **Sturgeon River** (Shell River), the **Spruce River** (Little Red River), **McFarlane Creek, Steep Creek** and **Miners Creek** are the largest rivers and creeks in the Nisbet forest. They all drain into the North Saskatchewan River.

Adamson Lake, Lobstick Lake, Roddick Lake, **Coubeaux** (Kristie) **Lake** are small lakes within the Nisbet forest, fed from local precipitation run-off.

4.5 MINERAL RESOURCES

Minerals include oil and natural gas, metallic minerals, industrial minerals, coal, oil shale, and helium and other gases.

4.5.1 Regional

Sedimentary rocks of the Western Canada Sedimentary Basin underlie the land use plan area. The youngest of these rocks are Cretaceous-aged sandstones and shales of the Upper Colorado, Lower Colorado, and Mannville Groups. These rest on limestones and dolomites of the Devonian Winnipegosis and Meadow Lake Formations, Silurian Interlake Group, and Ordovician Stony Mountain and Red River Formations. Sandstone and shale of the Cambrian Deadwood Formation form the base of the sedimentary sequence. Precambrian basement rocks of the Canadian Shield lie at a depth of about 1000 metres. A veneer of relatively young glacial material covers the bedrock in the region.

4.5.2 Mineralization

Although there are no known mineral deposits in the plan area, there is a reasonable potential for the occurrence of a number of mineral deposit types. Although remote from any current activity, there is a significant potential for oil and natural gas to exist in the region.

The plan area also has good potential to contain kimberlite-hosted diamond deposits. Over 70 kimberlite igneous bodies of Cretaceous age have been discovered in the Fort a la Corne – Candle Lake region to the east. Most have been found to be diamond bearing. The most promising of the kimberlite bodies are currently being evaluated for their economic potential. Two diamond-bearing kimberlite bodies have also been discovered at Sturgeon Lake immediately to the north of the plan area.

Other mineral deposit types that may have some limited potential to occur in the plan area include: silica sand, kaolin, and coal hosted by the Cretaceous Mannville Group, and Mississippi Valley Type lead-zinc and high-purity limestone hosted by the Ordovician to Devonian carbonate formations.

4.6 BIODIVERSITY

Biodiversity, or biological diversity, is “the totality of genes, species and ecosystems in a region or the world” (World Resources Institute, 2000). This includes diversity within species, between species and diversity of ecosystems. Biodiversity in the Nisbet Provincial Forest includes all the living things in the forest such as deer, mice, mosses, blueberries, grasses, herbs, bacteria, trees, etc., as well as the variety of genes within each species. As well, it includes all of the ways that organisms group together to create different areas within the forest (e.g.: meadows, bogs, forested areas).

Biological diversity is the result of millions of years of evolution on earth. It is nature’s way of adjusting to change. To understand biodiversity one must know of the different species in a

given ecosystem, and understand various interactions among them. Biodiversity is often divided into three hierarchial levels - ecosystem diversity, species diversity, and genetic diversity (see glossary). Each level is dependent on the others. What happens at a higher level may affect the lower levels. In addition, all three levels of biodiversity can be influenced over time (e.g. global warming), and over space (e.g. natural disturbances such as fire or human developments).

An **ecosystem** is an interdependent system consisting of all the living organisms in a given area, all the physical and chemical factors of their environment, and the processes which link them. Forests provide a variety of ecosystem functions that contribute to overall ecosystem integrity. The alteration of these ecosystems can positively or negatively affect individual species, or systems within the ecosystem.

Biodiversity and ecosystems are interdependent. Together they provide us with clean air, clean water, food, materials for clothing, shelter, medicines and aesthetic enjoyment. Because of the interdependence of the many elements in an ecosystem, managing for one element can mean that another is affected. Maintaining biodiversity means keeping the living systems in their natural state, and maintaining forest ecosystems means not demanding more from the forest than its ability to absorb change. In order to accommodate ecosystem biodiversity, we need to understand what we must manage for and why.

Site specific features of a given ecosystem are important for protecting biodiversity. Examples include nesting sites for certain birds or important habitats for rare, threatened or endangered species.

4.6.1 Invasive Species

Invasive plant species include both exotics (those introduced to the area by people), and plants normally associated with other ecosystems. Many exotics are brought into the forest inadvertently from agricultural use or animal baiting. Species like Canada thistle move in through new road corridors, become established, multiply and displace native species. Agricultural plants often spread from seeds used as bait for wildlife. Purple loosestrife is a common non-native wetland plant that displaces native species and makes wetlands less attractive to waterfowl and other species. Some exotic plants may compete with local plant species or communities for available growing space, moisture and nutrients. Displaced species may have formed part of the habitat or food source for other species. Displacement then would affect other forest species by causing an alteration in their diet or site use. Species distribution ranges can also change as a result of changes in local or regional environmental conditions such as climate.

The brown-headed cowbird, which is native to the grasslands is considered invasive. Agriculture, forestry, road networks and transmission lines open the forest, allowing this bird to move into new areas, where it lays eggs in other birds nests, leaving the unknowing birds to raise the young cowbirds as their own. Unlike birds which are familiar with cowbirds, forest birds have no strategy to avoid raising the young cowbirds (e.g. abandon eggs and build a new nest). Some researchers believe that cowbirds may be partially responsible for the decline of many songbirds.

Invasive insect species are generally associated with changing climatic conditions. The absence of spring frosts, and/or delayed fall frosts allow new insects to live in more northerly areas.

4.6.2 Programs for Biodiversity in the Nisbet Provincial Forest

4.6.2.1 Saskatchewan Biodiversity Action Plan

The Government of Saskatchewan is developing a Biodiversity Action Plan to conserve the province's biodiversity for present and future generations. The Action Plan will guide Provincial Government activities from 2001-2005.

The importance of biodiversity is recognized worldwide, as evidenced by the 1992 United Nations Convention on Biological Diversity. In 1995 Canada followed with the Canadian Biodiversity Strategy, which was endorsed by the Saskatchewan Government the same year. In 1997, Provincial Cabinet endorsed the Representative Area Network Program as a tool to protect biodiversity. The Saskatchewan Biodiversity Action Plan is the result of Saskatchewan's efforts to live up to our commitment to conserve our native biodiversity.

4.6.2.2 The Saskatchewan Forest Vegetation Inventory (SFVI)

The SFVI is the new inventory format that will be applied to the Universal Transverse Mercator (UTM) zone of the provincial forests (generally being the provincial forest south of the Churchill River). It is intended to be an inventory principally based on the interpretation of stereo-paired aerial photographs normally produced at a scale of 1:15,000. Ground information, aerial reconnaissance, derived data, and other sources of information will contribute to the development and update of the inventory database (McLaughlan, 1999).

4.6.2.3 The Forest Ecosystem Classification (FEC) Program

The Provincial FEC program will develop and implement a classification system that describes the composition and structural features of ecosystems at the ecosite level.

Although the FEC program is not yet completed, it will provide a meaningful system that not only describes or defines the ecosystems of the province but also shows the interrelationships among the ecosystems. It will provide the framework on which to base management decisions, and a field guide to the terrestrial and wetland ecosites of Saskatchewan's provincial forests.

Data will be collected from 1999 - 2003, and analysis of that data will identify site characteristics, and more importantly the relationships between the sites. Publication of the field guide is scheduled for 2004.

It is the intent of the program to take samples from each of the 83 ecodistricts represented in the Provincial forests and parks. It is recognized though, that some ecodistricts may be inaccessible and not sampled. While it is not the immediate intent of the program to re-sample the established FEC plots, the plots will be permanently established and marked for their

monitoring potential. Information on location and site data will be in the FEC database. Plots established in each ecodistrict do not necessarily represent the range of conditions in that particular ecodistrict.

There are 37 FEC plots in the Nisbet Provincial Forest.

4.6.2.4 Forest Management Effects Monitoring

The province and the forest industry of Saskatchewan are implementing a program to monitor the effects of forest management activities on the long term health of forest ecosystems. Under long term harvesting agreements, forest management plans call for harvesting activities to emulate the effects of natural disturbances. Some patterns of succession are not well understood, but are recognized as forming the core of forest sustainability. Sites that have been subject to natural disturbances are selected, and monitored for comparison with sites subject to forest harvesting activities.

Although there are presently no long term forest harvesting agreements in the Nisbet Provincial Forest, there is one permanent sample plot of 140 m x 120 m located within it to be used as a comparison for forest harvesting activities elsewhere.

4.6.3 Threats to Biodiversity in the Nisbet Forest

The principal threats to biodiversity in the Nisbet Provincial Forest are: habitat loss and fragmentation, non-native species invasion, pesticides and pollution, over-harvest and global warming.

As an island forest surrounded by agricultural land, this forest is a prime example of fragmentation. It is cut off from other forested areas by a considerable distance on all sides. Compounding this situation is that the forest itself is very much fragmented, having an irregular outer boundary, and being divided into many small “islands” by numerous pieces of lands that are privately owned. There will be little movement of many species into or out of the Nisbet

forest because of the large barrier of agricultural land, and movement within the forest is restricted due to fragmentation within it.

Fire suppression activities in the Nisbet forest affects biodiversity, as fire suppression interrupts natural succession patterns. Fire suppression activities permit a forest to age, which can alter natural patterns of vegetation development. Altering patterns of vegetation development can affect the presence of wildlife, depending on species habitat requirements. At the same time, invasion by non-native species can be a problem in many areas.

The effects of pesticides are much more serious in agricultural areas than in forested areas like the Nisbet, but there may still be effects from their use on the outer boundaries of the forest. Many pesticides kill more than just target species and can impact on native species diversity.

Pollution caused by garbage dumping or industrial development can be a serious problem at a site specific level, especially where toxic chemicals are released.


Flicker

Over-hunting of native species is a potential problem in the Nisbet forest, since it is a small forest. While there are limits set for the number of large game animals to be harvested by licensed hunters, the extent of unlicenced harvesting is more difficult to ascertain. Surveys of most populations are costly and unlikely to occur on a small land base like the Nisbet forest. Other species of animals and plants may be harvested with little or no regulation, possibly allowing populations to be reduced to low levels.

Global warming may result in changed environments, requiring native species to relocate in order to survive. However, forest species of the Nisbet may find relocation even more difficult due to fragmentation from other forested areas by the surrounding agricultural landscape.

4.7 FISH

There are 26 recorded species of fish in the North Saskatchewan River and 32 (including at least one introduced) species in the South Saskatchewan River. Species include goldeye, northern pike, walleye, sauger, perch, rainbow trout, lake sturgeon and 5 species of suckers.

4.8 WILDLIFE

A variety of forest vegetation provides habitat for different types of wildlife in the Nisbet Provincial Forest. Some species require certain types and ages of forest stands, as well as open areas. Others require different species of forest stands for survival, and still others are generalists, as they can use a wide variety of habitat types to survive.

Most wildlife populations are driven primarily by the amount, quality and distribution of their habitat. The suitability of the Nisbet forest ecosystem for wildlife habitat is as much dependent upon human activities (agriculture, forestry, road construction) in and around the forest as it is

upon the natural characteristics (vegetative community, soil types, moisture conditions) of the forest ecosystem.

Areas having open water are important habitat for ungulate and waterfowl species. River valleys act as migration routes for several species of wildlife (e.g. raptors). The North and South Saskatchewan Rivers, and the lesser rivers and streams of the forest are especially important to wildlife.

The forest provides habitat for various bird populations. There are two known sharp tailed grouse dancing grounds, and the forest is a seasonal staging area for several bird species. The Saskatchewan River Forks area is the northernmost recorded nesting area for prairie falcons in the province. The area around Eb's Ski Trails in the MacDowall Block is a popular birding area that hosts a high diversity of bird species, many of which are less common varieties. Several species of amphibians and one species of reptile are found in the forest.

The Nisbet forest has a small resident elk herd with an estimated population of approximately 100 animals. There is a small moose population in the forest, as well as white-tailed deer, timber wolves, black bear, numerous fur-bearers and small mammals.

Privately owned forested and cleared agricultural lands adjacent to the forest boundary have both a positive and negative effect on wildlife. Wildlife use these lands as habitat for browsing and cover. Agricultural crop depredation has been a concern of local residents in the past, so much so that an elk feeding station was installed approximately 10 years ago. Current ungulate populations are somewhat low, and depredation problems are correspondingly low. SERM receives two to three complaints per year regarding ungulate populations in the area around the forest.

4.8.1 Boreal Transition Species

According to the Saskatchewan Conservation Data Centre (May 10, 2000), there are 179 plants and 367 animal species listed as associated with the Boreal Transition Eco-Region. Of these, some have been identified as rare-uncommon, rare or extremely rare species, and are listed by rural municipality. (**Note**: Not included in the following list, and which SERM has identified as at risk in the Boreal Transition Ecozone, are eskimo curlew (almost extinct), piping plover and whooping crane. The Nisbet Provincial Forest has no recorded incidences of piping plover, and the forest may serve as a stop over during spring and fall migrations for the eskimo curlew and the whooping crane (which no longer breeds in the Nisbet forest area).

The Saskatchewan Conservation Data Centre identified the following species as being rare-uncommon, rare or extremely rare species (listed by rural municipality in which the Nisbet Provincial Forest is located):

Rare-Uncommon, Rare and Extremely Rare Species (by Rural Municipality)

Scientific Name	Common Name	Municipality	Global Status	Provincial Status
Cirsium drummondii	short-stemmed thistle	RM of Buckland # 491; RM of Duck Lake #463; RM of Prince Albert #461; RM of Shellbrook #493	G5	S3
Cypripedium arietinum	ram's-head lady's slipper	RM of Buckland #491	G3	S1
Elymus lanceolatus ssp psammophilus	sand-dune wheatgrass	RM of Duck Lake #463	G5	S2
Leucophysalis grandiflora	large white-flowered ground-cherry	RM of Buckland #491; RM of Duck Lake #463; RM of Prince Albert #461	G3	S2
Pedicularis macrodonta	purple or swamp lousewort	RM of Buckland #491; RM of Duck Lake #463; RM of Prince Albert #461	G4Q	S2
Potentilla nivea var pentaphylla	five-foliolate cinquefoil	RM of Buckland #491; RM of Prince Albert #461	G5	S2
Primula mistassinica	bird's-eye primrose	RM of Buckland #491; RM of Prince Albert #461	G5	S3
Carex vulpinoidea	fox sedge	RM of Duck Lake #463	G5	S3
Felis concolor	cougar	RM of Buckland #491; RM of Duck Lake #463; RM of Prince Albert #461; RM of Shellbrook # 493	G5	S2, S3
Phalacrocorax auritus	double-crested cormorant	RM of Duck Lake #463	G5	S4B, SZN
Ardea herodias	great blue heron	RM of Prince Albert #461	G5	S3B, SZN
Source: Saskatchewan Conservation Data Centre - Ecoregion Species Report. (May 10, 2000)				

Key:

G3 Either very rare and local throughout its range or found locally in a restricted range (21 to 100 occurrences)
G4 Apparently secure globally
G5 Demonstrably secure globally
Q Taxonomic difficulties, more information needed

S1 Extremely rare. Critically imperiled in the province
S2 Rare. Imperiled in the province
S3 Rare or uncommon in the province
S4 Common, widespread, abundant, and apparently secure in the province, but with cause for long-term concern
B For a migratory species, rank applies to the breeding population in the province.
Z No practical conservation concern since there are no mappable and predictable occurrences (migrants)
N For a migratory species, rank applies to the non-breeding population in the province.

4.9 PROTECTED SITES & SPECIAL MANAGEMENT AREAS

4.9.1 The MacDowall Bog Protected Site

The MacDowall Bog Protected Site (See Map in Appendix 2) is approximately 56 hectares in size, and is located about 7.5 kilometres southwest of MacDowall. It was established as a protected area in 1998 under the *Parks Act*. The site is given the protection of a park, and is to be used primarily for the protection and preservation of the significant natural resources within it. The vegetation of the site is its most significant attribute, as it has large numbers of rare plant species and a variety of orchids.

4.9.2 Nisbet Trails Recreation Site and Sturgeon River Recreation Site

Both the Nisbet Trails Recreation Site and the Sturgeon River Recreation Site (See Map in Appendix 2) are administered under *The Parks Act*, and are located west of Prince Albert near the Sturgeon (Shell) River. The Nisbet Trails Recreation Site is 1,868 hectares, and the Sturgeon River Recreation Site is 94 hectares in size.

4.9.3 Wildlife Management Zones

There are four wildlife management zones within the Nisbet Provincial Forest, which facilitate the preservation and protection of wildlife (See Map in Appendix 10). Management goals and objectives of the zones are to maintain a population of wildlife to meet the needs of all users while minimizing the negative impacts on the surrounding agricultural community. They are as follows:

- Zone 51, north of the North Saskatchewan River
- Zone 52, south of the North Saskatchewan River (the MacDowall and Steep Creek Blocks)
- Zone 54, west of the North Saskatchewan River (Shellbrook area), and
- The Prince Albert Wildlife Management Zone in the RM of Buckland.

The Prince Albert Wildlife Management Zone was first established in 1971 as the Buckland Wildlife Management Unit. The purpose of the special zone was to conserve wildlife, and to protect human lives by prohibiting wildlife hunting within an area having a high density of rural acreages.

Archery was introduced in the zone in 1990 in order to manage white-tailed deer populations which were causing problems such as high numbers of vehicle/deer collisions in the area. In 1995, SERM allowed the shooting of nuisance animals in the zone by holders of special permits.

4.9.4 Riparian Areas

Riparian areas "are the interface between terrestrial and aquatic ecosystems which display sharp gradients of plant communities, ecological processes, and environmental factors. The riparian zone not only provides a corridor for the movement and maintenance of mammals, but largely influences the adjacent aquatic environment by absorbing solar radiation, retaining dissolved nutrients and terrestrial particulate inputs, and subsequently determining aquatic invertebrate and vertebrate populations" (Gregory et al. 1991).

Riparian areas tend to have a high diversity of plant and animal species compared to upland areas and are considered to be very important. At present, SERM does not have provincial standards for riparian management.

There are guidelines for forest operations around water systems with game fish populations. Forest harvesting is only allowed in these areas with approval from SERM. Fisheries reserves are identified for the following:

- North Saskatchewan River: 90 m
- South Saskatchewan River: 90 m
- Miner's Creek: 90 m within 1 mile of the North Saskatchewan River, the rest of the creek has 15 m
- Sturgeon (Shell) River: 90 m
- Spruce (Little Red) River: 90 m
- Bennett Creek: 15 m
- All small creeks draining into the North Saskatchewan River: 15 m.

There is a fisheries reserve of 90 metres around the Nisbet Trout Pond located on an unnamed creek draining into the Sturgeon River, and around the trout pond in Steep Creek, located in the Steep Creek Block of the forest. No other fisheries reserves are placed around the small lakes and water bodies in the Nisbet forest because of the lack of fisheries potential in them.

4.9.5 The Representative Areas Network (RAN)

Saskatchewan's Representative Areas Network (RAN) is being developed to conserve the province's native biological diversity through the protection and management of natural areas representative of the province's varied landscapes. Through the process, areas are identified for monitoring and research, serving as benchmarks to guide efforts in ecosystem-based management.

Areas of land and water are selected for representation based on an ecological approach within each of Saskatchewan's eleven ecoregions. Saskatchewan's ecoregions were delineated on the basis of characteristic features such as climate, land form and dominant vegetative communities. Each of the ecoregions was further delineated into enduring feature types based on specific soil and land form complexes which are very stable over long periods of time and are generally occupied by characteristic plant and animal communities. It is at this level of enduring feature type that areas are first identified for inclusion in the RAN.

The Nisbet forest is within the Boreal Transition Ecoregion which stretches across the center of the province, and which marks the transition between arable agriculture land in the south and the boreal forest land in the north. A variety of enduring feature types are within this ecoregion, ranging from peaty lowlands of bogs and fens to moderately sloped, glacially deposited, knolls of gray wooded soils to gently undulating plains of rich black soils. The Nisbet Provincial Forest contains portions of seven different enduring feature types, six of which require further representation in the program.

SERM is interested in exploring the potential for including a portion of these feature types within the Representative Areas Network with the involvement of local users and interest groups through this land use planning process.

Designation of a RAN site will not change people's traditional use or enjoyment of the land. Activities which have been shown to not have negative ecological impacts to natural systems can usually continue within a RAN site. The long-term ecological impacts of other human activities such as road building, commercial forest harvesting and mineral development are less well understood at this time. Ideally, sites selected as representative areas will not include these types of activities.

While the designation of certain representative areas will help to preserve certain aspects of the ecoregion, this does not necessarily mean that the RAN area will be of sufficient size to protect the whole range of biodiversity in the Nisbet Provincial Forest.

Crown lands selected for inclusion in the Representative Areas Network will generally be designated using existing legislation such as *The Ecological Reserves Act*, *The Parks Act* or *The Wildlife Habitat Protection Act.*

4.10 CLIMATE CHANGE

Climate change "means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods" (United Nations Framework Convention on Climate Change, 1992) (Natural Resources Canada, 1999). Human activities, in particular burning of fossil fuels and the clearing of forested lands for developments and agricultural use, are increasing the atmospheric concentrations of greenhouse gases, mainly carbon dioxide, nitrous oxide, methane and chloro-flurocarbons, which tend to warm the atmosphere (Natural Resources Canada, 1999).

The change in concentrations of atmospheric greenhouse gases alters global radiation balance, which alters the global energy balance. This change in energy balance occurs primarily as an increase in the amount of heat trapped by the lower atmosphere which is then re-radiated back to the earth's surface, resulting in an increase in the earth's surface temperature. This in turn causes increased variability and extremes in weather events such as severe hail storms, wind storms, snow storms, cold spells, fires, winter thaws, spring/fall freezes, and droughts (Natural

Resources Canada, 1999). If such events occur at vulnerable times of the year, existing forest ecosystems would change. These extreme weather events have more potential to cause changes to forest ecology than long-term climatic change.

Although average global warming is predicted to increase 1 ºC to 3.5 ºC by the end of the next century, it will not be the same all over the globe, or even within Canada (Natural Resources Canada, 1999). Over the past decade, Canada's annual air temperature has increased by 1.1ºC (Natural Resources Canada, 1999). Data collected from 77 climate stations in the boreal forest region of western interior Canada indicate that the forest-grassland transition and the predominantly forested region are only separated by a 2ºC mean annual temperature difference. A warming of only 1ºC could dramatically alter the composition of the Nisbet Provincial Forest, and may cause the southern part of the Boreal forest to shift northward. Some predict it could shift north several hundred kilometres (Wheaton et al. 1992).

Temperature increases are expected to result in milder winters, more growing season days, increased evapotranspiration, reduced snowfall and reduced spring runoff (Wheaton et al. 1992). For Saskatchewan, general circulation models predict temperature increases to be largest in winter, with secondary peaks in summer. Precipitation percentage increases are expected to be highest during late spring (May), and secondary increases during winter (January) as rainfall (Wheaton et al. 1992).

4.10.1 Effects of Climate Change on Forest Ecosystems

Since trees have a relatively long life span, the ecosystem of the Nisbet Provincial Forest will appear to respond to climate change slowly, over decades. Warm spells during winter could affect dormancy of trees, and they could start to grow. Once trees start growing, they will be vulnerable to winter or spring kills or damage from subsequent cold spells (Wheaton, et al. 1992).

Warmer temperatures, more evaporation from the land and vegetation, and a longer frost free period results in generally drier conditions. Drier conditions mean less moisture is available to the trees, causing stress. When trees are stressed and weakened from warmer, drier conditions over a number of years, they become more susceptible to insect and disease infestations, and with that they are at greater risk of burning.

Later springs and earlier fall frosts usually kill off insects. A longer frost free period means insect and disease species of warmer climates may be able to survive in this area, and those native to the area can have a longer period to feed and reproduce.

Global warming and fire could change some plant and animal species now present in the Nisbet forest to those characteristic of the more southerly prairie ecozone. Fire could remove stressed vegetation from the landscape, allowing vegetation more suitable to drier climatic conditions to grow. Studies suggest that either moisture conditions alone, or fire frequencies caused by the drier climate are the limiting factors of the present growth of conifers along the southern boreal forest (Anderson, et al. 1997).

Some plant and animal species may find warmer temperatures and a drier climate intolerable, while others could benefit. Each species has different adaptation mechanisms, and changes do not necessarily occur at the same time. Different adaptation mechanisms may result in some species disappearing entirely from the Nisbet forest, as they may not be able to respond to climate change fast enough.

An increase in air temperature can increase the temperature of water in streams and rivers, and some could dry up. Increased river temperatures and more evaporation mean more favorable conditions for algae growth, negatively affecting the aquatic ecosystem.

Water demands, and with that competition among users will likely increase, especially in the longer, hotter summers that are expected (Wheaton, et al. 1992). Water quality and availability are expected to deteriorate as algae growth and concentrations of pollutants, sediment and salinity increase.

CHAPTER 5
ECONOMIC ASPECT

5.1 FOREST PRODUCTS HARVESTING

The Nisbet Provincial Forest is small, highly visible and hosts many types of activities - timber harvesting and silviculture included. Regrowth occurs over a relatively long period of time, and the overall health of the forest ecosystem needs to be considered in all harvest and silviculture activities.

The forest has historically been an important source of timber, both locally and to southern Saskatchewan for fence posts, fuelwood and construction material. As well, it has been a local source for food and medicinal plants. Today, small mill operators and many individuals in the area continue to depend on the forest as a source of wood.

There are no major forest permits (term supply licence or forest management agreements) for harvesting forest products in the Nisbet Provincial Forest. Individuals and companies harvesting trees commercially obtain an annual forest products permit from SERM. *The Forest Resources Management Act* and Regulations allow individuals to harvest dead trees, and to gather other forest products for "own use" without a permit.

Local residents are currently authorized by permit to harvest timber commercially (fuelwood, pulpwood, lumber, posts, and rail ties), or for "own use" (rough lumber, fencing and fire wood). Permits have also been issued for the harvesting of other forest products such as landscape trees or birch sleeves. Tree cutting is also done for utility lines, roads, gravel pits, dwarf mistletoe treatment, SIAST education programs and fuel breaks.

Reforestation occurs through natural regeneration (with or without scarification), and tree planting. Ideally, silviculture activities should be integrated with harvesting activities. In the Nisbet forest, regeneration is not always done immediately after harvesting, and sites may have been cut a number of years before silviculture activities are started. Replanting occurs when the department has the funding, and is focused on sites identified as being most in need.

Most of the stands are not considered "old" from a biological and harvesting perspective, but a great deal are of uniform age and species composition. Approximately 70% of the jack pine stands are 70 to 80 years old. Many of them are infected with dwarf mistletoe. Although both mature stands and diseased stands occur as a natural condition in the Boreal Forest, the extent of today's diseased jack pine stands of uniform age over large areas of the forest is primarily due to past and current fire suppression activities to protect human values.

5.2 MERCHANTABLE TREE SPECIES IN THE NISBET PROVINCIAL FOREST

5.2.1 Softwood Species

Jack pine is the predominant softwood tree species in the Nisbet forest, and it accounts for approximately 39% of the forest area. It is found on well drained, sandy soils, in pure stands or in mixed wood stands. In mixed stands it is found with white spruce, black spruce, balsam fir, trembling aspen, balsam poplar, and white birch. It is used for pulp, paper, lumber, fuelwood, and for treated wood products such as railway ties, posts, and poles.

White spruce is most commonly found in mixedwood stands, on well drained to moderately well drained sites, and predominantly in moist, silty soils. White spruce has historically been one of the most important trees in Saskatchewan for lumber, and it is because of these demands that the supply has been seriously reduced in the Nisbet forest. White spruce is also used for pulpwood.

Black spruce grows in many different soils, and is generally associated with low lying, swampy areas or muskegs. Unlike white spruce, it commonly occurs in pure stands, regenerating from fire disturbances. It is a slow growing tree, used for pulp and paper and rails. This species is generally not cut commercially in this forest.

Tamarack or larch is the only conifer species that sheds its needles in the fall. It is used primarily for specialty wood products such as wood veneers, floor planking, building skids, pilings, posts and poles. This species is generally not cut commercially in this forest.

5.2.2 Hardwood Species

Trembling aspen (white poplar) is the most common tree species in the Nisbet forest (46.8% of the forest), and is common across the Boreal forest and prairie region. The south portion of the MacDowall Block is dominated by aspen. It grows best in well-drained, loamy soils. It is the primary hardwood species used commercially in Saskatchewan for wafer board, oriented strand board, pulp, paper, plywood, veneer, lumber, pallets, boxes, furniture stock, flooring, chopsticks, and fuelwood.

White birch is the preferred species for fuelwood. It is found in scattered, mixed stands of trembling aspen. This scattered occurrence, combined with its historically high demand for fuelwood has resulted in a reduced, and limited supply in the Nisbet Provincial Forest.

Balsam (black) poplar is generally associated with trembling aspen, but prefers more moist soils. This species is generally not cut commercially in this forest.

5.3 FOREST COVER (See Map in Appendix 6)

5.3.1 Forest Cover Type

Type	% of Forest
Forested land	68.3
Burned over	.1
Open productive land	16.3
Scrub brush	3.1
Cutover	1.1
Water	1.1
Non-timber producing	10.0

Definitions:

Forested land: is productive land which currently supports a stand of living trees and which can be expected to produce a merchantable stand within a reasonable amount of time.

Burned over: the majority of forest cover has been destroyed by a recent wildfire, leaving residual tree cover which is less than 2.5 metres high or less than 10% crown closure.

Open productive land: having residual tree cover less than 2.5 metres in height or less than 10% crown closure.

Scrub brush: includes vegetative cover shrubs (willow, alder, witch hazel, etc). This land is considered available for and capable of producing a merchantable stand of living trees within a reasonable amount of time.

Cutover: the majority of forest cover has been removed leaving residual tree cover less than 2.5 metres high or less than 10% crown closure.

Water: includes water bodies and rivers (rivers identified as having both shores within provincial forest).

Non-timber producing: are lands not available for or capable of producing a merchantable stand of living trees within a reasonable length of time. Includes muskeg, rock, brushland, meadow, and human developments (gravel pits, roads, etc.)

As illustrated in the above table, 68% of the forest is classed as forested. The burned over, open productive land, scrub brush and cutover land, all which are considered capable of producing merchantable stands within a reasonable amount of time account for 20.6% of the forest - this means that 88.9% of the forest is considered capable of growing timber. Water accounts for 1.1% of the provincial forest, and 10% is identified as non-timber producing lands.

5.3.2 Species Composition

Species	% Area of Forest
Black Spruce	6.1%
Jack Pine	39.2%
Trembling Aspen	46.8%
Tamarack/Larch	2.8%
White Birch	.1%
White Spruce	5.0%

5.3.3 Age Composition

Age (in years)	% Cover
120	.6
110	5.4
100	4.4
90	10.8
80	33.0
70	23.1
60	7.5
50	7.5
40	3.6
30	1.2
20	2.2
10	.7

The above chart illustrates that over 2/3 of the forest is comprised of stands 70 to 90 years old. Lands excluded from the above table include the recreation sites, One Arrow First Nation treaty land entitlement selection, and the lands within the option to purchase by the RM of Buckland.

5.3.4 Age Distribution (See Map in Appendix 7)

The forest north of the North Saskatchewan River, where much residential development occurs is comprised mainly of softwood stands of 70-90 years old.

The oldest stands appear to be in the Steep Creek Block, having softwoods 120 years old. The majority of softwood and hardwood stands in this area are 70 to 80 years old.

The MacDowall Block contains the area of the 1989 North Cabin Fire, where much of the softwood stands are now identified as young. The southerly portion of the MacDowall Block is dominated by hardwoods of 50 to 100 years of age.

5.4 ECONOMIC VALUE

When considering economic value, each tree stand has an optimal harvest period which occurs between the “rotation age” and the “terminal age”. Rotation age is when the tree growth rate starts to slow. Terminal age is the biological age when the tree volumes begin to decrease and growth slows markedly (note: a tree can remain alive for many years after reaching “terminal age”). The rotation age and the terminal age for average Saskatchewan stands is as follows:

Optimal Harvest Period for Saskatchewan Stands		
Dominant Growth Type Stands	**Rotation Age**	**Terminal Age**
White Spruce	110	150
Black Spruce	95	160
Black Spruce- Jack Pine	85	160
Jack Pine	75	115
Jack Pine- Aspen	75	115
Spruce- Black Poplar	110	150
All Hardwoods (Aspen, Birch, Black Poplar)	70	110

5.5 TREE HARVESTING

If forests are to be managed sustainably, harvesting levels must be balanced with renewal. The volume of wood that can be harvested each year on a sustainable basis is called the harvest volume schedule (HVS). The HVS is an estimate of harvestable timber volume based on forested lands within a larger area that:

a) are considered timber productive;
b) are currently supporting a forest;
c) do not contain designated protected areas;
d) are not reduced because of site specific environmental constraints, proposed exclusions, or the needs of other users and values.

A summary of the HVS for the Nisbet Provincial Forest, based on 69,000 hectares of productive land is as follows:

Harvest Volume Schedule		
Softwood	**Hardwood**	**Total**
35,743 m^3	28,910 m^3	64,653 m^3

The above HVS is a gross figure of available wood supply, and is based on minimal field verification. It does not exclude sites used for other values such as recreation or grazing, or areas leased for a variety of uses. The HVS figures reflect an assumption that stands are economically viable and that sufficient regrowth occurs.

Commercial forest harvesting for fuelwood, pulp, lumber, posts and rail ties in the Nisbet forest has historically been licensed by SERM to traditional quota users through annual permits

Traditional quota users include the MacDowall Spruce Group (four members operating in the MacDowall Block) and seven other independent cutters operating mainly north of the North Saskatchewan River. There is no long term commitment by SERM to any of the operators for wood volumes currently received.

The current cutting activities for "own use" white spruce and white birch volumes occur throughout the forest, and are a carry-over from farm permits allowed under previous legislation. This category of wood permit is no longer recognized under *The Forest Resources Management Act*.

Distribution of all wood volumes, both commercial and "own use" is a SERM Regional Office responsibility. The current annual allowed cutting volume was determined in the late 80's, and was based on the knowledge available at that time. Since that time, the volume of White Birch for "own use" was adjusted downward from the earlier set amount of 960 m^3 to 60 m^3. These maximum wood volumes were set considering the sustainability, growth and age structure, renewal and health of the forest.

The current allowed cutting volumes are as follows:

Allocations for Green (Live) Timber by Type			
Permit Type	**Softwood**	**Hardwood**	**Total**
Own Use	361 m^3	60 m^3	421 m^3
Commercial	20,121 m^3	4,100 m^3	24,221 m^3
Total	20,482 m^3	4,160 m^3	24,642 m^3

The current allowed cutting volumes by species are as follows:

Allocations for Green (Live) Timber by Species					
Permit Type	**Softwood**		**Hardwood**		**Total**
	Jack Pine	White Spruce	White Birch	Trembling Aspen	
Own Use	no set amount	361 m^3	60 m^3	no set amount	421 m^3
Commercial	19,483 m^3	638 m^3	0	4,100 m^3	24,221 m^3
Total	19,483 m^3 + own use	999 m^3	60 m^3	4,100 m^3	24,642 m^3 + own use

The annual harvest of green timber, averaged over the past 5 years is as follows:

Average Annual Harvest for Green (Live) Timber by Type (1994-1999)			
Permit Type	**Softwood**	**Hardwood**	**Total**
Own Use	2,708.2 m^3	371 m^3	3,079 m^3
Commercial	19,860.4 m^3	4,459.8 m^3	24,320.2 m^3
Total	22,568.6 m^3	4,830.8 m^3	27,399.4 m^3

The annual harvest of green timber by species, averaged over the past 5 years is as follows:

Average Annual Harvest for Green (Live) Timber by Species (1994-1999)								
Permit Type	**Softwood**				**Hardwood**			**Total**
	bS	jP	wS	tL	tA	wB	bPo	
Own Use	39.8 m^3	2,196.6 m^3	382.2 m^3	89.6 m^3	250.6 m^3	115.6 m^3	4.8 m^3	3,079.2 m^3
Commercial	267.2 m^3	18,132.8 m^3	1,460.4 m^3	0	4,457.4 m^3	2.4 m^3	0	24,320.2 m^3
Total	307 m^3	20,329.4 m^3	1,842.6 m^3	89.6 m^3	4,708 m^3	118 m^3	4.8 m^3	27,399.4 m^3
	(Total softwood =22,568.6 m^3)				(Total hardwood = 4,830.8 m^3)			

KEY:

bS = Black Spruce
jP = Jack Pine
wS = White Spruce
tL = Tamarack / Larch
tA = Trembling Aspen
wB = White Birch
bPo = Black Poplar

The above two tables indicate timber harvest activities are within the current HVS of 35,743 m^3 for softwoods and 28,910 m^3 for hardwoods.

5.6 FUELWOOD

The average annual removal of trees for fuelwood, which have been identified as fire kill, damaged from insects and diseases, or other salvage, averaged over the past 5 years is as follows:

Average Annual Harvest For Salvage Fuelwood by Species /Type (1994-1999)							
Permit Type	**Softwood**			**Hardwood**			**Total**
	jP	wS	tL	tA	wB	bPo	
Own Use	5,746.2 m^3	2.4 m^3	2 m^3	86 m^3	5.8 m^3	1.4 m^3	5,843.8 m^3
Commercial	1,738.4 m^3	0	0	63.6 m^3	0	0	1,802 m^3
Total	7.484.6 m^3	2.4 m^3	2 m^3	149.6 m^3	5.8 m^3	1.4 m^3	7645.8 m^3
	(Total Softwood = 7489 m^3)			(Total Hardwood = 156.8 m^3)			

KEY:

bS = Black Spruce
jP = Jack Pine
wS = White Spruce
tL = Tamarack / Larch
tA = Trembling Aspen
wB = White Birch
bP = Black Poplar

5.7 SPECIAL FOREST PRODUCTS

Other forest products of economic value include Christmas and landscape trees, various berries, lichens, mosses, mushrooms, birch bark sleeves, birch syrup tapping, branches, boughs and needles for essential oil extraction, burls, cones, fiddleheads, labrador tea, and many other products. Of these, permits have been issued for only birch sleeves to be harvested commercially in the Nisbet forest.

A forest products permit is required to harvest forest products for commercial purposes, but subsistence gathering (e.g.: blueberries for own use) can be done without a permit. However, a permit is required if green (living) trees are harvested (the exception being “own use” Christmas trees which have harvest guidelines to follow). White spruce is the favored species for landscape trees, followed by jack pine.

The extent of subsistence use (and their associated value) of the many forest products in the Nisbet is unknown. Permits issued for other forest products over the past five years are mainly “own use” landscape trees, and are as follows:

Special Forest Products (1994-1999)				
Year	**Type of Permit**	**Product**	**# of Permits Issued & Amount of Pieces per Request**	**Total Number of Pieces**
1994-1995	own use	landscape trees	31 (range from 3 to 100)	763
1995-1996	own use	landscape trees	22 (range from 1 to 100)	744
1996-1997	own use	landscape trees	14 (range from 10 to 200)	485
1997-1998	own use	landscape trees	25 (range from 3 to 200)	514
1998-1999	own use	landscape trees	15 (range from 6 to 80)	423
	commercial	birch sleeves	1 (for 100 pieces)	100

5.7.1 Peat Harvesting

There are some peat deposits in the Nisbet forest, and landscape grade peat has been harvested in the past by SERM for use in the department owned forest nursery. The nursery is now owned and operated by Pacific Regeneration Technology (PRT).

5.8 RENEWAL

Permittees harvesting live trees must pay forest management fees as part of their licensing requirements. These fees are for the renewal, protection, development and management of forest products, and are based on the amount of wood cut.

To maintain forest sustainability, renewal of disturbed areas is important - either through natural means or by human efforts. The two main species of the Nisbet forest are jack pine and trembling aspen. Natural regeneration for jack pine usually occurs after a fire, since germination requires exposure to mineral soil and high temperatures to release the seeds from the cones. A softwood forest that is regenerating naturally requires productive sites with good cone crops as a seed source. For aspen, natural regeneration occurs through the suckering of roots after a disturbance from cutting activities or fire.

Several methods are used to help achieve forest renewal for softwood species, including: mechanical site preparation, (includes drag scarification), prescribed burns, seeding and tree planting.

Different reforestation methods have been used with varying rates of success. The two main renewal activities in the Nisbet forest are drag scarification for natural regeneration of jack pine, and replanting for spruce and jack pine. From 1957 to 1996, approximately 500 hectares of

forest have been scarified for natural regeneration, and from 1962 to 1999, 3,600 hectares of forest were planted.

SERM silviculture staff estimate that over the last 25 years, there is an average success rate of 60% for planted stock. Silviculture activities within the last 5 years have an 80 - 90% success rate in this area due to newer site preparation techniques and improved seedling quality. Several thinning projects to improve productivity have been conducted in the plan area.

PLANTING ACTIVITIES IN THE NISBET PROVINCIAL FOREST (1962-1999)

Decade	Area Planted (In Hectares) By Species				Total Hectares
	White Spruce	Norway Spruce	Jack Pine	Hardwood (Caragana, Choke Cherry, Willows, Elm, Cottonwoods, Poplar)	
1960 - 1969	56		33	-	89
1970 - 1979	234	48	896	-	1178
1980 - 1989	-		779	-	779
1990 - 1999	-		1623	12	1635
Total	290	48	3331	12	3681

Not reported in the above table are smaller area planting activities done over the years by permit holders, community organizations, schools, Boy Scouts and Girl Guides.

400,000 red pine (approximately 200 hectares) are prepared for planting in the Nisbet forest in 2001, with more scheduled for planting in 2002. Target areas for planting include fuel breaks and sites to buffer new jack pine stands from adjacent stands infected with dwarf mistletoe. Target sites for the 2001-2002 fiscal year are west of Prince Albert, as well as the Holbein and Lily Plain areas. Red pine will be used in the fuel breaks and buffer areas because it is resistant to dwarf mistletoe and it is likely to be compatible with sites identified for planting.

5.9 NOT SUFFICIENTLY REGENERATED (NSR) LANDS

When tree survival rates fall below acceptable standards, or when they do not regenerate, the area is deemed not sufficiently regenerated (NSR). NSR lands in the Nisbet forest are due to several factors including:

- Past harvesting methods which have hindered reforestation efforts;
- Reforestation that has not kept up with harvest levels;
- Fires occurring when the stands (planted or natural) are too young to have formed cones to allow for regeneration - ie: no seed source at the time of the fire; and
- Plantation failures (e.g.: poor site conditions, planting techniques, seedling stock).

Although NSR lands occur, the extent of the problem is not currently known due to lack of information. Mapping of timber harvesting areas, and areas treated for silviculture are not current on forest cover maps maintained by SERM.

5.10 FOREST INSECTS AND DISEASES

Insects and diseases are present in all forest ecosystems. They are essential to ecological balance in a natural forest, as they help to break down and release nutrients stored within trees, facilitate succession and maintain genetic, species and age diversity in the forest. They have a role to play in forest ecosystems in terms of species distribution, forest structure and composition, succession, biodiversity and landscape pattern (Castello et al. 1995). Their impact is primarily tree mortality, which can occur in only a small number of stands or over entire landscapes. Environmental factors such as drought can significantly increase tree mortality. Human activities, such as fire suppression or partial cutting can enhance diseases such as Armillaria root disease or dwarf mistletoe which can then alter species composition and forest health (Castello et al. 1995).

Dwarf Mistletoe

The major disease affecting trees in the Nisbet Provincial Forest is dwarf mistletoe (*Arceuthobium americanum)*, which affects mainly jack pine stands. It is a parasitic plant that causes stem deformation, impedes growth and reproductive capacity, and eventually causes mortality of its host jack pine. It is generally recognized in the later stages of infection by the presence of witches' brooms.

In areas where partial cutting has occurred, infected residual trees have infected young trees regenerating in the understory, facilitating the growth and spread of the disease. Fire is a natural means to keep the disease in check. However, fires have been suppressed and the disease continues to progress. Diseased stands increase fire's ability to spread and crown, due to the presence of witches' broom and accumulation of dead materials - both on the tree and forest floor. Dwarf mistletoe damages growth such that few economic products are feasible.

Some field work was carried out in the period 1985 to 1989 to determine the extend of dwarf mistletoe occurrence (See Map in Appendix 8). At that time, it was determined that much of the jack pine stands in the forest had either light, moderate or severe infestations of dwarf mistletoe. The 1989 North Cabin Fire burned 17,246 hectares of land, and much of the jack

pine in the fire area was infected with dwarf mistletoe at the time of the fire. However, the fire left many residual live trees infected with the disease, and these live trees which host the disease will infect the young jack pine trees regenerating after the fire.

5.10.1 Insects

In 1987, Volney and Cerezke conducted a survey of the pest conditions in and near plantations in the MacDowall Block of the Nisbet Provincial Forest. Their report indicated the presence of the following damaging agents:

- Spruce Bud Midge - *Rhabdophaga swainei*
- Yellow Headed Spruce Sawfly - *Pikonema alaskensis*
- Lodgepole Terminal Weevil - *Pissodes terminalis*
- White Pine Weevil - *Pissodes strobi*
- Warren's Collar Weevil - *Pissodes warreni*
- Clearwing Moth - *Synanthedon sequoiae*
- Jack Pine Budworm - *Choristoneura pinus*
- Spruce Budworm - *Choristoneura fumiferana*
- Spruce Beetle - *Dendroctonus rufipennis*
- Ambrosia Beetles (species undetermined)
- Engraver Beetles (species undetermined)
- (unidentified) Pissodes species
- Large Aspen Tortrix - *Choristoneura conflictana*
- Poplar Borer - *Saperda calcarata*
- Northern pitch twig moth - *Petrova albicapitana*
- Cooley spruce gall adelgid - *Adelges cooleyi*
- Ragged spruce gall adelgid - *Pineus similis*

5.10.2 Diseases

- Armillaria Root Disease - *Armillaria mellea*
- Lodgepole Pine Dwarf Mistletoe - *Arceuthobium americanum*

5.10.3 Other Damaging Agents

- Yellow Bellied Sapsucker
- Porcupine

It is important to keep in mind that although the above pests were identified as being present at one point in time, and in one area of the forest. The list is not all inclusive, nor are all of the identified pests a problem in the Nisbet forest. The extent to which pests present a problem for forest management is yet to be determined.

5.11 FIRE MANAGEMENT

The Nisbet Provincial Forest is within the southern limit of the Boreal forest. The Boreal forest ecosystem is fire dependent, which means that it depends upon fire to renew itself. The ecosystem recovers through natural succession - a process that helps to maintain diversity and forest health. Natural fire occurrence in the boreal forest is characterized by very large, high-intensity stand-replacing crown fires that occur on average every 50 -100 years. These extreme fire events can result in loss of lives and buildings. Such an extreme fire occurred in the Nisbet forest in 1919, which has resulted in today's numerous, even-aged jack pine stands.

Burns of all sizes produce a variety of effects on the landscape, and are important in maintaining biodiversity. Depending on the intensity, a fire can consume the duff layer of the forest floor, exposing the mineral soils. The heat from the fire triggers jack pine cones to open and release their seeds in the mineral soil. A fire can stimulate the suckering of aspen, and sprouting of white birch and shrubs. A fire can clean up insect or disease infested stands, undergrowth, and other dead and down materials that provide essential nutrients to new growth.

Season, climate, forest composition and human activities all affect the probability of fire occurrence. In Saskatchewan, the fire season is set by legislation to be April 1 to October 31 of each year. Spring season, before leaf and bud flush, has the highest potential for extreme rates of fire spread. This is due to the low moisture content of the highly flammable coniferous foliage and ground conditions.

Decades of aggressive fire fighting to protect timber and human values around the Nisbet forest have affected the overall health and biodiversity of the forest. The forest has continued to age, but it has not been able to regenerate itself through fire. This, in turn has affected species distribution and substitution. A declining biodiversity also reduces carbon absorption, nutrient cycling and overall ecosystem stability.

Jack pine stands contain resins, which are highly flammable. As they age, jack pine become more susceptible to insects and diseases - and with this, the potential for fire grows. Diseases such as dwarf mistletoe have become more prevalent in jack pine stands of the Nisbet forest and on private properties adjacent to the forest. Since this disease causes an abundance of witches' broom and dead stem material in jack pine stands, there is increased fuel available for a fire to "climb" to create a crown fire. Fire spreads fastest once it reaches the crown (tops) of the trees.

If climate change occurs, two main factors are associated with increased risk for fire in this region. One is the expectation that we will experience more severe storms - and with that more lightning strikes, and the other is generally drier conditions. In drought years, there is a greater risk of fire as trees and vegetation of the forest floor become drier and stressed.

For Boreal forests, the prediction is that the frequency and intensity of fires is expected to increase, resulting in longer fire seasons, more fires, and more areas burned each year.

5.11.1 Burning Permit Area

There is a legislated 4.5 km (3 miles) burning permit area around the perimeter of the forest (See Map in Appendix 9). Together, the burning permit area and the forest have been designated as a “primary protection zone” by the province. This means that should a fire occur within this area, it will be aggressively fought by SERM until it is extinguished.

The forest policy is in place not only to protect human lives, recreation use, residential and industrial developments within and adjacent to the forest, but to protect the forest itself. Although country residential development occurs in many areas around the forest boundaries, it is particularly concentrated in the RM of Buckland, and within the City of Prince Albert. Other concentrated urban areas within or immediately adjacent to the forest include the Wahpeton Dakota Nation, and the Hamlets of Crutwell and Holbein, both in the RM of Shellbrook. These areas, in which human development intermingles with forest vegetation and fuels susceptible to forest fires, are of growing concern.

5.11.2 Fire Fighting Responsibilities

The Prairie and Forest Fires Act provides direction regarding the responsibilities of SERM and rural municipalities in the event of a fire occurrence within the burning permit area or the provincial forest. SERM is currently reviewing its provincial fire policies, one of which is to examine how forest user residents can better reduce the risk of fire on their property.

Permits are required from SERM by anyone who wishes to start an outdoor fire during the fire season within the burning permit area.

5.11.3 Nisbet Provincial Forest Fires

- Average number of fires (1991-2000): 59 per year
- Average number of hectares burned (1991-2000): 68 hectares per year
- Causes of fires (1991-2000): 81% party; 18% other (residential, recreational, forest industry); 1% lightning

The North Cabin Fire of 1989 is the largest fire which has occurred in recent history in the Nisbet forest. That fire started in the MacDowall Block, and jumped the North Saskatchewan River. The fire resulted in one person losing his life, 17,000 hectares of forest burned and one house destroyed.

5.11.4 Fire Prevention Activities and Agreements Affecting Forested Lands

SERM maintains three fire towers in the Holbein, MacDowall and Prince Albert areas. There is also a fire tower in the west portion of the Fort a la Corne Provincial Forest which serves the Steep Creek Block of the Nisbet forest. Three initial attack crews are on standby during the fire season at the Prince Albert fire base located north of the City of Prince Albert. As well, four First Nations sustained action contract crews are available to fight fire in the Nisbet forest. Air

and land patrols are carried out, depending on the season, weather, and humidity conditions. The time it takes to respond to a fire will vary, depending on both the incidence of fire elsewhere and the fire season.

A Wildfire Action Plan, updated in 1994, was developed by SERM, the RM of Shellbrook, the RM of Buckland, and the City of Prince Albert. This plan is an emergency action plan to coordinate suppression activities in the block of the Nisbet forest north of the North Saskatchewan River.

The City of Prince Albert Fire Department has developed an Emergency Preparedness Plan. The plan has a section that is dedicated to forest fire emergency. This is focused on forest fires within city limits, including those Nisbet Provincial forested lands that are within city boundaries. The RM of Prince Albert, where the Steep Creek Block is located, does not have fire fighting capabilities, but does contract fire services with the City of Prince Albert. The Buckland Coop Volunteer Fire Department, based in the RM of Buckland, is equipped and trained to fight wildland fires. The RM of Shellbrook is responsible for fighting fires within the Hamlets of Crutwell and Holbein. The RM of Duck Lake has one equipped truck available to fight wildland fires. The RM of Garden River has one truck available, and the RM of Leask has two trucks available to fight wildland fires.

A fire fighting agreement between the Government of Canada and SERM calls for the same level of protection on designated Indian reserves as is provided on adjacent provincial forested lands.

5.11.5 Fuel Reduction Program

A fuel break program, initiated in 1990, is currently under way in the Nisbet Provincial Forest. The program has resulted in the creation of six fuel breaks varying between 200 and 800 metres wide with varying lengths, and others are proposed over the next few years. The criteria for selecting fuel break sites included: species of trees, stand health; accessibility; slope or terrain; soil condition; proximity to urban development; and merchantability of timber proposed for clearing. The intent of creating fuel breaks is to aid in fire suppression activities by slowing the progress and intensity of a fire, and to provide access for people and equipment to action a wild fire in order to protect human life, residential and industrial properties. The lines cut for the fuel break program were not originally intended to be maintained, and natural regrowth was to be promoted.

Since the original fuel breaks were created, the fuel break program was combined with forest disease control and silviculture programs. Some fuel breaks were cleared of softwoods (mainly jack pine stands) and replanted with non-native hardwood species as a trial project. In other areas, jack pine stands infected with dwarf mistletoe were harvested and replanted with jack pine, leaving an unplanted buffer of approximately 15 to 30 metres between the infected stands and the newly planted stands. The buffer was intended to slow the spread of dwarf mistletoe infection, and maintenance was not intended.

SERM will plant fuel break areas with red pine, starting in the spring of 2001. The long term plan of the fuel break program is that once the cleared areas have regenerated to a suitable standard, a new fuel break will be created adjacent to the old fuel break.

5.12 HUNTING & TRAPPING

5.12.1 Hunting

The Prince Albert Wildlife Management Zone is designated as an archery only hunting area, due to the close proximity of human populations. This zone has only one regulated hunting season (September to December), and is for white-tailed deer only. Also in this zone, nuisance animals can be shot by landowners protecting their property. For the other wildlife zones of the forest, there is a seasonal draw for 25 elk, and a hunting season for white-tailed deer, bear, upland game birds and migratory game birds.

Treaty Indians can hunt in all wildlife management zones in the forest. They are not restricted by any bag limits, and hunting in the Prince Albert Wildlife Management zone can be done with a rifle or archery. Restrictions are placed on hunting within 500 metres of occupied buildings, and discharging firearms along or across roads. Treaty Indians hunt mainly elk, moose, deer, game birds and migratory game birds in the forest.

5.12.2 **Trapping** (See Map in Appendix 10)

Saskatchewan is divided into two trapping regions: the Fur Conservation Block in the northern forest and the Southern Saskatchewan Wildlife Management Zone. There is no trapping in the Prince Albert Wildlife Management Zone unless SERM issues a special permit. There are two trapping regions in the Nisbet Provincial Forest, one is designated as a fur block, and the remainder is within the Southern Wildlife Management Zone. The Pines Fur Conservation Area, trapping zone P-27, is under the Northern Fur Conservation Block, and is in the MacDowall area. The remainder of the Nisbet forest within Wildlife Management Zones 51, 52, and 54 is in the southern trapping region. In the southern trapping region any licensed trapper may trap in any southern zone, and it is difficult to ascertain the trapping numbers for that part of the Nisbet forest.

The Pines Fur Conservation Area (P-27) is broken into six trapping zones. The number of people licensed to trap in the block has varied somewhat over the years from one to six trappers. There are currently six trappers in this area. Trapping activity generally follows a seasonal pattern of 10-12 weeks. The trapping year is considered to start in the fall and end on June 30.

Fur management requires careful management of habitat types (ecosites) in terms of quantity, distribution and age class. Important conditions for many fur bearers include habitat in the later seral stages (D'Eon and Watt, 1994) and riparian communities.

Wildlife populations fluctuate as the vegetation communities and habitat types change, which in turn influences trapping success. Fur-bearers in the Nisbet forest that can be trapped include wolf, weasel, fox, coyote, squirrel, raccoon, otter, beaver, muskrat, mink, marten, lynx, fisher, bobcat, badger, and skunk. There are currently no limits on the number of animals a trapper can harvest in any given year. The fur harvest in Saskatchewan has decreased over the years, mostly due to a worldwide concern over the environment and a European lobby against the wild fur industry.

Fur Harvest in the Nisbet Provincial Forest (P-027 The Pines Fur Conservation Area)

Year	# of Licences Issued	# of Pelts	Revenue Generated (for harvesters)
1994-95	3	66	$964.40
1995-96	2	106	$2334.26
1996-97	3	98	$2424.41
1997-98	1	205	$1752.05
1998-99	4	169	$616.52
1999-2000	2	No production	0

5.13 AGRICULTURE (See Map in Appendix 11)

5.13.1 Grazing

Permits are issued for grazing in the Nisbet Provincial Forest on an annual basis. There are 53 active grazing permit holders, for a total of 1991 head of cattle to graze on 34,310 hectares of land. This represents 41% of the provincial forest's land base. Permit holders consist of individual operators, partnerships and one livestock association. Permits to individuals and partnerships range from 7 cattle on 65 ha (1/4 section) of land to 100 head of cattle on 2,266 hectares (8.75 sections). The livestock association has a permit for 358 head of cattle on approximately 7,123 hectares (27.5 sections) of land.

Although licence provisions are made in *The Forest Resources Management Act* (1996) for longer grazing terms, currently none are in effect. Most of the existing annual permit holders have long histories of having grazing permits in the forest, with many instances of annual permits being issued to families of one generation to the next. The original permits were done by the Canadian Forestry Service prior to transfer of resources to the Province in 1930. At that time grazing was seen as not just a benefit to the individual settler, but also a method to decrease the potential for the spread of forest fires. Over time, additional permits were issued as farmers requested. Historically, no detailed site assessments have been required or completed.

The present demand for grazing permit areas is high, as there is usually someone wanting to move cattle onto areas no longer required by a permit holder. Over the last 20 years, most of the permit holders no longer wanting to continue grazing activities have passed their interest on to a family member. When permits are transferred from one family member to the next, an assessment to determine the appropriate carrying capacity has not been required. However, when a non-family member applies for a permit to graze cattle in a former grazing permit area, an assessment to determine the appropriate carrying capacity is required. Since the new act has come into effect, there has been one site assessed for carrying capacity, and it was denied due to environmental stresses. No active grazing permit areas in the Nisbet forest have been assessed for carrying capacity.

The Forest Resources Management Act and Regulations have provisions to require the completion of range management plans. SERM intends to have all current grazers in the Nisbet forest complete range management plans. Range management plans allow for a review of stocking rates, but do not require an assessment for carrying capacity.

5.13.2 Haying

There are 17 active haying permit holders in the Nisbet Provincial Forest, for 475 tons of hay from 6,365 hectares of land. Annual permits range from 5 tons of hay from 130 hectares (½ section) of land, to 85 tons of hay from 518 hectares (2 sections) of land.

Historically, permits were likely first issued for haying activities because people saw an opportunity to utilize the wild grass and meadows of the forest for supplementing their agricultural operations. The demand for haying permit areas remains high.

5.14 WILD RICE HARVESTING

Wild rice permits have been taken out on 7 small water bodies in the past, but there are no recent wild rice harvesting activities in the Nisbet forest.

5.15 ECOTOURISM

Ecotourism is one of the fastest growing market segments of the tourism industry. The Saskatchewan Watchable Wildlife Association's 1996 report, *Ecotourism in Saskatchewan*, identified the Nisbet Provincial Forest as not unique, but having a good representation of unique features, above average scenic appeal, moderately remote, and at little risk of damage to the environment by tourists (Anderson/Fast, 1996).

Although there are no dispositions issued for ecotourism in the Nisbet Provincial Forest, there is a growing interest. Current SERM policy does not require ecotourism operators to obtain a permit if they utilize existing trails and do not consume the forest resources. The establishment of new trails or permanent camp sites are not permitted.

Two ecotourism operations in the Duck Lake and MacDowall areas have recently started. They use existing trails in the forest for sleigh rides in the winter and hay rides in the summer. Ecotourism operators have made inquiries into the use of the South Saskatchewan River for rafting and canoeing activities. There have also been inquiries to start ecotourism operations elsewhere in the forest.

5.16 MINERAL EXTRACTION

There are currently no mineral dispositions (either mineral claims or leases) within the Nisbet Provincial Forest. A mineral claim allows the claim holder the exclusive right to explore for minerals within the claim area. The claim is held on a year to year basis by expending the required amount on exploration and by filing the work for assessment credit. The claim holder has a guaranteed right to convert the claim to a lease assuming that all of the requirements are met. A mineral lease allows the holder the exclusive right to develop and produce from the lease area subject to lease fees and royalty payments. A mineral lease has a renewable term of ten years. Mineral claim and lease holders have a guaranteed right of access to their dispositions, subject to meeting the requirements of the surface permits and leases issued by SERM.

Initial mineral exploration requires large land areas where exploration activities have no significant impact on the landscape. Successive stages of exploration target progressively smaller areas where some impact on the landscape may occur. These stages of exploration require surface exploration permits issued by SERM, with specific regulations governing activities and the reclamation of disturbed sites. In the rare situation where a mineral orebody is to be mined, an environmental impact assessment must be approved by SERM prior to the granting of the surface lease that is necessary for mining to take place.

5.17 SAND AND GRAVEL EXTRACTION (See Map in Appendix 13)

There are 17 leases for sand and gravel extraction in the Nisbet forest, for 305 hectares of land, generally in the Lily Plain, Crutwell and Round Lake areas. Sand and gravel extraction was permitted throughout the forest until April 1981, at which time a restriction on such activities was placed on forest lands within a general area that extends from the Weyerhaeuser site to five miles west of the Sturgeon (Shell) River. The restriction was put in place because of growing public concerns over such development in close proximity to homes and recreation activities. There are sand and gravel sites within this area that are no longer in operation. Many of these sites do not meet today's standards for closure.

Besides requiring a surface disposition from SERM, a development permit is required by the municipality in order to allow extraction to occur on lands in the forest. Generally, individual surface leases may not exceed four hectares (10 acres), and the maximum cumulative area which a lease holder may lease at any one time will not exceed 40.5 hectares (100 acres).

Government agencies are exempt from the 40.5 hectares limitation. There is no overall cumulative quarry site size maximum (ie: from a number of lease holders working in the same area).

CHAPTER 6
LAND MANAGEMENT

6.1 LEASED LANDS (See Map in Appendix 13)

There are 13 leased sites in the Nisbet Provincial Forest, two of which are within provincial recreation sites. In total they occupy 625.27 ha (1,545 acres), and are as follows:

Lease Holder	Purpose	Area of Lease
Prince Albert Pistol and Rifle Club	Gun range in the Nisbet Trails Recreation Site	97.1 ha (240 acres)
Northern Canada Evangelical Mission	Institutional use	1.1 ha (2.72 acres)
Sask Wildlife Federation	Meeting rooms and range	19.7 ha (48.7 acres)
RM of Shellbrook	Sewage and waste disposal site at Holbein	12.1 ha (30 acres)
Holbein and District Community Club	Ball diamond and booth	2.83 ha (7 acres)
Communications Research Centre	Prince Albert Satellite Station	410 ha (1013 acres)
City of Prince Albert	Prince Albert landfill	12.1 ha (30 acres)
Harry Mudry	Sewage lagoon serving the Whispering Pines Trailer Court	2.4 ha (5.9 acres)
Red River Riding and Roping Club	Horseback riding arena	17 ha (42 acres)
Sask Tel	Cellular tower site	3.5 ha (8.6 acres)
Sask Tel	Equipment storage	.14 ha (.35 acres)
Par Place	Commercial purposes	23 ha (56.8 acres)
Kachur's Country Club	Campground area in the Sturgeon River Recreation Site	24.3 ha (60 acres)

Commercial, industrial and institutional development is permitted in the forest subject to resource capabilities and environmental impacts, where such developments cannot be accommodated within the community. Any such development must comply with municipal development controls.

Residential leases are not permitted in the Nisbet forest. Dispositions may be made available to adjacent communities for public or passive recreation use, with municipal approval. Sustainable Lands Branch of SERM requires a 1.6 km. buffer from any Forest Ecosystems Branch permanent sample plots.

6.2 THE PRINCE ALBERT LANDFILL

The Prince Albert landfill lease is located north west of the City of Prince Albert, and has been in operation at the current site since the early 1970's. The location was once the site of a sand and gravel excavation, and the base of the landfill is sand overlying clays. There are known sand and gravel layers below the clay horizon. All aspects of the municipal waste stream have been deposited in the landfill, including domestic, commercial and industrial waste.

Ground water flow is to the south-southwest toward the North Saskatchewan River. Tests for ground water contamination are conducted by the City of Prince Albert under a letter of operating requirements from SERM. Ground water quality has degraded close to the landfill, but monitoring data indicates that the potential plume of contaminants has not moved more than a few tens of metres to the south-southwest. Time of travel computer models indicate that it would take approximately 100 years for contaminants to reach the North Saskatchewan River.

The landfill has reached the height that SERM permits, and the current lease area has been exceeded. The City of Prince Albert has applied for an expansion to their current lease area (12.1 hectares) to be 171 hectares (423 acres) in size. SERM will not approve a larger site until the city meets environmentally acceptable construction and operational requirements.

6.3 OTHER LANDFILL SITES

The Crutwell landfill site has recently been decommissioned.

Holbein maintains a landfill site to the northeast of the community. The lease area was initially for 8 hectares (20 acres), but was increased to 12 hectares (30 acres) in 1986. Disposal of waste is from an embankment to an open pit. The site is gated and supervised. The site meets minimum environmental standards for the operation of a landfill, and is being considered for a transfer station for a regional waste management area.

6.4 FOREST LANDS COMMITTED FOR SALE or SELECTED FOR TREATY LAND ENTITLEMENT (See Map in Appendix 13)

6.4.1 Lands Committed for Sale

There is currently an “option to purchase” lands agreement between SERM and the RM of Buckland for approximately 971 hectares (2,400 acres) of Nisbet Provincial Forest land in the

vicinity of the Weyerhaeuser pulp and paper mill site. Most of these lands are intended to be developed as an industrial park.

There is an agreement to sell approximately 1.9 hectares of forest land to Kachur's Golf and Country Club for an expanded course.

6.4.2 Treaty Land Entitlement (TLE)

There are two treaty land entitlement claims in the Nisbet Provincial Forest. One Arrow First Nation is negotiating with the Province to turn over approximately 2024 hectares (5,000 acres) of land at the southern edge of the MacDowall Block. The TLE claim has been under way for a number of years, and is near completion.

The Peter Ballantyne Cree Nation has recently selected approximately 72 hectares (180 acres) of land just south of the Whispering Pines Trailer Court for treaty land entitlement. This TLE claim is in the early stages of negotiation, and no commitments have been made concerning the sale of the land.

6.5 ROADS (See Map in Appendix 12)

A number of provincial, municipal and resource roads throughout the forest provide access to resources.

6.5.1 Provincial Highways

There are five paved, and one unpaved, provincial highways in the Nisbet Provincial Forest. The total length of highway within the forest is approximately 70 kilometres of paved surface, and 8 kilometres of gravel surface.

6.5.2 Potential Future Highway Developments

- Upgrade of the Pulp Haul Road within 2 years.
- Possible four lane upgrade of Highway #3 west for 9 kilometres from the City of Prince Albert (15-25 years).
- Possible extension of twinning of Highway #11 from Saskatoon to Prince Albert (15-25 years).
- Possible twinning of Highway #55 east of the City of Prince Albert to the Pulp Haul Road (20-25 years).

Any improvements to highways within the planning area may require earth and granular materials from outside the existing highway rights of way and Saskatchewan Highways existing sand and gravel lease areas. Highway improvements will remove area from the forest, and may increase pressures to develop new sand and gravel lease areas.

6.5.3 Municipal Roads

There are a number of grid roads in the Nisbet Provincial Forest developed for access to farms, residences or other values. As well, some old sections of paved highways in the forest that are no longer required by the province have been transferred to municipalities for administration.

6.5.4 Resource Roads

The Nisbet Provincial Forest is inundated with resource roads and trails. Most were developed over a long time, primarily for the gathering of forest products for commercial and "own use" purposes. These roads then allowed access to the forest for recreation, "own use" harvesting of forest products, hunting and trapping. Some of these roads have been closed to the public to decrease the incidence of party fires.

6.6 OTHER LINEAR DEVELOPMENT

6.6.1 Rail

Active rail lines exist in the MacDowall Block, and north of the North Saskatchewan River to points north and east to the Weyerhaeuser mill site. There is an abandoned rail line to Shellbrook from Prince Albert.

6.6.2 Utility Lines (Power/Gas/Telephone) (See Map in Appendix 12)

Extensive utility lines have been created in the Nisbet Provincial Forest over time. Where possible, these utility lines are constructed within existing road rights of way.

The proposed Prince Albert to Timber Cove transmission line may require a new right of way through the Nisbet Provincial Forest. A route has not been selected for the southern portion of the line, where it is intended to connect with the existing east-west line through the forest. There are no other known planned utility lines in the forest.

6.6.3 Drainage Projects

Saskatchewan Water Corporation has records of two long-standing drainage projects constructed to drain areas adjacent to the forest, which reach natural runs in the forest. They are:

1. A private drainage project drains water from Ellis Lake via a constructed ditch through Sections 3, 9 and 10 of Township 49, Range 2, West of the 3rd Meridian.

2. A private drainage project drains water from lands near the forest in NW 1/4 Section 22, Twp. 49, Rge 26, W2M into Kristie Lake.

6.7 RECREATION

Now, more than ever, the Nisbet Provincial Forest is used for a variety of outdoor recreation activities. Recreation demands on the forest are a reflection of increasing available leisure time and an increasingly urban population. As our provincial urban population increases, people from the immediate region and beyond are turning to the Nisbet forest as an escape from urban life, where they expect to derive physical and psychological benefits. Recreational activities in the forest include cross country skiing, hiking, horseback riding, cycling, canoeing, fishing, snowmobiling, motorized bike riding, 4X4 vehicle and all terrain vehicle (ATV) use, camping, berry picking, hunting, picnicking, and nature interpretation. The increase in demand for free public access to the Nisbet forest for recreation has resulted in growing conflicts not only between recreation users, but between recreationists and wildlife, as well as with other forest values such as quarrying and timber harvesting activities.

Current SERM practice for recreation use in the Nisbet forest is that there is to be no development of trails without a work permit. Permits for recreation use have been put on hold until the land use planning process develops forest management strategies. Although there are no current dispositions issued for any given recreation use, many of the existing trails, both for skiing and snowmobiling, have existed for a number of years and continue to be maintained by organized clubs without trail agreements.

6.7.1 Proposal for Recreation Park

A 1986 Provincial Parks System Plan prepared by Saskatchewan Parks and Renewable Resources identified 13 candidate areas for consideration as new provincial recreation parks in Saskatchewan. Of these, a site in the MacDowall Block was one of five to be park reserve in the "near future" (1992-2000). The plan recommended that the area be a tier 2 recreation park, of moderate scale and facility development (Hilderman, et al. 1986). Later, a 1990 Provincial Parks System Plan summary document identified the Nisbet forest as one of seven candidate tier 2 recreation parks, and one of five to be designated as park reserve in the "near future" (1992-2000) (Hilderman et al. 1990). There has been no further action to advance this recommendation.

The MacDowall Block was identified as a suitable site for a recreation park because of its high outdoor recreation value, it is within one hour of two major urban centres and is easily accessed from a major highway.

6.7.2 Proposal for Urban Park

The 1983, Little Red River Study was commissioned by the City of Prince Albert, and one of the participants was Saskatchewan Parks & Renewable Resources. The focus of the study was on the Little Red River Park, including city lands, private lands, and the Nisbet Provincial Forest north of the North Saskatchewan River from the Weyerhaeuser mills to west of the satellite station. The study identified that of recreation users interviewed, most relied almost exclusively

on the Little Red River Park or the Nisbet Provincial Forest for outdoor recreational opportunities in a natural setting (Hough, et al. 1982).

The study outlined conservation and recreation planning and management goals for the next 25 to 50 years. Some of the recommendations included emphasizing passive recreation activities, acquiring additional lands for recreation, developing a natural and cultural heritage centre at Kristie Lake, expanding the cross country skiing and hiking trails on Nisbet forest lands, directing motorized recreation vehicles to a single recreation vehicle zone in the forest, and allowing no new dispositions of forested land for non-recreational purposes. The plan called for a comprehensive forest management plan, based on sound biological principles.

6.7.3 Proposal for Heritage River

The Canadian Heritage River Systems Study for Selected Rivers in Saskatchewan, 1993 was prepared for Parks Canada and Saskatchewan Department of Environment & Resource Management. That study evaluated 34 river sections, rivers or river systems for natural heritage, human history and recreation characteristics. Based on these evaluation criteria, eleven rivers were recommended to be given further consideration as potential Canadian Heritage Rivers, or provincial heritage resource candidates. The South Saskatchewan River and the North Saskatchewan River were among the top five deserving special recognition for consideration due to their high value scores (Baschak, 1993).

6.7.4 Recreation Activities

6.7.4.1 Cross Country Skiing

There are 4 known areas within the forest that are developed by clubs for cross country ski areas: Eb's Trails, MacDowall Ski Trails, Holbein Ski Trails, and the Little Red River Ski Trails. The province has been involved in developing many of the ski trails.

Eb's Trails, located 18 km. north of Duck Lake along Highway 11, were initially started in 1977 with the permission of the Department of Tourism & Renewable Resources. The trails have been expanded since then, and there are now cabins, toilets, ski trails and signs associated with the trails, which are maintained by the Saskatoon Nordic Ski Club. Most of the people who ski on the trails are from Saskatoon, with other users from Prince Albert, Rosthern, MacDowall, Duck Lake and other communities. There have been problems related to the extensive use of the developed ski trails by ATV users during spring, summer and fall.

The MacDowall Ski Trails were developed in the late 1980's by the Saskatoon Nordic Ski Club, Katimavik work program and the Department of Tourism & Renewable Resources. The North Cabin Fire of 1989 burned over most of the trails, and since the fire, the trails have not been tended.

The Little Red River Ski Trails are maintained by the Prince Albert Ski Club. These ski trails extend from the city's Little Red River Park into private lands and the Nisbet Provincial Forest.

There have been problems associated with snowmobilers damaging ski trails during winter and ATV operators and cyclers in other seasons.

The Holbein Ski Trails were developed and are maintained by the Holbein and District Community Club.

6.7.4.2 Snowmobiling

Although snowmobiling occurs on many roads and trails in the forest, there are three known areas developed or used for snowmobiling: the Nisbet Trails Recreation Site, the MacDowall area trails, and the Holbein area trails.

The Nisbet Trails Recreation Site was designated in 1974 to focus snowmobiling in a given area in the Nisbet forest, and to limit snowmobiling in the Buckland Wildlife Management Unit. These trails are no longer groomed. The North Cabin Fire of 1989 burned over some of the trails in the MacDowall area. The MacDowall area trails are used by the Saskatoon and Wyngaard Snowmobile Clubs. The Holbein and District Community Club developed and maintains the snowmobile trails near that community.

There are few known conflicts over the use of resource roads and trails for snowmobiling, because most are closed to vehicular traffic in winter. However, there have been complaints from snowmobilers being limited in their use of the forest due to development of cross country ski areas.

6.7.4.3 Hiking/Running

The Little Red River Ski Trails and Eb's Cross Country Ski Trails are used for both hiking and running activities. Hikers using Eb's Ski Trails have expressed safety concerns over the use of ATV vehicles on hiking trails.

6.7.4.4 ATV Use

Use of all terrain vehicles (ATVs) in the forest for recreation purposes has increased over time. Although there are no designated sites in the Nisbet forest for such use, most trails have the potential for access by motorized recreation vehicles. There have been some organized ATV rallies in various areas of the forest. Concerns have been raised by ATV users regarding conflicts with other recreation uses, in particular cross country skiers and hikers.

6.7.4.5 Horseback Riding

There are no trail riding agreements in the forest for any equestrian group or ecotourism operation. Horseback riding occurs in the Steep Creek Block, the MacDowall Block, and north of the Little Red River Park near the Red River Riding & Roping Arena. Horseback riders in the MacDowall area use the shelters and toilets constructed for Eb's Ski Trails. There is

potential for conflict between those who maintain cross country ski trails and horseback riding activities if they use the same trails.

6.7.4.6 Fishing

Angling is permitted in the rivers and waters of the Nisbet forest. Fish stocking is carried out in the Nisbet Trout Pond and in Steep Creek. The Nisbet Trout Pond, within a creek draining into the Sturgeon (Shell) River in the Nisbet Trails Recreation Site, is stocked by SERM annually with 2,400 catchable rainbow trout. A parking area and toilet facilities at the site are maintained by SERM.

Steep Creek, located in the Steep Creek Block of the Nisbet forest, is stocked annually by SERM with 500 brook trout fingerlings. This site has been improved by SERM and the RM of Prince Albert in 1999 to provide parking, and to stabilize water levels in the pond.

Fish stocking has occurred in Bennett Creek and Miner's Creek in the past, but is no longer carried out.

6.7.4.7 Canoeing

Both the North and South Saskatchewan Rivers are used for canoeing. The area of the South Saskatchewan River between Saskatoon and Nipawin is identified in Saskatchewan's 2000 Vacation Guide as Canoe Route #19. Since no registration is required, it is difficult to estimate the extent of recreational use on both rivers.

6.7.4.8 Cabins

Permits were issued in the past to the Duck Lake Métis Society to build log cabins in the MacDowall Block as a training exercise. Although dispositions for the six cabins have expired long ago, the cabins remain, and they are often used by winter recreationists as warm-up shacks.

6.7.4.9 Educational Activities

Mouse Meadows Interpretive Trails, developed and maintained by the Saskatchewan Forestry Association, are under discussion for possible relocation from near the industrial area (Carrier Lumber, Provincial Forest Products, Weyerhaeuser mills site, etc.) to a site north-west of the Little Red River Park, in the Kristie Lake area. These interpretive trails are used extensively by local area schools for education experiences. The University of Saskatchewan and local high schools access the MacDowall Bog Protected Site, and other areas of the forest for plant and nature studies. Local Scouts and Guides use many parts of the forest for outdoor education experiences, and gathering craft products.

6.7.5 Provincial Recreation

There are two designated provincial recreation sites in the Nisbet Provincial Forest - The Nisbet Trails Recreation Site, and the Sturgeon River Recreation Site. These are both located north of the North Saskatchewan River, in the vicinity of the Sturgeon (Shell) River (See Map in Appendix 2). Although both are located within the boundaries of the forest, they are administered under *The Parks Act*.

- The Nisbet Trails Recreation Site is 1,868 hectares in size, and is located west of the Sturgeon (Shell) River, on the north side of Highway No. 3. Snowmobile trails, a stocked trout pond and a gun range are all located within the recreation site.

- The Sturgeon River Recreation Site is 94 hectares in size, and is located on both sides of Highway No. 3 along the Sturgeon (Shell) River. A portion of the recreation site is leased to private interests, and it contains approximately 6 day use picnic sites, and 20 full service campsites. The full service campsites are currently being developed.

CHAPTER 7
ISSUES

There are a number of items listed as issues related to the management of the Nisbet Provincial Forest - some of which need long term strategies, and others which can be solved in the short term. Identified issues are as follows:

7.1 GENERAL

1. There is a public expectation that the forest will continue to provide indigenous plant and wildlife species. At the same time, there are increasing demands on the forest lands and its resources by people from both inside and outside the immediate area. There are expectations for more recreation space, continued timber harvesting, continued cattle grazing, and more land leases or sales. All of these activities combine to impact wildlife habitat, aesthetic values and sustainability of the forest, and often these activities are at odds with one another.

2. The few wetlands which occur in the Nisbet Provincial Forest are areas of predominantly organic soils that are permanently or periodically saturated. Agricultural, residential and industrial activities on adjacent lands that have drainage activities to enhance their productivity and value can have a negative impact on water regimes, waterfowl and fur-bearing animal habitat within the forest.

3. The irregular shape of the forest boundary, and its fragmented segments makes it difficult to manage the forest for wildlife, biodiversity, recreation, fire, insects and diseases. Adjacent agricultural Crown lands and municipal lands require complementary policies for wildlife habitat, disease management, recreation, etc.

7.2 CLIMATE CHANGE

1. Healthy forest ecosystems affect climate by removing carbon from the air and storing it, by absorbing solar radiation and regulating moisture, by reducing wind speeds, and through linkages to the general air circulation. Increasing atmospheric carbon dioxide and other greenhouse gases may already have begun to influence the forest ecosystem through global warming. A major climatic change may occur in the time it takes from tree planting to harvest (Wheaton, et al. 1992). Climate change has implications for silviculture policy and management in terms of species planted, and the timing of planting.

2. The amount of total precipitation in winter is expected to increase in the form of rain (Wheaton, et al. 1992), with less expected to fall as snow. When rain falls on snow, the snow cover increases in density and forms ice layers. This has negative implications for not only wildlife, but also for recreation activities such as skiing and snowmobiling in the forest.

3. The changes in forest plant and animal species that may occur from climate change could alter the value of the forest for timber harvesting or trapping activities. It may also affect those who gather forest products for their own use.

4. Climate change, combined with the presence of upstream dams and municipal, agricultural and domestic waste activities, could have a significant effect on the volume and quality of water in the North and South Saskatchewan Rivers by the time the rivers reach the Nisbet forest. The increased evaporation brought about by climate change, and the presence of upstream dams which already affect the seasonal flow of water may reduce the degree to which upstream contaminants are diluted. This could place significant pressure on water users for treatment and use of the water supply.

7.3 WILDLIFE

1. The Nisbet Provincial Forest is an "island" of trees and other vegetation surrounded by urban and agricultural development. The land base available for wildlife habitat has been decreased over time due to development for other values. Encroaching activities and land fragmentation are a growing concern.

2. A small elk herd exists in the Nisbet forest. The herd is particularly sensitive to the presence of residential and industrial areas, forest harvest operations, motorized recreation activities, hunting, and the presence of cattle and associated grazing activities. Any major increase of big game populations is limited because of the small land base of the forest, and the multiple activities (both economic and recreational) that occur upon it. In much of the forested lands, the understory is too sparse, or the brush stands too dense, to adequately provide a food source for a sizeable number of big game.

3. Continuing fire suppression activities have reduced natural fire in the Nisbet forest, which means that the forest is more mature than would naturally be the case. As the forest matures, it tends to restrict the diversity of wildlife habitat, as mature jack pine forests contain little undergrowth for species habitat and variety. If the forest cannot sustain adequate habitat within itself, many of its species (such as deer) need to go elsewhere to sustain themselves. This can result in species mortality, and property and crop damage to adjacent farms and rural residential areas.

4. Use of pesticides, herbicides, insecticides and fungicides on farm and residential lands that border the forest may introduce toxins into the food chain. Contamination can occur by off-target applications, wind drift, surface run-off, sub-surface leaching, or other means.

5. The increased number of incidents of wildlife ranches in the area is of growing concern due to the potential of introduction and spread of disease into the natural populations.

6. Limited wildlife habitat management occurs in the Nisbet Provincial Forest. This is likely due to a lack of information on population numbers and important wildlife habitat areas.

7. Proximity to urban centers results in wildlife and human conflicts which can include: crop depredation; collisions with aircraft and vehicles; increased incidences with "problem wildlife" like skunks and beaver; dogs and cats as predators of wildlife; and increased bear/human incidents.

8. Where the forest is already fragmented into patches, as is the case for the Nisbet forest, a fire occurrence can destroy animal habitat, or cut off their travel corridors.

7.4 PROTECTED SITES & SPECIAL MANAGEMENT AREAS

1. The MacDowall Bog Protected Site is within a grazing permit area, and some motorized recreation vehicles can access the site. There is a potential for damage to the protected site from grazing during drier periods, or from recreation use.

2. Riparian areas are important because of the many functions they perform, such as providing wildlife travel corridors, maintaining terrestrial plants and animals, and maintaining water quality and fish habitat. Activities such as cattle grazing and timber harvesting can negatively impact these functions.

7.5 FOREST PRODUCTS HARVESTING

1. The demand for green (non-salvage, living) "own use" white spruce, and white birch exceeds the set annual limits.

2. Harvest volume schedule (HVS) calculations for the Nisbet forest are based on stands from a large forested area, rather than the local conditions of the land supporting the stands in the Nisbet forest. Dwarf mistletoe has reduced the potential volume of trees in the Nisbet forest, and in order to factor this into the HVS, we need more information to determine the extent of the reduction. Also, the current allowed volumes and the HVS do not consider other forest values such as leased sites, recreation or grazing permit areas. If the planning process identifies areas where harvesting is to be excluded, the HVS must be adjusted accordingly.

3. Forest harvesting methods and practices often conflict with aesthetics, recreation, wildlife habitat and biodiversity. Small, scattered, partial and clear cuts have high reforestation costs, and clear cuts without adequate buffers encourage spread of dwarf mistletoe.

4. Planted trees are sometimes harvested by individuals for Christmas trees.

5. There is a substantial backlog of not sufficiently restocked lands (NSR lands) that have been harvested or burned over. These sites have not been restocked (planted), nor have they sufficiently regenerated naturally. The exact status of NSR lands is not presently known. Reforestation efforts in the Nisbet Provincial Forest do not occur every year, and have not addressed the NSR backlog.

6. Neither cut areas nor silviculture areas are currently mapped. This has implications for effective forest management.

7. Replanting the areas cleared for fuel breaks has included species of hardwoods and softwoods not native to the Nisbet Provincial Forest. These activities have implications for native biodiversity.

7.6 FOREST INSECTS & DISEASES

1. Managing the forest for timber, aesthetics, and recreation has resulted in an increased incidence of jack pine stands infected with dwarf mistletoe. Past reforestation efforts have not considered the presence of dwarf mistletoe in adjacent stands or in residual trees as a factor in regenerating stands. These adjacent stands are infecting the young stands.

2. Present forest harvesting methods encourage the spread of dwarf mistletoe and greatly increase renewal costs. Current practices remove the best wood and leave infected residual trees in the canopy and in advanced regeneration. This leaves a two-aged stand with an infected overstory which will provide a continual source of dwarf mistletoe to regenerating susceptible species.


Witches' broom on jack pine from dwarf mistletoe

3. Dwarf mistletoe is present in forested areas of private lands, provincial lands not administered by SERM, federal or municipal owned lands, provincial recreation sites, and leased sites in the forest. The presence of dwarf mistletoe in jack pine stands on these sites increases the spread of dwarf mistletoe into the Nisbet forest.

7.7 FIRE MANAGEMENT

Historically, fire management in Saskatchewan has not been included in forest management. Fire issues are related to how we can minimize our risk while living in a fire-prone environment.

1. Increased residences and industries developed adjacent to and within the Nisbet forest mean that more human lives, residences and businesses are at risk from wild fires. Currently fire risk within municipalities and nearby Indian reserves is not fully addressed in municipal development plans (lot size, access, setback and density requirements), vegetation management plans, and building requirements for developments near forest boundaries.

2. Party fires occur (80 - 100 per year) within the forest, usually near urban areas. These fires often occur in areas and during times (fire season) when the forest is most likely to burn. The fires are often left burning and unattended after a party has dispersed. Not only do such occurrences add risk to area residents, residences and industries, they require extra attention to fire patrol activities.

3. The increased use of the forest for motorized recreation activities such as motorized bikes and ATV's increases the risk for fire starts, particularly when activities occur during dry periods.

4. There are incidences of people depositing piles of dead and trimmed landscape trees in the forest. These deposits of dead material add to the potential for a forest fire.

5. Dwarf mistletoe in jack pine stands is a concern, due to the fuel it produces for fire. This disease weakens the host jack pine and with time, diseased stands will increase a fire's ability to spread and crown due to the presence of witches' broom and the accumulation of dead materials on the tree and forest floor.

6. The Prince Albert landfill within the forest has numerous fire incidences with the potential to spread onto adjacent forested land. Efforts of SERM and the City of Prince Albert fire department have contained all landfill fires thus far.

7. Agricultural burning during critical times of the year is a further source of ignition.

8. Increased industrial development in the RM of Buckland near the Weyerhaeuser mills adds further potential sources of ignition. Some of the developments incorporate a large burner, and others have had fires start from spontaneous combustion within bark piles.

9. Lack of water in the forest is a major problem, should a large fire start within the forest boundaries. Unfortunately, due to the numerous sand bars in the river, SERM's water skimming aircraft cannot utilize the river. It will be necessary to truck water to the site or pump water from the North Saskatchewan River. SERM's land based tracker aircraft

will continue to use the Prince Albert Airport unless it gets smoked in from a fire. With prevailing northwest winds, this poses a real possibility.

10. Many jack pine areas of the forest have been cleared, or are scheduled to be cleared as fuel breaks. Of the fuel breaks that have been cleared, some have been replanted to jack pine, others to non-native hardwood species, and still others have been left for natural regrowth. There are recent plans to replant some fuel breaks with red pine. The long term effects of fuel breaks and silviculture strategies on the ecosystem need to be considered when determining the appropriate strategies to manage the fuel breaks.

7.8 GRAZING & HAYING

1. Grazing and haying activities limit wildlife habitat by competing for the same food source as some forest species, while depleting habitat for others. As well, grazing activities require fencing, which creates a problem for wildlife. There have been no studies regarding the cumulative effect of all grazing and haying activities in the Nisbet Provincial Forest regarding forest ecosystem sustainability.

2. Grazing and haying activities impact other values such as biodiversity, timber harvesting and recreation.

3. Fencing associated with grazing activities requires maintenance, and some have improper construction materials such as growing trees used as fence posts. Abandoned fence lines in the forest negatively impact recreation activities and wildlife.

4. Grazing within the forest can lead to lower forest productivity by damaging the stem and bark of existing and regenerating trees, reducing native species abundance, introducing non-native plant species, compacting soils, polluting water and introducing domestic animal diseases to native populations.

5. When cattle are allowed access to water bodies for drinking water, they can cause extreme damage to riparian areas by damaging streambanks and vegetation. This results in decreased habitat quality for many plants and animals, increased sedimentation in the water body, and decreased water quality and fish habitat.

7.9 MINING

1. Potential conflicts with other land uses or priorities may restrict access to land for mineral exploration and development. Limitations on mineral exploration and development could have negative economic implications. Land excluded from mineral exploration and production represents a potential economic loss to the Province and local area.

2. Mineral exploration and development involve a high risk of investment over a significant time span, and will not occur if there are uncertainties about tenure of mineral rights. If resolution to a disputed site cannot be reached, and existing mineral dispositions are voluntarily surrendered by the holders, the disposition holders must be adequately compensated. There is no legislative provision for the expropriation of existing mineral dispositions.

7.10 LAND MANAGEMENT (LANDS DISPOSITIONS)

1. Over time, there have been a number of land transfers in the forest to private and commercial interests. There are 625.27 hectares (1,545 acres) of forest lands leased for institutional and industrial use, and 305 hectares permitted for sand and gravel extraction. As well, there are continued demands for lease or transfer of ownership of forested lands. Sale or lease of pockets of forested lands results in more fragmentation, making wildlife management more difficult.

2. The cabins constructed in the MacDowall Block no longer have dispositions. These cabins present a safety and fire hazard risk, as they are often the site for parties and vandalism.

7.11 ENVIRONMENTAL CONCERNS

1. The City of Prince Albert landfill has exceeded its lease area, and has reached the permitted height. Unauthorized Crown lands and soils are presently utilized for the operation of the landfill.

2. Garbage, domestic waste, vehicle parts and tires are deposited along trails throughout the forest. Garbage carried by the wind into the forest from the landfill is a continuing problem.

3. Local agriculture industries have used Provincial forest lands to dispose of waste.

4. The sewage lagoon for the Whispering Pines Trailer Court, located in the Nisbet forest, does not fit the current criteria for sewage lagoons.

5. Although burning at the Holbein landfill is no longer permitted, there have been complaints received by SERM of burning garbage at the site. Burning at the landfill is a potential start for a forest fire, since it is surrounded by a jack pine forest.

7.12 GROUNDWATER

1. The ground water direction of flow and quality is of particular concern to residents of Nordale due mainly to the proximity of the Prince Albert landfill within the Nisbet forest. Ground water flow is in the south - southwesterly direction, and Nordale is between the landfill and the North Saskatchewan River (1 kilometre south of the landfill).

7.13 RECREATION USE

1. Expectations for free public access for different types of recreation have caused conflict between recreation users. Current SERM policy is such that no permits are required for organized recreation events on Provincial forest land. Concerns over the impact of ATV and motor bike use on developed cross country ski trails have been expressed, particularly at Eb's Trails near MacDowall. There have also been complaints of snowmobiles on ski trails in the Little Red River Park area. Concerns expressed include erosion of the trails from motorized vehicles, and safety of skiers and hikers.

2. The need for ATV/dirt bike facilities and trails has not been addressed, and continues to grow. As a result, many areas of the forest are repeatedly used, causing damage to the ecosystem. Repeated ATV use of the same site over a long period of time, or intensive use over a relatively short period of time (such as organized rallies) can cause erosion damage which takes decades to recover. Use of ATVs during wet conditions (after rainfall) or in the spring before vegetation has had a chance to take hold are particularly vulnerable periods, as the soil is more readily exposed during these periods.

3. Recreation activities, especially motorized activities, and associated trails negatively impact wildlife and wildlife habitat. Such activities have not occurred in a coordinated fashion, taking into consideration wildlife habitat, other values, and long term sustainability of the ecosystem.

7.14 ROADS AND OTHER LINEAR DEVELOPMENTS

1. As both the provincial and local populations increase, so do demands for roads and other linear developments. The continuity of the forest and wildlife habitat can be negatively impacted when roads and utilities are created or upgraded.

2. Many roads and other linear developments throughout the forest have been created for past resource extraction, rail transportation and utility corridors. Resource roads and other linear developments left open after they are no longer required continue to provide access for recreation or hunting activities that disturb wildlife.

3. Stream crossings created long ago for timber harvesting are no longer maintained. These stream crossings are not only a safety concern, but also present a problem for natural water flow, as they cause siltation and erosion.

7.15 SAND AND GRAVEL

1. Many of the old sand and gravel quarry sites were abandoned. In many cases, the extraction activities occurred without permits and SERM is unable to identify the parties responsible. These sites are not suitable for forest regrowth.

2. It is expected that the demand for sand and gravel aggregate (jack pine sand and gravel for both road construction and concrete) from the forest will grow as urban demands increase, and existing deposits are depleted.

BIBLIOGRAPHY

Acton, D.F., G.A. Padbury, C.T. Stushoff. March, 1998. The Ecoregions of Saskatchewan. Prepared and edited by Saskatchewan Environment and Resource Management. Canadian Plains Research Centre/Saskatchewan Environment and Resource Management. University of Regina.

Anderson/Fast Marketing Solutions. 1996. Ecotourism in Saskatchewan: State of Resource Report. Report I. [Prepared for Saskatchewan Watchable Wildlife Association]

Anderson, John, I. Crane, A. Diamond, and R. Hansell. 1997. "Impacts of Climate Change and Variability on Unmanaged Ecosystems, Biodiversity, and Wildlife" in Canada Country Study. Vol. VII - National Sectoral and Cross-Cutting Issues. Chapter 2. Environmental Adaptation Research Group. Environment Canada. Downsview, Ontario

Baschak, Lawrence. 1993. Canadian Heritage River Systems Study for Selected Rivers in Saskatchewan. Parks and Protected Areas Branch, Saskatchewan Department of Environment and Resource Management.

Supply and Services Canada. 1995. Canadian Biodiversity Strategy, Canada's Response to the Convention on Biological Diversity. Hull, Quebec.

Canadian Council of Forest Ministers. May, 1998. National Forest Strategy 1998 -2003, Sustainable Forests, A Canadian Commitment. Ottawa. [Government of Canada].

Castello, John D., Donald J. Leopold, and Peter J. Smallidge. January, 1995. Pathogens, Patterns, and Processes in Forest Ecosystems. BioScience Vol. 45 No. 1.

The Senate. 1999. Competing Realities: The Boreal Forest at Risk. Report of the Sub-Committee on Boreal Forest of the Standing Senate Committee on Agriculture and Forestry. [Government of Canada]

Department of the Interior, Government of Canada. 1910. Report of the Superintendent of Forestry.

Department of the Interior, Government of Canada. 1912. Report of the Superintendent of Forestry.

Department of the Interior, Government of Canada. 1914. Report of the Director of Forestry.

D'Eon, R.G.; Watt, W.R. 1994. A Forest Habitat Suitability Matrix for Northeastern Ontario. North East Science & Technology Technical Manual TM-004

Environment Canada. <http://www.ec.gc.ca/air> [Retrieved 20 October, 2000]

Etkin, David. 1997. "Climate Change and Extreme Events: Canada" in Canada Country Study. Vol. VIII - National Sectoral and Cross -Cutting Issues. Chapter 2. Environmental Adaptation Research Group. Environment Canada. Downsview, Ontario.

Gregory, S.V.; Swanson, F.J. Mckee, W.A.; Cummins, K.W. 1991. An Ecosystem Perspective of Riparian Zones. BioScience 41(8): 540-551.

Hilderman, Witty Crosby, Hanna & Associates. 1986. Saskatchewan Parks System Plan, Final Report. Volume 2: The Parks System Plan. Report 86-22. [Prepared for Saskatchewan Parks and Renewable Resources]

Hilderman, Witty, Crosby, Hanna & Associates. 1990. Provincial Parks System Plan - Summary Document. Parks Branch, Saskatchewan Parks & Renewable Resources. Report 90-4.

Hough, Stansbury & Michalski. 1982. Little Red River Study, Final Report. [Prepared for City of Prince Albert].

Lambrecht, Kirk. 1991. The Administration of Dominion Lands, 1870-1930. Canadian Plains Research Centre. Regina, Saskatchewan.

Morton, Arthur S. 1938. "History of Prairie Settlement" in Canadian Frontiers of Settlement. Edited by W. Mackintosh and W. Joerg. The Macmillan Co. Toronto.

McGilp, I. 2000. Personal communication. Tourism Saskatchewan. Saskatoon, Saskatchewan.

McLaughlan, M.S. 1999. Saskatchewan Forest Vegetation Inventory Standards Manual (Version 3.3). Unpublished draft manual. Forest Ecosystems Branch, Saskatchewan Environment & Resource Management, Prince Albert, Saskatchewan.

Natural Resources Canada. 1999. Climate Change and Forests. Ottawa. [Government of Canada]

Prince Albert (City of). <http://www.citypa.com> [Retrieved 6 December, 2000]

Prince Albert Planning District Development Plan. 1991

Russell, Dale. 1991. Eighteenth-Century Western Cree and Their Neighbours. Canadian Museum of Civilization. Hull, Quebec.

Saskatchewan Conservation Data Centre. <http://www.biodiversity.sk.ca> [Retrieved 10 May, 2000)

Saskatchewan Department of Tourism and Renewable Resources. 1974. Nisbet Provincial

Forest Management Plan.

Saskatchewan Parks and Renewable Resources. 1976. General Land Use & Recreational Concept Plans for the Nisbet Forest.

Saskatchewan Parks and Renewable Resources. 1985. Nisbet & Canwood Provincial Forests: Land Management Statement.

Saskatchewan Environment & Resource Management. 1993. State of the Resource Report.

Saskatchewan Environment and Resource Management. 1994. Saskatchewan's Environmental Agenda, Securing a Sustainable Future.

Saskatchewan Environment and Resource Management. 1994. Wild Fur Harvesting in the Boreal Forest of Saskatchewan 1976/77 to 1991/92. Wildlife Technical Report 94-3.

Saskatchewan Environment and Resource Management. 1995. Saskatchewan's Forest Management Policy Framework.

Saskatchewan Environment and Resource Management. August, 1997. Saskatchewan's Representative Areas Network. Final Action Plan.

Saskatchewan Environment & Resource Management. 2000 draft. Framework for an Action Plan to Conserve Saskatchewan's Biodiversity.

Saskatchewan Environment & Resource Management, and Natural Resources Canada. 1995. Saskatchewan Long Term Integrated Forest Resources Management Plan.

Smiley, W.D. (No date). The Forest Industry and Prince Albert to 1918. Prince Albert Historical Society. Prince Albert, Saskatchewan.

Statistics Canada. 1996. <http://ww2.statcan.ca/english/profil> [Retrieved 15 July, 1999]

Volney, W. J. and H. Cerezke. 1987. Report on Pest Conditions of the MacDowall Block, Nisbet Forest, Saskatchewan. [Internal report prepared for Forestry Branch, Saskatchewan Department of Parks, Recreation and Culture].

Weber, M.G. and M.D. Flannigan. 1997. Canadian Boreal Forest Ecosystem Structure and Function in a Changing Climate. Canadian Forest Service, Environ. Rev. Vol 5.

Wheaton, E.E., V. Wittrock and G.D.V. Williams (editors). 1992. Saskatchewan in a Warmer World: Strategies for the Future. SRC Publication No. E-2900-17-E-92.

Wild Rose and Area History Book Committee. 1990. Footprints of our Pioneers. Friesen Printers.

World Resources Institute. <http://www.wri.org/biodiv/gbs-glos.html> [Retrieved 11 October, 2000]

GLOSSARY

Annual Allowable Cut: An expression of the maximum volume of timber that may be removed each year from the forest land base. Calculations are a function of the forest area, the initial volume of standing timber and the growth of the forest over some specified period or until the uniform distribution of age classes has been achieved.

Biodiversity: The variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part. This includes diversity within species and between species and diversity of ecosystems.

Carrying Capacity: A measure of the capacity of an ecosystem to support life without undergoing degradation (loss of productivity).

Crown Land: Lands under the tenure of the provincial or federal government.

Ecodistrict: (also known as landscape areas) Subdivisions of ecoregions, characterized distinctive assemblages of landform, relief, surficial geological material, soil, water bodies, vegetation and land uses (Acton, et al. 1998).

Ecoregion: Subdivisions of the ecozone, characterized by distinctive climatic zones or tegional landforms, and constitute the major bridge between the subcontinental scale ecozones and the more localized ecodistricts (Acton, et al. 1998).

Ecosection: A part of an ecodistrict throughout which there is a recurring pattern of terrain, soils, vegetation, waterbodies and fauna.

Ecosite: A part of an ecosection having a relatively uniform parent material, soil, and hydrology, and a chronosequence of vegetation.

Ecosystem: an interdependent system consisting of all the living organisms in a given area, all the physical and chemical factors of their environment, and the processes which link them.

Ecosystem Diversity: Ecosystem diversity relates to the variety of habitats, biological communities and ecological processes (fire, insect, disease, etc.) within ecosystems. Maintaining ecosystem diversity is important as a goal in the preservation of biodiversity because ecosystem functions control the fluxes of energy and materials across the landscape upon which species diversity relies (Etkin, 1997).

Ecotourism: Tourism which involves travel to relatively undisturbed or uncontaminated natural areas with the specific objective of studying, admiring, and enjoying the scenery and its wild plants and animals, as well as any cultural aspects found in these areas.

Ecozones: the ecozone lies at the top of the ecological hierachary, and as such, it defines, on a

subcontinential scale, the major physiographic features of the country (e.g., Canadian Shield, Great Plains, Rocky Mountains) (Acton, 1998).

Genetic Diversity: Genetic diversity refers to the diversity of genetic information within a species population. Some individuals may have identical genes, others may have very little genetic variation, while still others may have substantial genetic variation and may be better adapted to survive alterations in the environment. The extent and kind of genetic diversity present today is important because genes are the source of new variations which allow adaptation by a species, and eventually ecosystems, to altered climates and new environmental conditions (Etkin, 1997). The degree of genetic diversity present in a population is important because it influences reproductive capacity and resistance to disease.

Habitat: The place or area where organisms or populations naturally live.

Landscape Area: See Ecodistrict.

Mechanical Drag Scarification: is a method of seedbed preparation which exposes mineral soil and redistributes accumulations of slash and cones making conditions suitable for natural regeneration of jack pine.

Peat: Is a biogenic material composed of partially decayed organic matter, mainly of plant origin, which has accumulated under water-logged conditions during the 10,000 or so years since the last ice age. This water-logged environment leads to anaerobic conditions which impede decay, thereby resulting in an accumulation of organic matter.

Shrub: A woody plant, mostly less than 5 m tall, and usually with several stems.

Silviculture: The theory and practice of controlling the establishment, composition, growth and quality of forest stands to achieve management objectives.

Site Preparation: Disturbance of an area's topsoil and ground vegetation to create conditions suitable for regeneration.

Species Diversity: Species diversity, or species richness, refers to the variety of organisms found within an area. Species diversity is influenced by a variety of ecological and environmental processes that include habitat size, disturbance regimes, habitat heterogeneity, invasion history, and soil moisture regimes (Etkin, 1997). The response to change in habitat is different in different populations. The life-span and reproductive rates of mice, deer, birds, and bear, and that of white spruce, pine, lichens or grasses all differ and will respond differently to disturbances and change over time and space.

Sustainability: A characteristic of a process or state that can be maintained indefinitely.

Sustainable Development: Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Sustainable Use: The use of components of biodiversity in a way and at a rate that does not lead to their long-term decline, thereby maintaining the potential for future generations to meet their needs and aspirations.

Treaty Land Entitlement: A process agreed to by the province, federal government and Federation of Saskatchewan Indian Nations where funds are made available over 12 years to buy private and/or Crown lands to be designated as Indian reserves.

Use: Any activity involving resources (wildlife, fish, etc.) that benefits people. The activities range from those having a direct impact on the organisms and ecosystems concerned (such as logging, recreation or hunting) to those having no impact (such as appreciation).

Wetland: A low lying area of land saturated by water often enough to support aquatic plants and wildlife. Wetlands include a wet basin and an area of land between the basin and the adjacent upland.

APPENDICES