Nipissing Forest
Resource Management Inc.
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Nipissing Forest
Forest Management Plan

2009 - 2019

Title, Certification and Approval Page of the
FOREST MANAGEMENT PLAN
for the
NIPISSING FOREST

Ministry of Natural Resources North Bay District and Northeast Region
Nipissing Forest Resource Management Inc.
for the 10-year period from April 1, 2009 to March 31, 2019

I hereby certify that I have prepared this forest management plan, including the Silvicultural Ground Rules, to the best of my professional skill and judgment, with the information available, in accordance with the requirements of the *Forest Management Planning Manual.*

REGISTERED PROFESSIONAL FORESTER
2103
MARK LOCKHART
ONTARIO

[R.P.F. seal]

Mark Lockhart, R.P.F. Plan Author, NFRM Inc.	March 25, 2009 Date

Submitted by:

Peter Street, R.P.F. General Manager, NFRM Inc.	March 25/2009. Date

I recommend that this forest management plan be approved for implementation and certify that it has been prepared in accordance with the requirements of the *Forest Management Planning Manual* and relevant policies and obligations (including any relevant MNR agreements with Aboriginal peoples). I also certify that the forest management plan has been prepared using the applicable implementation manuals and forest management guides. In this forest management plan, prescriptions that differ from specific direction or recommendations in the applicable forest management guides are identified in the attached List of Exceptions.

Certified and Recommended for Approval by:

Dave Payne District Manager, North Bay District MNR	March 25, 2009 Date

Approved by:

Eric Doidge Regional Director, Northeast Region MNR	Date

*Note: Original Certification Page containing Regional Director Approval contained at SFL and MNR District Offices

Title and Certification Pages
For Sections of the Forest Management Plan not Prepared by the Plan Author

FOREST MANAGEMENT PLAN
for the
NIPISSING FOREST

Ministry of Natural Resources North Bay District and Northeast Region
Nipissing Forest Resource Management Inc.
for the 10-year period from April 1, 2009 to March 31, 2019

I hereby certify that I have prepared the sections of the forest management plan as indicated, to the best of my professional skill and judgment, with the information available, in accordance with the requirements of the *Forest Management Planning Manual*.

Sections Prepared: 2.3, 3.8, 3.9, 4.3, 4.5, 4.7.4, 6.1.12, FMP-22
Name: Ric Hansel, R.P.F.
Job Title: Operations Forester, NFRM

Ric Hansel — March 16/2009.
Signature — Date

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Tom MacLean — March 12, 2009
Signature — Date

Sections Prepared: 4.3.6, 4.7.1, 6.1.17, 6.1.24
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Job Title: General Manager, NFRM

March 12/09.
Signature — Date

Sections Prepared: 2.2.4, 2.2.5, 3.2.2, part of 6.1.6
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Job Title: Resource Analyst

Shelley Straughan for R. McGregor   Mar 9/09
Signature   Date

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MAR 16, 09
Signature   Date

Sections Prepared: 6.1.1, 6.1.21
Name: Rick Calhoun
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Name: Nanette Lecompte
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March 9/09
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Sections Prepared: 2.1, 2.2.1, 2.2.2, 2.2.5, 2.4, 6.1.20
Name: Lynn Farintosh
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March 4, 2009
Signature   Date

Sections Prepared: 6.1.16
Name: Lorence Reed
Job Title: Nipissing Local Citizens Committee Representative

L.R. Reed   2009 MARCH 17
Signature   Date

List of Exceptions for the FOREST MANAGEMENT PLAN
for the NIPISSING FOREST

Ministry of Natural Resources North Bay District and Northeast Region
Nipissing Forest Resource Management Inc.
for the 10-year period from April 1, 2009 to March 31, 2019

All silvicultural treatments in the silvicultural ground rules which are exceptions to the recommendations in the silvicultural guides, and all operational prescriptions for areas of concern which are exceptions to the specific direction or recommendations (standards and guidelines) in the applicable forest management guides, are provided in this list of exceptions. The specific section of the forest management plan that provides documentation of the exception is also referenced in this list.

Description of Exception	Specific Section of Plan
Full tree skidding of soft limbed trees in PWUS, LWMX, HE, HDUS BY (Seeding Cut stage). This exception is related to two Guides, they are: A Silvicultural Guide for the Great Lakes – St. Lawrence Conifer Forest in Ontario (MNR 1998), and, A Silvicultural Guide for the Tolerant Hardwood Forest in Ontario (MNR 1998). The exception is within the Silvicultural Ground Rules. The exception is to the Harvest treatment and more specifically, the Logging Method as described in the Guides.	3.3.2, 4.7.2, Supplementary Documentation 6.1.11
Clearcut Silviculture System using a Strip Harvest Method in HDUS. This exception is related to the following Guide: A Silvicultural Guide for the Tolerant Hardwood Forest in Ontario (MNR 1998). The exception is within the Silvicultural Ground Rules. The exception is to the Harvest treatment of Clearcut-Strip as described in the Guide.	3.3.2, 4.7.2, Supplementary Documentation 6.1.11

Plan Contributors to the
FOREST MANAGEMENT PLAN
for the
NIPISSING FOREST

Ministry of Natural Resources North Bay District and Northeast Region
Nipissing Forest Resource Management Inc.
for the 10-year period from April 1, 2009 to March 31, 2019

PLANNING TEAM MEMBERS

Peter Street, RPF	Mary Lou McKeen	Mark Lockhart, RPF
Guylaine Thauvette, RPF	Rob Keen, RPF	Dave Joanisse
Clifford Bastien Jr.	Patrick Restoule	Clayton Goulais
Doug Friday	Lorence Reed	Rick Calhoun
Norm Dokis	Melanie Alkins	John Salo
John McNutt, RPF	Rob McGregor	

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Remi Labreche	Jamie Geauvreau	Dave Fluri
Phil Hall	Randy McLaren	Ron Lee
Joel Girard	Robin Hill	Marinus Verwey Grant
Ritchie	Steve Osawa	Craig Crosson
Robert Hunt	Greg Lucking	Chad Anderson John
Copeland	Fred Pinto	Brian Fox
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John Thompson	Edward Morris	Burke Korol
Emmanuel Asinas	Steve Osawa	Jennifer Potvin
Gerry Stroud	Chuck Miller	Tracey Snarr
Wade Murrant	Brian Naylor	Scott McPherson
Murray Woods	Al Stinson	Will Kershaw
Glenn Seim	Mark Vincent	Doug Walsh
Marlo Johnson	Tim Lehman	Joe Johnson
Joe Yaraskavitch	Don Farintosh	Krista Watters

LOCAL CITIZENS COMMITTEE MEMBERS

Lloyd Anderson, Peter Foy (alternate) *Access Groups, Anglers and Hunters*
Dave Minden, Doug Billingsley (alternate) *Cottagers*
Dave Joanisse, Patrick Restoule (alternate) *District Aboriginal Working Group*
Jan Vandermeer, Brennain Lloyd (alternate) *Environmental Groups*
Elwyn Behnke, Blayne Behnke (alternate) *Independent Loggers*
Chris Mayne, Sarah Campbell (alternate) *Municipalities, Chambers of Commerce, Economic Development*
Lorence Reed, Roy Summers (alternate) *Naturalists*
John McNutt, Peter Street (alternate) *Sustainable Forest Resource Licensee/Nipissing Forest Resource Management Inc.*
Frank Tagliamonte, Mike Roxborough (alternate) *Prospectors, Mining Industry, Aggregates*
Tim Toeppner, Tracey Cain (alternate) *Public-at-large*
Andy Straughan *Silvicultural Contractors*
Jennifer McCourt, Tracey Cain (alternate) *Trails*
John Matthews, Heinz Erb (alternate) *Trappers*
Roy Summers *Local cultural heritage groups*
Jan Vandermeer *Education*

The LCC is in general agreement with the FMP as the best effort with the tools available. The Planning Team has considered many forest values and interests, some of which are diametrically opposed, and the FMP provides a reasonable balance of responses to those values and interests.

It is agreed that the FMP should result in sustainability of the forest ecosystems, although not necessarily with the make-up predicted by the models. There are reservations concerning the credibility of the outputs of the models due to much of the starting condition Forest Resource Inventory (FRI) having been derived from 1989 aerial photography and limited understanding, by the LCC, of how well the models reflect the complexity of the forest in a changing climate.

It is understood that the models are continually being improved and future Forest Management Plans will strive to correct past deviations from the desired outcomes.

PLAN REVIEWERS

Steve Osawa
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1.0 Introduction

The Minister of Natural Resources (MNR) is responsible for forest management on Crown land in Ontario. Forest management activities on Crown land in Ontario must be carried out in accordance with an approved forest management plan. Forest management plans are a statutory requirement of the *Crown Forest Sustainability Act* and must be prepared by a professional forester registered under the *Professional Foresters Act, 2000*. Forest management activities covered by these plans include road access, timber harvesting, and forest renewal, tending and protection treatments.

The Crown forest of Ontario is divided into management units for the purpose of forest management. The Ministry of Natural Resources North Bay District contains the Temagami Management Unit and the Nipissing Forest. This Plan is for the Nipissing Forest, which comprises the southern portion of the North Bay District. The Nipissing Forest is administered and managed by Nipissing Forest Resource Management Inc. (NFRM) under the authority of Sustainable Forest Licence (SFL) No. 542053.

This Plan has been prepared in accordance with the Forest Management Planning Manual for Ontario's Crown Forests, (FMPM, 2004). Forest sustainability has been determined in accordance with this manual and within the overall context of higher order provincial and regional land use and resource management policies and strategies.

A team of resource managers, appointed by the District Manager, developed this Plan. A local citizens committee (LCC) helped prepare the Plan and will continue to advise the District Manager throughout Plan implementation. The primary role of the local citizens committee is to communicate local interests to the planning team and to the District Manager, to discuss management options with the planning team and the District Manager and to advise the District Manager on issue resolution.

The Antoine, Dokis, Nipissing, Temagami and Mattawa/North Bay Algonquin First Nation Communities had representatives on the planning team and participated in the planning process.

Thirty-six Resource Stewardship Agreements (RSA's) have been developed between resource-based tourism operators and NFRM and their relevant provisions have been incorporated into the Plan.

The strategic direction for forest management plans is written for a ten-year period, with two five-year phases of operational planning. This Plan is for the period April 1, 2009 to March 31, 2019. It is includes details on operations scheduled for the initial five-year phase of the Plan. It also contains detailed information related to operational planning for the second five-year phase of operations, with the understanding that Phase II planning will commence 3-4 years after the implementation of this Plan. Five years from now, in 2014, a new operational plan will be approved using the same strategic direction outlined in the first phase. At that time there will be the opportunity to adjust operational planning to consider actual events occurring on the management unit between now and then.

Annual Work Schedules will be the annual plan for implementation of forest operations and will be produced prior to April 1st of each year of operation. These schedules will provide the link between the work proposed in the Plan for the five-year term and the financial resources allocated through the annual budgeting process. Annual reports are prepared each year on the actual implementation of planned activities and a report of past forest operations is prepared at the end of the five-year term.

The MNR's Statement of Environmental Values (SEV) under the *Environmental Bill of Rights* (EBR) is a document which describes how the purposes of the EBR are to be considered whenever decisions that might significantly affect the environment are made in MNR. The SEV was considered in the development of this forest management plan. This Plan is intended to reflect the direction set out in the SEV, and to further the objective of managing Ontario's natural resources on a sustainable basis. A SEV briefing note has been prepared for the Plan, and is provided in section 6.1.21.

An index to the environmental assessment components of this Plan has been inserted immediately after the table of contents. This index will serve as a guide for those readers who are familiar with common formats for environment assessment documents.

2.0 Management Unit Description

2.1 Administration

The Nipissing Forest is administered and managed by Nipissing Forest Resource Management Inc. (NFRM) under the authority of Sustainable Forest Licence (SFL) No. 542053. The company is owned by its shareholders: R. Fryer Forest Products Limited, Goulard Lumber (1971) Limited, Tembec Industries Inc., Hec. Clouthier and Sons Inc., and Grant Forest Products Inc. The Sustainable Forest Licence, under the *Crown Forest Sustainability Act*, is administered by the Ontario Ministry of Natural Resources, North Bay district office. North Bay District reports administratively to the Regional Director of the Northeast Region, based in Timmins, Ontario.

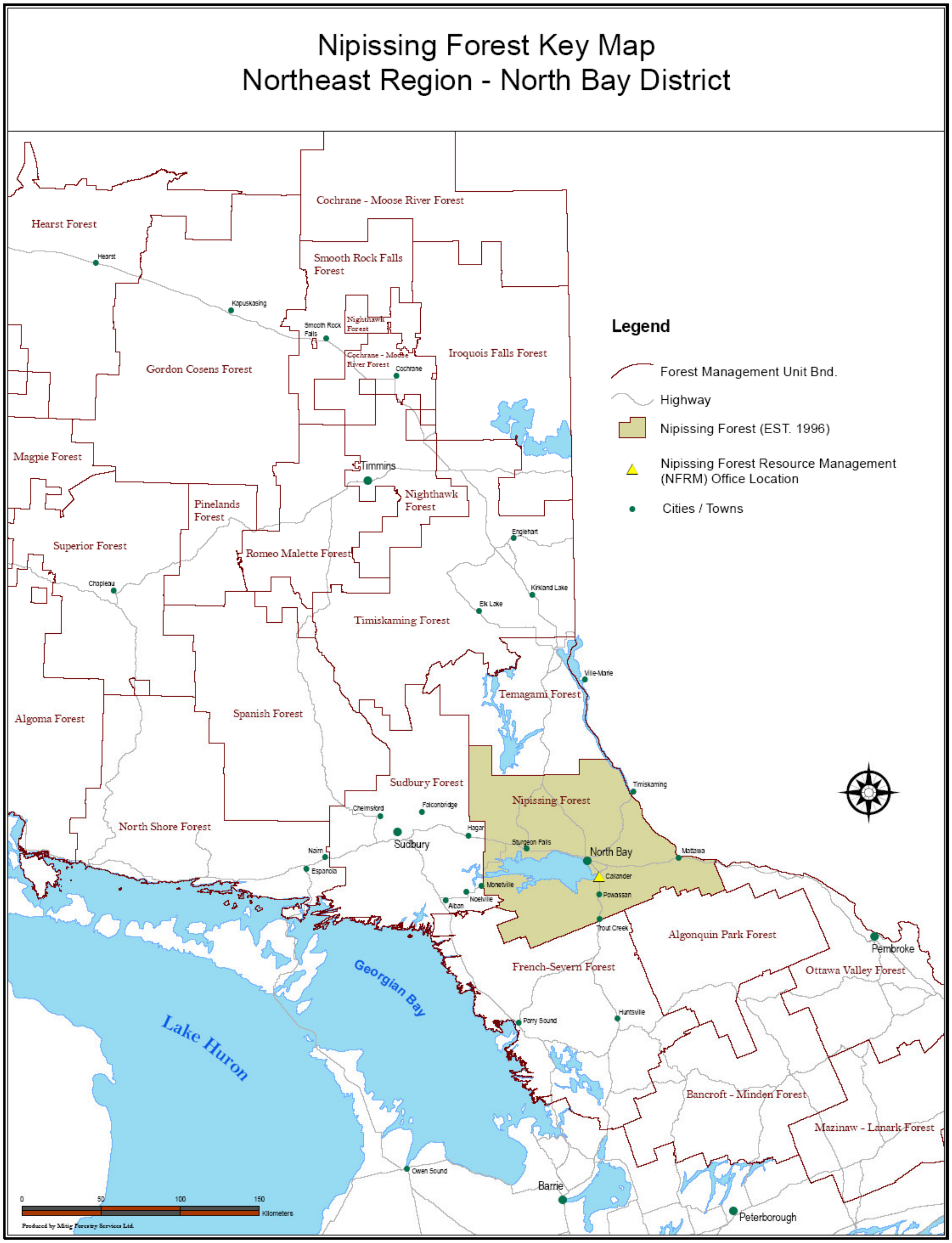
The Nipissing Forest (the Forest) covers more than half of North Bay District and comprises the southern portion of that district. The district is located in the south-eastern part of the Northeast Region (see Figure 2.1.1). The Forest extends over 11,932 square kilometres and has a permanent population of approximately 86,000. The city of North Bay has a population of 56,000 and is a supply and communications centre for much of north-eastern Ontario. North Bay is a focal point for a ring of smaller, nearby communities.

The largest of the neighbouring centres is Sturgeon Falls (population about 6,000), which is located 38 km west of North Bay. Verner (population about 1,000), 16 km farther west, is the centre of a large agricultural community. Powassan (population about 1,200) is 33 km south of North Bay on Highway 11, and is the service centre for another agricultural community. The town of Mattawa (population about 2,500) is located 62 km east of North Bay, at the confluence of the Mattawa and Ottawa Rivers. The town of Temiskaming, in Quebec, on the east side of the Ottawa River at the end of Highway 63, also relies to a great extent on the services provided by the community of North Bay.

The Nipissing Forest is composed of 80 full townships and portions of four other townships. It is bounded on the north by the Temagami Crown Management Unit; by Sudbury District on the west; by Parry Sound District and Algonquin Park to the south; and by Pembroke District and the Ottawa River to the east.

There have been many changes in boundaries in the North Bay District in past years, but none since the last FMP in 2004. The Temagami District was amalgamated with North Bay District in 1996, and became the Temagami Area of the North Bay District. From 1980 to 1990 there were four Crown Management Units (CMUs) in the North Bay District: Wasi CMU, Mattawan CMU, Tomiko CMU and Verner CMU. In 1990, the area was reorganized from four to three management units: the Ottawa River CMU, the Sturgeon River CMU, and the Nipissing CMU. In 1994, the entire district became one Crown Management Unit, which became the Nipissing Forest when the sustainable forest licence was signed in 1996. A comprehensive forestry history of the management unit may be obtained by reference to the four timber management plans produced in the 1980s, to the three plans produced during the 1990s, to the North Bay CMU 1994-1999 plan and to the Nipissing Forest 1999 plan.

Figure 2.1.1 Key Maps of the Nipissing Forest Management Unit



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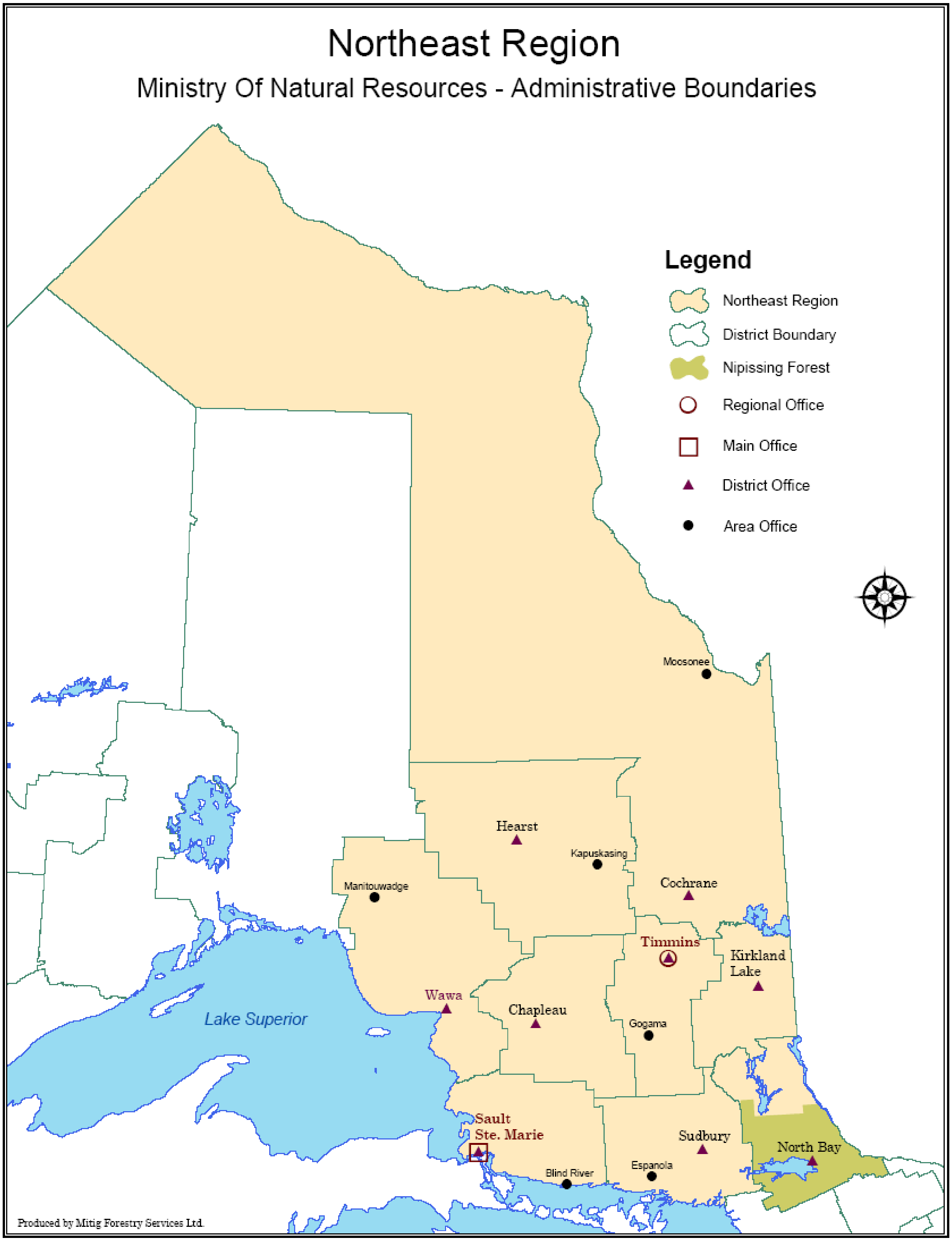
Northeast Region
Ministry Of Natural Resources - Administrative Boundaries
Legend
Northeast Region
District Boundary
Nipissing Forest
Regional Office
Main Office
District Office
Area Office
Moosonee
Hearst
Kapuskasing
Cochrane
Manitouwadge
Timmins
Kirkland Lake
Wawa
Chapleau
Gogama
Lake Superior
Sault Ste. Marie
Blind River
Espanola
Sudbury
North Bay
Produced by Mitig Forestry Services Ltd.

Private land comprises 23 percent of the total area of the Nipissing Forest and is concentrated in the southern and central-western part of the area. Its contribution to the overall wood supply in the management unit is minimal. The Forest in the eastern part of the management unit was cleared in the past for agricultural activities; that has resulted in hundreds of hectares of idle marginal agricultural land that could make a significant contribution to the district's future wood supply with proper management.

There are 39 protected areas either entirely or partly within the boundaries of the Nipissing Forest. Of these, 18 are provincial parks. They are: Amable du Fond, Alexander Lake Forest, Chiniguchi Waterway, French River, Jocko River, Kenny Forest, Manitou Islands, Marten River, Mashkinonje, Mattawa River, Ottawa River, Restoule, Samuel de Champlain, South Bay, Sturgeon River, Temagami River, West Sandy Island, and Widdifield Forest. There are also 21 conservation reserves, either partly or entirely, within the Nipissing Forest. They are listed in section 2.5.3.

This FMP is consistent with the *Crown Land Use Policy Atlas* which is the source of area-specific land use policy for Crown lands on the Nipissing Forest. It contains land use policies consolidated from a variety of planning documents including the *District Land Use Guidelines for North Bay and Parry Sound Districts* and *Ontario's Living Legacy Land Use Strategy*.

Two Indian Reserves, Dokis and Nipissing are situated in the western and central parts of the Forest respectively. Two other aboriginal communities, the Mattawa/North Bay Algonquins and the Antoine First Nation, are located in the Mattawa area, but do not have any reserve lands. The Temagami First Nation is located north of the Nipissing Forest, but uses parts of the Nipissing Forest for traditional uses. The provincial government has no land use jurisdiction on the Indian Reserves, but timber extraction is an important activity on these lands and many band members are involved in timber management on the adjacent Crown lands.

Two major provincial highways, #11 and #17, intersect in the city of North Bay, thus providing excellent access to the north, south, east and west parts of the district. Numerous secondary highways branch off from these two creating an elaborate grid of primary access into all corners of the district. Besides provincial highways, most townships have a network of municipal and local roads. The logging roads, constructed primarily for wood harvesting, are maintained by logging companies. Recent government funding has allowed the forest industry to upgrade many of the primary forest access roads within the Forest

A number of mills receive wood fibre from the Nipissing Forest, but not all of them are entirely dependent on the unit for their timber supplies. The major wood processing facilities that draw their wood supplies from the area are listed in Figure 2.1.2. The four mills below, identified with an *, are physically located in the management unit.

Figure 2.1.2 A list of the major mills historically receiving wood from the Nipissing Forest Management Unit.

Mill	Community in Ontario, *unless otherwise noted*
Abitibi Bowater	Iroquois Falls
Ben Hokum & Son Ltd.	Killaloe
Columbia Forest Products Ltd.*	Rutherglen, Hearst
Domtar Corp	Espanola, Nairn Centre, Elk Lake
Goulard Lumber (1971) Ltd.*	Sturgeon Falls
Grant Forest Products Inc.	Engelhart, Timmins
H & R Chartrand Lumber Ltd.	Noelville
Herb Shaw & Sons Ltd .	Petawawa
Liskeard Lumber Ltd.	Elk Lake
Northern Pressure Treated Wood Ltd.	Kirkland Lake
Precut Hardwood*	North Bay
R. Fryer Forest Products Limited	Monetville
St.Marys Paper Corp.	Sault Ste. Marie
Tembec Industries Inc.*	Mattawa, Kenogami
AbitibiBowater.	Quebec
Les Industries Davidson Inc.	Quebec
Les Industries L.P.B. Inc.	Quebec
Maibec Industries	Quebec
Smurfit-Stone	Portage, Quebec
Tembec Inc. (Temiskaming)	Temiskaming, Bearn, Quebec
Temlam (Ville-Marie)	Ville-Marie, Quebec

2.2 Forest Description

2.2.1 Geology, Soils and Sites

Geology, soils and site are underlying factors that influence forest management. They are key determinants in species composition and stand development. Because of this, they greatly affect the location and development of forest units. (See section 3.2.1 for a description of forest units.) A summary of the geological composition of the management unit is located in section 6.1.2.2.

The Nipissing Forest is comprised mostly of Ecoregion 5E with a portion to the north in Ecoregion 4E. An ecoregion is characterized by a range and pattern of climate. Climate features such as temperature, precipitation and humidity influence ecosystem processes and their associated flora and fauna.[1]

[1] Crins, Williams J., Paul A. Gray and Peter W.C. Uhlig, 2006. *The Ecosystems of Ontario, Part 1: Ecozones and Ecoregions, draft*, 6pp. and *Part 2: Ecodistricts*, 38pp. in prep.

Ecoregion 5E, also called the Georgian Bay Ecoregion, is located on the southern part of the Precambrian Shield. Almost 69 percent of the Ecoregion is dominated by bedrock. This bedrock is mostly migmatitic gneisses and felsic igneous rocks. Felsic plutonic, carbonate metasedimentary and mafic rocks also occur in significant amounts. Much of this bedrock is covered with varying amounts of ground moraine (till). The remainder of the zone that isn't bedrock is almost evenly divided amongst glaciofluvial outwash deposits, till deposits and glaciolacustrine deposits[1].

The soils of 5E are not all well developed. Where they are, they are mostly humoferric podzols. Acidic bedrock and melanic brunisols occur to a lesser extent, especially the latter. Acid buffering capacity is variable but generally lower in the southern areas. 5E is cool-temperate and humid and is moderated by the Great Lakes. Mean annual temperatures range from 2.8 to 6.2°C and precipitation between 771 and 1134 mm. About 20 percent of the land cover of 5E is dominated by mixed forest of a predominantly conifer component and about another 20 percent by mixed forest of a predominately deciduous component. Dense deciduous and sparse deciduous forests also occur to a significant degree. Only 2.5 percent of the land cover in this Ecoregion is wetland[1].

As its name suggests, water is very significant in the Georgian Bay Ecoregion. It covers over 10 percent of the surface area and mean annual runoffs of 350 to 400 mm are well above the provincial average. This ecozone is within the Great Lakes drainage basin and is characterized by its many river systems and lakes.

Ecoregion 4E is named the Lake Temagami Ecoregion. It is on the Precambrian Shield where the bedrock is mostly granitic and gneissic. Ground moraine is the most common surficial feature although valley train deposits are found in the numerous north-south flowing river systems. End moraines, Aeolian deposits, lacustrine deposits and eskers can also be found locally. Almost ¾ of the Ecoregion is hard rock with acidic cover and very poor soil development. Where soils are better developed, they are mostly podsols with some brunisols and gleysols. Ecoregion 4E is humid and cool with a mean annual precipitation between 725 and 1148 mm per year. Mixed forests cover about 40 % of 4E with another 12 % in dense coniferous forest and about 11 % in dense deciduous forest[1].

Ecodistricts occur within Ecoregions and are defined by a set of physiographic features such as bedrock, topography and surficial geology. Local climate patterns may also act to define an Ecodistrict. These features affect successional pathways, species associations and habitats. The Nipissing Forest contains eight ecodistricts, one in Ecoregion 4E and the other seven in Ecoregion 5E. A map illustrating the ecodistricts found on the Forest is located in section 6.1.2 of the supplementary documentation. Ecodistricts 5E-5 and 5E-6 make up the majority of the Nipissing Forest. 4E-4 and 5E-10 cover the northwest and southeast corners of the Forest respectively. The other four ecodistricts 5E-4, 5E-7, 5E-8 and 5E-9 are just barely represented on the Nipissing Forest.

The Ecodistrict 5E-5, also called the North Bay Ecodistrict, is mostly underlain by undifferentiated igneous and metamorphic rock. This rock lies bare or is thinly covered by a layer of drift. In the lowlands between rock ridges, soils are silty clay, silt or sand. These soils and their underlying parent material, are somewhat to quite acidic in nature. However, areas in the south eastern parts of the Ecodistrict have large areas of glaciofluvial and till deposits and even some pockets of organic materials around Lake Nipissing[1].

Ecodistrict 5E-5 is characterized by extensive tracts of developed agricultural land interspersed with sections of Crown forest. The soils are thin and the topography is flatter that than of 5E-7. Forests are typically a mixture of pine, spruce, birch and poplar with some maple. The white and red pine ecosites and the intolerant hardwood ecosites are mixed throughout site district 5E-5, with the intolerant hardwoods being more prevalent (probably due to past harvesting activities). The tolerant hardwood ecosites dominate the southern part of this site district, and ecosite 18 (intolerant hardwoods – poplar, white birch, white spruce, and balsam fir) dominates the northern portion.

Ecodistrict 5E-6, the Tomiko Ecodistrict, is largely similar to 5E-5 in physiography but has more areas of glaciofluvial deposits. These are made up of gravel and sand and are scattered throughout the Ecodistrict. Most of these deposits include sand plains and sand uplands. The fine sands, gravels and silty sands are all generally acidic.

Ecodistrict 5E-6 has a wide range of forest units with typical boreal species growing on the shallower or wetter sites in the north & west portions of the Ecodistrict and white and red pine growing on the dryer gravel and sand sites in the north-eastern portions. Finer textured soils support mid-tolerant and tolerant hardwood forest units in the south east corner of the Ecodistrict.

The third largest Ecodistrict on the Nipissing Forest is 4E-4, also called the Temagami Ecodistrict. It is located along the northern boundary of the Forest and is the only Ecodistrict on the Nipissing Forest located in Ecoregion 4E. Similar to 5E-5 and 5E-6, 4E-4 is a moderately broken upland. Its Precambrian granites and gneisses are bare or lightly covered with coarse to fine and silty sand till. Both sandy and gravely soils of glacio-fluvial or glacio-lucustrine origin and rock cored drumlins are frequent. Soils are humo-ferric podzols on uplands and gleysols or organic on moist, poorly drained sites.

Site district 4E-4 is in the northwest part of the Nipissing Forest where the Great Lakes-St. Lawrence Forest starts to give way to the Boreal Forest. Pure to mixed stands of jack pine, poplar, white birch and black spruce predominate but stands are also interspersed with white and red pine. Tolerant hardwood stands of hard maple and yellow birch have scattered occurrences. Black spruce predominates on the lowland peat bogs. The jack pine (15) and black spruce (16) ecosites dominate in 4E-4, with conifer mixedwood ecosites (20, 21, and 22) and white and red pine ecosites (11, 12, 13, and 14) mixed throughout.

The south western corner of The Nipissing Forest falls into Ecodistrict 5E-10, Brent Ecodistrict. It lies in the rain shadow of the Algonquin Dome and is warmer and drier than Ecodistricts to its west. The portion of 5E-10 within the Nipissing Forest is dominated by underlying bedrock of Precambrian granites, gnesises and schists and rock outcrops with valley depression having deeper sand deposits. Soils are mostly dystric brunisols and humo-ferric podzols. Fire is a major agent of disturbance in this Ecodistrict. Extensive areas of high quality red & white pine forest units can be found throughout this Ecodistrict, growing on deeper sandy soils. Tolerant hardwoods are found in the southern portion of the district growing on finer textured soils.

Forest Ecosystem Classification surveys have been completed for the Nipissing Forest. This classification system is built on Hill's previous work.[2] Its results have been used, together with Forest Resource Inventory data, to assign an ecosite to each stand in the Nipissing Forest. "Ecosites are mapping units which represent a consistent set of vegetation and site conditions. They may range from several hectares to tens of hectares in size"[3]. Ecosites are an integral component of forest management planning with the silviculture guides based on ecosites.

A map showing ecosites is located in section 6.1.2.4. This map shows that there are 25 ecosites in the Nipissing Forest – ecosites # 11 through to # 35. The forest is dominated by the tolerant hardwood ecosites (# 23 to # 30) and the intolerant hardwood ecosites (# 17, 18 & 19), both groupings being quite similar in size. The tolerant hardwood ecosites occur mainly in the southwest corner and stretch along the southern border of the forest. These ecosites are also found along the Ottawa River from Mattawa north and in a triangle formed by the Mattawa River, the Ottawa River and the city of North Bay on Lake Nipissing.

The intolerant hardwood ecosites are found mainly in the west/northwest section of the forest from the old beach line north of Lake Nipissing to the western boundary and up. There is also a concentration of these sites along the southeast shore of Lake Nipissing over to Wasi Lake, Lake Nosbonsing, Talon Lake, and Trout Lake, and diminishing towards Mattawa.

The red and white pine ecosites (# 11, 12, 13 &14) occur throughout the forest, and are most abundant on the peninsula formed by the western reaches of Lake Nipissing and the French River. They are also found along the Mattawa River; in the southeast corner of the forest; and along the south shore of Lake Nipissing from the French River towards Commanda Lake.
The biggest concentration of lowland ecosites (# 31 to # 35) is on the lacustrine plain north of Lake Nipissing. These sites are also scattered along wetlands throughout the forest.

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[2] Hills, G.A. 1961. *The Ecological Basis for Land-use Planning*. Ontario Department of Lands and Forests, Research Branch, Research Rep. No. 46. 204pp
[3] *Field Guide to Forest Ecosystems of Central Ontario*, 1997

The intolerant hardwood sites, the jack pine and black spruce sites, and the mixed conifer sites are often associated with each other throughout the forest. The jack pine and black spruce sites (# 15, 16) occur mainly in the north-central part of the forest around Tomiko Lake and up through Marten River. The mixed conifer sites (# 20, 21, 22) are most frequently found across the northern portion of the forest.

The geology and soils of the forest are important considerations in determining appropriate silviculture strategies on a site by site basis. The most critical relates to appropriate selection of sites that can be successfully restored to red and white pine on the Forest. Other future forest considerations rely on keen knowledge of soils and site differences, and each one's ability to regenerate appropriate forest stands.

2.2.2 Historic Forest

Information about the historic condition on the Nipissing Forest is available from Ontario Land Surveyor (OLS) records. In the late 1800's and early 1900's surveyors established township lines and other legal boundaries as part of the settlement process. Surveyors followed pre-determined bearings through the forest, marking township boundaries, road allowances and lot corners. While doing this, they recorded information on land types, landforms, soil productivity and forest cover. Descriptions of forest cover included species (in order of abundance), relative ages, health and diameter at breast height of the trees they encountered.

Paul Leadbitter[3] used OLS data from the boundary lines of 10 townships in the Nipissing Forest and compared it to the 1989 FRI (forest resource inventory) data from these same 10 townships. Fred Pinto[4] compared historic data to the 2004 FRI data. He expanded the study and looked at data from all 63 townships for which data were available. Only partial coverage was available for the remaining 21 Townships, so they were not used.

In order to ensure that survey data of township boundaries represented that of the township itself, Pinto first did an analysis to determine if FRI data along the township boundary was representative of that of the entire township. He found that this was the case for most species, but not for balsam fir, tamarack or red pine at the 99% confidence level.

[3] Leadbitter, Paul, 2000. Unpublished
[4] Pinto, Fred, Stephen Romaniuk and Matt Ferguson. 2005. Presettlement forest composition of the Nipissing Forest. 13pp. Unpublished.

Figure 2.2.2.1 Land survey data displayed to show changes in first-listed species composition.

Species or Species group	Species included in the group	OLS (1856-1934)	FRI (2004)	Change
AL[N]	alder species	2.48	n.a.	
B	balsam fir	10.99	5.11**	inconclusive
BIR[N]	birch species	12.27	n.a.	
BW[N]	white birch	6.78	17.97	
BY[N]	yellow birch	0.74	5.18	
Total birch		19.79	23.15*	increased
CE	eastern white cedar	4.70	5.00	not significant
HE	eastern hemlock	4.34	2.29*	decreased
L	tamarack	6.08	0.19**	inconclusive
M[N]	maple species	4.58	n.a.	
MH[N]	sugar maple	0.86	16.23	
MS[N]	red or silver maple	---	4.69	
Total maple		5.45	20.92**	increased
PJ	jack pine	2.56	3.77**	increased
PO	poplar species	8.81	16.91**	increased
P[N]	pine species other than jack	12.67	n.a.	
PR[N]	red pine	1.27	1.71	
PW[N]	white pine	2.99	7.46	
Total pine		16.93	9.17**	decreased
SP[N]	spruce species	8.69	n.a.	
SB[N]	black spruce	3.51	10.58	
SW[N]	white spruce	0.02	2.12	
Total spruce		12.22	12.70	not significant
H[N]	hardwood	3.98	n.a.	
Other[N]		1.68	0.80	

** significance at 95% confidence interval between OLS and FRI township boundaries.*
*** significance at 99% confidence interval between OLS and FRI township boundaries.*
[A] The 'other' group includes first-listed species with < 1% of forest composition (Table 2b).
[N] not analyzed.

Figure 2.2.2.1 shows the results of Pinto's analysis of changes to first listed species between the surveyor's notes and the 2004 FRI data. Since not all birch, maple, pine and spruce were recorded by species in the land surveys, all entries were lumped at the genus level. Each value is expressed as the percent of the length of the survey line on which the species is recorded and represents the mean for all township boundary lines. Species listed as "inconclusive" had an insufficient sample size and it wasn't possible to state with certainty that the changes found along township boundaries reflect changes to the whole forest area.

Leadbitter's sample was much smaller than Pinto's, and the results of the two studies vary somewhat. However, they are consistent for maple and white birch. Both analyses showed the most significant differences between the pre-settlement forest condition and the current forest condition occurs in maple. Pinto showed that there is now more than three times the amount of maple there was in the past and more than twice as much poplar. Pine (species other than jack pine) has decreased by almost half, and there is about 50% less hemlock now. It is important to note that these comparisons are not based on the actual amount of area covered by each species, but on the proportional representation of the different species.

As per Pinto *et al*[2], the pre-settlement forest had a significantly greater conifer (particularly pine) component with considerably fewer mid-tolerant and intolerant hardwoods stands (birch and maple, specifically). Consequently, those species of fauna typically associated with conifer dominated forests would also have been represented more frequently on the landscape.

Human-induced disturbances to the landscape, such as urbanization, highway construction, rural development, agriculture, and shoreline development, among others, have undoubtedly altered the habitat supply for some species. The magnitude of these impacts is evidenced by the fact that several forest-dwelling species known to have existed on the Nipissing Forest are now listed as at risk or extinct.

Extinct	passenger pigeon (*Ectopistes migratorius*)
	eastern elk (*Cervus elaphus*)
Vulnerable/Threatened	peregrine falcon (*Falco peregrinus*)
	least bittern (*Ixobrychus exilis*)
	woodland caribou (*Rangifer tarandus*)
	Blanding's turtle (*Emydoidea blandingii*)
	eastern hog-nosed snake (*Heterodon platirhinos*)
	eastern Massasauga rattlesnake (*Sistrurus catenatus*)
Endangered	logger head shrike (*Lanius ludovicianus*)
	eastern cougar (*Felis concolor*)
	wood turtle (*Clemmys insculpta*)
Special Concern	yellow rail (*Coturnicops noveboracensis*)
	great gray owl (*Strix nebulosa*)
	red-shouldered hawk (*Buteo lineatus*)
	red-headed woodpecker (*Melanerpes erythrocephalus*)
	monarch butterfly (*Danaus plexippus*)
	eastern wolf (*Canis lupus lycaon*)
	eastern milk snake (*Lampropeltis triangulum triangulum*)[5]

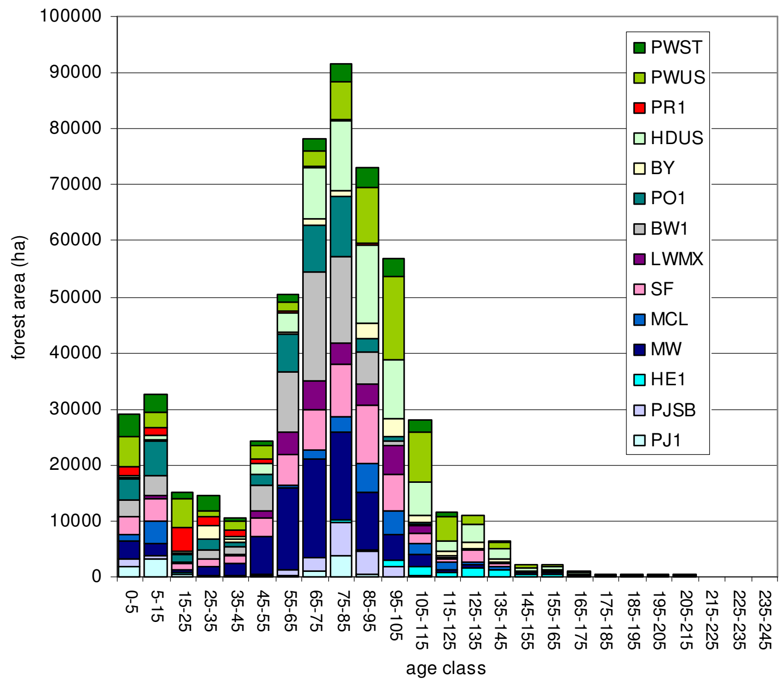
Some experts, such as Pinto *et al*[2], believe that, along with a more conifer-dominated landscape (particularly pine), the forest would also have had a good deal more mature and old growth pine stands than is currently the case. Such a forest would have provided habitat for species such as woodland caribou, a species whose southerly limit has now receded northward to about the 50th parallel. These larger, unfragmented and roadless forest tracts also would have provided conditions favored by several species at risk found in the area (wood turtle (*Clemmys insculpta*), Blanding's turtle (*Emydoidea blandingii*),

[5] Royal Ontario Museum (ROM) and Ontario Ministry of Natural Resources, *Ontario's Species at Risk*, http://www.rom.on.ca/ontario/risk.php (February 2007)

eastern massasauga rattlesnake (*Sistrurus catenatus*) and American marten (*Martes americana*)[6].

Fire suppression has resulted in the forest aging in a different manor than it would naturally, with more area accumulating in older age classes, and perhaps assisting in the contribution to the current ageclass gap noted in the productive stands on the Forest (Figure2.2.2). Historic logging practices, combined with the introduction of fire suppression have influenced the amount of productive forest in the 30-40 year ageclass with a lack of proper forest renewal and natural disturbance on the forest, two key sources of stand initiation on the forest.

Figure 2.2.2.2 Current Ageclass Structure of the Nipissing Forest



In a time of pre-fire suppression, there would have been a wider range of forest patch sizes that would have created a more diverse landscape[7] and in turn a different suite of habitat conditions. Changes in habitat can affect species composition by selecting for one over another (for example, favouring white-tailed deer at the expense of caribou). Shifts in predator presence and abundance are also possible. The moose deer caribou dynamic in the Nipissing Forest is an example of such change: the shift from a relatively conifer-dominated forest to one more dominated by mid- and intolerant hardwoods has favored

[6]COSEWIC 2002. COSEWIC assessment and update status report on the woodland caribou Rangifer tarandus caribou in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 98 pp.

[7] Ontario Ministry of Natural Resources (OMNR), 2001. *Forest management guide for natural disturbance pattern emulation*, Version 3.1. Ont. Min. Nat. Res., Queen's Printer for Ontario, Toronto. 40 p.

deer over moose and caribou. Both natural forest dynamics and forest management practices have contributed to landscape-level changes. Some species inhabiting the forest have adapted to differing degrees, those and others will continue to adapt to such changes provided they occur at a manageable rate.

Disturbances, both natural and manmade, have influenced the Nipissing Forest historically. Human population increases since the 1800s, timber harvesting and fire suppression have changed the composition of the Forest, with almost all stands of red & white pine and tolerant hardwoods show evidence of past logging (eg. decaying stumps). This historic activity has resulted in complex stand structure and composition within much of the forest. As a result, many forest operation prescriptions identify two or more silvicultural treatments and sometimes several stages of management to be applied in a single stand.

Transportation corridors, agriculture and recreational activities are some of the dominant footprints humans have left on this Forest.

Spruce budworm populations have occasionally accumulated to damaging levels on the management unit and as a result, the balsam fir and white spruce component of various patches of the Forest have been damaged. In addition, a significant wind storm in July 2006 caused damage in a broad and general pattern. As with all things, the past has a bearing on the present. Amendments to the 2004 Plan were required to enable salvage operations in areas damaged by wind or budworm. These areas were tracked and incorporated into the planning inventory. Similar events are likely during the life of this current plan and the management strategies and modelling have been adjusted accordingly, to the extent possible.

2.2.3 Planning Inventory

There are two inventory products. The planning inventory comprised of the planning composite (PCI) and forecast depletions, and the base model inventory (BMI). The planning inventory and base model inventory provide information required for forest management planning, including forest modelling, habitat modelling, forest diversity analyses and operational planning.

The PCI is comprised of the photo interpreted Forest Resource Inventory in combination with annual updates published in annual reports which detail forest management activities. At the beginning of the planning cycle, a landbase is created and used to prepare each forest management plan. The PCI is updated to the beginning of the plan term. The current FRI is based on 1989 aerial photography. The ages of forest stands are projected to the start of the plan term, but other stand information in unmanaged areas are left intact and will reach the 25-year age limit (set out in the FMPM, 2004) during the course of this forest management plan. The inventory information will reach 20 years of age during the period of a forest management plan and therefore, strategies to re-inventory the productive forest area on licensed Crown lands within the Forest have been in place since 2006, and it is expected that NFRM will receive the results of this inventory from the MNR in time for the next planning cycle. This area will include the productive forest on the Nipissing comprised of various hectares of various forest types and will be completed using the latest high resolution digital acquisition techniques, combined with new softcopy on-screen interpretation techniques.

The PCI for the Plan was spatially updated to March 31, 2006 for depletions, silvicultural activities and previously depleted area declared "free-to-grow". Interim attribute updates, such as height, species composition and stocking have also occurred for stands managed under the shelterwood and selection silviculture systems based on post-harvest survey information. This continuous inventory management has allowed for more accurate estimates in managed areas on the forest.

For the period between March 31, 2006 and April 1, 2009, an estimate of activities was made in the form of a forecasted depletion. In July of 2006, a significant wind event lead to some disturbances in both unmanaged and previously managed stands, predominantly pine shelterwood stands with recently implemented partial removals. The results of this event were captured in the inventory development process in the form of forecasted depletion, since they occurred after the completion of the 2006 photography program. Detailed mapping was performed by ground crews for these areas and other newly disturbed areas. Forecast depletion assumptions adjusted the stand information when the management direction of the stand had changed as a result of the wind disturbance. In many cases, even though individual trees were impacted by the disturbance, the condition of the stand remained in tact and therefore did not receive any attribute adjustment. Figure 2.2.3.1 provides a summary of the estimate.

Figure 2.2.3.1 Summary of Forecast Depletion

Type of Forecast	Hectares
Natural Disturbance, Salvage Clearcut	3,668
Natural Disturbance, Salvage Shelterwood	1,559
Natural Disturbance, Salvage Selection	95
Total Salvage	**5,321**
Total Natural Depletion (Not being Salvaged)	**598**
2004 FMP Depletion, Clearcut	10,389
2004 FMP Depletion, Shelterwood	7,873
2004 FMP Depletion, Selection	4,319
2004 FMP Depletion, Commercial Thinning	42
Total 2004 FMP Forecast Depletion	**22,624**
Total Forecast Depletion	**28,543**

Created for strategic planning, the BMI is a union of the planning composite and the forecast depletions into one spatial data layer. This process requires that forest stand description information in the planning composite be updated to reflect the estimated result of activities forecasted for the remainder of the current plan term. The data reflected in forest management planning tables 1 through 13, as well as the strategic forest management model, are derived from the base model inventory. It is with this inventory that the strategic portion of the forest management plan is carried out.

For more detail on decisions made relating to the planning inventory comprised of the planning composite and forecast depletions, and the base model inventory, and for details regarding the production of the planning landbase, please refer to the analysis package found in section 6.1.6 of the supplementary documentation.

Table FMP-1, found in section 9, provides a summary of land ownership and type of land on the Forest. The Nipissing Forest is just over one million hectares including forested area, water and other non-forested areas. Figure 2.2.3.2 shows that 74% of the total management unit is Crown land (67% in managed plus 7% in parks); 23% is patent land; and 3% is other. The Crown owned land represents 843,546 ha and includes land and water. Of this, 78,964 ha are in parks, protected areas and conservation reserves and 764,582 ha is Crown managed area.

Figure 2.2.3.2 Land Ownership Summary

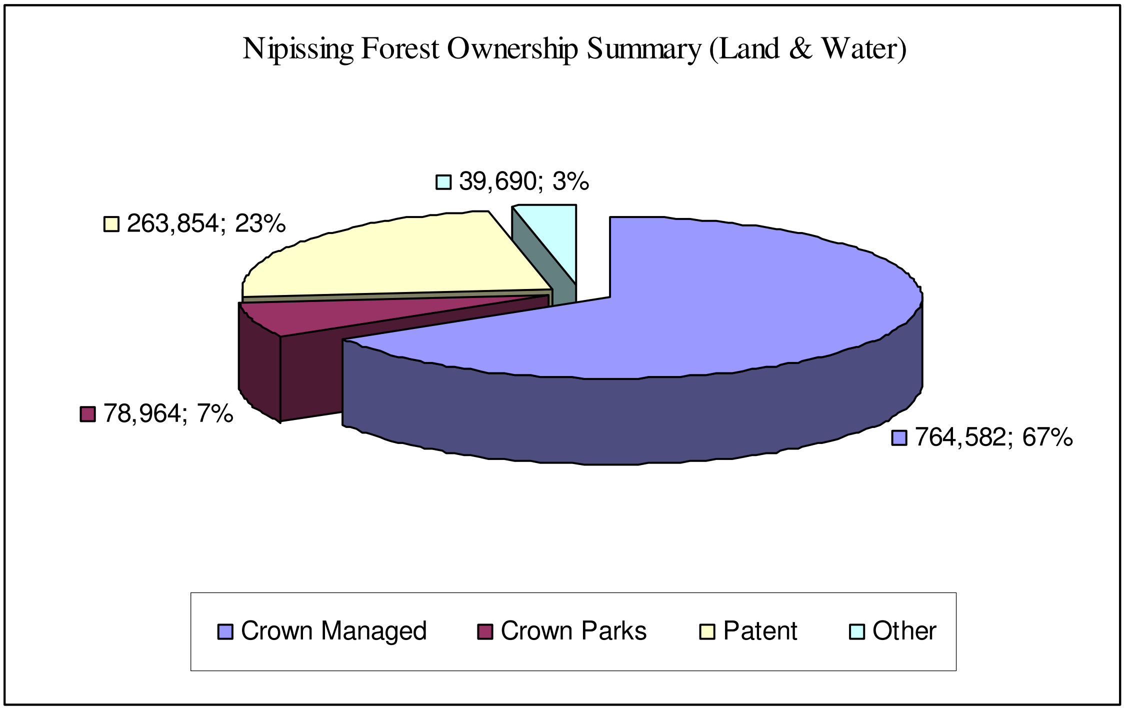


Figure 2.2.3.3 illustrates how the 67% Crown managed forest, shown in figure 2.2.3.2, is divided up by land type. 72% of it is productive forest with the remainder consisting of other land types (water, non-forested land, patent, federal, Crown parks and non-productive Crown forest). Likewise, Figure 2.2.3.4 illustrates that the 7% Crown parks is 63% productive forest.

Final analysis of these figures shows that 49% (552,298 ha) of the Nipissing Forest is classified as Crown productive forest, and therefore, available for timber production

Figure 2.2.3.3 Crown Managed Land Type Summary

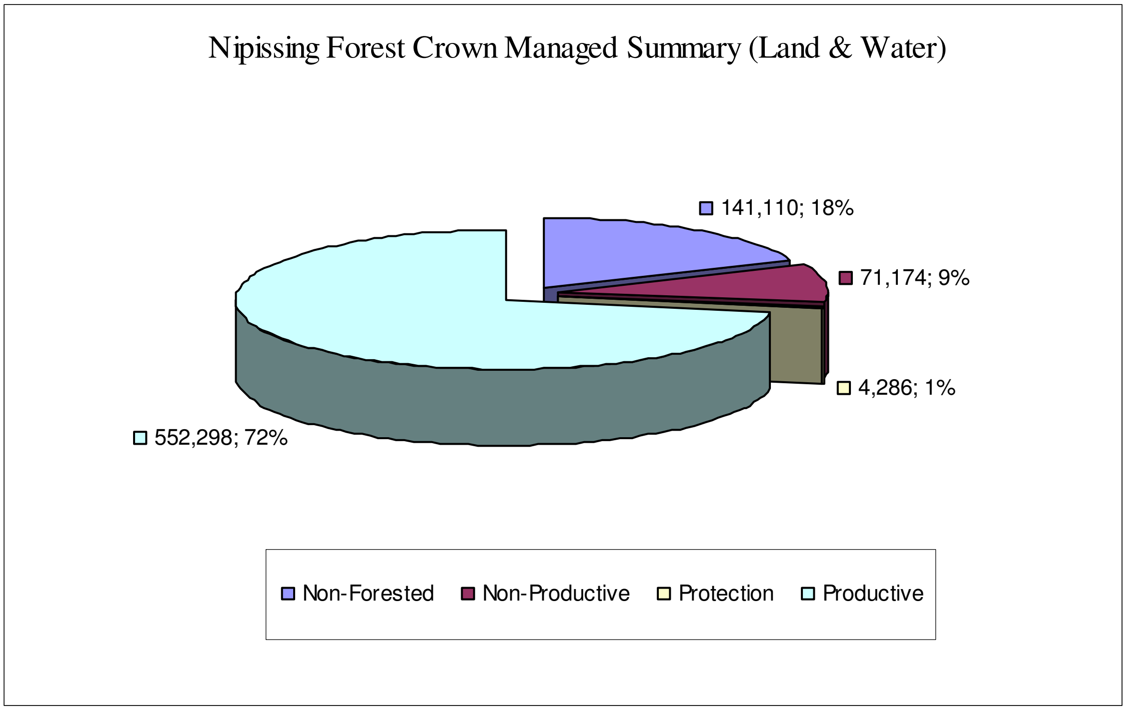


Figure 2.2.3.4 Crown Parks Land Type Summary

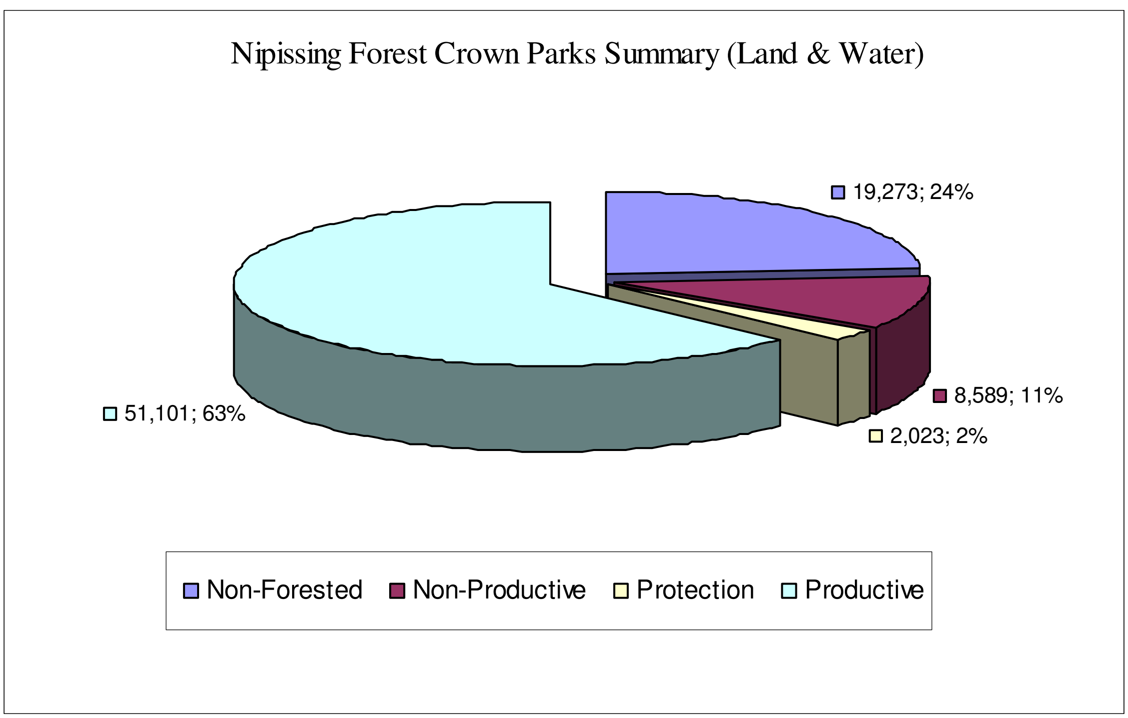


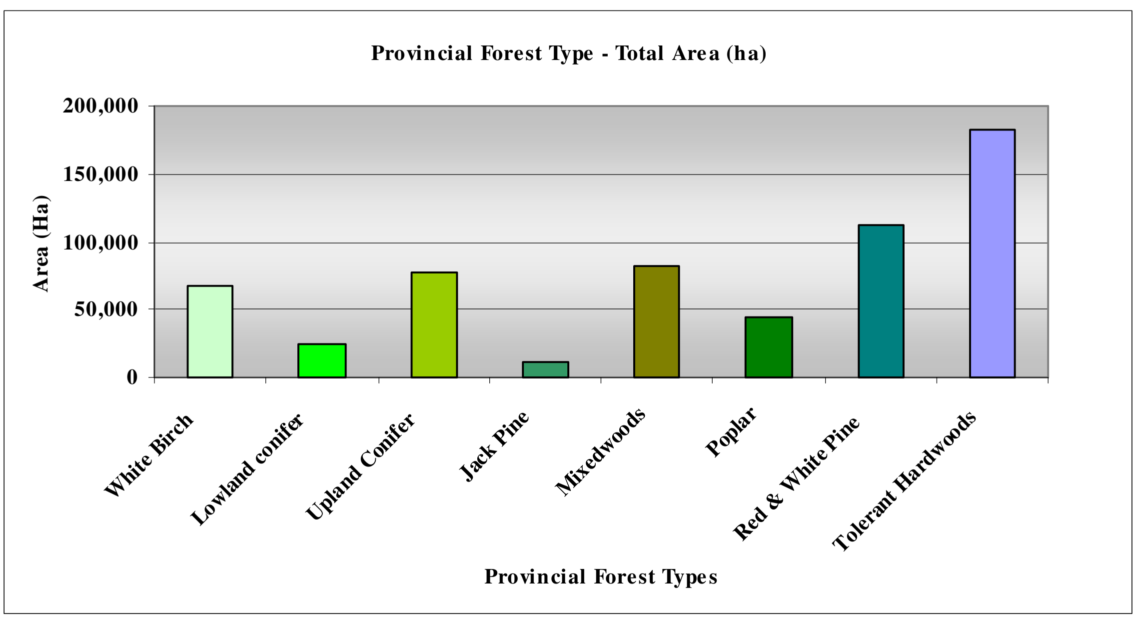
Table FMP-2 summarizes the number of hectares of each provincial forest type by age class for the production and protection forest. Three separate tables illustrate composition of the Crown managed, Crown other and total Crown forest.

Figure 2.2.3.5 shows how the Provincial forest types were designated to each of the forest units. Figure 2.2.3.6 illustrates how the Forest is structured into the different provincial forest types. Figure 2.2.3.7 illustrates the ageclass structure of the current forest.

Figure 2.2.3.5 Forest Unit to Provincial Forest Unit Summary

Plan FU	Provincial Forest Type	Area (ha)
BW	White Birch	67,068
BY	Tolerant Hardwoods	16,265
HDSEL	Tolerant Hardwoods	61,856
HDUS	Tolerant Hardwoods	68,402
HE	Tolerant Hardwoods	9,777
LWMX	Tolerant Hardwoods	26,557
MW	Mixedwoods	82,567
MCL	Lowland conifer	24,956
PJ	Jack Pine	11,639
PJSB	Upland Conifer	18,376
PO	Poplar	45,216
PR	Red & White Pine	11,433
PWST	Red & White Pine	29,837
PWUS	Red & White Pine	71,209
SF	Upland Conifer	58,607

Figure 2.2.3.6 Provincial Land Type Summary



The forest types on the managed forest that cover the greatest area are tolerant hardwood (TOL) at 31% and white and red pine (PWR) at 18%. The mixedwood (MIX) forest type at 14%, mixed conifer upland (MCU) at 13% and white birch (BWT) at 11% are also significant in size. The same five forest types are also dominant in parks and other protected areas. These five forest types make up 86% of the managed forest.

On the Nipissing Forest, the tolerant hardwood forest type is the most common and is made up predominantly of hard maple. Hard maple is found throughout the forest, most frequently on fresh to moist glacial tills. It is most common as pure stands, but is also associated with yellow birch, hemlock, beech, balsam fir and white spruce. Maple stands in the northern portion of the district are generally poorer in quality than those south of Lake Nipissing due, primarily, to differences in climate. Hard maple is represented in all age classes with the majority between 60 and 140 years of age. Categorized into the TOL provincial forest type is the area in hemlock on the forest. Although this is a small amount, hemlock is important to several wildlife species. White-tailed deer, for example, make use of stands of hemlock as wintering areas.

There are 112,420 ha in the PWR forest type, which constitutes just over 18% of the managed forest. Because of past heavy logging of white pine and red pine, an objective is to increase the amount of area in this forest type. This objective has been carried forward from the 1999 and 2004 plan (see Section 3.6, Objectives). Table FMP-2 shows a reduced number of hectares in the 40-80 age class compared to the other age classes. This is the result of the combination of poor historic harvesting practices in the 1930's to 1970's, as well as the predominance of mature white pine in pure stands that lead to age typing of 80 plus when a 40-50 year condition exists in the understorey. Area has been planted for the last 30-40 year in red and white pine plantations as a result of sustainable forest management practices being introduced to the unit. The current forest only has about half of the red and white pine that there was at the beginning of the last century (around 1900). One of the consequences of this is that there is much more area in the intolerant species, poplar and white birch (See section 2.2.2, Historic Forest).

At about 14% of the managed Crown forest, the MIX forest type is the third most prevalent on the Nipissing Forest. This forest type is made up of areas with generally no more that 20% of any species dominating the stand. Almost as common as the MIX grouping, covering almost 13% of the managed forest is the forest type MCU, made up of primarily spruce, pine and fir with the presence of some intolerant hardwoods.

The BWT forest type covers about 61,179 hectares of the managed Crown forest. White birch can be found in relatively pure stands, as well as associated with poplar, balsam fir, white spruce, black spruce, hard maple and white pine on the Forest. White birch can be found on most soil types in the area, however the best growth and quality is found on deep, fresh, loamy tills. BWT stands on dry sands are often the result of wildfires. Many stands that used to be primarily white pine or red pine are now dominated by white birch because of removal of the pine in past logging operations.

The POP forest type is found on 40,609 ha throughout the managed Nipissing Forest on a wide range of sites from silty to fine sands and tills. It is more common in the northwest portion of the forest and in the area adjacent to Lake Nipissing. The POP forest type contains mainly trembling aspen and large tooth aspen. Balsam fir is also present, but to a much lesser extent. Most of the area in the poplar working group is 60 to 100 years old. This is mainly the result of past logging practices where pine and spruce were removed from these areas.

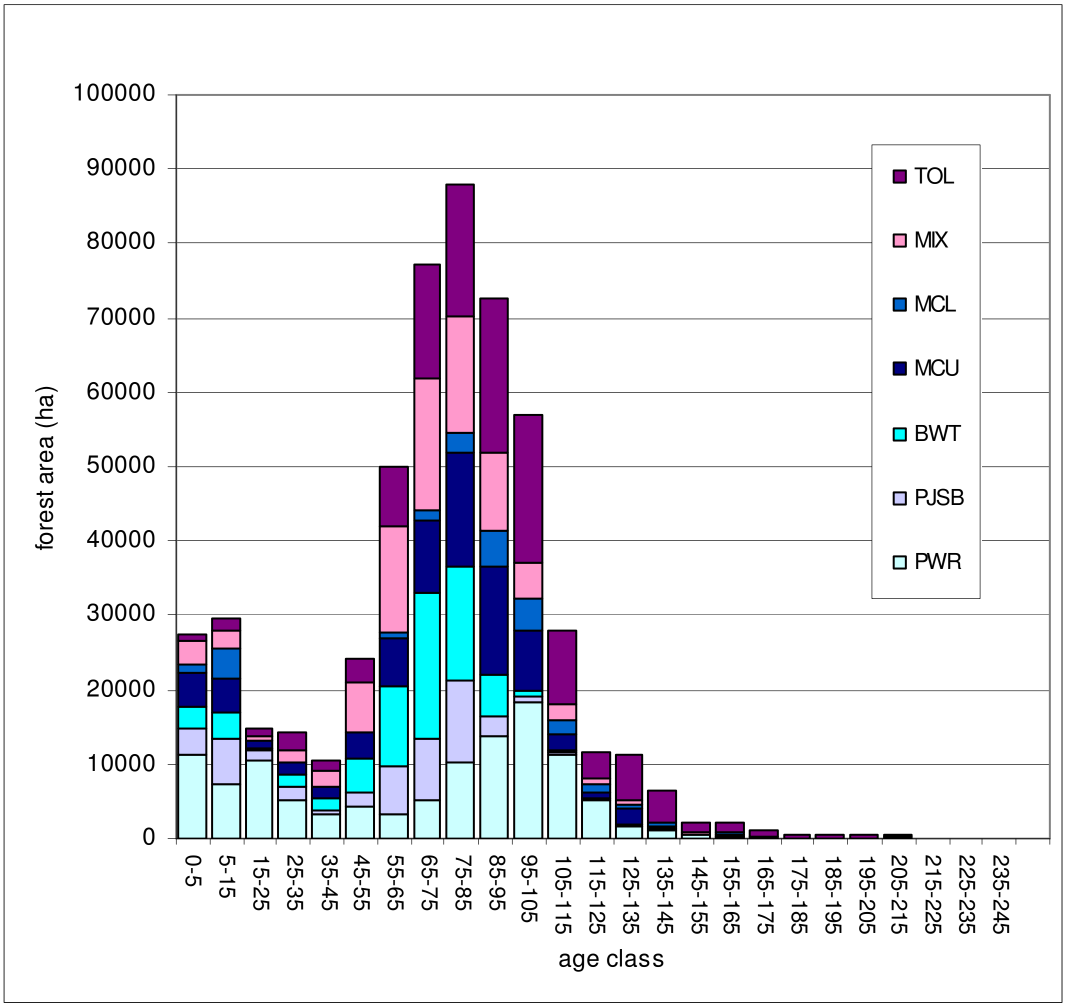
MCL is one of the smaller forest types on the Nipissing Forest, encompassing only 4% of the total Crown forest. These low lying areas are dominated by spruce, cedar and larch.

The PJK forest type is found on only about 2% of the Nipissing Forest. The best jack pine is found in the northeast and northwest corners of the district on coarse sands and gravels. Poor quality stands are found in different parts of the district on dry shallow pockets of soil between exposed bedrock. Stands in the south and west are poor quality due to site conditions and also because of attacks from the jack pine budworm in 1969, 1970, and again in the mid-1990's

Worth noting with regards to smaller forest conditions on the Forest, are the five working groups on the managed forest that are 1,000 ha to 5,000 ha in size; these are oak (4,610 ha), mixed spruce (3,176 ha), mixed maple (2,175 ha), larch (2,147 ha) and ash (1,317 ha). The two smallest working groups are other hardwoods (222 ha), which includes basswood, ironwood and black cherry; and Scots pine with only 33 ha.

The current forest has just over half of the total Crown forest area clustered in the 61-100 age classes. Approximately 17% of the area is in the age classes of 0-40 years and 3.0% in the oldest age classes (141 years+). Objectives and strategies have been developed so that the future forest composition will be more similar to the way it would occur naturally (See Section 3.6, Objectives). Age class distribution for each forest type is displayed graphically in Figure .2.2.3.7.

Figure 2.2.3.7 Ageclass Distribution of the Current Forest Condition by Provincial Forest Type



The major management implications of the current forest condition are illustrated in Section 3.6, Forest Diversity Objectives, where objectives and strategies are provided to attempt to move the forest toward a forest composition more similar to that at a time before fire suppression and before logging and to an age class distribution that has more area in the youngest and oldest age classes.

2.2.4 Fish and Wildlife Resources

2.2.4.1 Background

The Nipissing Management Unit is a diverse forest of both Great Lakes-St Lawrence (GLSL) and Boreal Forest types. The landscape provides for a diverse range of flora and fauna including; 51 mammals, 23 reptiles and amphibians, and over 200 bird species. This has significant implications on the management of the Forest, not only from a landscape perspective, but also from the field operations and silvicultural implementation level. The implications of these issues are discussed throughout this FMP.

Biodiversity refers to the variety and variability (in time and space) among living organisms and the ecological complexes in which they occur. Diversity can be defined as the number of different items and their relative frequency within an ecological complex. For biological diversity, these items are organized at many levels ranging from complete ecosystems to the chemical structures that are the molecular basis of heredity. Thus, the term encompasses different ecosystems, species, genes, their relative abundance, how species associate with one another, and their pattern of association.

Biodiversity is an important aspect of forest ecosystems. It includes the overall number and relative abundance of species ranging from microbes and soil organisms to large trees. It includes genetic diversity, which is the range of genetic variation found in a species. In maintaining genetic diversity, one goal of management is to have healthy representative populations of species across their natural ranges. Biodiversity is key to maintaining functioning ecosystems, from species interactions to nutrient/energy cycling processes which they support.

As contributors to the development of this Plan, it is the MNR's responsibility to ensure the long- term sustainability of the forest. This can be defined as "long-term Crown forest health (which is) the condition of a forest ecosystem that sustains the ecosystem's complexity while providing for the needs of the people of Ontario." Additionally, the *CFSA* presents two guiding principles for the determination of sustainability in Ontario:

(a) Large, healthy, diverse and productive Crown forests and their associated ecological processes and biological diversity should be conserved.

(b) The long-term health and vigour of Crown forests should be provided for by using forest practices that within the limits of silvicultural requirements, emulate natural disturbances and landscape patterns while minimizing adverse effects on plant life, animal life, water, soil, air and social and economic values, including recreational values and heritage values.

2.2.4.2 Wildlife Resources

As described previously, the Forest supports a diverse suite of flora and fauna. A list of 16 species (mammals, birds and amphibians) was identified to represent a range of habitat conditions common to the Great Lakes-St. Lawrence and Boreal forest regions and more specifically, the Nipissing Forest. The following section lists the species that were included in the long term management direction for this plan. The list is comprised of several mandatory species along with the species that were selected to incorporate the broad range of habitat conditions on the forest or were deemed significant locally.

2.2.4.2.1 Provincially Featured Species

This is a mandatory suite of species that must be modeled both aspatially and spatially and are specific to a forest region. For the Great-Lakes St. Lawrence Forest Region, moose, pileated woodpecker and white-tailed deer are the mandatory species.

The preferred habitat supply is the focus of both SFMM and OWHAM (Ontario Wildlife Habitat Model) modelling that serve to measure the long-term sustainability of these habitat conditions on the forest.

Moose Preferred Habitat

Moose are one of the primary ungulate species managed on the Forest. Moose occur throughout the management unit, except in the heavily populated or agricultural areas. The key components of moose habitat are semi-mature and mature conifer stands, young deciduous stands, aquatic feeding areas, mineral licks and calving sites.
The wildlife management unit 41, 47, and 48 herds are currently listed as stable. Despite this, numbers are currently below the desired population and carrying capacity to support the targeted herd populations (K Total: 0.6 moose/km²).

Moose require a wide range of habitat conditions to survive. In winter, moose require shelter from snow depth, weather, and natural predators along with an abundant supply of woody browse. These conditions are normally found in moderately large stands (3 to 5 ha minimum) of dense conifer (greater than 60 % conifer crown closure) where the trees are greater than 10 m in height and where young deciduous growth, suitable as browse, is within close proximity. Even if these conditions are met, moose are normally extremely taxed by winter because woody browse does not supply adequate nutrition. In the spring moose rely on emergent and submergent aquatic vegetation found in wetlands to recover from the nutritional deficit of winter. This aquatic vegetation is high in macro- and micro-nutrients and is the earliest quality food source after the ice is gone.

In summer, moose require refuge from the heat and a good supply of young, fresh, leafy deciduous browse. Thermal refuge is normally found in well-shaded sites near water, which are often represented by lowland conifer or deciduous stands with good crown closure. Since browse and forage are often relatively abundant, in comparison to cover, we can usually ignore the food component of summer and winter habitat and focus on the provision of adequate cover.

Conifer stands provide shelter from weather and escape cover for evading predators. In much of the district, good conifer shelter is minimal, and this is the element of moose habitat which is most limiting on the Forest. Strategies in this plan to manage conifer should improve moose habitat over the longer term. Young deciduous stands provide food for moose. The best sites for providing food are stands logged or burned five to 15 years previously. After snow depths reach about 80 cm, moose will not venture far from conifer cover to access these food sources. Cutting of hardwood stands adjacent to conifer cover should improve habitat for moose.

Moose use aquatic feeding areas and mineral licks in spring and early summer. Aquatic vegetation has a higher content of sodium and other nutrients when compared to winter browse. Aquatic feeding areas are especially important in spring when moose have been on a sodium-deficient diet all winter. There are many aquatic feeding areas throughout the forest. Generally, they are in sheltered bays of lakes, in slack current areas along streams and in shallow ponds. There is a mineral lick in Pringle Township and more undoubtedly exist. Preferred calving sites are islands and peninsulas. Several of these sites have been identified in the north-central portion of the unit. There are a number of other suitable sites throughout the Forest. Moose are very sensitive to hot weather in the summer, and wet, treed swamps are used frequently for thermoregulation.

OWHAM was used to predict where, on the landscape, each of the three seasonal factors is limiting moose production, see the wildlife section of analysis package, section 6.1.6. In general, moose carrying capacity is highest when the three seasonal habitat types are abundant within a moose's home range (~10 km^2). OWHAM was used to map existing moose critical or preferred habitats (summer thermal, late winter, early winter and aquatic feeding areas) and predict its supply over a 10-year period with and without harvesting. A further analysis of the above habitat, indicates the habitat component that is limiting the productive capacity on the landscape, see the wildlife section of the analysis package, section 6.1.6. This analysis directed the stand level strategies for the provision of moose habitat in the development of the plan along with the first five years of operational block planning.

Consistent with past trends, spatial modelling indicates that natural supplies of thermal cover for moose are the limiting factor on the management unit. Efforts to ensure the long-term sustainability of both summer thermal and late-winter cover via operational planning will continue to be implemented in this plan. These stands often occur in small patches (3-5 ha) and are generally deferred in harvest blocks or are incorporated into the operational planning for NDPEG residuals.

Forest harvesting can be beneificial for moose where woody browse is limiting as it creates early succesional forest, browse. However, harvesting can be detrimental where critical moose habitat - aquatic areas, summer thermal cover, late-winter thermal cover, or calving sites are limiting. Both area of concern and operational planning serve to protect the known critical site specific habitats for moose.

Moose habitat features (i.e. moose late winter, summer thermal cover and aquatic feeding areas) that require further management and are situated within harvest blocks, will be combined with the retention requirements dictated by the *Forest Management Guide for Natural Disturbance Pattern Emulation* (OMNR, 2001) in order to minimize the impacts on not only this critical habitat condition, but also on harvest volumes.
Within harvested stands, residual patches and distance-to-distance cover will be left/maintained to provide critical habitat requirements at the stand level as per the Area of Concern Prescription for Moose Habitat summarised in Table FMP 14.

Pileated Woodpecker Preferred Habitat
The pileated woodpecker is considered a keystone species in the Great Lakes-St. Lawrence Forest. It is a primary excavator in that it creates nesting, roosting, feeding and escape cavities for at least 52 other birds and mammals (e.g., red-breasted nuthatch, American kestrel, northern flying squirrel, and American marten). Pileated woodpeckers inhabit a wide range of older (60-160 years old) aged Great Lakes-St Lawrence/Transitional forest types. Poplar, white and red pine, black and white spruce,

balsam fir and white birch appear to be central components of preferred habitat. Nest sites can be found in live or dead trees of an appropriate size (usually greater than 40 cm in diameter). Roosting sites are found in either snags or live trees with significant fungal rot. Downed-woody debris, common in older intolerant hardwood stands, and dead standing snags, provide a significant amount of forage and are an important component of this habitat condition.

Population status for the pileated woodpecker has not been quantified on the management unit, despite its widespread distribution on the Forest. Casual forest visitors may well be expected to view the undulating flights of these large woodpeckers or hear their loud calls. Habitat supply analysis from currrent and previous plans reveal the large quantity of this habitat condition on the management unit historically.

Without adequate care, however, social and economy objectives and woodpeckers can be in direct competition since both are attracted to mature to over-mature poplar and pine. Conversely, if certain harvesting practices are implemented, harvesting can be beneficial to the species. Best practices include leaving unmerchantable timber, tops and felled or removed limbs on site to provide habitat for insects, the woodpecker's key food. Area of concern planning and NDPEG requirements ensure the continued availability of woodpecker habitat.

White-tailed Deer

White-tailed deer are the second ungulate species managed on the Forest. They are found primarily in the southern portion of the Forest.The WMU 41, 47, and 48 herds are currently listed as increasing or at or above carrying capacity. The main wintering areas are around Golden Valley, Loring, and near Mattawa, although small groups of deer also winter elsewhere on the unit. WMU 47 is home to the largest traditional deer wintering yard in the province, the Loring Deer Yard (LDY). Each winter the unit experiences a migration of thousands of deer from surrounding units. Here deer seek refuge from the winter elements and predators. During the spring, summer and fall months, deer disperse over a much larger area and can be found throughout the forest.

The critical habitat components for deer are conifer shelter, early successional stage hardwood stands, openings (including log landings, clearings and fields) and forest stands containing oak and beech trees. Acorns and beechnuts are high energy food sources which help deer build up the fat reserves necessary to survive the winter. Deer exhibit a predictable migration pattern, returning each year to the same "yarding" areas of conifer shelter. The main shelter species on the unit is hemlock. It is difficult to regenerate hemlock in wintering areas because deer also regard it as a preferred food. Conifer shelter is important for protection from the weather, in particular for intercepting snow. This allows the deer access to food and escape from predators. During winter, deer browse on the woody twigs which are usually abundant in an early successional stage forest such as an area which has been recently cut. These browse supplies should be within 100 m of adequate shelter under moderate winter conditions, or within 30 m of adequate shelter when snow depths reach 50 cm or more. In the spring, new herbaceous growth generally appears first in openings, and deer seek out these easily digestible, high protein food sources to restore body reserves depleted over the winter. The openings also provide nutrients important for lactation, antler growth and hair replacement. Recent regeneration efforts to plant red oak for food and red spruce for cover will continue in this plan in areas within or adjacent to deer yards.

Deer are a species that require several habitat features in order to survive. Most importantly and most applicable to the forest management planning process is winter thermal cover and browse. Both features are directly affected by forest management practices in that the forest industry and deer can be in competition for mature-over-mature well stocked conifer stands. On the other hand, deer browse is created when harvesting occurs in the appropriate forest types adjacent to cover.

Area of concern planning will be implemented to manage this habitat condition. Specifically, within the LDY modified harvesting operations will occur and efforts will be made to ensure adequate levels of critical thermal cover are managed to provide for this critical habitat requirement at the stand level as per the Thermal Cover Prescription as detailed in Table FMP 14.

2.2.4.2.2 Old-Growth Species

This is a mandatory suite of species to be monitored, aspatially throughout the development of the plan. These species are representative of a range of over-mature habitat types on the forest landscape. The long-term sustainability of habitat for American black bear (fall habitat), black-backed woodpecker, Canada lynx, and ruby-crowned kinglet are a mandatory component of the planning process. The supply of their preferred habitat is modelled aspatially in SFMM over the short, medium and long terms.

American Black Bear (Fall) Preferred Habitat

Black bears are common inhabitants of the GLSL and Boreal forest. Based on harvest estimates, black bear density in the Nipissing Forest has been estimated at 0.3 to 0.4 bears/km².[8] They are a large, omnivorous mammal that follows a variety of food crops (grasses, leaves, shoots, berries, fruits), and thus a wide variety of forest habitats, through the seasons. Specifically, fall mast producing food crops (mature-to-over-mature oak, beech and hazelnut) are a critical requirement for this and many other species that need high calorie foods in order to put on weight to find a mate, successfully produce offspring and to survive the winter.

The use of wintering dens makes bears particularly unique amongst the large mammals. Dens can be comprised of numerous downed trees in combination with deeper soils or slash piles from forestry operations. Den areas are usually associated with lowland sites, the sides of hills, uprooted trees, and crevices with less severe microclimates.

The fact that mast producing species are limited on the Forest (red oak in particular,) means there is a low supply of this condition. Changes to this habitat condition, either due to succession or planned harvest, could have significant impacts.

[8] OMNR, Dave Fluri, personal communication, 2008.

Black-backed woodpecker Preferred Habitat

The black-backed woodpecker is an uncommon resident of North America.[9] It is strongly associated with boreal and northern areas of the GLSL forest. It prefers mature and over-mature conifer and mixed-wood forest, and recently burned forests.[9] Specifically, it prefers mature and over-mature black spruce, tamarack and jack pine forests with a minimum stem density of 100-125 stems per ha and a diameter at breast height of at least 23 cm.[10] This is the preferred breeding habitat throughout Central and Northern Ontario and is the preferred habitat type modeled in SFMM.

Once again there can be direct conflict between the needs of this species and wood supply objectives mature-to over-mature conifer.

Canada Lynx Preferred Habitat

The Canada lynx is ranked as secure in Ontario by the Natural Heritage Information Centre.[11] They are common to the GLSL and Boreal Forests. They require older coniferous or mixed forest with abundant coarse woody debris, along with a mixture of regenerating stands with dense under-story, to support their main prey species, the snowshoe hare. [10]

Timber markets can raise a conflict with this species' habitat requirements since mature-to-over-mature aged conifer stands are usually most the economically attractive stands. The species' preference, however, for openings and edge habitat in lowland conifer (areas that are frequently deferred in harvest operations) convey a somewhat greater tolerance of forest management activities.

Ruby-crowned Kinglet Preferred Habitat

These birds are most often found in close proximity to water in open black spruce peatlands, lowland and upland conifer forests of mature and over-mature stages of development.[12] The RCKI requires medium-to-large diameter spruce trees for nesting. This forest type is its preferred breeding habitat throughout Central and Northern Ontario and the bird is considered common within this range. This species tends to be found in association with opening and edge habitat and, therefore, can be a measure of edge habitat.

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[9]Cadman, M.D., D. A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier (eds). 2007. *Atlas of the Breeding Birds of Ontario*, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto, xxii +706 pp.

[10] Holloway, G.L., B. J. Naylor, and W. R. Watt, Editors. 2004. Habitat relationships of wildlife in Ontario. Revised habitat suitability models for the Great Lakes-St. Lawrence and Boreal East forests. Ontario Ministry of Natural Resources, Science and Information Branch, Southern Science and Information and Northeast Science and Information Joint Technical Report #1. 110p

[11] OMNR, 2008. *Natural Heritage Information Centre: General Element Report: Lynx canadensis*, http://nhic.mnr.gov.on.ca/MNR/nhic/elements/el_report.cfm?elid=180738, as seen on June 9, 2008.

[12] Cadman, M.D., D. A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier (eds). 2007. *Atlas of the Breeding Birds of Ontario*, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto, xxii +706 pp.

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2.2.4.2.3 Locally Featured Species

Locally featured species are species that are to be selected by the planning team. The intention of this list of species is to ensure that the full range of habitat conditions are monitored and managed on the forest along with any other species of local or special interest in the short, medium and long term. This is another suite of species that must be modeled aspatially. The species are specific to the Nipissing Forest and must have documented occurrences on the Forest. Nine species were selected and are described below.

American Marten Preferred Habitat

Marten inhabit primarily mature to late-successional mixed forests with high components of conifer cover (white spruce, red and white pine, cedar, black spruce). These forests typically contain downed-woody debris and dead standing trees (snags) with cavities created by pileated woodpeckers. Marten require large tracts of undisturbed or un-fragmented mature conifer-dominated forests.

Forest harvesting can be both beneficial and detrimental to marten habitat. It can either regenerate forests to conifer dominated stands for future preferred habitat or remove existing preferred marten habitat.

Blackburnian Warbler Preferred Habitat

This species is widely distributed within the Great Lakes-St Lawrence forest (GLSL). It prefers mature coniferous and mixed forests and in places occupies strictly deciduous forests. It has a strong affinity for eastern hemlock and, is a key indicator for this forest type in the mature-to-over-mature state.

This species has a low tolerance of forest disturbance yet appears quick to recolonize reforested areas.[12]

Hermit Thrush Preferred Habitat

The hermit thrush is the most widely distributed of the brown thrushes in Canadian forests.[13] It occupies a broad array of forested habitats; both wet and dry coniferous, mixed, and deciduous woods, tamarack-spruce peatlands, barrens, savannahs and forests regenerating after fire or logging.[13] In the boreal forest, it prefers jack pine forests on sand or rocky ridges. The hermit thrush is an edge species and is often associated with disturbances such as logging, road-building, and utility lines.[13]

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[13] Cadman, M.D., D. A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier (eds). 2007. *Atlas of the Breeding Birds of Ontario*, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto, xxii +706 pp.

Forestry operations can be beneficial and assist in the creation of habitat.

Red-backed Salamander Preferred Habitat

This salamander is relatively common and is found within a number of GLSL habitats. They range from mature GLSL mixed-woods to mature GLSL lowland conifer to mature GLSL red and white pine dominated forests. In most cases, these amphibians are found on moist sites with deeper soils. The northern boundary of the management unit appears to be the northern extent of the range for this salamander, although anecdotal information suggests they may exist as far north as Cochrane, Ontario.

Forestry activities can affect salamander habitat by way of localized site disturbances such as the crushing or removal of downed-woody debris that provides nesting, cover or feeding habitat. Additionally, due to the fact that this is a mature habitat condition, there can be competition with wood supply objectives.

Ruffed Grouse Preferred Habitat

The ruffed grouse is widely distributed in the GLSL forest in Ontario.[13] Ruffed grouse have some of the most diverse habitat requirements, ranging from aspen, birch, maple-beech, hardwood, mixed-wood, and even conifer stands, providing there is a hardwood component present.[13] Prime habitat includes young (13-25 years post disturbance) and dense stands for feeding and cover. Ruffed grouse are early-successional habitat users. Within the management unit, they thrive on early-successional poplar and birch-dominated forest areas with minor components of conifer cover. Ruffed Grouse are most often found in the sapling (15-35 years old) and immature (35 -65 years old) ES 18-Poplar-White Birch-White Spruce-Balsam Fir and ES 17 Poplar-White Birch ecosites on the unit.

Forestry activities can serve to create this habitat condition on a managed landscape where fires are suppressed and disturbances are limited.

Snowshoe Hare Preferred Habitat

Hare depend greatly on mixed forest and conifer lowlands for food and cover. In both cases the forest types are in the young to moderate age classes (0-20 or 21-70 years) and supply succulent herbaceous and woody browse as well as cover. Hare populations fluctuate considerably. No evidence indicates that habitat is limiting for this species on the landscape. The general cause for fluctuations is the nature of the lynx-hare predator-prey relationship.

Due to the early successional nature of this condition, forestry activities can serve to create and maintain this condition on a managed landscape where fires are suppressed and disturbances are limited.

Spruce Grouse Preferred Habitat
The spruce grouse is a conifer specialist. In Ontario it prefers virtually pure conifer stands of jack pine or spruce created by fire or forest management activities. A dense conifer canopy set amongst low shrubs and herbs is ideal for both food and cover.[14]

As it prefers young stands, it too benefits from forest management activities which serve to create or maintain this habitat condition on a landscape where fire is suppressed and disturbances are limited.

White-throated Sparrow Preferred Habitat
White-throated sparrows are common in the management unit. They have a range of specific requirements which include young and moderate-aged red and white pine dominated forest; young and moderate-aged lowland conifer forests; and young (0-15 yr.) upland boreal coniferous forest. Their habitat requirements also include young GLSL mixed-woods. The WTSP is an edge species and breeds in openings, forest edges, areas of second growth after logging, fire or insect damaged areas, edges of beaver ponds and meadows, open bogs, and especially spruce, fir and jack pine forests.[14] These are ground-nesting birds that may use cutovers and burns with slash associations and use forest edge habitats extensively.

Forestry activities are beneficial in creating or maintaining this habitat condition on a managed landscape where fires are suppressed and disturbances are limited.

2.2.4.3 Fisheries Resources

There are 1453 lakes within the Nipissing Forest. Lake Nipissing accounts for 65 percent of the surface area of the unit's waters, with an area of 85,470 ha. The remaining lakes cover 44,873 ha for a total of 130,343 ha (this figure does not include small water bodies). A total of 949 km of cold water streams and 526 km of warm water streams, considered significant to the fisheries, wind their way through the management unit. Water bodies located in the eastern portion of the forest drain into the Mattawa-Ottawa River system and eventually into the St. Lawrence River. Waters in the western part of the unit flow into the Sturgeon River-Lake Nipissing-French River drainage system and on into Georgian Bay.
A variety of fish species inhabit the waters of the Nipissing Forest but they can be broadly classified as either warm water or cold water species. Warm water species assemblages include such game fish as walleye, northern pike, smallmouth and largemouth bass, yellow perch and muskellunge. Representatives from the cold water group include brook trout, lake trout, rainbow trout, splake, Atlantic salmon, and lake whitefish. Members of the minnow family (bait fish) occur in both habitat types but are primarily found in warm waters.

[14] Cadman, M.D., D. A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier (eds). 2007. *Atlas of the Breeding Birds of Ontario*, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto, xxii +706 pp.

Bait fish not only provide forage for predators, but are commercially important as they are harvested and sold to anglers. Approximately 230 tourist operators in the district rely on sport fish, from both the cold water and warm water groups, for all or part of their businesses. Walleye are the most sought after warm water species while trout are the most sought after cold water fish.

Only 12.8 percent of the surface area of water in the management unit is made up of cold water lakes, rivers, and streams. A large percentage of these water bodies occur in the easternmost portion of the unit, including McConnell, Timber, and Guilmette Lakes, while the majority of the remaining cold water sites are located in the north-west corner (Emerald, Manitou and Red Cedar Lakes). Trout Lake's land-locked Atlantic salmon (ouananiche) population is a unique resource since the species exists here outside of its normal range. Cold water fish species tend to be quite sensitive to disturbances to water quality and to shoreline habitat. The prescription for coldwater fisheries and the self-sustaining lake trout and brook trout lakes area of concern prescriptions are two mechanisms used in this plan to further enhance or protect existing coldwater fisheries, see FMP-14, section 9.0 for more detail.

Located centrally, Lake Nipissing is the largest body of water in the Forest. It accounts for two-thirds of the fishing pressure and 81 percent of the total harvest, by weight, in the management unit. Other heavily fished warm water lakes in the district include Lake Nosbonsing, Wasi Lake, and Commanda Lake. These lakes, located in the southern portion of the management unit, draw both tourists and locals in search of walleye and other game fish.

Forest management activities in riparian areas will be carefully planned and implemented in order to prevent harmful alteration or disruption of fish habitat. Information to designate waters as cold water fisheries versus warm water fisheries is limited. A very conservative approach to fisheries protection has been implemented. Where no data are available, waters have been classified as cold water fisheries. The more restrictive prescription is used because of the sensitivity of the cold water fish habitat accompanied with the fact that data on some areas is limited. On the values maps, this makes it look like there are more cold water streams on the Nipissing Forest than there actually are. There is a need for ongoing and enhanced data collection to correctly classify waters on the Nipissing Forest.

As indicated previously, protection of fisheries resources in forest management planning relies primarily upon Area of Concern planning which deals with erosion potential and watercourse disruption protection measures along with access restrictions on self-sustaining lake trout and brook trout lakes (FMP-14, section 9.0). The federal *Fisheries Act* is the enforcement tool used to ensure that there is no net loss to fish habitat, although our goals is a net gain.

2.2.4.4 Wetlands

Wetlands are some of the most biologically productive ecosystems on the management unit. They provide critical habitat for many plant and animal species, including many of the furbearers (e.g., beaver, mink, muskrat).

Wetlands of various sizes and types are scattered throughout the Forest, and are often associated with lake, river and stream systems. These aquatic systems can serve as important travel corridors and feeding areas for many wildlife species. Wetlands are also important fish habitat. Some species of fish, such as northern pike and muskellunge rely on wetlands as spawning areas. For other species, wetlands can be valuable feeding or food-producing areas, providing frogs, insects, bait fish and other food. Wetlands also serve other important functions such as: ground water recharge and discharge; flood damage reduction; shoreline stabilization; sediment trapping; and nutrient retention and removal.

Area of concern prescriptions to protect provincially significant wetlands are consistent with the Provincial Policy Statement (described in Section 4.2.1, Operational Prescriptions for Areas of Concern). An approved protocol for evaluating wetlands as to their level of provincial significance exists. In the mid-1990's, MNR focused wetland evaluations on the largest wetland complexes and those most susceptible to human activities. As a result of this wetland evaluation program, 12 provincially significant wetlands were identified. There are certainly more provincially significant wetlands on the Nipissing Forest. Further evaluations are required. Provincially significant wetlands identified to date are:

Wetland Name	**Township(s)**
Cache Bay	Caldwell, Springer
Callander Bay	North Himsworth, West Ferris
Chippewa Creek	Widdifield
Duchesnay Creek	Merrick, Widdifield
Fish Bay	Nipissing
Gauthier Creek	West Ferris
Jessup's Creek	West Ferris
LaVase River/Dreany	East Ferris, West Ferris
Loudon Basin Peatland	Loudon
Parks Creek	Widdifield
Rice Bay	Bonfield, Phelps
Upper Wasi River	Chisholm

2.2.5 Other Forest Resources

The Nipissing Forest is a transitional area and as is often the case with transitional areas, wildlife habitat is diverse and rich. Fisheries are a significant resource and wetlands contribute to both fish and wildlife habitat and to recreational activities. Fish and wildlife resources, as well as wetlands, were outlined in section 2.2.4 above.

Provincial parks and conservation reserves provide a significant contribution to the protection of other forest resources. These areas contribute to forest diversity and play a role in maintaining ecosystem health. Enhanced management areas also help conserve natural resource values in fish and wildlife areas, remote access areas, natural heritage areas, recreation areas and resource-based tourism areas. It is also important that resource managers manage the intervening landscape in general use areas on a sustainable basis.

Eight old growth sites have been identified on the Nipissing Forest. All eight are protected in the ministry's land use planning documents within parks or conservation reserves (CR). Seven contain representative old growth red and white pine; one, Widdifield Forest, supports large old growth yellow birch and hard maple. The parks and conservation reserves protecting these stands are follows:

o Gooderham Old Growth White Pine Forest Conservation Reserve	82 ha
o McLaren Forest Conservation Reserve	410 ha
o God's Lake Old Growth White Pine Forest Conservation Reserve	354 ha
o Boom Creek Conservation Reserve	590 ha
o Ottertail Creek Conservation Reserve	949 ha
o Mattawa River Provincial Park Additions	10,687 ha
o Alexander Lake Forest Provincial Park	1,934 ha
o Widdifield Forest Provincial Park	2,170 ha

During pre-harvest inspections, some additional areas may be discovered that contain old growth white or red pine. Where the stocking to white/red pine is adequate (as defined by the Silviculture Guides for Conifer Forests in the Great Lakes St. Lawrence) these areas will be managed under the shelterwood system to perpetuate these species.

The effects of timber operations on other forest resources are mitigated by area of concern planning. This process begins with identification of other forest resources on a values map. (See section 2.7 and supplementary documentation 6.1.12.) Where planned operations may impact values, they become "areas of concern". Detailed prescriptions are developed for areas of concern to mitigate the effect of timber operations on these values (see section 4.2.1, Operational Prescriptions for Areas of Concern, Table FMP-14, section 9.0, and the area of concern documentation in section 6.1.13).

Species at risk (SAR) are a part of the natural ecosystem and have intrinsic ecological, social and cultural value for the people of Ontario.
Summary of forest-dwelling species at risk on the Nipissing Forest:
Bald Eagle (SC) - AOC
Golden Eagle (end) – migrant only
Least Bittern (thr) - AOC
Peregrine Falcon (thr) - AOC
Red-headed Woodpecker (SC) – no recent confirmed breeding evidence
Black Tern (SC) - AOC
Cerulean Warbler (SC) – no confirmed occurrences

Kirtland's Warbler (end) – no confirmed occurrences
Great Gray Owl (SC) - AOC
Red-shouldered Hawk (SC) – AOC and habitat management objectives
Short-eared Owl (SC) – migrant only
Gold-winged Warbler (SC) – no confirmed occurrences
Loggerhead Shrike (end) - no recent confirmed breeding evidence, not forest dwelling
Yellow Rail (SC) - no confirmed occurrences
Deepwater Sculpin (thr) – no confirmed occurrences
Lake Sturgeon (SC) – fisheries AOC and water crossing standards
Northern Brook Lamprey (SC) – known occurrences not in areas of operations
West Virginia White (SC) - AOC
Eastern Cougar (end) - no confirmed occurrences, if occurs, managed at landscape level
Eastern Wolf (SC) - managed at landscape level
Wood Turtle (end) - no confirmed occurrences
Blandings Turtle (thr) - AOC
Spotted Turtle (end) - AOC
Eastern Hognose Snake (thr) – AOC
Eastern Massasauga Rattlesnake (thr) - AOC
Eastern Milk Snake (SC) - no confirmed occurrences
Five-lined Skink (SC) – no confirmed occurrences
Southern Flying Squirrel (SC) – habitat management
Flooded Jellyskin (thr) – no known occurrences
American Ginseng (end) – no confirmed occurrences
Butternut (end) – no known occurrences
Monarch Butterfly (SC) – not managed through FMP
West Virginia White Butterfly (SC) – AOC
Atlantic Coastal Plain Plant Communities
Eastern Fox Snake

It is a mandatory requirement of the FMPM to ensure that species currently listed at risk in Ontario on our forests are included in the forest management planning process. This is another mandatory suite of species that must be modeled aspatially, and spatially when an appropriate and regulated model exists. The species modeled are specific to the Great Lakes-St. Lawrence Forest Region and more specifically, the Nipissing Forest. Additionally, they must have documented occurrences on the Forest. For this plan, this includes the red-shouldered hawk and the southern flying squirrel.

It is important to note that there are numerous other species at risk on the Nipissing Forest (see list above taken from the wildlife section in the analysis package, section 6.1.6). There are currently no forest-dwelling SAR flora documented on the Forest,[15] but the Plan has included Area of Concern prescriptions for American Ginseng since there is potential for it to exist.

[15] OMNR, 2008. *Natural Heritage Information Centre: General Element Report: Lynx canadensis*, http://nhic.mnr.gov.on.ca/MNR/nhic/elements/el_report.cfm?elid=180738, as seen on June 9, 2008.

For some SAR, stand and site level protection is a more important and effective approach to managing the habitat requirements for these species. Therefore, in order to ensure accordance with the federal *Species at Risk Act*, *Ontario's Endangered Species Act*, the *Fish and Wildlife Conservation Act*, the federal *Fisheries Act*, the *Crown Forest Sustainability Ac*t, and the *Migratory Birds Convention Act,* these species have had their habitat requirements captured in the aspatial habitat modeling process and have had area of concern prescriptions developed to meet their particular needs. Additionally, to stress the importance of providing habitat for these species, this plan sets a target of zero compliance infractions in implementing the areas of concern for the habitat values.

The red-shouldered hawk is a species at risk that inhabits the Nipissing Forest. It is currently ranked as special concern. The red-shouldered hawk prefers mature-to-over-mature tolerant hardwoods in close proximity to riparian hunting grounds away from human infrastructure such as roads and buildings. These birds build medium-sized nests that may be reused from year to year, if not by themselves, by other species, for over a decade. Nests are typically found in the main fork of trees at the base of a live crown and are thickly decorated with greenery[16]. Several satellite nests can also be found within a 300m radius of the nest[2].

Forestry, if not properly managed, can have a negative impact on this species; these hawks rely on mature to over-mature habitat free from human disturbance such as roads and buildings. As such there is frequently direct conflict with the wood supply objectives. Also, harvesting operations require roads. Management for this species will focus on maintaining cover adjacent to occupied, active and satellite nests, along with specifying acceptable levels of activity during the breeding season as documented in the Red-shouldered Hawk Area of Concern Prescription in Table FMP 14.

The southern flying squirrel is currently listed as special concern. It is a species that is experiencing a northward-range expansion and has been documented and successfully captured as far north as Lake Temagami[17].

The southern flying squirrel is a secondary cavity nester which prefers large-diameter hardwoods for nesting and mast producing trees such as oak and beech for feeding. Its role as an indicator for this habitat condition serves a dual purpose in that it also represents a limited condition at the northern extent of its range, the tolerant hardwood forest. Due to the limited amount of this condition on the Forest, forest management activities could be detrimental. Sound management of this condition will ensure the continuation of this forest condition on the Forest. Marking practices in forest stand

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[16] Szuba, Kandyd and Brian Naylor, 1998. *Forest Raptors and their nests in Central Ontario; A Guide to Stick Nests and Their Users.* OMNR, Queen's Printer for Ontario

[17] Bowman, Jeff, 2005. *Spatial Habitat Suitability Model for Southern Flying Squirrels in the GLSL Forest*, Wildlife Research and Development Section, OMNR, Peterborough, ON

prescriptions target this condition to be left in the stand following a partial removal in the tolerant hardwood stands. Objectives in the management strategy will focus on the preservation of rarer tree species, like red oak, as well as the preservation of old growth conditions in hardwood dominated areas. For this reason, a specific area of concern prescription has not been identified for the southern flying squirrel. In addition to this, no known occurrence of this species has been recorded in MNR's values database.

In August of 2007 NFRM released a report called *High Conservation Value Forest in the Nipissing Forest SFL* with the subtitle *An assessment of forest values and their conservation in the Nipissing SFL from a global, regional and local perspective based on the Forest Stewardship Council's Principle 9.* (This report is available by link on the NFRM website, www.nipissingforest.com.) Principle 9 says that high conservation value (HCV) forests are forests that contain outstanding or critical biological, environmental or social values. It uses six categories to assess for HCV attributes. Although there is some overlap with the information above, the finding of report are outlined here. The report identified the following high conservation values on the Nipissing Forest:

The red-shouldered hawk, the bald eagle and the wood turtle were designated species of HCV in answer to the question - Does the Forest contain species at risk or potential habitat of species at risk as listed by international, national or territorial/provincial authorities? This same question designated the following species as possible HCV: peregrine falcon, least bittern, short-eared owl, lake sturgeon, eastern hog-nosed snake, northern brook lamprey, southern flying squirrel and Engelmann's quillwort.

Deer wintering areas, moose aquatic feeding areas and heron nest sites are designated HCV because of the response yielded to the question - Does the Forest include critical habitat containing globally, nationally or regionally significant seasonal concentrations of species (one or several species e.g. concentrations of wildlife in breeding sites, wintering sites, migration sites, migration routes or corridors – latitudinal as well as altitudinal)? The Loring Deer Yard, one of the province's largest deer wintering areas, is an example of this value.

All identified red spruce stands are designated HCV. A natural red spruce stand, located north of the City of North Bay, has been designated HCV due to its uniqueness. This stand contains the most northerly population of red spruce remaining in Ontario. It is hundreds of kilometres away from other natural red spruce populations which make it a regional outlier population.

The occurrences of the Atlantic Coastal Plain community are designated HCV because they are a naturally rare ecosystem type.

Trout Lake and the Sturgeon River are designated HCV as critical sources of drinking water supplies to communities on the Nipissing Forest. Due to their high cultural and historical significance to both native and non-native communities, the Ottawa, French and Mattawa Rivers and the West end of Lake Nipissing are designated HCVs.

All late seral stage white and red pine stands on the Nipissing Forest have been designated due to their significant declines from historical levels. Approximately 4467 hectares of area with white or red pine working group have been identified in the current forest inventory. For the same reason, undisturbed late seral stage tolerant hardwood forests are also designated HCV. All significant hemlock forest stands, those in late seral stage as well as others, have been designated HCV's due to the species declines from historical levels and to their high ecological values. Approximately 3591 hectares of area with hemlock working group have been identified in the current forest inventory. The parks and protected areas containing old growth stands have been put forward as candidate HCVs for the Nipissing Forest

Although not assessed as HCV, the report lists some land features of interest including; the Dana Township Ice Margin Complex, Devil Rock Exposure, the Friday Lake Moraine and the McConnell Lakes Interlobate Moraine. The following information is taken from the report. The Dana Township Ice Margin Complex is of Provincial significance. It represents ice margin features such as end moraine, outwash plain, and eskers and surficial deposits and features such as the moraine, eskers, kettle features, and outwash plain. The surficial deposits are undisturbed under the forest canopy. Devil Rock Exposure is a locally significant 85 m vertical exposure of Nipissing Diabase with talus at the base in some locations. It is primarily of interest due to scenic value and life science importance. The Provincial significance Friday Lake Moraine Compact is has fissile non-calcareous till plastered on southwest side of a northwest-southeast fault controlled valley in which Friday Lake has formed. It represents an undisturbed stoss moraine in a fault valley, associated regional ablation till, vegetated boulder talus, dissected tills. It is accompanied by a northern stand of mature tolerant hardwoods. McConnell Lakes Interlobate Moraine is classified as an EMA (Natural Heritage) under the Ontario Living Legacy LUS. Quoting the HCV report "This seemingly random jumble of sand and gravel deposits that lie under the forested hills of this area is part of an interlobate moraine that extended south to Huntsville and northeast into Quebec. This spectacular collection of glacial features is part of the most extensive landscape of its kind in eastern Canada. This site of earth science significance is in site district 5E-6 and consists of two core areas; referred to as the northern and southern sections. The northern section is located south of Green Lake and abuts the northeast side of the Spring/Cut Lake Esker Conservation Reserve. The southern section includes the area between Threetrails, Wyse and Little McDougal lakes. Sure Catch Lake sustains one of the rare lacustrine brook trout populations."

Objectives have been developed to consider all high conservation values and they are included in section 3.6 of the Plan. Through the development of area of concern prescriptions and other operational strategies discussed in section 4.0 of the Plan, operations in this FMP will not affect the conservation of any of the identified high conservation values.

Registered and potential cultural heritage resources, including archaeological potential areas, have also been identified and reviewed by the planning team.

The *Ontario Heritage Act,* which is administered by the Ministry of Culture, is the Legislation that provides for the protection properties of cultural heritage values or interests. As defined in the Act: *Cultural Heritage is the memory, tradition and evidence for the historical cultural occupation and use of a place, and the consideration of this evidence in contemporary society in developing group identities*. There are currently four classes of cultural heritage values: archaeological sites, archaeological potential areas, cultural landscapes and aboriginal values. Cemeteries and burial sites are legislated under the *Cemeteries Act*.

The principal focus for the protection of cultural heritage values should be to avoid or minimize physical damage to values through planning of reserves and modified operation. Indirect impacts, such as changes in visibility or accessibility of values as a result of operations, also need to be considered in the planning of prescriptions. Prescriptions for operations in areas of concern are recorded in forest management plans in Table FMP-14, section 9.0.

All five First Nation communities have compiled Aboriginal Background Information Reports, and they are located in Section 6.1.7 of the supplementary documentation. A summary of these reports can be found in section 2.6 of this text. Mapping of archaeological potential areas can be found on the operational scale harvest maps in section 6.1.2.

Geology, soils and sites are considered at different levels and detail of planning. A summary map illustrating the geology and ecosite classification of the Forest is included in section 6.1.2, and a description of forest soils and ecosites on the Forest can be found in section 2.2.1. The ecosite classification of the forest was performed by SFMMTool Version 4.01. This classification formed the basis for the connection between the forest units and the habitat for species modeled in the SFMM.

Part of an FSC initiative related to the identification and protection of rare landforms on the management unit formed the basis of a preliminary external GAP analysis. (For a map of these features, see section 6.1.2.13.) The primary reason for the analysis was to support future considerations of parks or protected areas on the forest by the MNR. The FMP does not dictate land use decision making, however, consideration of these areas was given in the development of the long-term management direction of the Forest, primarily in the areas selected for operations.

Consideration of other forest resources had an impact on the plan primarily through two factors. The location of parks and protected areas influenced the position of harvest allocations and roads. The location of known and potential cultural heritage resources influenced the location of harvest allocations, and in the latter case, the AOC prescription also influences the timing of operations.

2.2.6 Forest Landscape Pattern

2.2.6.1 Disturbance Pattern

This section of the plan discusses the forest landscape pattern in relation to the frequency distribution of clearcut and wildfire sizes.

<u>Disturbance Frequency and Area</u>

The *Forest Management Guide for Natural Disturbance Pattern Emulation* (NDPEG) generally states that a range of clearcut sizes needs to be created to ensure the size class distribution of clearcut disturbances follows the same tendencies and patterns as the natural disturbance size frequencies. In order to meet this test of sustainability, planned harvests should show movement towards emulating natural disturbance frequency and area by size class.

In order to demonstrate movement toward a more natural disturbance pattern regime the FMP must first establish the current disturbance pattern existing on the landbase as portrayed by the planning inventory. This is "where we are now" and is known as the **existing or plan start disturbance pattern**. Secondly, a target must be established based on historic natural disturbance data so that the question of "where <u>should</u> we be going" can be answered. This is known as the **natural disturbance template**. Thirdly, after the selection of harvest operations for the FMP, the answer to the question "where <u>are</u> we going" is evident. This is known as the **planned, or plan end with allocations, disturbance pattern**. The discussion of the relationship between these three elements will establish that the FMP planned operations are satisfying the test of sustainability for movement towards emulating natural disturbance.

<u>Developing a Natural Disturbance Template</u>

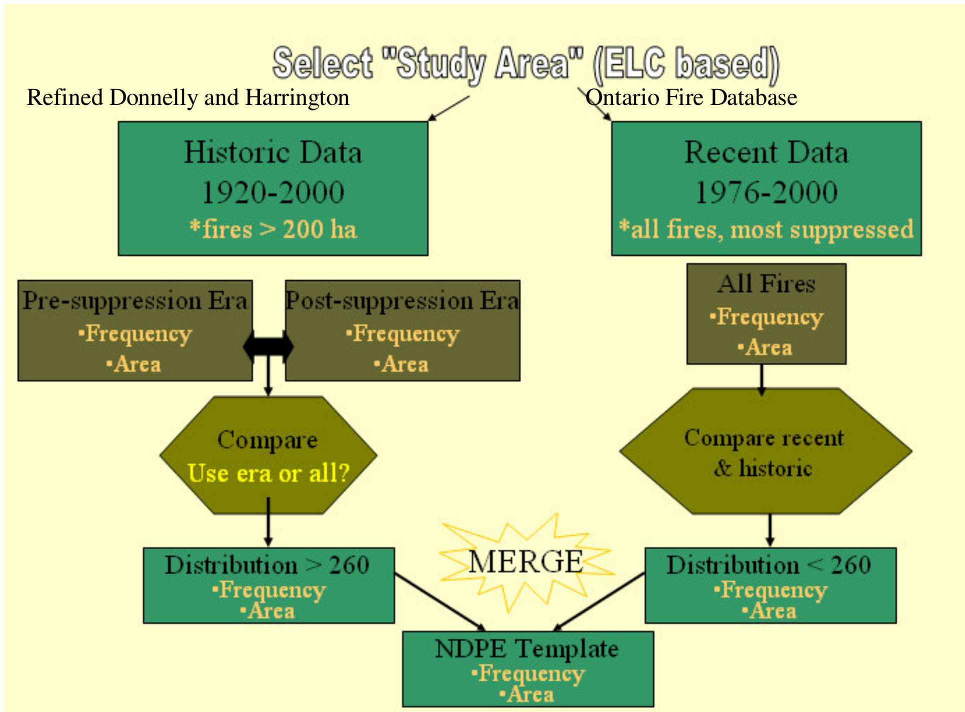
The Northeast Regional MNR provided the framework and text for the following description of the development of the natural disturbance template.

The natural disturbance template provides the basis for establishing landscape pattern targets for the FMP. The Forest Management Planning Manual (FMPM), and the Natural Disturbance Pattern Emulation Guide (NDPEG) both require the FMP to examine landscape pattern based on the frequency distribution of disturbances (clearcuts and wildfires) by size class. The natural disturbance template developed in this plan will provide targets based on natural fire history to assess how proposed areas selected for operations will influence the landscape pattern on the Nipissing Forest and to determine whether the proposed plan will create a pattern consistent with historic natural disturbances.

The NDPEG states that the natural disturbance template should be based on natural disturbance databases for the era prior to effective fire suppression. Since there was no local fire history information available at the time of planning, the template developed for this plan was based on two existing provincial fire history databases. The first provides fire history information for 1920-2000 timeframe and contains only those fires greater than 200 hectares in size (based on Donnelly and Harrington fire history maps as refined by the OMNR fire program). The second database is the Ontario forest fire database and it contains fires of all sizes for the 1976 to 2000 period. These two databases represent the best available information at the time of plan production.

The data provided within these two databases present some limitations and challenges for the development of a natural disturbance template. The data provided do not contain any information on the frequency of smaller disturbances (less than 200ha) for the pre-suppression era (prior to 1965). In the Nipissing Forest, this accounts for approximately 80% of the natural disturbances on the landscape. Therefore, in order to create a complete natural disturbance template a combination of both data sets is being considered. That is to say, the recent fire history data will be used as a surrogate to historical fire data to bridge the knowledge gap for fires less than 200 ha. This leads to some very important *caveat*s which are discussed in detail below. Figure 2.2.6.1 provides an overview of the methodology used for this FMP. The era of 1920-1965 was selected as the timeframe in which fire-suppression in this part of Ontario was not very effective. This timeframe was used to represent the pre-suppression era for all analysis. It follows that the remainder of the database timeframe was considered the post-suppression era (1965-2000).

Figure 2.2.6.1 Overview of the Methodology for the Development of Natural Disturbance Templates



The first consideration in the development of a natural disturbance template is the "study area" or the geographic extent to which historic data will be used to represent the management unit. The basis for this selection is the ecological districts associated with Ontario's Ecological Land Classification. The analysis was based on the ecological districts that the Nipissing Forest Management Unit boundary straddles or intersects. This includes eco-districts 4E-4 and 5E-4 to 5E-10 inclusive as depicted in section 6.1.2.4.

The selection of a "study area" based on eco-districts ensures that the areas chosen to be representative of the management unit have similar climatic and edaphic conditions and thus provide a reasonable basis in which to examine fire history data for the Nipissing Forest.

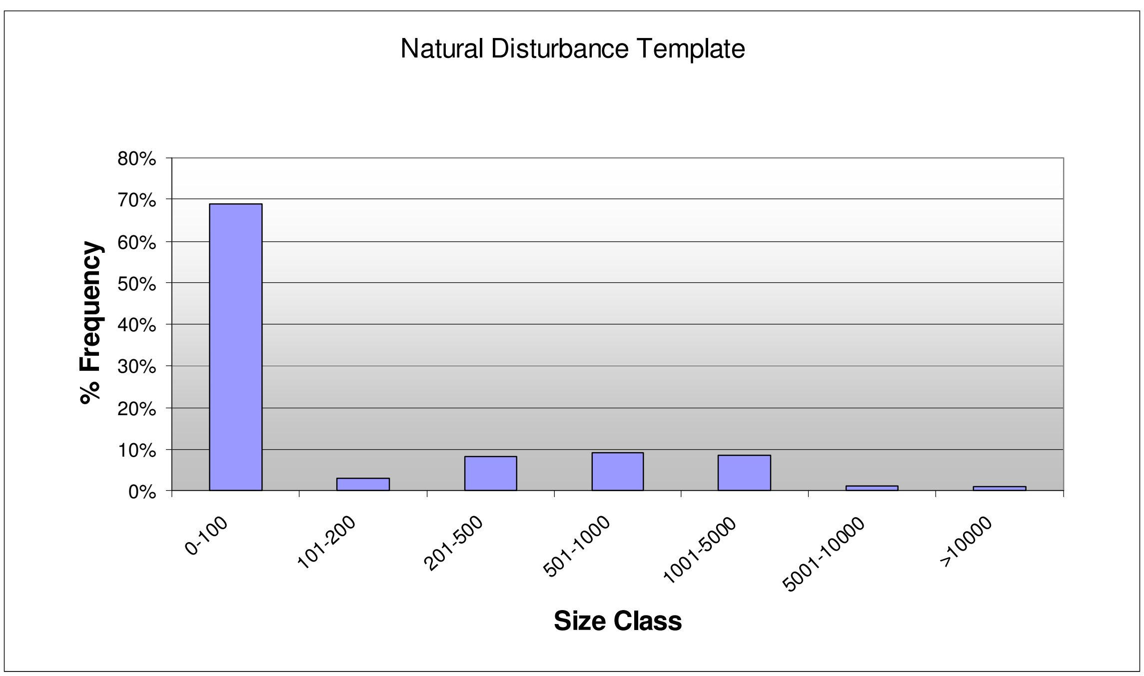
The planning team utilized the NDPEG tool developed by the MNR to establish the natural disturbance template. The tool summarized the fire data into discrete 20-year timeframes. Each 20-year timeframe was advanced five years within each era. For instance, the 1920-1965 timeframe consisted of six 20-year time frames (1920-1940, 1925-1945, 1930-1950, 1935-1955, 1940-1960, 1945-1965). This method of examining the data better reflected the way in which disturbances are measured in forest management plans hence, making comparisons to long-term harvest patterns more relevant. This methodology also provides a means for measuring the variability associated with examining data in this fashion and thus provides some bounds of expected variation in the data as a result of the way disturbances are measured.

The results of the NDPEG tool included data for:

1. Recent, un-attacked fires (this includes lighting strike fires that were not acted on between the years 1976 and 2000). These data were used to estimate the area and frequency distribution of disturbances in the 0-10 size class.
2. All recent fires (includes all fires in the database between the years 1976 and 2000). These data were used to estimate the frequency distribution of disturbances in the 11-130 size classes; and
3. All historic fires (includes fires from 1920 to 1959). These data were used to estimate the area and frequency distribution of disturbances in the 130 ha and greater size classes.

Figure 2.2.6.2 shows the result of this analysis and the natural disturbance template for the Nipissing Forest. The final step in setting the natural disturbance template according to the NDPEG was to adjust the template to account for social, economic or ecological reasons. Rather than doing this, the planning team elected to leave the template accurate to the data but rationalize variances from the template based on the above-mentioned adjustment factors.

Figure 2.2.6.2 Nipissing Forest Natural Disturbance Template Frequency Distribution by Size Class



Measuring the Existing Disturbance Pattern

A process was undertaken to identify all existing forest disturbances on the Nipissing Forest in the planning landbase in order to ascertain the existing disturbance pattern. This was undertaken through a process utilizing a geographic information system (GIS).

Temporal Separation

The NDPEG defines the rules for defining a disturbance. It states that the forest is considered disturbed if a stand is less than or equal to 20 years old and (less than 3 metres in height or has a stocking of less than 0.3). That is to say, if the age of a stand is less than or equal to 20 years old the trees must be greater than 3 metres in height and be stocked greater than or equal to 0.3 for it not to be considered a disturbance. If the disturbance is greater than 20 years old it is considered a young forest at which point it was deemed that the height and the stocking of the trees were irrelevant. For this FMP, the time-span for the disturbance analysis was between 1984 and 2004. The analysis excluded stands that were naturally barren and scattered, which are either site class 4, or identified with local knowledge by NFRM's field technicians on the management unit.

Spatial Separation

Furthermore, two or more clearcuts areas within 200 metres of each other are considered as one disturbance. For example, two clearcuts that are separated by a distance of 170 metres are considered one disturbance. If the cut blocks were separated by 220 metres they would be considered as two distinct disturbances. The graph in Figures 2.2.6.3 and 2.2.6.4 show the frequency and area distribution of plan start disturbances on the Nipissing Forest, as well as a depiction of where the landscape would move without any disturbance manmade or natural in the next 10 years.

Figure 2.2.6.3 Nipissing Forest Frequency Distribution by Size Class for the Natural Disturbance Template, Plan Start and Plan End without Allocations

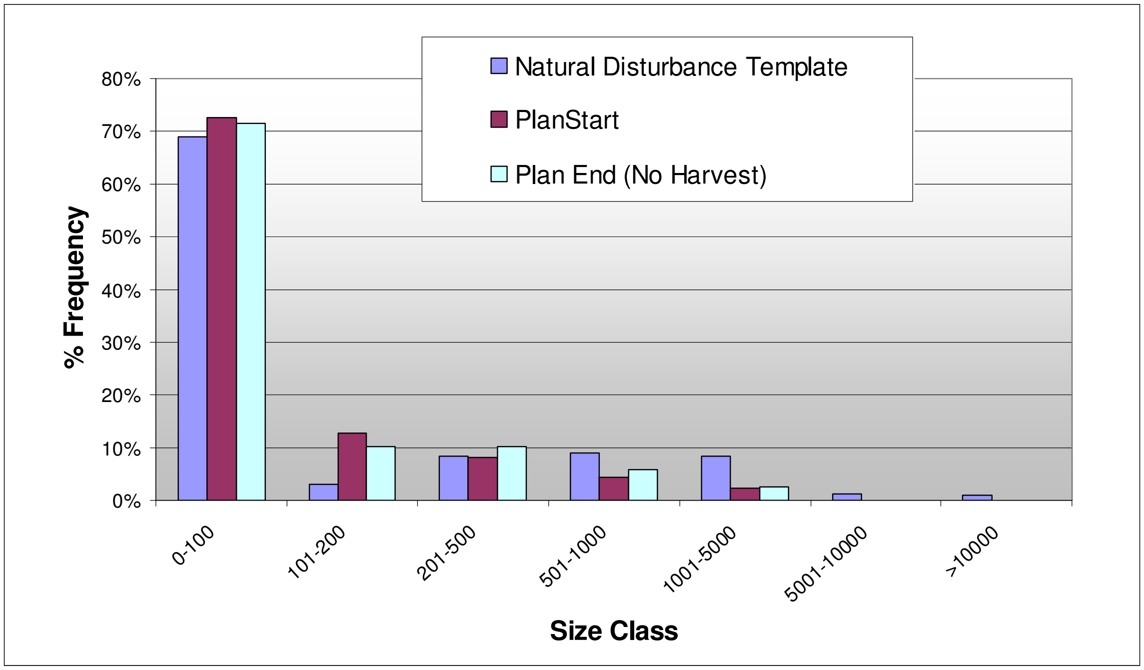
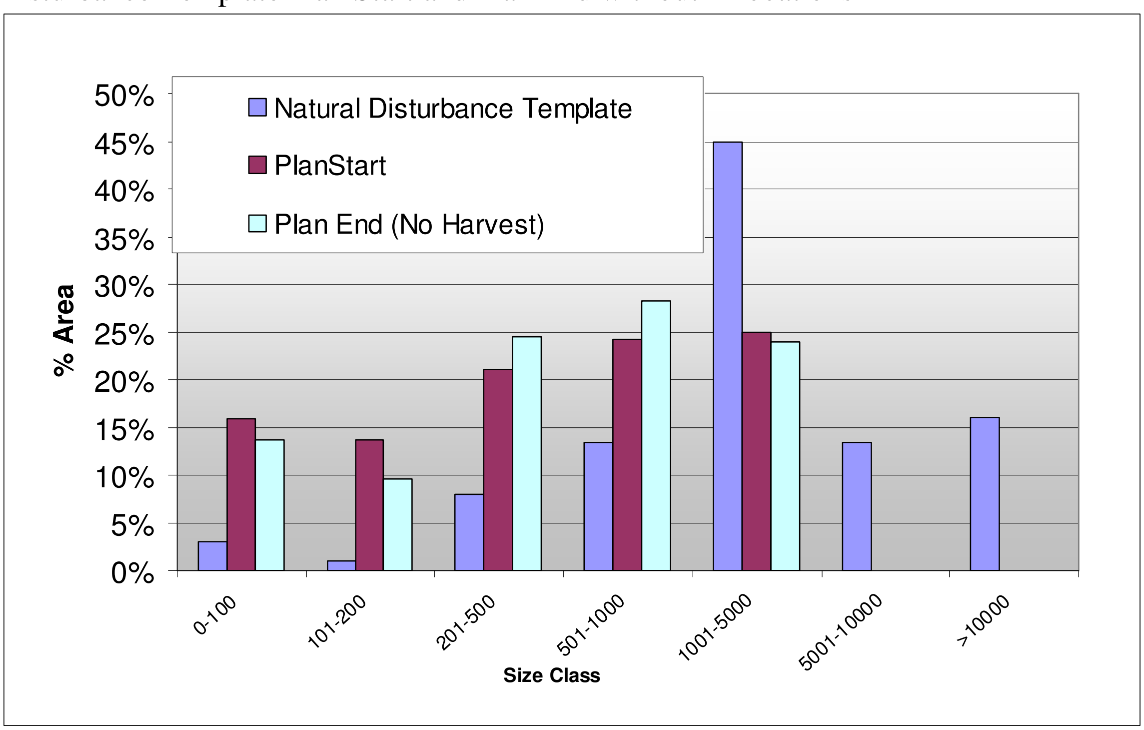


Figure 2.2.6.4 Nipissing Forest Area Distribution by Size Class for the Natural Disturbance Template Plan Start and Plan End without Allocations



Using the temporal and spatial separation rules discussed above, a disturbance perimeter was established. Maps in section 6.1.2.4 illustrate the established plan start (existing) and plan end with (planned) allocations disturbance patterns and an identification number for each distinct disturbance. It is the areas within the existing and planned disturbance perimeters that are analyzed in section 3.10 of the Plan as the assessment of the objective achievement. Areas within the disturbance perimeters include: disturbed forest area, residual forest area, and can also include non-productive area, such as water or wetlands. Further description of this analysis is provided in the analysis package, section 6.1.6, as well as section 3.2.3 and 3.10 of the Plan.

2.2.6.2 Spatial Old Growth

Other landscape patterns considered on the Forest related to the spatial arrangement of older seral stages on the landscape.

The historic forest description identifies that it is likely that larger more continuous track of older forest occurred in the past on the Forest, and contributed to the success of many ecological conditions on the landscape.

The planning team evaluated the current landscape in order to set objectives to return this historic condition to the forest. Maps have been developed, located in section 6.1.2.4 to illustrate the current arrangement of old growth on the Forest. Plan start maps are available and illustrate two key components important to the public and planning team. The spatial distribution of old growth, as well as the patch size distribution of this condition that currently exists on the forest. The current landscape is also summarized by forest unit.

This analysis was used in the development of the long-term management direction, by guiding realistic desired levels and targets surrounding old growth as an important ecological condition on the landscape. Further description of this analysis is provided in the analysis package, section 6.1.6 as well as section 3.2.3 and 3.10 of the Plan. An old growth strategy has also been developed for the 2009 Plan, found in section 6.1.25.

2.2.6.3 Spatial Wildlife Habitat

As discussed in section 2.2.4, various wildlife species on the forest possess different spatial requirement for preferred habitat, and for this reason spatial analysis was performed to identify plan start levels and arrangement of preferred habitat. Maps illustrating this analysis can be found in section 6.1.2.4.

Results of this analysis were considered heavily in the determination of desired levels and targets to support objective achievement in the long-term management direction. Further description of this analysis is provided in the analysis package, section 6.1.6 as well as section 3.2.2 and 3.10 of the Plan.

2.3 Existing Roads

The Nipissing Forest has an extensive existing road system developed primarily by the forest industry over a long period of time. Currently on the Forest there are 817 km of primary roads, 355 km of secondary roads, and 2,393 km of tertiary roads. There are also 2,862 km of "old logging roads" which are classified as such because they are no longer drivable with a four-wheel drive truck. In addition, there are 283 km and 469 km of primary highway and secondary highway, respectively, and over 1500 km of municipal or local road board maintained roads.

Many of the existing roads are multi-use and are shared with other users of the Forest such as private land owners, the mining industry, the tourism industry, the baitfish industry, cottagers, trappers, hunters and anglers and the general public for recreational purposes. Snowmobile clubs and ATV users also use numerous roads as part of their trail systems.

The FMP Roads Task Team undertook a review of the existing roads inventory. The main intent of the review was to reclassify the existing roads on Crown land to the correct or current classification and to map the true location of the roads. Also, expected future use in relation to proposed allocations, determined that some minor reclassification of existing primary, secondary and tertiary roads was needed. Depending on their present condition, many older existing roads were reclassified as "old logging roads" because they were no longer driveable with a four-wheel drive truck. An exercise was also completed to rename many of the existing primary and secondary roads to more accurately reflect common names and or give more meaningful names to identify the location of the road.

After the road inventory review exercise was completed, road responsibility was assigned for all of these existing primary and secondary roads. The responsibility was assigned to either the forest industry or the MNR. Responsibility includes the monitoring of road conditions, and addressing potential or existing personal and environmental hazards on the roads. This can include the closing of roads where hazards exist. The responsible party is not required to maintain and repair roads for other users.

Existing primary and secondary roads are identified on the operational maps in section 6.1.2. A custom existing roads map, entitled Selected Harvest Access and Existing Roads Overview is located in section 6.1.2.9, identifying the primary and secondary roads and existing tertiary road networks. This map also distinguishes which existing primary and secondary roads are considered shared (multi-party) and which are the responsibility of the forest industry.

The Existing Roads Table, found in section 6.1.12 of the supplementary documentation, gives each existing primary and secondary road that is the responsibility of the forest industry and the associated use management strategy. A detailed use management strategy, which outlines the maintenance, monitoring, access restrictions, transfer and decommissioning for each existing primary, secondary and road network, is also contained in section 6.1.12 of the supplementary documentation.

At the time of preparing this Plan, not all of the water crossings on these existing primary and secondary industry roads have been inspected to determine whether they meet the minimum standards. Crossings that do not meet the following standards will be repaired jointly with MNR in a co-operative manner, or returned to the MNR as being their responsibility if an agreement on repairs cannot be reached. Culverts installed prior to 1989 must, at a minimum, allow for fish passage and the banks around the water crossing must be stable. Culvert installed after 1989 must meet the mandatory standards identified in the 1990 Environmental Guidelines for Access Roads and Water Crossings. All repairs to existing water crossings must also meet these mandatory standards.

There are no mandatory safety standards with respect to road maintenance, however, the responsible party should correct any identifiable or known hazardous conditions that could be encountered unexpectedly and have the potential for serious consequences (e.g. washouts, steep hills, curves or obstructions).

The roads identified as being the forest industry's responsibility were then assigned to individual licensees. These responsibilities are identified in the Existing Roads or Road Network Strategies found in section 6.1.12. When the forest industry is responsible for a road, ongoing monitoring, maintenance and emergency repair work will be prioritized to meet safety, environmental and industry operational needs. It should be noted that emergency repairs to roads and water crossings might not be restored in a timely manner if they are damaged or destroyed by unplanned events, such as a major storm. Also, there is no obligation, on the part of the Crown or the forest industry, to undertake maintenance or repair work on behalf of other users. These users may not have the resources to replace failed infrastructure and access to businesses or properties could be disrupted at any time.

Responsibilities for roads will be detailed by NFRM in our Overlapping Licence Agreements (OLAs) with each individual licensee. NFRM will not enter into OLAs with licensees that do not want to take on or accept the responsibilities identified in this Plan.

The monitoring program for all roads that are the industry's responsibility will include a physical inspection of bridges on an annual basis. Culverts will be inspected every three years (or sooner if there has been a major weather event). The monitoring program will be conducted and documented by NFRM on behalf of all of the licensees.

The MNR has accepted the responsibility for existing primary and secondary roads used by multiple users or groups (shared roads). The MNR plans to negotiate agreements, outside of this forest management plan, between the users, to assign road maintenance and repair responsibilities. When using these shared roads, or any other roads during forest management operations, the forest industry is responsible for maintenance and is required to leave these roads in as good as or better condition as at the start of operations.

The existing tertiary road networks identified in this Plan as being the responsibility of the forest industry are those roads constructed by the forest industry in 2005/2006 or later. The 2005/2006 starting point was selected because MNR began a program of signing Memorandums of Understanding with the forest industry for water crossings in 2005/2006. These road networks have also been assigned to the individual licensees as being their responsibility.

Roads constructed in the last year of the 2004 FMP, as well as existing tertiary roads required by the forest industry to access allocations in this first phase of this plan, will be added to the maps, tables and existing road networks by November 15th, 2009. This allows for supplementary aerial photography in the summer of 2009 (for mapping the new roads constructed in 2008/2009) and for fieldwork to determine the condition of the roads and water crossings on the roads needed to access allocations. This fieldwork will be undertaken jointly with MNR staff. Any repairs to existing roads and/or water crossings needed to bring them up to the standards of the 1989 Environmental Guidelines for Access Roads and Water Crossings will be identified. This work will be undertaken between the licensee and the MNR in a cooperative fashion and with consideration given to the resources available to each party. Existing tertiary roads required by the forest industry to access the second phase of the plan will be incorporated into this plan in a similar fashion by the fall of 2010.

The transfer of road responsibilities between the forest industry and the MNR will be in accordance with the use management strategy for that particular road/road network and will follow the process identified in the 2003 Task Team Report for the Roads and Water Crossings Initiative. Generally, roads no longer required by the industry for periods of five years or more will be considered by the forest industry for transfer.

At the present time there are two active access controls on the Nipissing Forest. A concrete barrier restriction is located on a tertiary road in McNish Township northwest of Namasang Lake and a bridge has been removed to restrict access to the McCallum Peninsula.

2.4 Land Use Description

Values maps provide a summary of the geographical locations of known natural resource features, land uses and values for the management unit. The values maps for the Nipissing Forest can be found in section 6.1.2.12.

Forestry and tourism are the principal resource based businesses on the Forest. The forest industry provides employment and revenue from logging, forest management and wood processing. The tourism sector provides a range of services based on Lake Nipissing, and semi-remote and remote access. Details of these two key sectors are given in the following section, 2.5, however a few highlights of the tourism sector are listed below.

There are 18 provincial parks and 21 conservation reserves in, or partially within, the Nipissing Forest. More details are given in Section 2.5.3.2. The wide variety of tourism opportunities vary from remote access to urban settings. There are over 175 tourism establishments in the area; approximately 120 operate on a year round basis. This includes eco-tourism and wilderness expedition companies that may operate outside of the management unit boundaries, but utilize the Forest and local tourism businesses. See section 2.5.3.2.2 for more details on tourism on the Forest. Because of the preponderance of lakes and its relatively close proximity, and ever increasing ease of access, to southern Ontario, the Nipissing Forest is a popular cottaging area. Many local residents also have cottages on the Forest.

The management unit is comprised of approximately 23% private land, possessing various land types including forested, agriculture. The private land is distributed across the management unit, but is generally concentrated in the south, along the hwy 11 and 17 corridors. Objectives of forest management in the plan rarely use this land inclusive to long term management direction of the Forest. However in some instances it has been considered, in assessment of objectives related wildlife dependent on the percent of Crown and private land base made up of forest openings, clearings, fields and early successional forest. Measures have been considered aspatially only. Private land on the forest contributes to some obstacles in forest management planning on the management unit, such as meeting the guide requirements for natural disturbance pattern emulation on crown land and spatial distribution of old growth patches on the Forest. Private land also creates uncertainty around the connection of forested landscape, and can often render the planning team helpless to control how well this type of factor is considered on the landscape.

Cross country skiing, dog sledding, hiking, mountain biking, snowmobiling, all-terrain vehicle riding, camping, and ice fishing are some of the recreational activities that occur on the Forest. Land use permits have been issued for two cross country ski trail systems. Once again, more information on recreation can be found in section 2.5.3.2.3.

The Nipissing Forest provides opportunity for hunting and fishing on Crown land. In the entire North Bay district 20,547 resident fishing licenses and 6,517 non-resident fishing licenses were obtained. 11,789 resident hunting licenses and 570 non-resident licenses were purchased. Lake Nipissing is a popular destination for fishing and contributes a great deal to tourism in the Nipissing management unit. There are dozens of rivers and streams that drain into Lake Nipissing. There are also a number of lakes that the MNR stocks with fish. See section 2.5.3.2.4 for more information on hunting and fishing on the Forest.

The Nipissing Forest currently contains two operating mines and numerous waterpower generating facilities. In addition, 142 aggregate permits are issued for pits and quarries. Section 2.5.3.3 has more information on these land uses.

56 bear management areas are licensed, fifteen species of fur bearing animals are trapped, and 36 bait fish licenses are issued. There are 31 land use permits issued for maple tapping.

Various non-timber forest products are collected from the Nipissing Forest. Because there are no licences or permits currently required for the harvest and collection of these forest resources, the amount and value of the products are not known. Lycopodium and balsam fir boughs are collected and sold to make Christmas ornaments. Some of the blueberries sold at road side stands are picked from Crown land. Other interests are Taxus canadensis for cancer treatment and cedar clippings for cedar oil.

A variety of forest products are collected from Crown land for personal use. Approximately 800 cubic meters per year of fire wood is legally collected from Crown land. People also pick mushrooms and berries for personal use. Many families cut their Christmas tree on Crown land. Some areas are suitable for the collection of birch bark.

All forests have spiritual value. Although these values are important to society, in general, the spiritual values are of great significance to Aboriginal communities. The protection of native values, as described in section 4.2.1, prescription for areas of concern, of this Plan, provides for the protection of native spiritual sites.

The intrinsic values of the forest are becoming very important to Ontario residents. Knowing that there is forest in Northern Ontario provides comfort to many urban residents.

A commercial maple syrup production operation is being developed north of Mattawa. Members of the Antoine First Nation are establishing a tourism-business based on the maple syrup site.

The Ontario Living Legacy Land Use Strategy has recommended land use designations and guidelines that must be considered in forest management planning. Enhanced Management Areas (EMA) were established in order to provide land use direction in areas with special features or values. EMAs encompassed a variety of values and features and thus the OLL established seven EMA categories. EMAs that require consideration within the Nipissing Forest include Natural Heritage Areas (n), Remote Access (a) and Recreation (r) EMAs.

The following is an overview of the EMAs found on the Nipissing Forest as described by the OLL Land Use Strategy. Figure 2.4.1 lists the EMAs in the Nipissing Forest.

Natural Heritage (EMAn) areas are intended to protect areas with significant natural values while allowing for a range of resource activities. Forestry, mining, aggregate extraction and hydro electric development are supported, but will be subject to conditions to protect the natural heritage values.

Remote EMAs (EMAa) are typically relatively large areas which provide the public and tourism operators with high-quality remote recreational experiences. Roads for industrial and commercial use are permitted in these areas, however, their standards should be lower than those governing primary access roads.

The following is suggested to maintain the remote feature of the area:
- Roads should be constructed to the lowest standard possible;
- Existing access will be used as much as possible ;
- Layout should consider aesthetics; and
- Design and construction should facilitate access controls and closure rehabilitation
- New roads will be restricted from public use and existing authorized access will continue
- Specific road use strategies will be developed for new primary and secondary roads and procedures identified for managing tertiary roads within remote areas

Recreation EMAs (EMAr) are areas designated to provide high-quality recreation, resource-based tourism and natural values, within a remote or semi-remote forested setting, while also permitting sustainable business and industrial activities. In these recreation areas, industrial activities such as forestry, mining, aggregate extraction and hydro development, and the related construction of new roads, needs to be carried out in such a way as to maintain or enhance the remote recreation qualities.

Figure 2.4.1 Enhanced Management Areas in the Nipissing Forest

E67n	E133n	E155n
E74a	E135n	E162a
E112a	E141n	E163n
E119r	E143n	E176a
E122r	E144n	E185n
E132a	E154r	E330n

**Refer to Ontario Living Legacy – Land Use Strategy (July 1999) for a description of each EMA.*

Any forestry operations planned within these EMAs will be given special consideration prior to activities, to ensure that the features and values of the area are maintained or enhanced, as directed by the OLL strategy.

2.5 Social and Economic Description

The relationship between the economic activity engendered through forest management expenditures and the manufacture of the timber into processed products creates a chain of events which have an extensive impact on the social and economic dimension of the community, the region, and the province.

This report relates to communities that receive substantial amounts of timber, chips, or other forest products from the Nipissing Forest (SFL), or have substantial employment related to the forest industry, or are Aboriginal communities in or adjacent to the Nipissing Forest whose interests or traditional uses may be affected by forest management activities. More detailed socio-economic information can be found in the supplementary documentation, specifically section 6.1.22, Socio-economic Report.

2.5.1 Overview of Social and Economic Context

The determination of communities receiving substantial amounts of wood fiber, or that have substantial employment related to the Nipissing Forest is based on Timber Resource Evaluation System (TREES) reports from 2001 to 2005. TREES reports provide a summary of delivered volumes and associated dollar value to receiving mills from the management unit for the noted fiscal years.

The socio-economic profile for the Nipissing forest management plan has been produced and describes the social and economic environment of Ontario communities that are dependent on forest products from the management unit. Demographic profiles have been derived through Statistics Canada census data for communities that have substantial employment related to the forest industry. As well, available social and economic information on each Aboriginal community within or adjacent to the management unit that have interests or traditional uses that may be affected by forest management has been included.

The affected MNR districts and Ontario communities are:

- Cochrane District: Iroquois Falls
- Hearst District: Hearst
- Kirkland Lake District: Elk Lake (James), Englehart, and Kirkland Lake
- Nipigon District: Greenstone (Long Lac)
- North Bay District: Bonfield, Mattawa, North Bay, Rutherglen, and West Nipissing (Sturgeon Falls)
- Pembroke District: Bonnechere Valley (Eganville), Killaloe, Petawawa, Pembroke
- Sault Ste. Marie: Sault Ste. Marie
- Sudbury District: Blind River, Espanola, French River (Alban, Monetville, Noelville), Nairn and Hyman (Nairn), and Sudbury
- Temagami District: Temagami
- Timmins District: Timmins

Aboriginal Communities:

- Antoine Algonquin First Nation
- Dokis First Nation
- Mattawa North Bay Algonquins
- Nipissing First Nation
- Temagami First Nation

The Quebec communities which are not included in the profile are:

- Bearn
- Temiscaming
- Maniwaki
- Portage Du Fort
- St. Pamphile Cte. I'lset
- Ste. Just De Bretenieres

2.5.2 Summary of Demographic Profiles

The total population for each community listed in section 2.5.1 is provided, as well as the distribution of males and females within that population. The percent change in population from the 1996 Census year to the 2001 Census year is calculated, and in many instances shows a decline in population. In many northern Ontario communities populations fluctuate according to the employment climate of large resource-based businesses. Since the census period there has been a drop in employment in the forest industry. Much of the decline is due to the large number of mill closures, particularly in the pulp and paper industry since 2003.

Each profile summarizes the average income individually and by household. Employment rates are shown for each community and the number of individuals that were active in the labour force during the 2001 census.

Economic information specific to the importance of forestry in the local economy is displayed in the forest industry profile. The local dependency on the forestry sector in relation to the province as a whole is indicated by the employment dependency ratio. The dependency ratio shows the importance of a local profile in relation to the province. In instances in which the local value is greater than one, there is a greater dependency upon the forestry sector in the local labour force and the forestry sector has a greater impact on the local economy. The employment dependency ratio is then further subdivided into the North American Industrial Classification system (NAIC), and the industries, which employ the greatest numbers locally, are indicated.

The demographic profile for the Nipissing forest follows. This represents the summary values for all communities affected by forestry activities from the Nipissing Forest. The individual community profiles are included in section 6.1.22.

Nipissing Forest Demographic Profile Summary

Population and labour force;

- Total population 422,785 (male 48.5 %, female 51.5%)
- Labour force; 206,405
- employed; 90.4%, unemployed; 9.6%, participation rate; 61.2%
- main occupation categories; sales 29.4%, trades 16.6%, finance 16.1%, management 9.1%

Community diversity and official language;

- English only 64.3%, English & French 33.9%

Household characteristics;

- No. households 170,515, avg. persons per household 2.9

Individual income by gender, household income;

- Avg. individual income $ 27,551 (male $34,583, female $20,790)
- Avg. household income $62,285 (rate of households designated low income 19.3%)

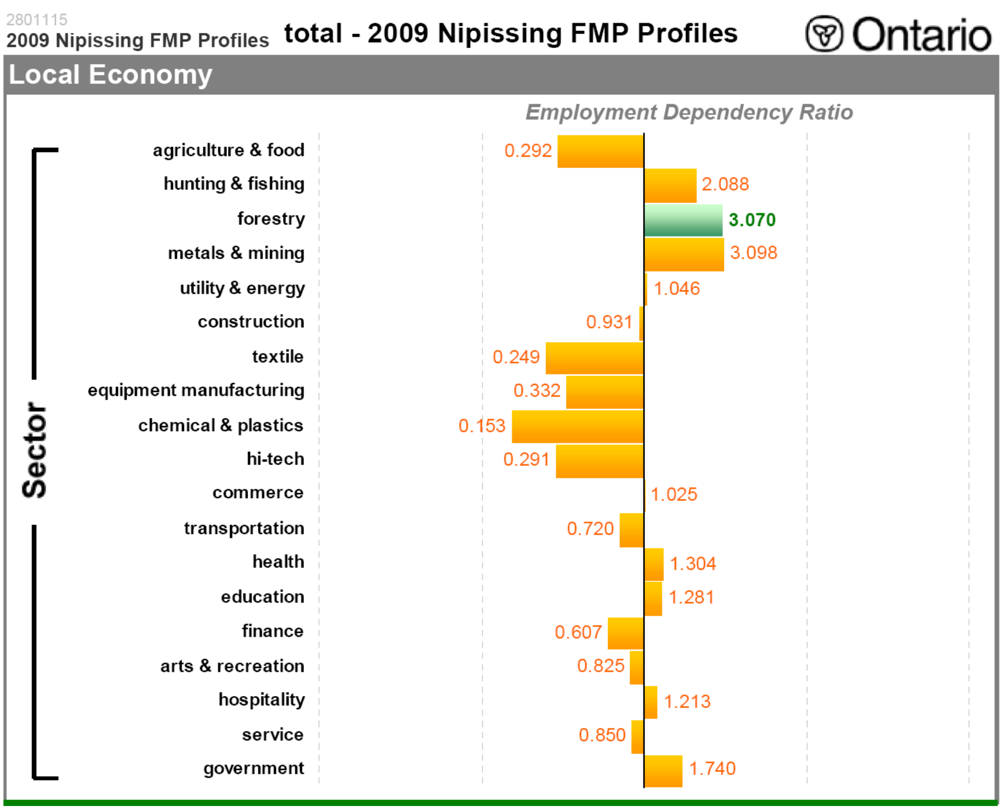
Educational accomplishment (highest level achieved);

- University 16.1%, college 24.6%, trade 13.6%, secondary 34.4%, primary 11.3%

Labour force dependency ratios (top five industry sectors);

- metals & mining 3.098
- forestry 3.070
- hunting & fishing 2.088
- government 1.740
- health 1.304

Figure 2.5.2.1 Employment Profiles



2.5.3 Industrial and Non-Industrial Uses of the Forest

2.5.3.1 Forestry

Forest industry activities include logging, wood processing, road construction, hauling, renewal, maintenance and protection of the forest.

2.5.3.1.1 Licensees

There are 15 forest resource licensees expected to harvest wood from the Nipissing Forest during the term of this plan. There are five SFL shareholder licenses, four licenses held by Aboriginal communities, and six independent licenses. A percentage of the available harvest is allocated to each licensee, as documented in the Sustainable Forest License and the Shareholders' Agreement. The available harvest area is distributed as follows:

The shareholder licensees are:

- Goulard Lumber (1971) Limited
- Grant Forest Products Inc.
- Hec Clouthier & Sons Inc.
- R. Fryer Forest Products Limited
- Tembec Industries Inc.

The Aboriginal licensees are:

- Antoine Algonquin Community Services Corporation (AACSA)
- Dokis Bay Indian Corporation
- Madadjiwan Economic Development Corporation (MEDC)
- Nbisiing Forestry Inc.

The independent operators are:

- Behnke Farms Inc.
- Bruno Quenneville
- Scott Gray
- Emile Janveaux Forest Products Ltd.
- Frerot Forestier
- Lucien Groulx & Son Planing and Saw Mill Ltd.

The shareholder licensees employ about 95 people in their woodlands operations. In addition to these employees, shareholders hire contractors and consultants to plan and supervise operations and to harvest the wood in their licensed area. Three shareholder companies are family owned and operated. Each of the Aboriginal communities has one full time employee assigned to timber harvesting operations, and they also hire contractors and consultants to carry out forest operations. The independent licensees are family owned and operated businesses, and carry out their own logging operations. One independent licensee is a member of an aboriginal community and has aboriginal employees. This licensee also is a contractor for a shareholder company and an Aboriginal Community licensee.

The Sustainable Forest Licensee, Nipissing Forest Resource Management Inc., has eight full time employees and hires consultants and contractors for office administration, forest management planning, tree marking, archaeological assessments, and renewal and maintenance projects.

2.5.3.1.2 Wood Supply Commitment

The following are the details of the wood supply commitments on the Nipissing Forest.

1) Grant Forest Products Inc., for use in their oriented strand board mill at Englehart, Ontario with a target volume of 97,967 m3 of non-veneer quality aspen poplar logs.
2) St. Marys Paper Ltd., for use in their paper mill in Sault Ste. Marie, Ontario, with a target volume of 48,000 m3 of conifer timber.
3) Columbia Forest Products, for use in their veneer mill at Rutherglen, Ontario, with all veneer quality white birch and tolerant hardwood logs, an estimated volume of 8,900 m3.
4) Tembec Industries Inc., for use in their pulp facility at Temiskaming, Quebec, with target volume of 41,600 m3 of pulpwood quality tolerant hardwood logs and 46,000 m3 of pulpwood quality white birch logs.
5) Tembec Industries Inc., for use in their sawmill at Mattawa, Ontario, with a target volume of 19,950 m3 of sawlog quality tolerant hardwood logs, 22,800 m3 of sawlog quality red and white pine logs, 41,400 m3 of sawlog quality spruce, jack pine and balsam fir logs and 25,900 m3 of sawlog quality white birch logs.
6) Precut Hardwood Inc., hardwood pallet and fuelwood operation in North Bay, Ontario, with an annual commitment of 16,000 m3 of white birch.

2.5.3.1.3 Volume of Wood

Annually the volume of wood utilized by each receiving mill is recorded. Figure 2.5.3.1 accounts for the volume of wood from the Nipissing Forest, by conifer, intolerant hardwood, and tolerant hardwood, from 2001-2002 to 2005-2006.

Figure 2.5.3.1 provides, annually for each of the last five years, standard indicators of economic value of delivered wood volume.

Figure 2.5.3.1 Volume of Wood from the Nipissing Forest for each of the Past Five Years

	2001/2002	**2002/2003**	**2003/2004**	**2004/2005**	**2005/2006**
Actual Harvest Volume (m^3)	360,645.14	310,764.34	428,975.98	445,425.28	474,289.82
Total Stumpage	$3,457,247.89	$2,439,568.49	$3,647,672.38	$4,442,274.82	$4,014,620.70
Payments to Forest Renewal Trusts	$1,561,588.83	$1,198,232.52	$1,622,667.48	$2,096,392.00	$1,985,563.64
Payments to Forestry Futures Trusts	$161,713.96	$139,999.65	$194,007.46	$209,476.37	$211,747.77
Average Stumpage per ($m^{3)}$	$9.59	$7.85	$8.50	$9.97	$8.46

2.5.3.1.4 Mills

Wood from the Nipissing Forest is processed into pulp, paper, veneer, dimension lumber, oriented strandboard (OSB), fuelwood, pallets and specialty products. The wood is delivered to over 30 forest resource processing facilities in Ontario and Quebec. Figure 2.5.3.2 includes a list of facilities that received more than 500 m3 of wood between 2001-2002 and 2005-2006 from the Nipissing forest management unit, as well as the number of employees for each company. The number of individuals that rely on the forest industry for employment is over 3,000. This includes employees that work in the processing facilities as well as in the bush.

Figure 2.5.3.2 Facilities Receiving Wood from the Nipissing Forest

Mill	Location	Number of Employees		Product Type
		Facility	Woodlands	
Abitibi Consolidated Company of Canada	Iroquois Falls	429	153	pulp mill
Ben Hokum and Son Ltd.	Killaloe	100	12	sawmill
Ben Hokum and Son Ltd.	Killaloe	no data		pulp mill
Columbia Forest Products Ltd.	Rutherglen	240	5	veneer mill
Dament & Charles Lumber Manufacturing Ltd.	Pembroke	33		sawmill
Domtar Inc.	Espanola	700	1	pulp mill
Domtar Inc.	Nairn Centre	123	105	sawmill
Domtar Inc.	Elk Lake	no data		sawmill
Forestply Industries Inc.	Blind River	30		veneer
Goulard Lumber Ltd.	Sturgeon Falls	33	15	sawmill
Grant Forest Products Inc.	Englehart	185	12	strandboard
Grant Forest Products Inc.	Timmins	159	6	strandboard
H. & R. Chartrand Lumber Ltd.	Noelville	24		sawmill
Herb Shaw & Sons Ltd.	Pembroke	12		sawmill
Lahaie Lumber Ltd.	Alban	23	8	sawmill
Lavern Heideman & Sons Ltd.	Eganville	43	3	sawmill
Levesque Plywood Limited (Columbia Forest Products Ltd)	Hearst	302	40	veneer mill
Liskeard Lumber Ltd.	Elk Lake	no data		sawmill
Longlac Wood Industries Inc.	Longlac	152	4	strandboard
Longlac Wood Industries Inc.	Longlac	207	4	veneer
Northern Pressure Treated Wood Ltd.	Kirkland Lake	20	1	pole mill
Portelance Lumber Ltd.	Capreol	9		sawmill
Precut Hardwood Inc.	North Bay	39		sawmill
R. Fryer Forest Products Ltd.	Monetville	68	7	sawmill
St. Mary's Paper Ltd.	Sault Ste. Marie	400	5	pulp mill
Tembec Industries Inc.	Mattawa	117	5	sawmill
	Total Employees	3,453		

Source of information: most recent data from Facility annual returns. Information current as of November 2008.

In the past few years there has been a trend of mill closures in Canada. There are a number of factors that have triggered structural changes in the forest industry and impacted the profitability of forest product companies. Included among these factors are: the U.S. softwood lumber dispute, the significant downturn in U.S. housing starts, a higher Canadian dollar, increasing energy costs, higher delivered wood costs, and increased competition from offshore producers.

There are at least three relatively large companies that rely on the Nipissing forest, for part of their wood supply, which have been forced to discontinue operations. Others are struggling to avoid closure.

Recent mill closures include:

- Temagami Forest Products Ltd. – Temagami, sawmill
- Isidore Roy Ltd. – Hagar, sawmill
- Mill closures are occurring in all regions of Canada, the majority of closures are in Ontario and Quebec.

2.5.3.2 Recreation and Tourism

2.5.3.2.1 Park and Conservation Reserves

There is a total of 39 protected areas within or partly within the Nipissing Forest that cover approximately 79,000 hectares. The 18 provincial parks account for 63,500 hectares, and the 21 conservation reserves cover the remaining 15,500 hectares.

The purpose of protected areas is defined in the Provincial Parks and Conservation Reserves Act as follows:

Section 1. The purpose of this Act is to permanently protect a system of provincial parks and conservation reserves that includes ecosystems that are representative of all of Ontario's natural regions, protects provincially significant elements of Ontario's natural and cultural heritage, maintains biodiversity and provides opportunities for compatible, ecologically sustainable recreation.

The Act sets the following objectives for these areas:

Objectives: provincial parks

2. (1) The following are the objectives in establishing and managing provincial parks:

1. To permanently protect representative ecosystems, biodiversity and provincially significant elements of Ontario's natural and cultural heritage and to manage these areas to ensure that ecological integrity is maintained.
2. To provide opportunities for ecologically sustainable outdoor recreation opportunities and encourage associated economic benefits.
3. To provide opportunities for residents of Ontario and visitors to increase their knowledge and appreciation of Ontario's natural and cultural heritage.
4. To facilitate scientific research and to provide points of reference to support monitoring of ecological change on the broader landscape.

Objectives: conservation reserves

(2) The following are the objectives in establishing and managing conservation reserves:

1. To permanently protect representative ecosystems, biodiversity and provincially significant elements of Ontario's natural and cultural heritage and to manage these areas to ensure that ecological integrity is maintained.
2. To provide opportunities for ecologically sustainable land uses, including traditional outdoor heritage activities and associated economic benefits.
3. To facilitate scientific research and to provide points of reference to support monitoring of ecological change on the broader landscape.

Provincial parks are categorized into six classes within the Ontario Provincial Park System. Parks in the Nipissing Forest fall under four of these classifications, namely nature reserves, natural environment, waterway parks and recreation parks.

Nature Reserve parks protect representative ecosystems and provincially significant elements of Ontario's natural heritage, including distinctive natural habitats and landforms, for their intrinsic value, to support scientific research and to maintain biodiversity.[18]

Natural Environment parks protect outstanding recreational landscapes, representative ecosystems and provincially significant elements of Ontario's natural and cultural heritage and provide high quality recreational and educational experiences.[19]

Waterway Parks incorporate recreational water routes. These river corridors provide canoeists with high-quality recreation and historical river travel.

Recreation Parks usually contain many campgrounds, modern facilities, beaches, boat launches, picnic areas, hiking, and other utilities used in modern recreational camping. These parks provide facility-based camping and day use opportunities.
The following two tables (Figures 2.5.3.3 and 2.5.3.4) identify protected areas and the hectares that they occupy.

[18] Provincial Parks and Conservation Reserve Act section 8 (3).
[19] Provincial Parks and Conservation Reserve Act section 8 (5).

Figure 2.5.3.3 Provincial Parks

Provincial Park	Class	Total Area (ha)*
West Sandy Island Provincial Nature Reserve	Nature Reserve	266
South Bay Provincial Park	Recreation	1,525
Marten River Provincial Park	Recreation	400
Manitou Islands Provincial Nature Reserve	Nature Reserve	1,926
Temagami River Provincial Park	Waterway	3,394
Jocko Rivers Provincial Park	Waterway	11,299
Mashkinonje Provincial Park	Recreation	1,101
Restoule Provincial Park	Natural Environment	2,619
Widdifield Forest Provincial Park	Natural Environment	2,170
Kenny Forest Provincial Park	Natural Environment	2,200
Alexander Lake Forest Provincial Park	Natural Environment	1,934
Samuel De Champlain Provincial Park	Natural Environment	2,550
Mattawa River Provincial Park	Waterway	14,142
French River Provincial Park	Waterway	73,530
Amable Du Fond River Provincial Park	Waterway	731
Sturgeon River Park	Waterway	4,653
Ottawa River Park	Waterway	10,359
Chiniguchi Park	Waterway	9,417

* Includes total area, parts of which may be outside the Nipissing Forest

Figure 2.5.3.4 Conservation Reserves

Conservation Reserve	Total Area (ha)*
Ottertail Creek Conservation Reserve	1650
God's Lake Old Growth White Pine Forest Conservation Reserve	354
Spring/Cut Lake Esker Conservation Reserve	691
Gooderham Old Growth White Pine Forest Conservation Reserve	82
Blue Lake End Moraine Conservation Reserve	1,408
Dana Township Jack Pine Forest Conservation Reserve	319
Holdridge Creek Conservation Reserve	1,343
Field Township Conservation Reserve	399
Smoky River Headwaters Conservation Reserve	928
Mudcat Lake Forest Conservation Reserve	396
Cache Bay Wetland Conservation Reserve	3,926
Boom Creek Conservation Reserve	590
Callander Bay Wetland Conservation reserve	319
Boulter-Depot Creek Conservation Reserve	2,348
Fish Bay Conservation Reserve	145
Sausage Lake Forest Conservation Reserve	664
Swan Lake Conservation Reserve	256
Bray Lake Conservation Reserve	265
Raganooter Lake Conservation Reserve	311
McLaren Forest Conservation Reserve	409
South River Forest Conservation Reserve	180

* Includes total area, parts of which may be outside the Nipissing Forest

2.5.3.2.2 Tourism

There is a diverse range of businesses within the Nipissing Forest. The hospitality sector is fuelled by the wide variety of tourism opportunities that the Nipissing forest provides for, including remote access and urban settings. There are over 175 tourism establishments in the area; approximately 120 operate on a year round basis. All establishments for which the number of accommodation units was available are listed in Figure 2.5.3.5. The information provided in the figure was drawn from the most current resource (Ontario Near North Inventory 2000). There are numerous tourist establishments that are not necessarily within the Nipissing management unit however many of their clients partake in activities in the Nipissing forest. This includes eco-tourism and wilderness expedition companies that may operate outside of the management unit boundaries, but utilize the Nipissing forest and local tourism businesses.

Figure 2.5.3.5 Tourism operators within the Nipissing SFL

Business Name	Units	Season
Andorra Lodge	7 cabins, 2 lodge rooms	summer
Angus Lake Lodge	8 cabins, 4 motel rooms	summer
Anima Nipissing Adventurers	5 cabins	summer
Auld Reekie Lodge	6 cabins, 6 suites	year round
Bass Lake Beach	8 cabins, 43 campsites	summer
Bay-Lee-Mac Camp	6 cabins	year round
Becca's Haven	5 cabins	year round
Best Lake Outpost Lodge	7 outpost cabins, bunk house	year round
Bullock's Gowganda Lake Camp	12 cabins	year round
Camp Caribou	5 cabins	summer
Camp Richfield	7 cabins	summer
Camp Tamar	6 cabins, 1 houseboat	summer
Canusa Vacations	7 cabins	summer
Chitaroni's Portage Bay Lodge	9 cabins	summer
Conroy Cabins	7 cabins	summer
Ellen Island Camp	6 cabins	summer
Garden Island Lodge	8 cabins	summer
Golden Eagle Camp	9 cabins, 1 outpost, camp/trailer sites	year round
Gow-Bush-Kon Lodge	9 cabins	seasonal
Glen Aura Cottages & Motel	6 cabins, 6 motel rooms	year round
Happy Holiday Campground - Cottages	cabins, 2 trailers, 150 campsites	summer
Island 10 Retreat	6 cabins	summer
Island Lake camp	1 lodge, 7 cabins	seasonal
Ket-Chun-Eny Lodge	4 cabins, 3 motel rooms	year round
Knight's Fly-In Outposts	2 outposts	summer
Lady Evelyn Camp	4 lodge rooms	summer
Lake Herridge Lodge	10 cabins	summer
Lakeland Airways	5 outposts	summer
Land O' Lakes Lodge	10 cabins, trailer park	seasonal
Leisure Island Houseboat Rentals	12 houseboats	summer
Long Point Lodge	11 cabins, camp/trailer sites	year round
Loon Lodge	1 cabin, 5 motel rooms	year round

Lost Lake Wilderness Lodge	cabins	year round
Lowell Lake Lodge	7 cabins	summer
Maiden Bay Camp	6 cabins	summer
Manitou Lake Lodge	10 cabins, 1 outpost	year round
Marsh Bay Resort	5 cabins, 23 campsites	year round
Matabitchuan Lodge	4 cabins	summer
Mountain Home Lodge	cabins, campsites	seasonal
Northland Paradise Lodge	1 cabin, 7 motel rooms	year round
Obabika Lake Lodge	7 cabins	summer
Ojibway of Keewadyn	19 cabins	summer
Old Mission Resort	7 cabins, 35 campsites	summer
O-Pee-Chee Lake Lodge	12 cabins	year round
Papa John's Place	6 cabins, 15 campsites	year round
Placid Bay Lodge	5 cabins	seasonal
Poplar Point Camp	6 cabins	year round
Pozniak's Lodge	1 lodge, 10 cabins	seasonal
Ravenscroft Lodge	6 cabins, 3 motel rooms	year round
Red Pine Wilderness Lodge	8 cabins	summer
Ridgewood Cottages	6 cabins	summer
Shining Wood Lodge	10 cabins	summer
Silverwater Lodge	10 cabins	year round
Smoothwater Eco-lodge	2 cabins, 5 lodge rooms	year round
Sportsmen's Camp	cabins, campsites	seasonal
Spruce Shilling Lodge	9 cabins	year round
Temagami Lodge	4 cabins, 2 lodge rooms	year round
Temagami Shores Inn & Resort	3 cabins, 20 motel rooms	year round
Three Bouys Houseboats	7 houseboats	summer
Timberlane Cottage Resort	6 cabins	year round
Twin Bears Resort Camp	1 lodge, 7 cabins	year round
Waterfront Inn	41 motel rooms	year round
White Pine Lodge	6 cabins	summer
Wilson Lake Cottages	7 cabins	summer
Wolfhead Camps	7 outposts	summer
Wolf Within Adventures	1 lodge, 1 cabin	year round

2.5.3.2.3 Recreation

The Nipissing management unit has numerous recreational facilities that provide for cross country skiing, dog sledding, hiking, mountain biking, snowmobiling, camping, and ice fishing. There are also a number of recreation activities that occur on Crown land in the Nipissing forest. Some land use permits in Nipissing include trail systems that identify ecology, geology, and historic values, cross country ski facilities, canoe routes, and snowmobile trail systems. Organizations that are associated with and promote trail use on Crown land are:

- Voyageur Multi-Use Trail System
- Discovery Routes Trails
- Near North Trail Association

There are two significant cross-country ski facilities:

- North Bay Nordic Ski Club
- Wasi Ski Club

There are multiple canoe routes in the Nipissing unit. The two major established historical canoe routes are:

- The Mattawa River canoe route
- The LaVase canoe route

The North Bay Mattawa Conservation Authority and the Canadian Ecology Centre are active participants in promoting Crown land use in the Nipissing forest.

2.5.3.2.4 Hunting and Fishing

The Nipissing forest provides opportunity for hunting and fishing on Crown land. Lake Nipissing spans 67 kilometers by 26 kilometers and is the fifth largest lake completely within Ontario. It is comparatively shallow (on average approximately 10 meters) and is consequently well aerated which is conducive to healthy plant and fish life. Lake Nipissing is a popular destination for fishing and contributes a great deal to tourism in the Nipissing management unit. There are dozens of rivers and streams that drain into Lake Nipissing with the largest being the Sturgeon River. There are also a number of lakes that the MNR stocks with fish in the area.

In the entire North Bay district 20,547 resident fishing licenses and 6,517 non-resident fishing licenses were obtained. 11,789 resident hunting licenses and 570 non-resident licenses were purchased.

These license counts for 2006 account for only those licenses purchased from area dealers. Additional licenses that were handled through the Outdoors card centre are not included.

The Ontario Federation of Anglers and Hunters (OFAH) completed a socio-economic analysis of big game hunting for the Nipissing Forest. The analysis estimates the 2007 annual expenditure on the moose, deer and black bear hunts on the Nipissing Forest at $5,779,000. The OFAH analysis is included in Supplementary Documentation 6.1.22, section 2.5.3.2.4.

2.5.3.3 Mining and Mineral Exploration, Aggregates, and Hydro Generation

2.5.3.3.1 Mining and Mineral Exploration

Currently in the Nipissing forest there are two operating mines. Dana Black Granite Limited was established in Dana Township near Sturgeon Falls in 1976. It is a quarry/pit mining operation that produces rough granite. The geographic markets for Dana Black Granite Ltd. include export experience to:

- Japan
- United States
- Maine
- New Hampshire

- o Rhode Island
- o Vermont

The second mine operating in the Nipissing forest is McLaren's Bay Mica Stone Quarry located in McAuslan Township. This is also a quarry/pit mine which produces granite products including; building stone, decorative and ornamental stone.

North West Pacific is in advanced exploration in Dana Township in the Nipissing management unit.

2.5.3.3.2 Aggregates

There are 142 aggregate permits issued in the Nipissing forest for the extraction of sand, gravel, and quarry stone. Additionally there are a number of category 14 pits. In 2005 there were 39 category 14 pits. The total tonnage removed from the pits was 36, 079 metric tonnes.

MNR no longer administers the “tonnage” and “fee” information for permits and Licenses. This is all handled with The Ontario Aggregate Resources Corporation (TOARC) which is a private organization based in Burlington Ontario.

The "royalty rates" for unconsolidated material (sand/gravel) has been $ 0.25 per tonne for the last 30 years. On January 1/07, the royalty rate increased to $ 0.50 per tonne. The "royalty rates" for consolidated material (rock-decorative stone) is still $2.00 per tonne.

2.5.3.3.3 Hydro Generation

There are numerous waterpower generating facilities within the Nipissing forest. With the exception of the Sturgeon Falls dam all generating stations in the management unit hold waterpower lease agreements with the North Bay district of the Ministry of Natural Resources. The Sturgeon Falls generating station is owned privately by the municipality of West Nipissing and was in operation prior to any such waterpower lease agreements. Figure 2.5.3.6 lists all current hydro facilities in the Nipissing area.

Figure 2.5.3.6 Hydro Generating Stations

Generating Station	Owner	Location
Otto-Holden Generating Station	Ontario Power Generation	Ottawa River
Hurdman Dam	Algonquin Power Fund Inc.	Mattawa River
Crystal Falls	Ontario Power Generation	Sturgeon River
Amable Du Fond	Longslide Power	Amble Du Fond River
Elliot Chute	Ontario Power Generation	South River
Bingham Chute	Ontario Power Generation	South River
Nipissing Generating Station	Ontario Power Generation	South River
Giesler Falls	South River Power Corporation	South River
Corkery Falls	Carlisle Ltd. Partnership No.1	South River
Truisler Chute	Trout Creek Power Corporation	South River
Sturgeon Falls Dam	Municipality of West Nipissing	Sturgeon River

2.5.3.4 Other

2.5.3.4.1 Fur Harvesting

Trapping provides seasonal employment for 107 registered trappers within the Nipissing management unit. There are 102 additional resident trappers that trap on private land. The value of the fur harvest per year is $327,719.58. This total is based on the total harvest for the 2006 season. The total number of animals trapped by species in 2006 and the average value of the pelts based on the 2006 average provincial price are outlined in Figure 2.5.3.7.

Figure 2.5.3.7 Number of Animals Trapped by Species

Species	2006 Harvest	Ave. Provincial Price ($)	Value ($)
Beaver	4205	28.87	121,398.35
Mink	409	24.08	9,848.72
Marten	949	79.72	75,654.28
Otter	330	108.13	35,682.90
Fisher	424	94.97	40,267.28
Lynx	49	139.41	6,831.09
Muskrat	3449	7.40	25,522.60
Raccoon	165	12.6	2,079.00
Red Squirrel	59	1.47	86.73
Weasel	226	5.99	1,353.74
Fox	256	28.02	7,173.12
Timber Wolf	13	57.24	744.12
Coyote	42	19.51	819.42
Black Bear	5	50.2	251.00
Skunk	1	7.23	7.23
Totals	10582		327,719.58

2.5.3.4.2 Baitfish Operations

For the year 2005/2006 there were 36 individuals with baitfish licenses, 13 of which were camp operators. North Bay District sells more bait fish licenses than any other district in the province. The bait fish industry supplies the local angling industry and provides supplemental income to individuals involved in either of these industries.

2.5.3.4.3 Bear Management Areas

There are 56 bear management areas in the Nipissing Forest. Bear management areas are licensed to tourist operators to provide bear hunting opportunities.

2.5.3.4.4 Ministry of Natural Resources Employees

There are approximately 420 MNR district employees that are associated with the Nipissing management unit. This includes all districts that are listed as being affected and/or participating in some way with the forest products or management of the Nipissing forest. This number also includes fire management employees, but not the additional employees that are hired on a seasonal basis.

There are approximately 66 employees working in the MNR North Bay District. These employees provide services for both the Nipissing Forest and the Temagami Crown Management Unit.

2.6 Aboriginal Background Information Report

The use of natural resources on the Nipissing Forest by Aboriginal communities has been well documented within their Aboriginal Background Information Reports (ABIR) and Community Demographic Profiles.

There are five Aboriginal communities that have been consulted with during every stage of the development of the 2009-2019 Forest Management Plan. These communities are:

- Antoine First Nation (AFN)
- Dokis First Nation (DFN)
- Mattawa/North Bay Algonquins (MNBA)
- Temagami First Nation/Teme-Agauma- Anishnabai (TFN/TAA)
- Nipissing First Nation (NFN)

The TFN/TAA has one combined ABIR and they have submitted an updated version. The report details their history and assists in explaining their historical use of natural resources. The DFN and NFN also contributed their ABIR's for the 2009-2019 FMP. These two First Nations have some shared values and historically have shared interests in the Nipissing Forest. The AFN and the MNBA also have shared interests in the Nipissing Forest and both have an extensive historical component to their ABIR's. For the time being, the MNBA are currently using their prior ABIR until their new information is finalized by a consultant. The AFN has submitted their ABIR. Refer to section 6.1.7 for more specific information related to the background information reports.

To summarize the extent of natural resources usage by these Aboriginal communities, the ABIR condenses a much wider scope of history such as:

- Almost 400 years of fur trading with Europeans,
- 6000+ years of Aboriginal habitation within the Nipissing Forest
- Evolvement of Aboriginal rights and title
- Evolvement of Aboriginal laws
- Subjection to Treaties or Non – Treaties and Varied Social Pressures
- Early to late lumbering era's

Non-Aboriginal people have only been in the Nipissing Forest for a short glimpse in the Aboriginal history of the area; however, it is their influences which may have caused the greatest impacts for the Nipissing Forest and the Aboriginal. These impacts are evident when studying the physical environment, biological environment, and social environment of the Nipissing Forest.

The forest management-related problems and issues that the Aboriginal communities speak to in their reports reflect historic non-access of forestry based opportunities in the past and present. There is also a statement made by Aboriginal communities through our Aboriginal Working Group meetings that their values are evolving on the landscape and their values are sometimes inherent Aboriginal rights .It should also be noted that in many cases the aboriginal communities are aware that these reports don't cover all of their values and research and additional future funding is needed to expand on their values inventory and verification. Refer to section 6.1.7 for more specific information related to the aboriginal background information reports.

2.7 Values Maps

For each forest management unit, MNR produces a series of values maps, in accordance with the requirements of the Forest Information Manual[20]. The values maps provide a summary of the geographical locations of known natural resource features, land uses and values for the management unit (hence known as MNR values), including parks and protected areas, which will be considered in forest management planning, and about which further inventory information is available. A value is considered to be a known value when there is sufficient information to describe its geographic location and its basic features at the time of printing. Existing roads and approved primary road corridors, as well as roads with access restrictions, are also portrayed on the values maps.

The values maps are intended to be used primarily as background information for planning, and will also be used for display purposes and to solicit additional information about MNR values.

Also, where a known value may be affected by forest management activities, the Forest Management Planning Manual[21] requires that a defined geographic area adjacent to the feature be established. The defined geographic area is called an "area of concern" (AOC). An operation prescription is developed for each AOC or group of AOCs to prevent, minimize or mitigate adverse effects of forest management operations on the value. Operation prescriptions for AOCs may be reserves (e.g. prohibition of operations), modified operations (e.g., specific conditions or restrictions on operations) or regular operations (e.g. in accordance with the silvicultural ground rules), individually or in combination.

Additional information regarding the development of operational prescriptions for AOCs associated with known values on the Nipissing Forest is provided in Section 4.2.1 Operational Prescriptions for Areas of Concern.

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[20] OMNR. April 2007. Forest Information Manual, Base and Values Technical Specifications. Toronto: Queen's Printer for Ontario: pages 31 and 37-51

[21] OMNR. June 2004. Forest Management Planning Manual for Ontario's Crown Forests. Toronto: Queen's Printer for Ontario: pages A-22.

The values maps are created and maintained at the North Bay MNR District office. They are continually updated as information is assembled during the production and implementation of the forest management plan.

Sources of information and methodologies used in the acquisition or collection of MNR values include field surveys, historical records, stakeholder information, reports from the public, and data from other Ministries. MNR values information is stored in the Natural Resources Values Information System (NRVIS). NRVIS is a Geographic Information System (GIS)-based system for managing the storage of the digital data in a standardized format, though certain data sets may be created, stored and maintained at the North Bay MNR District Office, when no home is available for it within NRVIS. MNR will update and provide the most current, relevant information available on MNR values for use in forest management planning.

Information on MNR values will be generally available to the public. Certain values such as the location and description of Aboriginal values, cultural heritage sites, and Species at Risk may be considered as “sensitive information” that, if released or portrayed on maps may pose a threat to their existence, integrity, or health. MNR values considered to be “sensitive” shall not be made available or accessible to the public, nor will they be portrayed on the values maps.

The Values Maps are found in section 6.1.2; the standard series of Values Maps are, and contain:

Map Title	Composite Scale	Operational Scale	Values depicted along with base features
Natural Resources Features Wildlife & Forest	1:150,000	1:50,000	Moose calving site Deer/moose wintering area Moose aquatic feeding area Crown game preserve Mineral lick Nesting site Research plot Significant ecological area Area of natural & scientific interest
Natural Resources Features Fisheries & Wetlands	1:150,000	1:50,000	Baitfish area Spawning area Thermal coding of waterbodies Identified brook trout stream Provincially significant wetland
Resource Uses	1:150,000	1:50,000	Recreation access point Boat cache Boathouse Designated camping site Canoe route Portage Trails

			Cottages Wild rice stand Cranberry marsh Water supply area Tourism lake Outpost lake Cottaging lake Enhanced management area Potential tourism area Commercial tourism facility
Land Values	1:150,000	1:50,000	Land Use Permit area Land ownership Municipal boundary Waste disposal site Area under Aggregate Permit Category 14 Pit site Road allowance Dam Active mining claim
Bear Management Areas	1:150,000	n/a	Bear management areas
Trapline Areas	1:150,000	n/a	Registered trapline Trapper cabin
Resource-Based Tourism Values	1:150,000	n/a	Existing recreation lake Commercial tourism facility
Cultural Heritage Values	1:150,000	n/a	High Potential Area Traditional Use Area

3.0 Long-term Management Direction

3.1 Introduction

The long-term management direction for the management unit provides guidance for the levels of access, harvest, renewal and tending activities required to achieve the desired forest and benefits. In the development of the long-term management direction, management objectives and indicators were identified and analytical methodologies, models, and tools regarding forest regulation, social and economic assessment, wildlife habitat supply and landscape management were used. This information will be discussed in more detail in Sections 3.2.1 through 3.6. All of this information is used in developing a management strategy (Section 3.7) that balances social, economic, and biological objectives over the long-term.

The level of harvest, as well as the criteria used in the selection of harvest areas (sections 3.8 and 3.9), is established for the 10 year period of the Plan. These criteria are based on forest regulation, models and tools that determine the available harvest area for each forest unit (FU) on the Forest.

The long-term management direction also provides a means of assessing the sustainability of the management strategy through the measurement and monitoring of indicators that have been developed for each management objective (Section 3.10). These management objectives have been developed by the planning team and form the basis to develop the desired forest and benefits.

3.2 Current Forest Condition

3.2.1 Forest Units

A forest unit is an aggregation of forest stands for management purposes which has similar species composition, develops in a similar manner (both naturally and in response to silvicultural treatments) and is managed under the same silvicultural system (OMNR, 1996). Forest units are among the fundamental building blocks of a forest management plan. They are used to describe current, and project future, forest conditions in the FMP.

The starting point for the development of the forest units is a regional set of sequential queries that create what is referred to as the standard forest units. The forest units selected for the FMP had to originate from the chart provided in section 6.1.31, Forest Unit Description, pg 4-7. The finest level of forest unit is in the column at the far right of the chart named standard forest units, a total of 33. These 33 units represent unique ecological and compositional conditions in forest types standardized for the great lakes region in Ontario. The planning team first needed to decide whether or not to group standard forest units into intermediate planning units or landscape units based on the connecting arrows and pathways prescribed in the chart. Landscape, intermediate planning and standard forest units that are highlighted in yellow in the relationship diagram indicate the selected forest unit. This initial grouping exercise was undertaken to reduce the number of forest units from the standard forest unit level of 33 to a more pragmatic total. The goal of the exercise was to strike a balance between limiting the number of forest units for practical purposes (e.g. calculating targets and implementing FMP strategies) and considering significant ecological, functional and developmental differences in forest types. The resolution of strategic planning and the forest projection methodologies and tools (e.g. SFMM) were also considered during the grouping exercise. The goal of balance was achieved after detailed analysis of the planning inventory was combined with consultation with the planning team, the MNR District, Region as well as Southern Science and Information FMP advisors.

Standard forest units are typically calculated to stands in the planning inventory using the Structured Query Language (SQL) sequence in section 6.1.31 (provided to the planning team by the MNR). During the analysis of the standard forest units and resulting forest unit assignment, the planning team noted some stand level anomalies requiring the development of “Adjustment SQLs” in section 6.1.31 to further ensure that stands were assigned to an appropriate forest unit based again on ecological, functional and developmental considerations. In addition to these fixes, the planning team also recognized the forest unit combination used in previous plans was not representative of hardwood selection and shelterwood in actual stand conditions. The SQL overestimated the proportion of tolerant hardwood stands that are suitable for management using the selection silviculture system (HDSEL forest unit) and those suitable for management using the shelterwood silviculture system (HDUS forest unit). Experience with this forest type on the management unit had indicated that tolerant hardwood stands in the planning inventory with a site class of 2 or less were generally good candidates for the selection system and stands with a site class greater than 2 were good candidates for the shelterwood silviculture system. All stands that were assigned to the HDSEL forest unit with a site class of 2 or greater were reassigned to the HDUS forest unit. The levels of yellow birch, poplar and white birch were also used as indicators in the inventory to adjust the stands from selection condition to shelterwood. This Adjustment SQL is documented in section 6.1.31. This adjustment should reflect more accurate wood supply and wildlife habitat projections in the model, more closely reflecting actual stand level prescriptions and ground conditions.

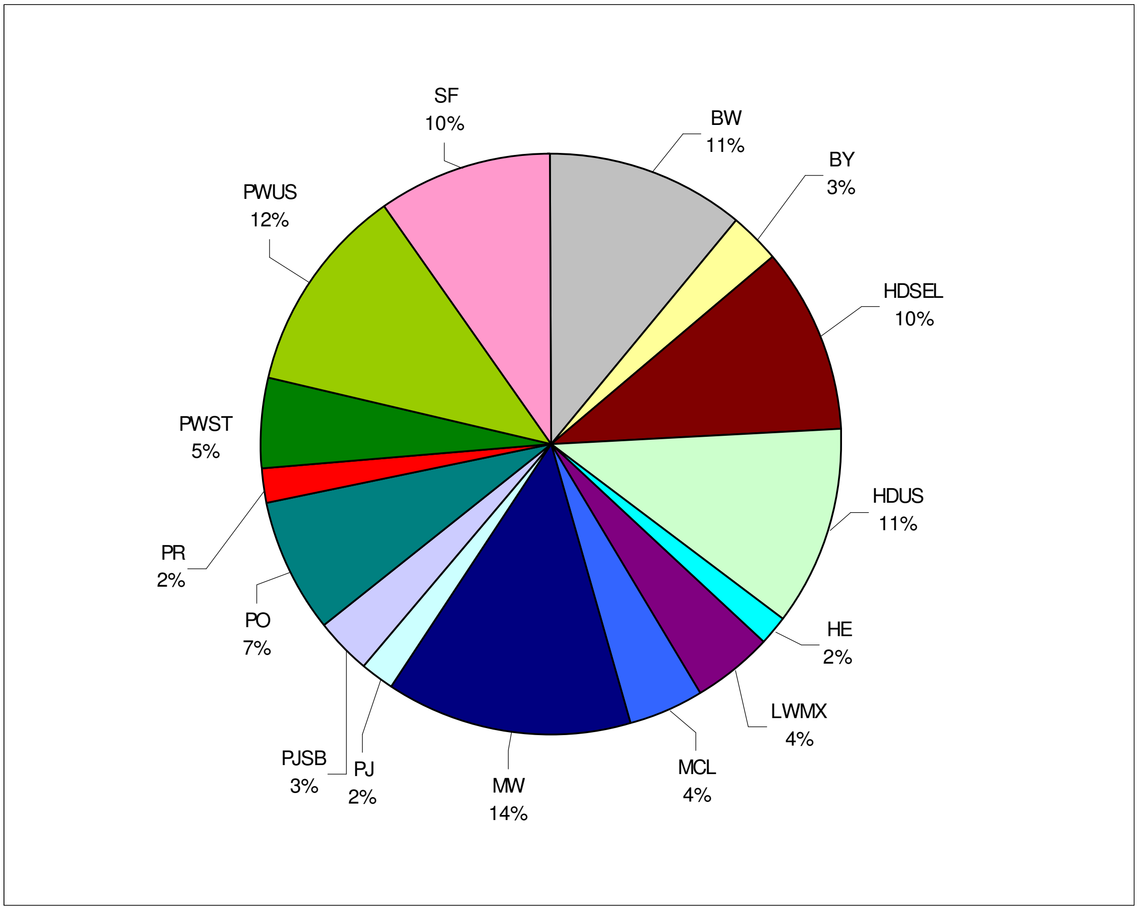
There are 15 forest units on the Nipissing Forest. Table FMP-3 provides a description of each, including the relationship between forest units and the forest ecosystems of Central Ontario (FEC)[22], most commonly referred to as ecosites. A description of the silviculture system that will be implemented on each forest unit, and provincial forest types are also shown in Table FMP-3. Table FMP-3 can be found in section 9.0 of the Plan.

Figure 3.2.1.1 shows the breakdown by percent Crown productive forest area (Crown managed and Crown park) covered by the fifteen forest units. No one forest unit

[22] Field Guide to Forest Ecosystems of Central Ontario, OMNR, 1997.

dominates the Nipissing Forest. Six forest units each make up 10% to 14% of the productive forest and the remaining nine each make up 2% to 7 %.

Figure 3.2.1.1 Distribution of Forest Units on the Crown Productive Forest



Section 6.1.31 lists the 15 forest units and provides information including area-weighted average species composition, stocking and site-class. There are five uniform shelterwood forest units comprising about 192,209 ha and 32% of the forest. The nine clearcut forest units add to about 349,340 ha or 58% of the forest; and there is one selection forest unit for the tolerant hardwoods comprising 68,855 ha or 10% of the forest.

Table FMP-4, Summary of Managed Crown Productive Forest by Forest Unit, found in section 9.0, summarizes the proportion of forest units on the managed Crown landbase. The table shows 509,635 ha as available production forest; this is a 5.5% decrease since the last plan when there were 538,970 ha. The decrease is the result of spatial area of concerns being realized in the strategic calculations of the landbase in this Plan. There are an estimated 38,377 ha tied up in riparian reserve on the forest, accounted for in the initial landbase. There is more Managed Crown Productive Forest in this plan compared to the 2004 Plan due to the absence of a non-forest category used in the modeling. These areas were assigned unique silviculture intensities to account for areas that are productive, however not free-to grow at this point.

The table also lists age class distribution for each forest unit, and the amount of protection and production forest. Production forest is further divided into unavailable and available forest. The unavailable columns in the table identify area within area of concern reserve (management reserve), based on the 2004 FMP riparian reserve estimate, as well as any area anticipated to be regulated OLL in the near future. Protection forest is also separated from the production forest. There are no other areas made unavailable for harvest in the landbase.

The following text provides a summary by forest unit of the managed Crown production forest.

The **mixedwood forest unit (MW)** is the most extensive at 75,779 ha or 14% of the managed Crown production forest. No one species dominates this forest unit. The weighted average species composition is 20% each white birch, poplar and balsam fir and 10% each white spruce, red maple, black spruce and white pine. This forest unit is designed to represent stands that are typically a 60-40% split between hardwoods and conifer (or vice versa). Some stands in this forest unit supported white pine and red pine in the past, and objectives have been established to restore these species. Ecosites 18, 21, 22 and 17 are most prevalent.

The **tolerant hardwood uniform shelterwood forest unit (HDUS)** comprises 11% of the managed Crown production forest, covering 62,887 ha. It is very mixed with 30% hard maple (sugar maple) and 10% each of red oak, yellow birch, white birch, hemlock, white spruce, balsam fir and poplar. It is mostly on ecosites 27, 28, and 29, with some on ecosite 14. The stocking in the uniform shelterwood forest unit is generally lower than that in the tolerant hardwood selection forest unit. The forest unit was developed to capture stands that have a high proportion of mid-tolerant hardwood species (e.g. red oak and basswood) as well as poorer quality tolerant hardwood stands with a relatively low proportion of "acceptable growing stock". The area within an average composition of this forest unit is the most significantly changed from the 2004 plan to the 2009 plan. The planning team decided based on annual reporting trends, that much of the categorized selection hardwood was being prescribed and treated in a shelterwood condition. With the help of the Forest Research Partnership (FRP), the planning team adjusted the area categorized by the standard forest unit as selection hardwood to shelterwood hardwood if it possessed a certain stocking level, and level of mid-tolerant species, as well as a certain level of tolerant hardwood species. These were identified by local experts as a reliable way to refine the forest unit SQL. The result was approximately 22,000 hectares re-categorized from selection to shelterwood management, making the team more comfortable that the groupings were closer to reality according to the annual report and FOP information.

The **tolerant hardwood selection forest unit (HDSEL)** comprises 10% of the managed Crown production forest with 57,494 ha. The weighted average species composition of the stands in this forest unit is 50% hard maple, and 10% each of red oak, yellow birch, red maple, white birch and hemlock. This forest unit is predominately ecosite 28 and 29.

It is distinguished from the tolerant hardwood uniform shelterwood forest unit primarily by having higher stocking and site class. This forest unit has declined in area after the re-categorization previously discussed with the tolerant hardwood shelterwood.

The **white pine uniform shelterwood forest unit (PWUS)** is and has been the focus of major restoration efforts and now covers 62,935 ha ranking second in coverage at 12% of the managed Crown production forest. Projections in the management strategy are to see an increase the amount of area on the available forest to 88,791 ha by 2109 (see FMP-7 for details of the management strategy projection). It will be restored to the largest forest unit on the Nipissing Forest in about 40 years. The PWUS forest unit occurs on ecosites 11, 20, 21 and 18 and consists of stands containing 40% white pine, and 10% each of white birch, poplar, red pine, white spruce, balsam fir and red maple.

The **white birch poplar mix forest unit (BW)** is at 60,655 ha or 11% of the managed Crown production forest. It is 40% white birch, 20% poplar and 10% each of balsam fir, red maple, hard maple and white spruce. It occurs in ecosites 17, 18 and 21 and 27 to a lesser extent. This forest unit is designed to capture hardwood forests that are not suitable for selection (HDSEL) or shelterwood (HDUS) and have less than 50% poplar. BW forest unit name may be somewhat of a misnomer given that a stand without the white birch species (refer to standard forest unit SQL in section 6.1.31 could qualify for this SFU.

The **spruce/fir forest unit (SF)** makes up 10% of the managed Crown production forest. The spruce fir forest unit is 53,952 ha. Spruce/fir is made up of 20% each of black spruce and balsam fir, and 10% each of white spruce, cedar, white birch, white pine and poplar and other hardwoods. This forest unit occurs on rich sites where competition is often an issue, so it will usually be treated intensively. Ecosites 16, 22, 18 and 21 are prevalent.

The **poplar forest unit (PO)** contributes to 7% of the managed Crown production forest. It occurs on ecosites 17, 18 and 14 and consists of 60% poplar and 10% each of white birch, balsam fir, white spruce and other hardwoods. The forest unit is comprised of stands with >40% composition of *populus* genus (i.e. trembling aspen, large-tooth aspen and/or balsam poplar).

The **white pine seed tree forest unit (PWST)** covers 5% of the managed Crown production forest. It is comprised of stands consisting of 30% white pine and 10% each of poplar, white birch, red pine, white spruce, balsam fir, black spruce and other hardwoods. PWST is similar in species composition to the MW forest unit with the exception of having a combination of red pine and white pine making up more than 40% of the stand species composition. Dominant ecosites in this forest unit include 11, 18, 21 and 20. Ecosites 11, 20, 21 and 14 identify stands where the opportunity exists for restoration to the PWUS forest unit.

Two forest units that each make up 4% of the managed Crown production forest are the **lowland mixedwood (LWMX)** and the **mixed conifer lowland (MCL).** The LWMX forest unit (ecosites 17, 33, 35 and 21) differs from the mixed conifer lowland (ecosites

16, 33, 31 and 32) in that the former has 60% tolerant to semi-tolerant hardwoods and is managed with the uniform shelterwood silviculture system. The MCL forest unit identifies stands where a combination of black spruce, cedar, balsam fir and other conifers exist. This forest unit is managed under the clearcut silviculture system. The planning team has set an objective to ensure that the cedar and spruce composition of this forest unit remain relatively similar to ensure the wildlife habitat value is protected within this forest unit.

The jack pine upland black spruce mix (PJSB) and the **yellow birch (BY)** each make up 3% of the managed Crown production forest. Trees in the PJSB forest unit generally grow more quickly than the lowland black spruce in the mixed conifer lowland forest unit but not as aggressively as pure jack pine forests. This forest unit is comprised of stands typical of ecosites 16, 15 and 13 and 19, where black spruce makes up at least 40% of the species composition.

Yellow birch is highly valued. It has different regeneration and light requirements, and initially grows more quickly, than the other semi-tolerant hardwoods. For these reasons, it is tracked separately from the HDUS forest unit. Stands with a species composition of >40% yellow birch comprise the BY forest unit, most typically on ecosites 28, 29 and 30.

The remaining three forest units - **red pine (PR), jack pine (PJ)** and **hemlock (HE)** each make up 2% of the managed Crown production forest.

The PR forest unit (ecosite 12) is relatively pure (>70% red pine in the species composition) and consists primarily of red pine plantations established during the late 1950's and onward. Red pine growth is generally very aggressive and responds well to silviculture treatment such as pre-commercial and commercial thinnings.

The PJ forest unit (ecosite 15, 13, 16 and 19) is also relatively pure (>80% jack pine in the stand species composition) typical of a boreal condition. Because this forest condition is relatively rare in the Nipissing Forest, objectives and targets have been established to maintain its current area and extent.

Hemlock typically grows in association with tolerant hardwoods and is often managed together with the hardwoods. However, much like the rational for the BY forest unit, hemlock develops differently than do tolerant hardwoods and is valued for wildlife habitat. Furthermore, the reduction in the extent and overall area of hemlock forests from historical levels has prompted the establishment of objectives and targets for restoration. The HE forest unit is comprised primarily of ecosites 28 and 30 and having at least 50% hemlock. The Plan currently has no market demand set in the objectives for hemlock, and prioritizes this forest condition as valued wildlife habitat.

The forest units presented in this Plan were agreed upon after a thorough review by the planning team, the MNR District, Region as well as Southern Science and Information FMP advisors.

More details related to forest units on the Nipissing Forest are available in section 6.1.6, Analysis Package, Planning Landbase and Base Model sections. Also, section 6.1.31 contains background information and statistical information related to each forest unit.

3.2.2 Habitat

3.2.2.1 Habitat Classifications

It is key to remember that each species selected is a representative or indicator of sustainability for a particular habitat condition or conditions. The revised, January 2004 version of the Wildlife Habitat Suitability Models[23] and the March 2000 Ontario Wildlife Habitat Analysis Model[24] were used to assess the implications of the proposed operations and the Long-Term Management Direction on the preferred forest habitat conditions represented by this group of species (FMP-8 & FMP-13). Plan start levels, area measured in hectares of habitat, were compared to projected levels for proposed operations for the long, medium and short terms. Changes in the provincial wildlife habitat matrices, along with updates to the FRI since the preparation of the 1999-2004 Plan, have influenced the results achieved in this plan, and hence, make direct comparisons of habitat supply changes difficult.

Habitat units are the ecological units of measure for the Plan. They are mapping units that represent a consistent set of vegetation and site conditions based on the forest ecosystem classification program for the Great Lakes St. Lawrence Forest[25]. In total, there are 25 ecosite types/habitat units for the GLSL[3]. A complete description of each ecosite type is available in either Chambers (1997) or Holloway (2006). They are proportionately related to the identified forest units (FU) on the forest (see FU:HU Matrix). Additionally, in order to ensure a range of habitat conditions are managed across the forest, a range of development/seral stages must also be considered. The development stages or seral stages in the model represent seven distinct age classes associated with identifiable differences in stand structure and composition. These have been standardized across the GLSL forests and the age range associated with each development stage varies among ecosites. Table 8 in the wildlife part of the analysis package (section 6.1.6), illustrates the suite of ecosites along with the seral stage definitions for each, to be used in this Plan and are as per the assumptions developed by Holloway (2006).

The habitat units form the basis of the Habitat Suitability Model developed by Holloway (2006). This model is used for the aspatial tests of sustainability for the Plan. Note, for

[23] Holloway, G.L., B. J. Naylor, and W. R. Watt, Editors. 2004. Habitat relationships of wildlife in Ontario. Revised habitat suitability models for the Great Lakes-St. Lawrence and Boreal East forests. Ontario Ministry of Natural Resources, Science and Information Branch, Southern Science and Information and Northeast Science and Information Joint Technical Report #1. 110p.

[24] Naylor, B,D. Kaminiski, S. Bridge, P. Elkie, D. Ferguson, G. Lucking, and B. Watt. 1999. *User's guide for OWHAM99 and OWHAMTool* (Version 4.0). OMNR, SCSS Tech. Rpt. No. 54.

[25] Chambers *et al.* 1997

this plan we will be using the GLSL Habitat Suitability Model as described by Holloway (2006) and no modifications to the model assumptions were required.

3.2.2.2 Aspatial Habitat Supply Analyses

Aspatial habitat supply analyses are a mandatory component of the forest management planning process. These are completed to ensure that a diversity of suitable habitat conditions are maintained or created on the Forest through time while ensuring the long-term sustainability of the Plan. Habitat availability for the selected species (FMP-8 & 13) was modeled for the 16 terms of the Plan at various stages during the planning process:

- Plan Start
- Preliminary Tests of Sustainability – Preliminary Proposed Management Strategy (PMS)
- Draft Plan Test of Sustainability (if changes to PMS were required)
- Final Plan Test of Sustainability (if changes to PMS were required)

For this Plan, the aspatial modeling was performed by the Plan Author in association with the Plan Biologist and then presented to and approved by the planning team. The maximum ecological attainable level with forest operations for the mature, over-mature, and the 16 wildlife species, was achieved at 80% with an agreed upon lower limit of 70%. These two numbers respectively become our desired and targeted **minimum** levels of achievement of the natural benchmark runs. Unless otherwise stated, the target (70%) was the minimum amount of any particular ecological condition required to pass any of the aspatial tests of sustainability and that must be maintained in the model.

Plan start and projected Plan end results based on the proposed allocations, proposed management strategy, and the desired and targeted levels at the various stages of development of the Plan were compared and assessed in reference to the trends indicated by the natural benchmark for each species for the short, medium and long terms.

SFMM was also used to assess present and future (to 2169) preferred habitat supply for all of the provincially and locally featured species along with the suite of mandatory old-growth species non-spatially (expressed as an area in hectares). The supply of preferred habitat for the no-harvest natural benchmark run (unmanaged) and the impacts of the proposed operations and Long-Term Management Direction (managed) runs on the aspatial supply of preferred habitat are assessed in accordance with the defined management objective. The results of these runs at the various stages of developemnt of the Plan, along with graphic representations of the managed versus unmanaged runs, are found in the wildlife part of the analysis package, section 6.1.6, for each species. Note that, due to different base model inputs, changes to the format of the FRI database and changes to the wildlife suitability models, strict one-to-one comparisons to estimates provided during the preparation of previous plans are not possible.

SFMM was also used to assess present and future (to 2169) preferred habitat supply for the species at risk (red-shouldered hawk and southern flying squirrel) non-spatially (expressed as an area in hectares). The supply of preferred habitat for the no-harvest natural benchmark run (unmanaged) and the impacts of the proposed operations and Long-Term Management Direction (managed) runs on the aspatial supply of preferred habitat are assessed in accordance with a defined management objective (management objective #13 for aspatial analysis, and #14 for spatial analysis, section 3.6, 3.7 and 3.10). The results of these runs at the various stages of developemnt of the Plan, along with graphic representations of the managed versus unmanaged runs, are found in the wildlife part of the analysis package, section 6.1.6, for each species. Note that, due to the nature of SFMM and the red-shouldered hawk's spatial habitat requirements, a unique target was used for management objective #13 (a minimum of 65% of natural benchmark value into the long-term) was set for this species in SFMM (details related to the objective can be found in section 3.6 and 3.10 of this Plan). Essentially, this is for two reasons. Firstly, the supply of red-shouldered hawk habitat currently on the forest is far in excess of what can reasonably be expected to be occupied. For example, there is a large amount of apparently ideal habitat north of the French and Mattawa rivers, and the models concur with this analysis, but we are unaware of red-shouldered hawks ever having been found in the vast majority of that portion of the forest. Secondly, it appears that, given reasonable expectations around hawk densities over the medium term, SFMM estimates are hugely inflated, due to a lack of spatial representation for the preferred aspects of the species' habitat in the SFMM model's habitat matrix. The species selects its habitat with several spatial criteria of the forest stands relationship to road networks, building structures, open meadows and water bodies. The non-spatial nature of SFMM is unable to temper its estimate of the preferred habitat with consideration of these landscape metrics on the management unit. Nevertheless, if we reduce to a more reasonable level the RSH constraint in the model, the model tends to severely over-allocate the desired condition leaving us with little room for population growth and expansion. The planning team is satisfied that a minimum of 65% of the natural benchmark adequately assures the supply of RSH habitat well into the future. Note as well that, due to different base model inputs, changes to the format of the FRI database and changes to the wildlife suitability models, strict one-to-one comparisons to estimates provided during the preparation of previous plans are not possible.

3.2.2.3 Spatial Habitat Supply Analyses

Spatial habitat supply analyses, using the Ontario Wildlife Habitat Analysis Model (OWHAM), are also a mandatory component of the forest management planning process for provincially featured species. These are completed to ensure that these habitat conditions are managed on the Forest through time while ensuring the long-term sustainability of the Plan. Habitat availability for SAR, red-shouldered hawk (when a provincially regulated spatial model is available and appropriate) and the provincially featured species, moose, white-tailed deer and pileated woodpecker were modeled (FMP-13 in section 9.0) at the various stages mentioned above during the planning process pre (2009) and post (2019) harvest.

For this Plan, the modeling was performed by the District Analyst in conjunction with the Plan Biologist and then presented to and approved by the planning team. Desired levels for red-shouldered hawk and pileated woodpecker were set to afford a 5% and 12% range

of variability, respectively, as per other plans across the province and due to the nature of the inventory and models. Desired levels and targets for moose were set based on the direction of the Timber Management Guidelines for the Provision of Moose Habitat (OMNR, 1988) along with district strategies for managing the local herds. Desired levels and targets for white-tailed were set based on direction from the Draft Deer Wintering Habitat Prescriptions in Management of Great Lakes-St. Lawrence Forest: A Training Note (2006) along with district strategies for managing the local herds.
Once again, plan start and projected plan end results based on the proposed management strategies and allocations were compared at the various stages of development of the plan and assessed in reference to the objectives and targets set by the planning team for each provincially featured species. And once again, due to changes in the model assumptions and FRI, direct comparisons to the previous plans estimated values were not appropriate.

Spatial modeling results for Plan start preferred red-shouldered hawk habitat projected in OWHAM are as follows (Figure 3.2.2.1 from the wildlife part of section 6.1.6). Additionally, OWHAM was used to map the home range territories preferred habitat in suitable condition pre and post harvest (wildlife part of section 6.1.6). These maps, of preferred red-shouldered hawk habitat, demonstrate the spatial distribution of this habitat condition at plan start on the landscape (wildlife part of section 6.1.6).

Figure 3.2.2.1 Plan Start Spatial RSH Habitat Summary

Plan Start 2009

HABITAT_CL	USED__HA_	PREFERRED_HA
HSI1	26115	80715
HSI2	770946	65250
HSI3	5180	1038960
HawkFinalHSI	57654	36471

Plan start results indicate that there is currently only 2179.3 ha (9.5%) of the Crown productive forest available in the severe winter thermal cover condition, in the Loring Deer Yard. A target was set to at least maintain the current level and in the long term move towards the desired level of 30% (6879.6 ha) of the yard in a CTC (critical thermal cover) condition. In addition to this, a specific AOC prescription was developed that will serve to manage this condition in the areas of operations within the Loring Deer Yard.

Based on MNR’s current deer management efforts to either maintain or reduce local deer numbers, Voigt recommends 10% of the summer range for deer be in fields, openings and early successional habitat and 5% of the area should be in permanent openings.

FMP 1 was used for this analysis. When calculating area in open fields, the following attributes were used; agriculture, fields, meadows and recent disturbances (section 6.1.6). When calculating area in permanent openings the following fields were used; agriculture, fields and meadows (section 6.1.6).

Plan start estimates indicate that there are currently 66,497ha (7%) of the Crown productive forest available in open habitat condition (section 6.1.6). A target was set to at least maintain the current level and, in the long term, to move towards a desired level of 10% (94,742.1 ha) of the summer range in openings. Plan start results also indicate that we are close to the 5% recommended by Voigt for permanent openings (44,756 ha) (section 6.1.6). Due to the nature of the definition of permanent openings and given the large dependency on patent land (which we do not manage within the scope of the FMP), an objective for this feature was not set.

Figure 3.2.2.2 Plan Start Summer Range Summary

Suitable Summer Range Analysis Summary - Plan Start 2009

	crown	patent	other	Combined
agricultural/meadows	486	44270	20	**44776**
recent disturbances	21704	13	4	21721
total	**22190**	**44283**	**24**	**66497**
Total Area	676,389	233744.64	37286.4	**947,420**
%	3.28	18.95	0.07	7.02

Spatial modeling results for Plan start preferred pileated woodpecker habitat projected in OWHAM are as follows (Figure 3.2.2.2, wildlife part of section 6.1.6). Additionally, OWHAM was used to map the home range territories (40 hectares) made up of preferred habitat in suitable condition pre and post harvest (wildlife part of section 6.1.6). These maps, of preferred pileated woodpecker habitat, demonstrate that pileated woodpecker habitat is widely distributed on the landscape and in good supply at plan start (wildlife part of section 6.1.6).

Within harvested stands, snags, downed woody debris and live trees will be left to provide pileated requirements at the stand level as per the *Forest Management Guidelines for the Provision of Pileated Woodpecker Habitat* (OMNR,1996) and the NDPE guidelines (OMNR, 2001).

Figure 3.2.2.3 Plan Start PWIO Habitat Suppy Modelling Results

Plan Start 2009		
HABITAT_CL	USED__HA_	PREFERRED_HA
PiwoHSI1	153457	286041
PiwoHSI2	138500	280400

Spatial modeling results for Plan start suitable moose summer and winter habitat projected in OWHAM are as follows (Figure 3.2.2.3, wildlife part of section 6.1.6). Additionally, OWHAM was used to map Plan start moose critical or preferred habitats (summer thermal, late winter, early winter and aquatic feeding areas) and to predict the habitat component that is limiting the productive capacity on the landscape pre and post harvest (wildlife part of section 6.1.6). This analysis directs the stand level strategies for the provision of moose habitat in the development of the plan and the first five years of operational block planning.

As in the past, spatial modelling indicates that natural supplies of thermal cover for moose are limiting on the management unit (wildlife part of section 6.1.6). As such, area of concern and operational (NDPEG) planning will continue to be implemented to ensure those values that do exist on the landscape are afforded the appropriate protection and this condition is maintained into the future as per the requirements outlined in the The *Timber Management Guidelines for the Provision of Moose Habitat* (OMNR, 1988).

Figure 3.2.2.4 Plan Start Moose Habitat Suppy Modelling Results

MOOSE_HABITAT	Plan Start VALUE
Dormant season cover (ha)	81869.20
Dormant season browse (mean kg/ha)	15.79
Dormant season range (ha)	698744.00
Growing season cover (ha)	68910.50
Growing season forage (mean kg/ha)	23.49
Growing season range (ha)	869467.00
K total (#/km2)	0.45
K dormant season (#/km2)	0.57
K growing season (#/km2)	0.65
K aquatic feeding habitat(#/km2)	0.82

3.2.3 Forest Landscape Pattern

There were several landscape pattern considerations feeding into the development of the strategic direction of the Plan.

As illustrated in the previous section, spatial wildlife considerations were given to four species on the Forest in the development of the management strategy, including deer, moose, pileated wood pecker and red shouldered hawk. Maps of landscape pattern for the current and projected condition can be found in section 6.1.2.4.

In addition to these, the Natural Disturbance Pattern Emulation Guideline (NDPEG) was implemented to the Great Lakes/St. Lawrence standard. There were two main spatial considerations associated with the emulation of natural disturbance in the strategic direction of the 2009 Plan. The first was related to the planned harvest areas possessing the requirement to have at least 90% of the planned clearcuts less than 260 ha in size, while the remaining 10% could be greater than the 260 ha marker. The second assessment determined how well the selected allocation contributed to movement towards the natural disturbance template, in terms of disturbance size classes.

Three Natural Disturbance Pattern Emulation Guideline (NDPEG) simulations were run. These were: at “Plan Start”, at “Plan End without Allocations”, and at “Plan End with

Allocations”. The first was to provide an illustration of the Forest at the beginning of the Plan; the second was to give the planning team an idea of how the Forest was changing in a natural scenario, excluding any type of disturbance (man made or natural); and the third was to measure how the allocations fit into the landscape pattern. The first and third of this series has been mapped and provided in section 6.1.2.4. These runs, along with the natural disturbance template for the Forest have been used as background information in the Plan, and are explained in section 2.2.6 of this Plan. Details around analysis can also be found in section 6.1.6, Analysis Package, Planning Database.

Natural disturbance pattern is evaluated on the landscape using the percent frequency and/or percent area of disturbances in various size classes, set out by the forest management planning manual. Moving toward the natural disturbance template was interpreted by the planning team as being closer to the template value (% in a certain size class) for each size class than the plan start level, even if the “move toward” ended up on the other side of the template figure. For instance, for disturbances in the size class 0-100 hectares, a plan start level of 73% frequency (or 73 of 100 total disturbances) was measured. The template illustrates a desired level of 69% (or 69 of 100 total disturbances). The planning team defined ‘moving toward’ as the net difference between the plan start and the desired level demonstrated by the template. In this size class, plan end with allocations should be less than 4% (73%-69%), regardless of whether it is less than or greater than the desired level.

In a general case, the preferred harvest areas associated with the proposed management strategy provide for movement toward the template. Targets were met in all but two of the frequency measures and all but one of the area measures, however in two cases, the indicator is within the range of the desired level. A detailed discussion about the results of how the management strategy compared to the template is located in section 3.10.

The second landscape pattern consideration playing a large role in the management direction of the Forest is the provision of spatial old growth. The current distribution of old growth is well distributed across the Forest, in both managed and park reserve areas on the management unit. The desire of the team was to maintain this spatial distribution. In addition to this distribution forest wide, the team also developed a strategy that would provide for and increase in the frequency and size of contiguous patches of this forest condition on the landscape. Both the current and projected forest conditions for this landscape pattern are provided on mapping products in section 6.1.2.4. A detailed discussion about the results of how the management strategy compared to the current forest condition is located in Section 3.10.

Specific information regarding the current landscape pattern in relation to old growth and NDPEG is provided in section 2.2.6, and the Old Growth Strategy in section 6.1.25.

3.2.4 Other Forest Classifications

There were several other forest classifications that were considered in the development of the strategic direction of the Plan.

The most prominent was the ecosite classification of the forest by SFMMTool Version 4.01. This classification formed the basis for the connection between the forest units and the habitat for species modelled in the SFMM. Details regarding this relationship can be found in the analysis package, section 6.1.6.

Although no flora of local concern are known to occur in the areas planned for operations, area of concern prescriptions for several species have been prepared since there is potential that some of them might be encountered during operations. Please refer to section 4.2.1, Operational Prescriptions for areas of concern, and table FMP-14, section 9.0 for more details.

Several Provincial Parks and other protected areas are found wholly or in part in the Forest; further information regarding parks and protected areas can be found in the Social & Economic Description (Section 2.5.3). See supplementary documentation section 6.1.2 for maps showing illustrating land classification on the management unit. These areas were included in spatial analysis performed relating to old growth, disturbance, and wildlife habitat pattern analysis.

Cultural heritage resources, including archaeological potential areas and a summary of Aboriginal Background Reports, are located in Section 2.6. Archaeological potential areas can be found on the operational scale harvest maps in section 6.1.2. These areas influenced some of the decision making related to the selection of harvest operations on the Forest.

The planning team also considered results of the preliminary GAP analysis performed on the Forest in the selection of the allocation. Efforts were made to minimized harvest in areas of special interest identified by Provincial GAP analysis. The analysis was completed by Ontario Parks, to assist NFRM with Forest Certification requirements, and identified under represented landforms and vegetation on the Forest. The planning team considered this information when selecting areas for operations in the ten year term.

Consideration was given also to self-sustaining trout lakes, minimizing allocation in the vicinity of these values and other known sensitive sites.

The planning team developed objectives to protect rare tree species in the event that stands containing them are encountered. Details of these objectives are located in FMP-13, section 9.0.

3.3 *Silvicultural Ground Rules*

3.3.1 Description

Silviculture Ground Rules (SGRs) document all possible silvicultural treatments that can be used to maintain or transform a specific forest unit, through harvest, renewal and tending actions, into the desired future forest unit. The SGRs identify a unique set of treatments (Harvest/Regeneration/Tending) documented as the "Most Common Treatment Package". The remaining possible treatments are documented as "Acceptable Alternative Treatments". Table FMP-5 in Section 9.0 contains 62 SGRs for the Nipissing Forest.

The information presented in Table FMP-5 is as follows:

- SGR Code - A label composed of the *current forest unit* followed by the *target forest unit* followed by an indicator of *silviculture intensity*. For example: BW-PWUS-I1 – indicates that a white birch forest unit stand at the time of harvest is planned to be renewed to a white pine uniform shelterwood forest stand. The "I" indicates that an Intensive silviculture effort/investment is to be applied, and the "1" indicates which set of documented intensive silviculture treatments are planned for this stand. In this case, planting and tending will be implemented with the intent to achieve the desired future forest. Once assigned, the SGR code is used throughout the treatment tracking, reporting, and effectiveness monitoring process.

- Silviculture System - A silviculture system is "A process whereby forests are tended, harvested and replaced, resulting in a forest of distinctive form. Systems are classified according to the method of carrying out the fellings that remove the mature crop with a view to regeneration and according to the type of forest thereby produced."[26] Silviculture systems used in the SGRs are clearcut, shelterwood and selection.

- Current Condition – A description of the forest stand at the time of harvest *(current forest unit).* It includes the: Forest Unit, and the Central Ontario Forest Ecosystem Classification Ecosite for the stand along with overall proportion that that Ecosite contributes to the forest unit throughout the Nipissing Forest. For example: 17-51% means 51% of the current forest unit area is classified as Ecosite17. Additional Information includes a description of the expected average stand conditions encountered and any specific conditions under which the SGR can be applied.

- Future Condition – A description of the future conditions of the renewed stand. The Forest Unit identified is the *target forest unit* expected to result from the application of the prescribed treatments. The expected Stand Characteristics of the renewed

[26] OMNR. 1998. A silvicultural guide for the Great Lakes-St. Lawrence conifer forest in Ontario. Ont. Min. Nat. Resources. Queen's Printer for Ontario. Toronto. Glossary of Technical Terms.

forest at maturity are documented using the standard forest inventory attributes – site class/stocking/species composition/age. The Development Information documents the planned *Silviculture Intensity* and the expected success in achieving the planned future forest unit (Post-Renewal Succession). The Silviculture Intensity is defined in terms of the number and type of treatments related to the SGR code. The level of Intensity also reflects the degree of monetary expense. The Post-Renewal Succession lists all forest units which may result from the treatments, and the proportion of area expected to develop to the given forest units. It is developed using effectiveness monitoring data (results from Free Growing Surveys) and professional opinion. These critical forest model inputs are used to predict how the planned silviculture effort and expected successes will affect the future forest composition on a landscape scale.

- Regeneration Standards- These are used to determine if the renewal effort is progressing towards achievement of the stand conditions described for the *target forest unit*. The Standards describe: Timing of Surveys, Target and Minimum levels of stand stocking for both Acceptable and Crop Tree species, minimum and maximum relative abundance of different species, and Minimum Crop Tree Heights. For a stand to be declared a success it must meet or exceed the minimum stocking levels for both acceptable and crop species, and be within limits of minimum and maximum species relative abundance limits, and meet the minimum height requirements.

- Silvicultural Treatments – The type of Harvest Method (silviculture system), Logging Method, Site Preparation, Regeneration, and Tending treatments prescribed to achieve the planned future forest unit are documented. The best bet 'Most Common Treatment Package' is explicitly laid out in one row. A second row of treatments lists the Acceptable Alternative Treatments that may also be applied to achieve the target future forest unit. .

    - Harvest Methods (silviculture systems) listed in the SGRs include:
        - Seed Tree - clearcut harvest with retained trees distributed to provide for natural regeneration
        - Clearcut with Standards - clearcut harvest with retained trees or patches of trees consistent with the Natural Disturbance Pattern Emulation Guide (NDPEG) - the residual trees are known as the 'Standards'
        - (CLAAG) - clearcut harvest with careful logging around advanced growth
        - Commercial Thin – partial removal of merchantable trees at several times before the final clearcut harvest
        - Uniform Shelterwood 2 Cut – combined Preparation/Seeding Cut followed by Final Removal Cut
        - Uniform Shelterwood 3 Cut – combined Preparation/Seeding Cut followed by First and Final Removal Cuts
        - Uniform Shelterwood 4 Cut – Preparation Cut followed by Seeding Cut followed by First and Final Removal Cuts

- Clearcut-Strip Progressive 3 Cut – narrow strip cutting on 1/3 of stand for 3 harvests
- Single Tree Selection – removal of single trees on a 20 to 30 year cycle basis
- Single Tree Selection with Opportunistic or fully Regulated Groups – same as above with openings (1 to 2 X tree height) to encourage regeneration of yellow birch, red oak or black cherry

▪ Logging Methods listed in the SGRs include:
  - Tree Length - removal of tree tops and branches at stump prior to skidding to landing
  - Full Tree-skidding of tree to landing without removing the top or branches
  - Cut to Length - removal of tops and branches and cutting tree into log lengths (8, 10,12 foot, etc.) at the stump prior to forwarding to landing

▪ Site Preparation listed in the SGRs include:
  - Mechanical - logging machines (skidders) and attachments (slash piling rakes, anchor chains, etc) modifying onsite vegetation/logging debris/surface organic matter to facilitate tree planting
  - Aerial/Ground Chemical - air or ground applied herbicides to reduce competitive non-crop vegetation (herbaceous and woody) to facilitate tree planting
  - Prescribed Burning – use of controlled fire to reduce onsite vegetation/logging debris/surface organic matter to facilitate tree planting
  - Scarification - logging machines (skidders) and attachments (slash piling rakes, anchor chains, etc) modifying onsite vegetation/logging debris/surface organic matter to create favourable seedbeds for the establishment of natural regeneration (seed to come from retained trees on site)

▪ Regeneration listed in the SGRs include:
  - Natural - crop tree seed from retained trees on site to germinate and establish on site
  - Fill Plant - low density planting (750-1200 stems per hectare) to augment existing regeneration on site
  - Plant - high density planting (1200-2500 stems per hectare) to establish new stands
  - Sowing - applying seed actively collected at a separate location and deliberately applied to a renewal area (e.g. seeding sites with red oak acorns)
  - Seeding – application of conifer seed (Pj) to a renewal area

▪ Tending listed in the SGRs include:
  - Aerial/Ground Chemical - air or ground applied herbicides to reduce competitive non-crop vegetation (herbaceous and woody) to facilitate crop tree survival and growth

- Manual Cleaning - use of brushsaws or other manual means to reduce competitive non-crop vegetation (woody) to facilitate crop tree survival and growth
- Mechanical Cleaning - use of mobile equipment (mulchers, brush clearers) to reduce competitive non-crop vegetation (herbaceous and woody) to facilitate crop tree survival and growth
- Pre-commercial thinning - use of brushsaws to space selected crop trees when stocking and density are high. This treatment is usually applied after a stand is free growing in an effort to increase the quantity and quality of large logs at final harvest
- Tending/Spacing/Improvement Cut-Even-Aged either concurrent with harvest or post-harvest - use of harvesting equipment to remove non-merchantable stems where they are competing with higher value crop trees. Usually prescribed in hardwood uniform shelterwood seeding/regeneration cuts
- Tending/Spacing/Improvement Cut-Uneven-Aged either concurrent with harvest - use of harvesting equipment to remove non-merchantable stems where they are competing with higher value crop trees. Usually prescribed for stands in the HDSEL forest unit

The development of the Silviculture Ground Rules considered not only the Guides referred to in the section 3.3.2 but also included an internal document recently prepared by NFRM. In 2005, the results of an Independent Forest Audit required NFRM to develop a means to better identify those forest units and site conditions where mechanical or chemical site preparation would enhance regeneration effectiveness, and direct the appropriate treatments to the sites. A decision support matrix has been developed to document thresholds/limits of several site attributes as they relate to the use of mechanical or chemical site preparation. Based on forest unit/ecosite combinations and objectives to either maintain conifer or convert to conifer, thresholds of site attributes were developed. Soil texture, soil moisture, depth of LF layer, amount and distribution of logging slash, expected vegetation response, forecasted seed crops, and topography were considered. The results indicated which combination of forest unit/ecosites/objectives would be best bets to target for site preparation. The priority to treat for each of these combinations was prioritized, and the suitability of mechanical vs. chemical methods was determined. These results were considered in listing the most common and acceptable alternative site preparation treatments in all SGRs.

3.3.2 Rationale for Use of Exceptions

The SGRs were developed using several Guides prepared by the Ontario Ministry of Natural Resources. The Guides used were:

- Silvicultural Guide to Managing for Black Spruce, Jack Pine and Aspen on Boreal Forest Ecosites in Ontario, September, 1997;
- A Silvicultural Guide for the Great Lakes-St. Lawrence Conifer Forest in Ontario, 1998;
- A Silvicultural Guide for the Tolerant Hardwood Forest in Ontario,1998;

- The draft Silviculture Guide to Managing Spruce, Fir, Birch and Aspen Mixedwoods in Ontario's Boreal Forest, February, 2003;
- Ontario Tree Marking Guide, 2004
- Field Guide Forest Ecosystems of Central Ontario, FG-01, 1997

In the Silviculture Guides, most common silvicultural systems and treatments are classified as Recommended, Conditionally Recommended or Not Recommended. Recommended treatments are ecologically appropriate and generally proven to be effective on the majority of stands within a specified forest type/ecosystem combination. Conditionally Recommended treatments are also ecologically appropriate and generally proven to be effective on the majority of stands within a specified forest type/ecosystem combination, but only if conditions or limitations noted in the guides are addressed. A treatment classified as Not Recommended may be ecologically inappropriate for the site or not supported by the experience or knowledge at the time of the guide's production. An SGR describing a treatment that is Not Recommended in the guide triggers the "exception monitoring" process (refer to Section.4.7.2).

The exceptions to the guides can be grouped under two general treatments: Full Tree Logging Method in Conifer and Hardwood Shelterwood Silviculture Systems; and, Clearcut with Strip Harvest Method in Hardwood Shelterwood Silviculture Systems.

The full-tree logging (skidding) method in shelterwood silviculture systems is considered "Not Recommended" in the silvicultural guides due to the high risk of damaging residual trees and advanced regeneration. The proposed Exception is qualified by saying "Full tree skidding of trees with fine/soft branches that will not excessively damage residual trees and advanced growth, and reductions to the nutrient load on the site". It is proposed to do this only during the combined Preparation/Seed Cut harvest for the LWMX, HE, and PWUS forest units and the Seeding/Regeneration Cuts in the BY and HDUS forest units. This Exception was included in the 2004 Forest Management Plan. To date, it has been implemented and monitored in PWUS and HDUS forest unit stands.

There are two reasons for continuing to include this Exception. SFL Shareholders and their associated harvest contractors must operate in harvest blocks managed under two, if not three, silviculture systems (clearcut/shelterwood/selection). Most large contractors include delimbers and slashers in their equipment profile to efficiently work the clearcut harvest areas. During shelterwood operations these pieces of equipment sit idle and have little or no earned revenue. If this equipment can even be partially utilized during some limited portion of shelterwood harvesting, the long term viability of the total operation can be improved. Full tree skidding of fine/soft branched trees in conifer shelterwood Seeding Cuts, when properly implemented, would facilitate roadside delimbing and slashing. Secondly, any increase in fibre utilization for pulp or alternative purposes could improve the long term viability of the industry. On sites where increased nutrient and wood debris removal is not a concern, full tree skidding of fine/soft branched trees could increase harvest yields.

Implementing the Clearcut Silviculture System using a Strip Harvest Method within the HDUS forest unit is a "Conditionally Recommended" treatment. The conditions required: Yellow birch regeneration is the objective; renewal expected to be ineffective unless follow-up site preparation timed to a seed year is assured; pre-harvest stocking inadequate to successfully implement uniform shelterwood system. The SGR addresses the first and second conditions described above. This SGR does not always address the third condition; therefore, an Exception Monitoring Program will be conducted. This Exception provides an alternative to using uniform shelterwood to move poor quality hard maple stands towards the yellow birch dominant condition. The cost for the harvest contractor to layout and operate in clearcut strips is lower than for a uniform shelterwood operation on the same site, especially when the pulp portion of the harvest exceeds 80%. There appears to be evidence where similar treatments (implemented 25-35 years previous) on the appropriate site have resulted in desirable yellow birch stands.

3.3.3 Strategic Silvicultural Options

The strategic silvicultural options documented for the 2004-2009 FMP formed the basis upon which to build and refine those for the 2009-2019 FMP.

The silviculture intensities of Exensive/Basic/Intensive1 and Intensive2 were maintained. In a similar manner, the associated species compositions/average stocking and site class assumptions associated with each yield/intensity curve remained relatively unchanged. Differences between those data elements for the 2004 and the 2009 FMP would have been caused by subtle changes (updates for renewal and depletion) in the Base Model Inventory for the 2009 FMP.

The assumed total cost for each renewal intensity option provided in SFMM is based on specific costs for each individual treatment included in that intensity. The specific costs for silviculture treatments assumed in the 2004 FMP were reviewed for consistency with actual conditions. All of the assumed costs were consistent with actual costs, however, there was a lack of consideration for situations where multiple tending treatments were applied. Due to the apparent need for multiple vegetation management treatments to ensure achievement of regeneration standards on most sites, a revised cost structure was established. The new structure considered all forms of tending and assigned a proportional use and associated cost to each method. This same step was conducted for anticipated second and possibly third tending treatments. This provided an average tending cost that was used in determining the total treatment cost for each renewal option. This exercise was performed for the following two groups of forest units: PO+BW+MW; MCL+PWUS+PJ+PJSB+SF+PR+PWST.

A review was made of the planting densities (trees per hectare) assumed in SFMM for the 2004 FMP. Establishment densities similar to those levels were being implemented on the ground in the forest. Current effectiveness monitoring surveys conducted three to five years after planting have revealed that establishment densities need to be increased to ensure achievement of regeneration standards. The planting densities assumed in SFMM for the 2009 FMP reflect the results of this work.

Current effectiveness monitoring surveys also illustrated differences between plantations that did and did not receive a site preparation treatment. Plantation densities were higher and the crop trees were growing faster along with generally lower levels of vegetative competition when site preparation treatments were conducted. This observed status of conifer plantation development, assuming the application of a timely tending treatment when and if required, should have a high probability of achieving the target forest unit. In cases where no site preparation treatments were conducted and only a tending treatment occurred, a lower probability of achieving the target forest unit is anticipated. These field-based observations facilitated a thorough review of the differences between the two levels of strategic options (Intensive 1 vs. 2) in their ability to achieve their respective target forest units. The outcome of the review is reflected in the degree of difference in post-renewal succession assumptions developed for the strategic forest management model (SFMM).

An FMP Silviculture task team was struck (composed of MNR, LCC, SFL) to develop SGRs, review objectives, exceptions monitoring, and focus review efforts on the Post-Renewal Succession for both clearcuts and shelterwood renewal. The review consisted of an analysis of approximately 7,800 ha of current free growing survey results. Reviews of this nature are critical in determining if adjustments to silvicultural treatments or to expected outcomes are needed. Development of the rule set for the 2009 post renewal succession included consideration of the trends from the survey results and the 2004 rule set.

Some initial and considered pre-liminary trends are appearing as a result of this first review of actual free growing survey data. Two general trends were: on the more productive sites area was being created in forest units other than those projected (i.e. rather than just two forest units resulting, as assumed in the 2004 FMP, there were 3 to 5); and, the degree of success of creating PWUS stands from restoration efforts was lower than predicted. In terms of the later trend, adjustments were made to the assumed silviculture treatments for the 2009 FMP in terms of higher establishment densities and increased tending or site preparation costs. These differences were reflected in SFMM both in terms of total renewal cost and forest unit renewal proportions for the intensive 1 and 2 options. In terms of operational implementation, higher scrutiny of site selection for restoration efforts should close the gap between the actual and planned achievement levels.

Unfortunately, limited data was available for renewal results in conifer and hardwood shelterwood due to the lack of planned first and final removal cuts during the 2004-2009 period. It is expected that more data will available for preparation of the next FMP. Also, limited data was available for natural regeneration of clearcuts. More data will be available for the next FMP.

The results of this work are reflected both in: table FMP-5, in terms of treatments and renewal proportions; and, in the Strategic Silviculture Options portion of the Analysis Package MU754 Base Model located in section 6.1.6.

Sensitivity analysis conducted during the development of the options can be reviewed in sections 1.1.6 to 1.1.8 of the Analysis Package - Scoping located in section 6.1.6. Several iterations were made with Strategic Forest Management Model (SFMM) with a focus on Silviculture Treatments, Silviculture Expenditures, and PWUS Restoration Limits. This was done to investigate the impact on levels of objective achievement when wide ranging levels of silviculture options are implemented. This analysis would also determine: if the range of silviculture options is sufficient to enable SFMM to produce realistic results; and, whether the differences between each option enable SFMM to effectively select a variety of options to satisfactorily meet all objectives.

Simulations were made where all of the renewal of the Clearcut forest units was either Intensive (Artificial) or Extensive (Natural). Several forest and non-forest objectives were not achieved when all renewal was Extensive. The analysis revealed that when a variety of options were chosen (Intensive1/2, Basic, Extensive) better solutions in achieving all forest and non-forests objectives were developed. Repeatedly, SFMM choose to use: Intensive 2 options when renewing SF, PJSB, and a portion of the MCL forest unit; Intensive 1 for PR and PJ and a variety on Basic and Extensive options for the remaining forest units.

Variations of Renewal Stumpage rates for Pw/Pr, SPF, and Po/Bw species groups as they relate to total Silviculture Expenditures was tested. Lower renewal stumpage rates/silviculture expenditures resulted in: little impact on short and medium term harvest levels but had some impact on longer term volumes; shift of some forest unit area from PWUS to PO, BW, or MW. Current renewal stumpage rates/silviculture expenditures enabled the use of a more diverse set of silviculture options.

Varying rates of PWUS restoration in PO, BW, MW, and PWST forest units were also tested. The analysis indicated that the options available for conversion of PWST to PWUS were more favorable than those for PO, BW, and MW.

In conclusion, the sensitivity analysis indicated that: there are enough silviculture options available for SFMM to produce realistic results that can be implemented; the differences between each of the options enabled SFMM to identify combinations of options that can achieve satisfactory levels all forest and non-forest objectives.

A brief description of the critical components of the silviculture options used in the analysis will be presented here for each forest unit. The remaining details and the rationale for each option can be found in the Strategic Silviculture Options portion of the Analysis Package MU754 Base Model located in section 6.1.6.

Each forest unit has strategic level options available for use. The total list of options include Extensive, Basic, Intensive1, and Intensive2. The options specific to each forest unit are documented below including a description of the silviculture treatments related to that option. Also included for each option is the forest unit(s) that is forecasted to result. The proportion or percentage of the time that a forest unit is forecasted to occur is documented. If the documented proportion(s) do not total to 100% it means that the remaining portion is attributed to another forest unit not included in the list. Table FMP-5 must be reviewed to determine the nature of the other forest unit(s).

The strategic silviculture options representing management of the BW forest unit are:

- Extensive-natural regeneration results in creating BW at 80% proportion
- Intensive1-plant with tending results in PWUS/PWST at 45%/25% proportion
- Intensive2-site prep/plant with tending results in PWUS/PWST at 65%/10% proportion
- Intensive 1 and 2 include provisions to create PR and SF at 10 and 5% respectively

The strategic silviculture options representing management of the MCL forest unit are:

- Extensive-natural regeneration results in creating MCL at 100% proportion
- Basic-natural regeneration with CLAAG results in MCL at 100% proportion
- Intensive1-fill plant with tending results in MCL at 100% proportion
- Intensive2-site prep/plant with tending results in MCL at 100% proportion

The strategic silviculture options representing management of the MW forest unit are:

- Extensive-natural regeneration results in creating MW/PO at 60%/20% proportion
- Basic- fill plant with tending results in MW/PO at 70%/20% proportion
- Intensive1-plant with tending results in PWUS/PWST at 45%/20% proportion- includes provisions to create PR and SF at 10 and 10% respectively
- Intensive2-site prep/plant with tending results in PWUS/PWST at 60%/15% proportion- includes provisions to create PR and SF at 10 and 5% respectively

The strategic silviculture options representing management of the PJ forest unit are:

- Extensive-natural regeneration results in creating PJ/PJSB at 40%/25% proportion
- Intensive1-plant with tending results in PJ at 87% proportion- includes provisions to create PR at 3%

The strategic silviculture options representing management of the PJSB forest unit are:

- Extensive-natural regeneration results in creating PJSB/MW at 50%/25% proportion
- Basic- fill plant with tending results in PJSB/PJ at 79%/6% proportion
- Intensive1-plant with tending results in PJSB/PJ at 85%/6% proportion- includes provisions to create PR at 3%
- Intensive2-site prep/plant with tending results in PJSB/PJ at 90%/6% proportion- includes provisions to create PR at 3%

The strategic silviculture options representing management of the PO forest unit are:

- Extensive-natural regeneration results in creating PO at 98% proportion
- Intensive1-plant with tending results in PWUS/PWST at 50%/25% proportion
- Intensive2-site prep/plant with tending results in PWUS/PWST at 65%/18% proportion
- Intensive 1 and 2 include provisions to create PR and SF at 10 and 2% respectively

The strategic silviculture options representing management of the PR forest unit are:

- Intensive1-plant with tending results in PR/PWUS at 95%/5% proportion
- Intensive2-plant with tending and pre-commercial thinning results in PR/PWUS at 95%/5% proportion
- Commercial thinning-three removals followed by final harvest resulting in PR at 100% proportion; SGRs include provision to establish PW between 3rd thinning and final harvest

The strategic silviculture options representing management of the PWST forest unit are:

- Extensive-natural regeneration results in creating PWST/PO/BW at 25%/25%/20% proportion
- Basic-scarification for natural results in PWST/PWUS at 66%/5% proportion
- Intensive1-plant with tending results in PWUS/PWST at 65%/17% proportion- includes provisions to create PR at 10%
- Intensive2-site prep/plant with tending results in PWUS/PWST at 75%/10% proportion- includes provisions to create PR at 10%

The strategic silviculture options representing management of the SF forest unit are:

- Extensive-natural regeneration results in creating SF/MW/BW at 50%/15%/10% proportion
- Basic- natural regeneration with CLAAG results in SF at 80% proportion
- Intensive1-plant with tending results in SF at 85% proportion
- Intensive2-site prep/plant with tending results in SF at 95% proportion

The strategic silviculture options representing management of the LWMX forest unit are:

- Uniform Shelterwood 2 Cut - Combined Prep/Seed Cut and Final Removal Cut create LWMX at 100% proportion; Treatment cost for each cut = $70/ha

The strategic silviculture options representing management of the HE forest unit are:

- Uniform Shelterwood 3 Cut - Combined Prep/Seed Cut with First and Final Removal Cuts create HE at 100% proportion; Treatment cost for each cut = $70/ha

The strategic silviculture options representing management of the BY forest unit are:

- Uniform Shelterwood 2 Cut - Seed Cut and Final Removal Cut create BY at 100% proportion; Treatment cost for each cut = $70/ha

The strategic silviculture options representing management of the PWUS forest unit are:

- Uniform Shelterwood 3 Cut - Combined Prep/Seed Cut with First and Final Removal Cuts create PWUS/PWST at 95%/5% proportion; Treatment cost for Prep/Seed cut = $70/ha; Treatment cost for First Removal cut = $625/ha which includes pre-harvest survey, tree marking, scarification, monitoring, tending; Treatment cost for Final Removal cut = $390/ha which includes fill planting and monitoring

The strategic silviculture options representing management of the HDUS forest unit are:

- Uniform Shelterwood 2 Cut - Seed Cut and Final Removal Cut create HDUS/BY/HE at 85%/10%/5% proportion; Treatment cost for each cut = $70/ha

The strategic silviculture options representing management of the HDSEL forest unit are:

- Single Tree Selection on a 30 year cycle
- Improvement in AGS of net 5% each cut / 85% long term
- Annual AGS growth rate as per the Forest Research Partnership
- Treatment cost for each cut = $130/ha which includes $70/ha for monitoring and marking, and $60/ha for stand improvement at time of harvest

The elements of Silvicultural Ground Rules as documented in Table FMP-5 ultimately must be transferred to on-the-ground operations. In a strengthened effort to do that a document was created as part of this FMP. Its purpose is to facilitate the Forest Operations Prescription process, and of course, the SGRs are one of the very important components of the process. The document provides very specific direction that is to be followed. The document titled "Prescriptions or Instructions for: Tree Marking, Harvesting Operations, Forest Access Roads, And Aggregate Management on the Nipissing Forest" is located in Supplementary Documentation 6.1.28.

3.4 Management Considerations

This forest management plan is consistent with higher order direction such as provincial legislation and provincial and regional policies and strategies. The report of past forest operations, the independent forest audit, other resource management plans, business needs of the forest industry and other forest-dependant industries, such as the tourism, were also considered in setting the strategic direction for this plan.

In addition to the provincial policy available to the planning team in the development of the long-term management direction of the forest, the notion of climate change and its relationship with forest management also contributed to many of the objectives developed by the planning team. This subject challenged the planning team and LCC, as ground level concepts that relate to the global issue are still in early development. Nevertheless, the plan does incorporate the basic ideas of adaptation to, and mitigation of, the negative effects of climate change and its relationship to forest management.

The major direction regarding production of a FMP is from the Crown Forest Sustainability Act and the Decision on the Environmental Assessment of Timber Management on Crown Lands in Ontario. Direction from these sources is incorporated primarily through requirements in the FMPM, 2004. The FMPM also complies with the Policy Framework for Sustainable Forests. The introduction of this plan describes how MNR's Statement of Environmental Values and the Environmental Bill of Rights are addressed in the plan.

Several provincial guides were used for direction during the development of the Plan. A completed listing of all guides available to the planning team is available in section 6.1.1 of the supplementary documentation.

The Forest Resource Assessment Project (FRAP) provides direction on timber production. It states that the long-term sustainability of the forest is the first priority, and that timber harvest levels are decided locally as part of the forest management planning process. The Strategic Forest Management Model has been used to determine sustainable timber production levels.

The final regulation of areas proposed as part of Ontario's Living Legacy Strategy is largely complete on the Forest, with most of the areas proposed for parks or conservation reserves designated in the planning composite inventory for the Plan.

This FMP is consistent with The Crown Land Use Policy Atlas, which is the source of area-specific land use policy for Crown lands on the Nipissing Forest. It contains land use policies consolidated from a variety of planning documents including the *District Land Use Guidelines for North Bay and Parry Sound Districts* and *Ontario's Living Legacy Land Use Strategy*.

In addition to recommending new protected areas (parks and conservation reserves), the OLL Strategy identifies a new land use category, that of enhanced management areas (EMA's). EMA's have been established in order to provide more land use direction in areas of special/sensitive features or values. Ontario's Living Legacy also provides for the identification of Intensive Forest Management Areas, but none have been identified as such on the Nipissing Forest.

MNR's Direction 90's outlined four major objectives:

- To ensure the long-term health of eco-systems by protecting and conserving our valuable soil, aquatic resources, forest and wildlife resources as well as their biological foundations;
- To ensure the continuing availability of natural resources for the long-term benefit of the people of Ontario; that is, to leave future generations a legacy of the natural wealth that we still enjoy today;
- To protect natural heritage and biological features of provincial significance;
- To protect human life, the resource base and physical property from the threats of forest fire, floods, and erosion.

This strategic direction was re-affirmed in a second document, Direction '90s: Moving Ahead 1995, which made a further commitment to an ecosystem-based approach to sustainable development of Ontario's natural resources. Beyond 2000, the third in an ongoing series of MNR policy direction documents, formally adopts a ministry mission of ecological sustainability and sets out supporting strategies

Since the completion of the previous FMP, Our Sustainable Future was released by the MNR in 2005. In addition to confirming its vision of sustainable development and the mission of ecological sustainability, this document added a new focus to work through a Commitment to the Conservation of Biodiversity. It sets the stage for continued support of sustainable resource development, while maintaining a strong emphasis on protecting the natural environment. The focus is supported through stronger policy development and enhanced science, information, assessment and reporting.

Our Sustainable Future replaces Beyond 2000, becoming the fourth in a series of strategic directions documents. It builds on many of the principles outlined in earlier strategic plans. For the first time, it includes specific strategies and proposed actions to help plan activities and deliver results that are aligned with strategic direction. These strategies and actions recognize the opportunity to strengthen our cooperation with all levels of government. The strategic directions framework also emphasizes the importance of assessing and reporting on the state of our natural resources to ensure the effectiveness of our actions and provide transparency and accountability for the results.
Strategic direction from NFRM is provided by its mission statement, which states, in part:

Through the integration of planning, renewal and harvesting operations, become a leader of sustainable forest management in Ontario while maintaining affordability for its partners.

In April 2003, NFRM was certified by the Forest Stewardship Council (FSC) on the Forest as a well-managed forest under the draft Great Lakes St. Lawrence (GLSL) Forest Standard. In 2008 the Company and Forest were re- certified under the updated 2007 GLSL Forest Standard. The main reason NFRM and its shareholders sought FSC certification was to maintain and potentially increase market share, especially when markets are poor. This certification has greatly benefited the utilization of low quality pulpwood which had been largely under utilized in the past. FSC sets out 9 key principles applicable to the Forest that must be adhered to by NFRM and its shareholders, these include:

1. Forest management shall respect all applicable laws of the country in which they occur, and international treaties and agreements to which the country is a signatory, and comply with all FSC Principles and Criteria.
2. Long term tenure and use rights to the land and forest resources shall be clearly defined, documented and legally established.
3. The legal and customary rights of indigenous peoples to own, use and manage their lands, territories, and resources shall be recognized and respected.
4. Forest management operations shall maintain or enhance the long-term social and economic well being of forest workers and local communities.
5. Forest management operations shall encourage the efficient use of the forest’s multiple products and services to ensure economic viability and a wide range of environmental and social benefits.
6. Forest management shall conserve biological diversity and its associated values, water resources, and unique and fragile ecosystems and landscapes, and by doing so, maintain the ecological functions and integrity of the forest.

7. A management plan – appropriate to the scale and intensity of the operations shall be written, implemented, and kept up to date. The long term management, and the means of achieving them, shall be clearly stated.
8. Monitoring shall be conducted appropriate to the scale and intensity of forest management to assess the condition of the forest, yields of forest products, chain of custody, management activities and their social and environmental impacts.
9. Management activities in High Conservation Value Forests shall maintain or enhance the attributes which define such forests. Decisions regarding High Conservation Value Forests shall always be considered in the context of a precautionary approach.

Note: The 10th principle deals with plantations where exotic species have been established and is not applicable to the Nipissing Forest.

As can be seen from the above principles, many of the requirements of FSC certification match very closely with the requirements set out in the FMPM, 2004 and the majority of the objectives in this plan are needed to maintain FSC certification.

Direction from "A Conservation Strategy for Old Growth Red and White Pine Forest Ecosystems for Ontario" must be followed for all management plans in Ontario. This strategy says:

The key objective for protection is to protect representative ecosystems of old growth red pine and white pine in each site district in Ontario within the natural range of pine.

Only site district 5E-6 is completely within Forest. North Bay will be the lead for site districts 5E-4 and 4E-4; most of the former falls within Forest. Small amounts of 3 other site districts are in the Forest (5E-8, 5E-9, and 5E-10) and other districts will be asked to take a lead role in maintaining representative ecosystems of old growth in those site districts. The policy also states that there must be no net loss of white pine.

To ensure wetland protection, the Ontario government has adopted a Provincial Policy Statement (PPS) under Section 3 of the *Planning Act*. This management plan will conform to the key thrusts of the PPS that deals with wetlands. To date, twelve provincially significant wetlands have been surveyed in the Forest. It is anticipated that more surveys will result in more wetlands being identified as provincially significant.

Science supporting recent guide development in the province was used for this 2009 Plan, where no existing guideline provided direction. Only science was permitted for use to support decision making, as the resulting guides were not yet approved for use in forest management plans at the time of plan development. The most appropriate material to utilize in the new Plan dealt with prescriptions for species that had no prior policy of guidance on how to operationally protect. Many of these species were categorized as rare, threatened or endanger by the province of Ontario. Good science from the development of recent guides was used in the development of some modelling assumptions for the natural landscape dynamics.

This Plan complies with the resource-based tourism policy. Several published tourism policies provide direction concerning the tourism/forestry interface. These documents reflect Ontario's commitment to maintain the viability of the resource-based tourism industry. Protecting tourism values in the FMP process through the application of the Resource-Based Tourism Guidelines and the use of Resource Stewardship Agreements (RSA's) are two methods of protecting and sustaining these values. Thirty-six RSA's have been developed between resource-based tourism operators and NFRM. Prescriptions related to forest management that were proposed in RSA's have been reviewed through this FMP planning process. All RSA's will comply with provincial legislation and policies. As specified in the Resource Based Tourism Guidelines, the terms of any Resource Stewardship Agreement (RSA) do not bind the Minister's right to make land use decisions for Crown land in Ontario.

The McConnell Lake Plan prepared by the MNR North Bay district has implications for forestry operations, as described by this excerpt:

> *"Poplar and white birch working groups will be managed to provide an interspersion of brooding, nesting and winter feeding sites for grouse. Open areas will be maintained to support other upland game. Timber harvesting will be designed to cause a minimum of damage to the recreation capability. To this end, cutting systems and logging methods will be prescribed which will minimize the impact on aesthetic values and promote establishment of acceptable species within all road, lake shore and stream corridors throughout zones 1, 2, 3, and 5. Such cutting will be conducted during the period September 1 to December 1. Firewood may only be cut in specific areas designated for this purpose and then only in small quantities by campers for their use while in the campground.*
> *Hauling resource material will not be permitted from 6:00 pm Friday to midnight Sunday, nor on statutory or declared holidays during the peak recreational period from May 1st up to and including the Labour Day weekend."*

The McConnell Lakes Recreational Plan is in the process of being updated. Once these revisions are finalized and approved this plan will be amended to conform with all requirements.

Table FMP-14 and the area of concern supplementary documentation describe the prescription for the McConnell Lake area.

There were independent forest audit recommendations on several FMP-related topics. The most significant related to utilization and planned harvest levels, as well as spatial considerations of old growth. Task teams for utilization and old growth were developed, and they have proved useful in FMP preparation.

In terms of utilization, the audit recommended that Corporate MNR, in consultation with NFRM, was to review and revise the wood supply allocation mechanisms, associated licence conditions, and supply commitments on the Forest to provide the Company with the flexibility to plan a realistic harvest and ensure that active harvesters are not penalized. It further stated that the Plan should provide a level of harvest that is more realistic than that in the 2004 plan, while still providing adequate flexibility to respond to markets and actual stand conditions.

In the past, the MNR has provided information to the planning team to assist in the establishment of demand levels. This information has included summaries of wood supply commitments and Ministry Recognized Operating Levels for mills receiving wood from the Forest. For the 2009 FMP, the MNR provided information regarding wood supply commitments and provided suggestions for other sources of information that might be useful to the planning team in the development of industrial demand numbers for this Plan. A description of this process is outlined in section 3.6.4, Social and Economic Objectives and Indicators, as well as section 4.3.6, Wood Utilization.

The need for further investigation into old growth, in terms of its make-up and spatial distribution across the Forest, was outlined in several old growth recommendations within the audit. The planning team did not receive any formal direction from the science experts or planning units on how to spatially arrange this forest type on the landscape. The planning team's old growth task team developed some objectives that, in the interim, are felt to be a good start to ensuring acceptable spatial distribution. They should also provide for the ability to react to policy that may be set into the future. The old growth task team explored all of the old growth information available and have developed two objectives described in section 3.6, Objectives and Indicators.

Spatial wildlife modelling on the management unit also provided the planning team with some sense of the current habitat conditions on the forest, and where the natural condition would extend those features into the future.

3.5 Desired Forest and Benefits

Goods and services, along with forest structure and composition, are the foundation of desires to be derived from the Forest. Achieving a balance of social, economic and environmental needs over a period of time is a challenge.

On May 7, 2007 the Desired Forest and Benefits Workshop (DFBW) was held in North Bay. It was hosted by the MNR, North Bay District Manager and facilitated by an experience MNR manager external to North Bay District. The meeting was intended to provide input into the LTMD of the Plan. The planning team along with members of the Nipissing Forest Local Citizen Committee (LCC), local forest contractors, as well as staff of MNR and NFRM participated in the meeting.

Participants were divided into groups where they generated desired forest and benefits outputs. The results of this exercise were displayed on cards and mounted to the walls of the meeting room. Each idea was assigned to one of the headings of forest diversity, silviculture, forest cover, social and economic and 'others'. The 'others' group was divided into the categories of global warming, new ways of doing business, access and out of scope. Participants were again divided into groups. Each group was assigned one of the categories and worked on developing an objective statement for each of the desired forest or benefits outputs. Similar outputs were grouped together under a single objective where appropriate.

In addition to the DFBW outlined above, a workshop was held by the Aboriginal Working Group (AWG). The AWG was designed by the First Nations on or adjacent to the Forest to create a forum for discussion on a regular basis outside of the FMP process. It serves as a valuable source of input into desires for the direction of the Plan. The group reviewed and added to the collection of information.

The results of both workshops were compiled and keyed into a spreadsheet package showing the output and related objective statement. The results of this work were reviewed by the planning team and it began the process of building inputs into the objectives of the Plan. Between July 2007 and January 2008, several discussions between the planning team and Nipissing LCC were held to address comments and issues raised, and to provide clarity on how different pieces could, or could not, be incorporated into the FMP. Discussion at these meeting included;

a) A re-introduction of the scope of Forest Management Planning, the development of the results from the DFBW and AWG and how the planning team had discussed and reached consensus on each value & issue.
b) Presentation of objectives and associated strategies, though not a requirement at this stage, proved a helpful way for the LCC to see how some objectives might guide the management on the Forest.
c) A summary of where local values & issues can be found in each objective and indicator for the planning process.

Several of the comments received at the meetings fed into the development of the objectives and the indicators, desired levels and targets that delivered measures of sustainability to the strategic direction of the FMP. A summary chart was produced to ensure that each of the Crown Forest Sustainability Act (CFSA) criteria and objective categories was covered, as well as additional indicators resulting from the DFBW and AWG input. These charts formed the basis for FMP-6, a Summary of Management Objectives, see section 9. Also available is section 6.1.23, a description of how the planning team decided to incorporate the results of the desired forest and benefits into the Plan.

The planning team considered all input from the meetings, and while some material was easily transformed into meaningful objective, not all of the inputs could be considered in the objective suite. The planning team also addressed many of the comments in operational decision making practice. Some of the key messages driving the strategic direction of the FMP are described below.

Once input was compiled and summarized, the planning team began to scope the potential of the forest to meet all of the desired benefits identified through these meeting, and objective development. The FMPM outlines the scoping analysis as the examination of the range of possibilities for management, to provide insight into what the forest is capable of producing and the investigation of potential management considerations. Each investigation was comprised of a series of modeling runs, designed to assess the impact of different management options on wood supply, forest condition, preferred wildlife habitat and other non-timber resources. Each investigation documents the short (10-year), medium (20-year) and long (100-year) term results of the target or constraint on the pattern of several indicators. Initial investigations included:

1) An exploration into the impacts of different harvest flow policies such as limiting increases and declines from term to term;

2) Several explorations of outcomes related to setting different mature, over mature and wildlife habitat targets from term to term;

3) Measuring the impacts of different silvicultural levels on the future forest condition;

4) An exploration into the impact to the projected available harvest area, considering harvest area stability constraints from term to term within each forest unit.

In addition to the analysis selected by the planning team, a number of specific investigations are also required by MNR's Forest Resources Assessment Policy (FRAP). These investigations included:

a) *realize the full wood production potential;*
b) *meet current industrial demand; and*
c) *increase wood supply to support industrial expansion and additional non-industrial goods and services, parks and protected areas.*

Completed scoping analysis can be found in section 6.1.6, the analysis package.

3.5.1.1 Forest Diversity

Group #1
"Forest is Un-fragmented"
This input has been addressed in the FMP with Objective #1, *Move toward a distribution of disturbances that more closely resembles the expected natural disturbance landscape pattern*, by measuring three different indicators. The purpose of this objective is to create a disturbance pattern on the Forest that aligns with a natural landscape found prior to fire suppression and forest management. The planning team has developed the ideal landscape pattern using historic fire information, and categorized the disturbance sizes according the requirement of the FMPM, 2004.

Group #2
"Old growth patch sizes should be big enough to be effective for wildlife"
"Retain large areas in intact, older aged forest"

"Ensure the old growth condition is maintained and allowed to develop into the future"

The provision of old growth in each forest unit, and its distribution across the landscape, was provided for in Objectives #2, *Increase the frequency of old growth area occurring in larger patch sizes*, #3, *With consideration given to the current landscape, ensure that an even distribution across the forest of old growth stands, and old aged stands is allowed to occur*. The old growth task team created meaningful definitions of old growth and created these two objectives to satisfy the spatial arrangement of the forest condition in larger patches, as well as with a realistic distribution across the Forest.

Group #3
"Balance or sustain the current forest structure"
"Promote White Pine"
"Return to an historic forest condition. Ensure the forest resembles the pre-industrial forest"
"Ensure adequate proportions and distribution of forest units by seral stage"

This group of input was addressed by the planning team using four objectives. The first, Objective #4, *To maintain the area of forest cover types that would occur naturally on the Nipissing Forest, similar to the expected natural landscape dynamics, with consideration of the pre-settlement forest condition,* considers both the FMPM requirement of the historic forest condition as well as the reality of the current forest condition and how it will develop given natural landscape dynamics. Objective #5, *Provide Red and White Pine forest area not less than 1995 levels, consistent with the Conservation Strategy for Old Growth Red and White Pine Forests Ecosystems in Ontario, 1996*, and *#6 Restore to the PWUS or PR forest unit, a proportion of all harvested area in the White Pine Seedtree, Mixedwood and offsite Poplar and White Birch forest units,* are designed to ensure the public desire to maintain and restore white and red pine composition is met. Finally Objective #7, to *Move towards a more natural age class distribution for each forest unit over the entire forest in mature and old aged condition, similar to that of a natural forest dynamic*. Desired levels, targets and achievement for the measures of these objectives were developed in the scoping analysis found in the analysis package in section 6.1.6 of the Plan.
Group # 4
"Increase mid-tolerant hardwood species such as yellow birch, red oak and black cherry."
"Provide cedar for lumber."
"Ensure regeneration of cedar, oak, cherry, elm and white ash."

Three objectives designed to promote and/or maintain the current levels of special or rare conditions on the Forest were created by the planning team. Objective # 8, to *maintain or increase the mid-tolerant hardwood component in stands with suitable conditions,* was continued from the 2004 FMP to increase the species abundance mid-tolerants in the hardwood stands on the Forest, relative to the proportion of mid-tolerants on the landscape historically. Objective #9, *for the mixed conifer lowland forest unit (MCL), ensure that the proportion of spruce and cedar remain relatively similar for the forest unit as a whole,* was also carried over from the 2004 FMP to protect the cedar component within the forest unit from conversion to spruce, for both habitat and timber market value of the species. Objective #10, *Protect and maintain genetic diversity of tree species, including species at the northern end of the range on the Nipissing Forest (i.e. black cherry, red oak, beech, white ash, burr oak, elm, silver maple, red spruce, green ash, basswood, natural red pine stands)*, captures an important theme in the FMP regarding maintaining and protecting certain forest cover types, in efforts to broaden the range of diversity on the Forest. Ensuring that a range of species is present on the forest, ties back to the Forest's ability to adapt to possible climate shifts in the future. Adaptation to the effects of climate change was an important focus resulting from the DFBW and is echoed in the design of many objectives in the FMP.

Group #5
"Promote biodiversity"
"Protect habitat for vulnerable species"
"Provide habitat for all native species"
"Maintain/protect deer yards"

The ideas from group #5 were encompassed by several wildlife objectives in the FMP. Objectives #11 through #18 were designed to ensure the continued monitoring and current habitat levels for a list of 18 species of provincial and local significance. In addition, two species at risk were modelled in the Plan. Non-spatial analysis was performed for all species and spatial analysis was performed for all species with modeling tools available. Desired levels, targets and achievement for the measures of these objectives were developed in the scoping and habitat analysis found in the analysis package in section 6.1.6.

Objective #20, *Protect critical sites for any wildlife species including vulnerable, threatened, endangered or species of special consideration known to occur on the Nipissing Forest,* deals with the operational level protection built into enhanced area of concern prescriptions, and the Plans adherence in the event of encountering habitat.

3.5.1.2 Forest Cover

Group #6
"Promote a forest that is able to withstand the effects of climate change"
"Prepare the forest to adapt to climate change"
"Document climate change"
"Provide a benchmark for climate change"
"Reduce the atmospheric carbon impact of forestry"

Public desires to see direction setting in forest management planning that adequately deal with the global issue of climate change is becoming very common, and the DFBW generated several desires. The planning team struggled with this input, as it felt that something could be done to address the concept, but the questions of what and how much constantly arose. Direction was sought from the province, but results of these discussions generated little forward momentum. Nevertheless, the team managed to develop three

Objectives, #19, to *Maintain the health of the forest under changing climate conditions*, #20, to *measure carbon emissions changes in the forest influenced by harvest operations,* and #34, *Maintain the area of Managed Crown Productive Forest available for timber production at the highest possible level and minimizing conversion of Crown forest area to non-forest land*. The team felt that the indicators related to these objectives were the best way to conclusively generate assessments of mitigation and adaptation of the Forest to the effects of climate change.

Group #7
"Encourage beaver habitat development"
"Re-establish and sustain beaver ponds"

This input was unique in that beaver was the only species specifically isolated by the public in the input. The team recognized the need to set an objective specifically for this type of habitat, and measure the use of the operational prescription in the field, in Objective 22, to *increase the amount of early successional shoreline forest habitat.*

3.5.1.3 Social and Economic

Group #8
"Provide a forest that includes areas that are difficult to get to"
"Limit forest access road network"
"Provide an efficient primary road system"

The planning team and local citizens committee debated over an efficient way to capture the desires of stakeholders in terms of access. Input was polarized to increases and decreases of access levels on the Forest. The team decided that Objective 23 would *evaluate changes to the road density indicator in the short term, in order to set realistic targets in future objective setting* as well as *encourage the maintenance or decrease of present road density in remote EMAs through the development of road use strategies. Medium term (20 year) objective is to maintain the present road density on the forest, subject to further assessment.* This objective allowed the planning team to analyze the indicator of road density to set more direct targets in future planning on the Forest, while still providing some general short term direction.

3.5.1.4 Silviculture

Group #9
"Increase sawlog yield"
"Practice intensive silviculture"
"Economically treat/renew severely degraded stands"
"Manage all quality of stands across the forest"
"Improve health and vigour of low quality hardwood stands"
"Promote ground disturbance and mechanical site preparation during summer logging to provide conditions for natural regeneration"
"Ensure the use of new science and current information in regeneration practices"
"Reduce presence and associated risk of non-native tree species"

"Use herbicide as required"
"No reliance on herbicides"

Most of the silviculture input was organized into two Objectives, #24, to *conduct intensive forest management activities on the Nipissing Forest to support timber quality and mill demand* and #25, to *ensure silvicultural activities create the desired future forest condition or successful regeneration in the areas harvested on the Nipissing Forest.* These objectives are set to measure amounts of intensive silviculture and the success of the program overall, with the intention of providing results that will meet all of the desires collected at the DFBW. Desired levels, targets and achievement for the measures of these objectives were developed in the scoping analysis found in the analysis package in section 6.1.6.

In terms of herbicide use, it was clear that the public desire was to eliminate its use in future silviculture programs. The planning team considered this, together with other management objectives, and decided that the best approach would be to recognize the public desire, however, approach the target cautiously. In Objective #39, *To reduce and eventually eliminate the use of herbicides used in forest management on the Nipissing Forest,* the team set a target to develop a policy that will allow NFRM to make better attempts at determining realistic levels into the future, while still allowing the flexibility to implement a silviculture program that allows for the achievement of other forest condition objectives.

Group #10
"Provide resource based tourism opportunities"
"Protect watersheds"
"Maintain water quality"
"Respect Native cultural interests"
"Provide big white birch trees for canoes and wigwams"
"Provide for, and protect, a wide range of existing and potential recreational options"
"Protect and maintain current and future trout populations by controlled or managed access to lakes and proper measures when working around water"

Protection of social and natural values on the Forest was built into several objectives, including #27, to *respect the presence of resource-based tourism as well as other commercial businesses on the Nipissing Forest,* #29, to *protect cultural heritage values within the Nipissing Forest,* and #33*, Protect water quality and fish habitat within watercourses and water bodies affected by forest management.* All of these objectives have influenced the development of the area of concern prescriptions, and have compliance based indicators.

Group #11
"Utilize more of the available harvest area"
"Commit to address under-utilization of wood supply"
"Encourage stable markets for all forest products"
"Use the market potential"

“Ensure wood supply is sustainable and reliable“
“Promote a healthy forest industry for the long-term”
“Support product diversity“
“Stable Economy”
“Local Employment”

Various timber supply based desires were clearly stated at the DFBW, and Objective #28, *provide a sustainable, continuous and predictable wood supply from the Forest that will meet, as closely as possible and for as long as possible, the current recognized industrial demand of the Forest,* deals with this input by measuring 11 indicators of sustainability. Desired levels, targets and achievement for the measures of these objectives were developed in the scoping analysis found in the analysis package in section 6.1.6 of the Plan.

Group #12
“Provide for equitable First Nation involvement in SFL management”
“Provide meaningful economic opportunities and benefits to local Aboriginal communities”
“Support non timber forest products forming a larger part of the local economy”
Objective #35, *First Nations and Aboriginal Communities are involved in forest management both during the development of the forest management plan and also with the implementation of the plan, #36, First Nations and Aboriginal Communities will benefit economically through partnerships, employment opportunities and new business relationships* and #37 *First Nations and Aboriginal Communities will continue to benefit from forest management through educational and social opportunities* were developed by the planning team and the AWG, and have captured the input provided at the AWG.

Group #13
“Provide opportunities to understand forest processes”
“Improve public education of industry practices”

This input was well received by the planning team as a recognition that the public stakeholders are interested in knowing more about forest management planning, and as a result, being closer to the decisions made during plan development. Objective #40, *to encourage support of the Local Citizens Committee (LCC) in the development of the FMP for the Nipissing Forest,* recognizes the need for LCC’s support for the decisions made in forest management planning, and the training and information required to provide this support.

While all information within the scope of forest management planning was considered by the planning team in the development of the objectives, not all public input was addressed. Some of the input was not in line with provincial policy and/or direction and some was not easily tracked or measured in terms of determining achievement.

Connectivity, as it relates to the adaptation and mitigation of climate change, was introduced at the DFBW and was one of the most discussed concepts by the planning team. The group sought outside advice from provincial experts in the area of forests and climate change, but no consensus could be reached as to how the FMP could effectively measure connectivity on the landscape. The team agreed that the forest as a whole was relatively well connected in areas where forest management activities were occurring. The team concluded that larger landform and land use issues may be impacting connectivity more so than forest management when it considered the amount and arrangement of private land, the size and location of Lake Nipissing, and finally the major provincial highways intersecting the management unit. With all of the information in hand, the planning team decided that it would not be able to move forward with an objective dealing with forest connectivity in the Plan.

The planning team and LCC have agreed that the information collected has been considered and formed part of the basis for the development of the objectives in the Plan.

3.6 Objectives and Indicators

Work completed by the planning team, the Nipissing LCC and the AWG considering and refining the DFBW and AWG consultation, as well as the FMPM and all other applicable forest management guides and guidelines, yielded 42 objectives and 61 indicators, thus providing over 1000 measures of sustainability. The planning team set a desired level, or a specific number, range or trend for each indicator, to be achieved and maintained over time. Accompanying the desired level is a target, with a specific number, range or trend and a timeframe for achievement. One or more desired levels and targets have been identified for each indicator. The desired level is intended to reflect the planning team's interpretation of moving towards the emulation of natural processes on the landscape, or meeting a series of environmental, economic or social values. The target may be the same as, or different from, the desirable level of the indicator, but it has remained consistent with or established movement toward, the desired level. Rationale for all desired levels and targets has been documented by the planning team, and is contained in section 6.1.26.

All indicators developed for the Plan are quantifiable. The establishment of a target for each management objective often reflects the necessity to balance conflicting management objectives. Targets may be the same, or differ from the desired levels. The strategic forest management model (SFMM) was used to develop a management strategy that balances the achievement of related management objectives over time. In order to measure each objective and its related indicators, one or more measures were assigned for each indicator. There are objectives for forest diversity, social and economic values, silviculture, and provision of forest cover for those values that are dependent on the Crown forest. The following section discusses each objective, associated indicators and selected desired levels and targets. FMP-6 provides a summary of management objectives in the Plan, and includes information related to the timing of assessment for each objective.

In FMP-6, there are 5 different categories for timing of assessment in the forest management plan. They are as follows:

a. To be assessed at LTMD
b. To be assessed at draft Plan submission
c. To be assessed at final Plan submission
d. To be assessed at year 3 annual report
e. To be assessed at year 7 and 10 annual report

Each category considers the requirement of information available to the planning team in order to properly assess the achievement for each objective.

Several objectives have been assessed at the long-term management direction stage of the process, and followed-up at each stage of plan production. This subset of objectives and indicators that required measurement through time was assessed using SFMM, GIS, NFRM tool (NDPEG) and OWHAM and balanced as part of the requirements of the management strategy. A total of 4 objectives were assessed within the SFMM for achievement of sustainability of the Plan. In addition, eleven other objectives were assessed, outside of the SFMM model, to evaluate spatial disturbance pattern and preferred wildlife habitat as a result of selecting the preferred allocation on the landscape. Tools used to evaluate these objectives included OWHAM, GIS and NFRM tool (NDPEG analysis). The consideration of these eleven objectives will continue until the selected areas of operations are in place and approved in the final Plan.

One objective was assessed during plan at the long term management direction using a tool developed at the Ontario Forest Research Institute (OFRI) that evaluated carbon sequestering in the management strategy.

A final objective assessed at long term management direction was an evaluation of the Nipissing Local citizen's committee agreement with the management objectives developed in the strategic direction of the Plan.

Certain parts of several objectives were assessed for the first time at the draft Plan submission, including the Nipissing LCC and its self-evaluation, as well as certain indicators in the wood supply objectives that deal with forecast and planned harvest area and volume.

One objective was assessed for the first time at the final plan submission, again linked to the Nipissing LCC's support for the final Plan.

Many objectives are assessed in the annual reports following implementation of the forest management plan. This is necessary as achievement is linked to how well NFRM and North Bay District MNR, as well as all others involved in the management of the forest execute the intentions of the forest management plan. The first objective to be assessed in the annual reports is linked to herbicide use on the forest, and will be assessed in the third year of plan implementation to measure achievement.

The remainder of the Plan objectives will be tracked annually and assessed in the 7 and 10 year annual reports, to prepare for the development of the next forest management plan (year 7), and to assess the sustainability of the Plan. (year 10).

3.6.1 Forest Diversity

The forest diversity objectives are assessed based on a series of indicators for: landscape pattern; forest structure, composition and abundance; amount and distribution of old growth; and habitat for forest-dependent provincially and locally featured species.

Management Objective #1: Move toward a distribution of disturbances that more closely resembles the expected natural disturbance landscape pattern.

The *Forest Management Guide for Natural Disturbance Pattern Emulation* (NDPEG) provides direction for developing a natural disturbance template. There were two major considerations associated with the implementation of the NDPEG:

a. 90% of planned clearcuts in preferred harvest areas must be less than 260 hectares in size (this is described in detail in section 4.3.4): and,

b. Meeting or moving toward the disturbance size template (i.e. assesses the amount of each size class of disturbance, and the area contained in each).

Indicator(s):

1. **Frequency** distribution of **forest disturbance** (harvest and natural) area.
2. **Area** distribution of **forest disturbance** (harvest and natural) area.
3. **Frequency** distribution of **planned clearcut areas**.
4. Forest interior, as measured as a percent of crown productive forest land base made up of deer wintering areas.

Desired Levels: The Natural Disturbance Pattern Emulation Guideline sets guidance to planning teams to move toward the natural disturbance template. Considering this, the planning team decided to create landscape disturbances consistent with the area distribution of disturbances, by size class similar to that of a natural template developed using historic fire data relevant to the Forest, for indicators #1 and #2. Values can be found on table FMP-6 related to each size class.

The desired level for indicator #3 is to achieve a 90/10 ratio of planned clearcut areas less than and greater than 260 hectares, this is a standard in the Natural Disturbance Pattern Emulation Guide. For indicator #4, the desired level represents the maintenance of no less than 15% (142,113.0 ha) of the crown and private land base as deer wintering areas, and considers the current forest condition in line with the application of the Forest Management Guidelines for the Provision of White-tailed Deer Habitat

Management Objective #2: Increase the frequency of old growth area occurring in larger patch sizes

Indicator(s):

5. **<u>Mean size</u>** and **<u>frequency</u>** of old growth patches, in large size classes.

Desired Level(s): Greater number of large patches and greater mean size of large patches than current levels.

The desired level is based on the desired forest and benefits meeting inputs to see more of this condition, in larger patch sizes, and discussion held by the Old Growth Task Team. Stand or patch size is significant for old growth in that larger is generally better for retaining genetic reproductive fitness[27] and for certain types of wildlife habitat. The map in section 6.1.2.4 of the Plan shows the current spatial distribution of even-aged old growth stands, as defined by forest unit and age.

As there is no certain evidence to prove other wise, the Old Growth Task Team felt that the forest historically contained larger patches of old forest, and the desire to bring the forest back into this condition was unanimous.

Management Objective #3: With consideration given to the current landscape, ensure that an even distribution across the forest of old growth stands, and old aged stands is allowed to occur.

Indicator(s):

a) Composition of old growth stands and old-aged stands by landscape sector (NE,NW,SE,SW)

Desired Level(s): An even distribution across landscape sectors. The desired level is based on the desired forest and benefits meeting inputs and discussion held by the Old Growth Task Team. In the absence of background information or science related to the natural distribution of old growth on the Forest, the team decided that an even distribution in four sectors would allow future ecological targets to be set with ease, once the natural information was better understood.

Management Objective #4: Maintain the area of forest cover types that would occur naturally on the Nipissing Forest, similar to the expected natural landscape dynamics, with consideration of the pre-settlement forest condition.

Indicator(s):

6. Total area of Forest Cover Type

The areas being measured for this indicator have been classified by the following forest unit groups:

a. PWUS +PWST +PR (Red and White Pine)
b. PO +BW (Intolerants)
c. MCL (Conifer Lowland)
d. PJ + PJSB (Jack Pine)

[27] Rajora, O.P., Mosseler, Alex, and Major, John E., 2002.

e. MW (Mixedwood)
f. SF (Spruce/Fir)
g. HE (Hemlock)
h. LWMX (Lowland Mixed Hardwood)
i. HDUS +HDSEL (Maple Mixed)
j. BY (Yellow Birch)

The groups were based largely on comparisons that could be made to historic forest cover data by working group. See section 2.2.2 for a description of the historic forest. The survey data has been summarized and compared to the current FRI to assess changes from historic to current and to facilitate broad directional changes for each cover type.

Figure 3.6.1 Proportion of forest cover by working group in OLS data compared to 2009 Planning Composite Inventory

Working Group	**OLS (1856-1958) % of representation**	**FRI (2009) % of representation**	**Change**
Pine	17.66**	15.19	FMP Increase
White Birch	14.19*	13.12	FMP Stable
Spruce	11.39	10.94	FMP Stable
Balsam Fir	11.17**	3.68	FMP Increase
Poplar	8.88**	17.81	FMP Decrease
Maple	6.30**	23.86	FMP Decrease
Larch	5.92**	0.36	FMP Increase
Cedar	4.74	4.60	FMP Stable
Yellow Birch	4.54	3.96	FMP Increase
Hemlock	4.50	2.05	FMP Increase
Hardwoods1	4.34	N/A	
Jack Pine	2.41**	4.01	FMP Stable/Slight Decrease

*Significant difference between 1856-1958 OLS data and 2004 FRI township lines at the 95% confidence interval.

** Significant difference between 1856-1958 OLS data and 2004 FRI township lines at the 99% confidence interval.

[1] Hardwoods: "hardwoods" were not well defined in the surveyors notes, so we cannot say if they were tolerant hardwoods, or a mix of hardwood species including poplar and white birch.

Desired Level(s): 100 year projections will show that no forest cover type declines below 82% of natural condition (maximum ecological level), and where possible, movement towards the pre-settlement forest condition should be achieved. This desired level has been selected by the planning team in consideration of two sources of input. The first desire has been set with the natural benchmark in mind. The second is science based, and considers the influence that the current forest condition might be having on the ability of the forest to move in a certain direction. The target also considers the industrial/habitat value in the current forest structure to the mills, communities and wildlife associated with each condition. The second, pre-settlement condition was collected as a desire of the public at the DFBW, which also specifically sought an increase in yellow birch, hemlock and pine with a decrease in maple.

The objective has been an attempt to find the appropriate balance between historic condition and current demand.

In terms of the natural benchmark portion of the desired level, consideration has been given to the fact that although the general intent of forest management is to emulate natural disturbance, current silviculture practices may not replicate exactly the process

carried out in a natural context. The achievement reflects this reality. The 82% value has been developed through the course of scoping analysis, and designated as the maximum ecological level for the Forest in this Plan.
The following desired levels have been set by forest cover type:

Red and White Pine Forest Cover Type (dominant species Pw and Pr): desired level established to increase the amount of area in these forest units because the proportion of white and red pine has decreased by approximately 47% in pure conditions from historic proportions according to Pinto. Work completed in restoration is showing increases in this area on the forest compared to planning inventories in the past. However, the need to continue restoration is still an important goal for the planning team.

Intolerant Forest Cover Type (dominant species Po and Bw): desired level established to see some decrease in area in forest cover type because there has been a significant increase in this condition through time on the Forest (see Table 3.6.1.1).

Lowland Mixed Conifer Cover Type (dominant species Ce and Sb): Desire to keep this cover type stable on the landscape. As one of the smaller cover types, its value in terms of biodiversity outweighs its economic value on the Forest.

Jack Pine Cover Type (dominant species Pj): desired level established to maintain the amount of area in this forest unit. The Nipissing Forest is within the transition zone of the Great Lakes St. Lawrence forest (GLSL) and the Boreal forest regions. The jack pine forest unit is a classic example of a Boreal forest type mixed within GLSL forest types. Maintenance of this forest unit is important to conserve the unique transition type forest that exists within the management unit. The jack pine species is also of commercial importance. Pinto showed a 44% increase in the proportion of jack pine species and Leadbitter showed a decrease of about the same magnitude.

Spruce/Fir (dominant species Bf and Sb): Desire to keep this cover type stable on the landscape. This forest unit is present as a successional forest unit, providing an intermediate stage between different forest conditions. While Pinto's data shows a great deal of balsam fir in the historic forest, it is believed that much of this has been impacted by natural causes, primarily spruce budworm. The planning team felt that stability would better serve diversity on the Forest as an objective.

Hemlock Forest Unit (dominant species He): desired level established to increase the amount of area in this forest unit. Pinto showed a decrease from historic levels and hemlock stands have been designated as a candidate high conservation value.[28]

Lowland Mixed Hardwood Cover Type (dominant species Ab and Ms): Desire to keep this cover type stable on the landscape. As one of the smaller cover types, its value in terms of biodiversity outweighs its economic value on the Forest.

Mixed Maple Cover Type (dominant species Mh): desire to see a slight decrease in this cover type to facilitate the creation of healthy yellow birch stands on the Forest.

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[28] Clark, Tom and Riki Burkhart, 2007. High Conservation Value Forest in the Nipissing Forest SFL., 88pp. Nipissing Forest Resource Management Inc. Inc.

Yellow Birch Cover Type (dominant species By): desired level established for a small increase in the yellow birch forest unit. Although Pinto showed a small increase in the proportion of yellow birch working group area, he found a small decrease in the proportion of the yellow birch species.

Management Objective #5: Provide Red and White Pine forest area not less than 1995 levels, consistent with the Conservation Strategy for Old Growth Red and White Pine Forests Ecosystems in Ontario, 1996.

Desired Level(s): Desired Level is guided by the Conservation Strategy for Old Growth Red and White Pine Forests Ecosystems in Ontario, 1996, and is to maintain or increase the 1995 levels of red and white pine on the landscape into the future. The source for the desired level and target (79,671 ha) was the Nipissing 1999 FMP, FMP-2, a summary of the PW and PR working groups, this was the closest, most accurate information the team could use to relate back to the intent of the Old Growth Strategy. Comparisons to this value will be by forest unit from the 2009 Plan, as working group is not a modelled condition in the SFMM. This value will provide an indication to the planning team of how much white and red pine based forest unit should be on the Forest today, and how the projection of this forest condition should progress through time.

Management Objective #6: Restore to the PWUS or PR forest unit, a proportion of all harvested area in the white pine seed tree, mixedwood and offsite poplar and white birch forest units.

Desired Level(s): The desired levels for this objective have been determined through the scoping analysis, section 6.1.6, in conjunction with several other objectives (eg. Forest Cover Type). During the development of the management strategy, the SFMM was given absolute minimums and maximums (silviculture renewal limits based on realistic possibilities in the field) and percentages for sites typically restored on the Forest were determined by the model and endorsed by NFRM, the LCC and the planning team. Considerations toward the future forest condition results from scoping analysis were a driving force to determining appropriate levels for restoration. The following figures illustrate the desired level by forest unit:

f. White Pine Seed Tree (PWST) – 75% of harvested area
g. Mixedwood (MW) – 20% of harvested area
h. Offsite Poplar (PO) – 12% of harvested area
i. Offsite White Birch (BW) – 5% of harvested area

Management Objective #7: Move towards a more natural age class distribution for each forest unit over the entire forest in mature and old-aged condition, similar to that of a natural forest dynamic.

Indicator(s):

7. Total Area by Forest Unit in a mature state by term.
8. Total Area by Forest Unit in an over mature state by term.

Desired Level(s): To achieve the maximum ecological level (82%) of the selected forest unit by seral stage, by term, of the natural benchmark in SFMM. The desired level for any biodiversity indicator (Forest cover type, age structure and wildlife habitat) is intended to mimic the most likely ecological conditions that we would expect to occur. Understandably, a certain amount of fluctuation would be expected, depending on the indicator, especially when modeled out to 100 years. Ecosystems and the species within them can tolerate a certain level of fluctuation through time, provided it is within the scale of what would occur naturally. Using the forest management model, the best estimate we have to determine how these natural pathways might occur; in the natural benchmark. It would be most appropriate to target the results of the natural benchmark to achieve any ecologically desired level. This desired level also considers that although the general intent of forest management is to emulate natural disturbance, current silviculture practices may not replicate exactly the process carried out in a natural context. Subsequently, the achievement reflects this reality. The 82% value has been developed through the course of scoping analysis, and designated as the maximum ecological level for the Forest in this Plan.

For smaller forest cover types on the Forest, objectives #8 and #9 were set to ensure that composition and area are maintained or increased through the duration of the Plan.

Management Objective #8: Maintain or increase the mid-tolerant hardwood component in stands with suitable conditions.

Indicator(s):

9. Area of stands containing >10% of mid-tolerant species (excluding By)
10. Percentage of mid-tolerant species in the HDUS and BY forest units average condition

Desired Level(s): The desired level for each indicator was selected by the planning team in attempts to identify the mid-tolerant hardwood condition in the forest inventory, and then show increase in the average species composition for the hardwood shelterwood and yellow birch forest units. To maintain or increase the current 29,524 ha of area that contains greater than 10% of mid-tolerant species. For the 10th indicator, the desired level is to show an increase in the mid-tolerant component of the average species composition within the HDUS and BY Forest Units based on desired forest and benefit input, as well as historic forest information which illustrates levels higher than today in mid-tolerant hardwood on the forest, other than Yellow Birch, on the Forest.

The planning team did not set firm increases in the desired levels, as some on the planning team feel that the hard maple component of the hardwood forest units should be stressed as crucial to current industrial demand, and therefore balance must be considered in the achievement of this objective.

Management Objective #9: For the mixed conifer lowland forest unit (MCL), ensure that the proportion of spruce and cedar remain relatively similar for the forest unit as a whole.

Indicator(s):

11. Spruce and Cedar composition in MCL

Desired Level(s): set to conserve suitable habitat condition in the MCL forest unit, preventing the conversion of cedar dominated areas to black spruce. The level is set at the current composition of the forest unit on the landscape.

Conserving genetic diversity is one component of conserving rare tree species on the Forest. To conserve and enhance the genetic diversity, the planning team recognized that sites with rare or special tree species would be protected and/or managed to enhance the extraordinary condition.

Management Objective #10: Protect and maintain genetic diversity of tree species, including species at the northern end of the range on the Nipissing Forest (i.e. black cherry, red oak, beech, white ash, burr oak, elm, silver maple, red spruce, green ash, basswood and natural red pine stands).

Indicator(s):

12. Total area of stands containing 10% or greater, rare tree species of species at the northern end of their range.

Desired Level(s): The planning team set the desired level for this objective considering the current forest condition. It decided the best way to achieve this objective would be an increase in occurrences of these types of sites, if possible.

Management Objective #11: To achieve wildlife habitat levels similar to the natural condition for forest dependent provincially and locally featured species on the Nipissing Forest.

Within the Forest, the provincially-featured species include deer, moose and pileated woodpecker. Other significant wildlife species tracked in the assessment of this objective are stipulated according to their dependency on the old growth forest condition. These species include, black-backed woodpecker, black bear, lynx and ruby-crowned kinglet.

Locally featured species on the Forest include marten, ruffed grouse and the eastern red backed salamander, among others. The locally-featured species were identified through the Desired Forest and Benefits meeting and have been declared as such by the MNR District Manager. The general measure of habitat for this indicator is the area (ha) of suitable habitat for each provincially and locally featured species identified for the management unit.

Indicator(s):

13. Area of preferred wildlife habitat for the provincially featured species by term.
14. Area of preferred wildlife habitat for mandatory old growth species by term.
15. Area of preferred wildlife habitat for locally significant species by term.

Desired Level(s): To achieve the maximum ecological level (82%) for the selected species, by term. The desired level for these biodiversity indicators is consistent with other objectives related to other ecological groupings. It is intended to mimic the most likely ecological conditions. Understandably, a certain amount of fluctuation is expected, depending on the indicator, especially when modeled out to 100 years. Ecosystems and the species within, can tolerate a certain level of fluctuation through time, provided it is within the scale of what would occur naturally. Using the forest management model is the best estimate we have to determine how these natural pathways might occur; in the natural benchmark. It would be most appropriate to target the results of the natural benchmark to achieve any ecologically desired level. This desired level also considers that although the general intent of forest management is to emulate natural disturbance, current silviculture practices may not replicate exactly the process carried out in a natural context. The achievement reflects this reality. The 82% value has been developed through the course of scoping analysis, and designated as the maximum ecological level for the Forest in this Plan.

In addition to the assurance of the management strategy providing for mature and over mature forest cover, the planning team also wanted to ensure that the level of disturbance creating early successional forest was occurring at a level comparable to the natural benchmark. This early successional stage is important for a range wildlife species, and can be limited by other objectives that may reduce the frequency of stand replacing disturbances.

Management Objective #12: To provide early successional forest over 100 year term.

Indicator(s):

16. Non-spatial assessment of total pre-sapling, sapling and two-canopy uniform area by Ecosite type (ha) by start of each planning term.

Desired Level(s): To achieve a minimum of 82% for the selected Ecosite in a pre-sapling, sapling and two-canopy phase, by term, of the natural benchmark in SFMM. The desired level has been selected in concert with other desired ecological objective achievement, through the course of scoping analysis.

In addition to the provincially and locally featured species, the planning team selected to manage for both southern flying squirrel and red shouldered hawk. Both of these species have been included on the provincial species at risk listings at some point during the planning process, and have been evident on the Forest in the past. SFMM has been used to set targets for each of these species in the management strategy, and additional modeling tools have been used when available.

Management Objective #13: to achieve wildlife habitat levels similar to the natural condition for forest dependent wildlife species at risk with known to occurrence on the Nipissing Forest.

Indicator(s):
17. Area of preferred wildlife habitat for the selected species by term.

Desired Level(s): To achieve a minimum of 82% of the natural benchmark in SFMM for the selected species, by term. The desired level has been selected in concert with other desired ecological objective achievement, through the course of scoping analysis.

In addition to the non-spatial measurement of wildlife habitat in the management strategy, the planning team also utilized a spatial tool, the Ontario Wildlife Habitat Assessment Model (OWHAM) to develop further strategies to maintain effective spatial arrangement of preferred habitat for red-shouldered hawk, moose, deer and pileated woodpecker. These species are 4 of the 5 total modelled by OWHAM.

Red-shouldered hawk is known to be a very spatially dependent species, the SFMM does not incorporate spatial habitat requirements into its analysis. The preference of habitat conditions for the red-shouldered hawk is highly susceptible to various spatial factors. To properly assess the species' preferred habitat, a spatial analysis was performed. A target was set using the results of this analysis as well. The limitations of SFMM causing a tendency to overestimate the availability of the preferred habitat for this species lead to the following management objective.

Management Objective #14: Create and maintain a landscape that ensures the long term sustainability of preferred red-shouldered hawk habitat on the Nipissing Forest as modeled in OWHAM

Indicator(s): Area of preferred habitat as indicated in the Spatial (OWHAM) assessment of red-shouldered hawk habitat on Crown land over the next 10-years.

Desired Level(s): Spatial (OWHAM) assessment of red-shouldered hawk habitat will indicate no net loss of preferred habitat from 2009 Plan Start levels (>= 36,471 ha). This desired level is designed to illustrate the team's desire to see the entire current habitat on the forest maintained and where possible, increased. It does not however, take into consideration that the species is relatively rare on the Forest, and that all of this habitat may not necessarily be used.

The Loring Deer yard is a significant wildlife value on the Forest. This deer yard has been designated as a candidate high conservation value due to the critical winter habitat it provides to the province's largest deer herd. For this reason, the Forest Management Guidelines for the Provision of White-tailed Deer Habitat were applied and resulted in two objectives in the Plan. Deer is one of three provincially featured species identified on the Forest. OWHAM analysis will assess the current, desired, targeted and achieved habitat levels on the Forest

Management Objective #15: Create and maintain the white-tailed deer critical thermal cover condition in the Loring Deer Yard core area to ensure the long term sustainability of this condition on the Nipissing Forest.

Indicator(s):

18. Percent of critical thermal cover (CTC) within the Loring Deer Yard (LDY) core (Stratum 1) on the crown land in the Nipissing Forest.

Desired Level(s): Retain 30% of CTC in Stratum 1 of LDY, a total of 6,880 ha. The desired level corresponds to the application of the Forest Management Guidelines for the Provision of White-tailed Deer Habitat

Management Objective #16: Create and maintain suitable white-tailed deer summer habitat on the landscape to ensure the long term sustainability of this condition on the Nipissing Forest.

Indicator(s):

19. Percent of crown and private land base made up of forest openings, clearings, fields and early successional forest.

Desired Level(s): Maintain 10 % (94,743 ha) of the Crown and private land base as deer summer range. The desired level corresponds to the application of the Forest Management Guidelines for the Provision of White-tailed Deer Habitat.

Pileated woodpecker is the second provincially featured species identified on the Forest. OWHAM analysis will assess the current, desired, targeted and achieved habitat levels on the Forest. The spatial analysis will assess the habitat trend in comparison with the proposed management strategy to ensure that the selected harvest areas provide maximum pileated woodpecker habitat potential.

Management Objective #17: Create and maintain a landscape that ensures the long term sustainability of pileated woodpecker feeding, nesting and roosting habitat on the Nipissing Forest as modeled in OWHAM.

20. *Indicator(s)*: Area of preferred habitat as indicated in the spatial (OWHAM) assessment of Pileated woodpecker habitat on Crown land over the next 10 years.

Desired Level(s): the spatial (OWHAM) assessment of preferred pileated woodpecker habitat (ha) will not decline more than 12% of the 2009 Plan Start level (>246752 ha by plan end (T2)). Desired Level corresponds to the Forest Management Guidelines for the Provision of Pileated Woodpecker Habitat, combined with the trend of proposed management strategy.

Historically, the carrying capacity of moose on the Forest has been at the lower end of the preferred range. The team set the Plan objective to ensure that the harvest areas improve the spatial arrangement, and therefore the total carrying capacity for moose on the Forest.

Management Objective #18: Create and maintain a landscape that ensures the long term sustainability of suitable moose summer and winter habitat on the Nipissing Forest as projected in OWHAM.

Indicator(s):

21. Spatial (OWHAM) habitat projections on Crown and private land over the next 10 years as measured by moose carrying capacity.

Desired Level(s): Desired moose carrying capacity (as assessed by OWHAM) will be greater than or equal to 0.6 moose/km2 as required to meet target population range of 0.2 to 0.4 moose/km2. Desired Level corresponds to the Forest Management Guidelines for the Provision of Moose Habitat and has been selected based on historical trends on the Forest related to moose carrying capacity.

3.6.2 Forest Cover

This series of objectives relates to the provision of forest cover for those values that are dependent on the Crown forest.

In response to the public desire to see Plan objectives that incorporate the notion of global climate change, the planning team developed two objectives that addressed the mitigation and adaptation of the Forest to the effects of climate change. These objectives were guided by planning team discussion with provincial experts and local science advisors, but with no official policy or guide to refer to.

Management Objective #19: Maintain the health of the forest under changing climate conditions.

Indicator(s):

22. Participation and support for the Gurd Twp. Tree Improvement Management Committee
23. Compliance with strategy for monitoring wood movement from infected areas.
24. Number of Salvage Plans for infected areas.

Desired Level(s): Participation and support for the Gurd Township Tree Improvement Management Committee will included a regular contribution to the research and development into the program. Annual training/compliance will be provided to staff and licensees to improve knowledge on potential wood movement risk/concerns related to forest health. Where economically feasible, salvage plans will be carried out for disturbances greater than 1000 hectares. The desired levels have been selected to ensure forest management considers forest health as a priority by protecting resources in changing climate conditions.

Management Objective #20: Measure carbon emissions changes in the forest influenced by harvest operations.

Indicator(s):
25. Carbon Budget Measurement (OFRI FORCARB-ON Analysis)

Desired Level(*s*): Natural Levels. Desired level derived from public input to consider effects of forest management on levels of carbon emitted and stored within the Nipissing Forest.
With no evidence to prove otherwise, the planning team expects that the carbon sequestering ability of the Forest, and products created as a result of forest management, should be equivalent or similar to natural levels.

A number of objectives were created by the planning team to ensure the protection and maintenance of the wildlife, natural heritage, tourism, sensitive ecosystems and other social values dependent on forest cover.

Several of the Plan's objectives use compliance inspections as key indicators to be measured as the percent of inspections in compliance. The desirable level for the percent of inspections would be 0% non-compliance for inspections related to all of the following objectives. These levels were chosen to ensure that there is no impact of forest activities on the values and other stakeholders on the Forest. However, it is unrealistic to expect that there would never be an incidence of non-compliance at some level of significance. The target (refer to FMP-13) has therefore been set according to a combination of the sensitivity and frequency of the value being protected. These indicators (#26-32) will be tracked and monitored through the annual report and will be assessed at year 7 and 10.

Management Objective #21: Protect critical sites for any wildlife species including vulnerable, threatened, endangered or species of special consideration known to occur on the Nipissing Forest.

Management Objective #26: Ensure land use direction is being followed in enhanced management areas as well as adjacent to parks and conservation areas.

Management Objective #29: Protect cultural heritage values within the Nipissing Forest.

Management Objective #30: Minimize the potential impact of forest operations on recreation areas that are identified on the values map.

Management Objective #31: Protect water quality of known sources of drinking water.

Management Objective #32: Minimize the amount of productive forest land negatively impacted, causing site damage and loss of forest productivity.

Management Objective #33: Protect water quality and fish habitat within watercourses and water bodies affected by forest management.

An important species identified by the LCC, and at the DFBW, was the beaver. It's recognized for its contribution to the trapping community on the Forest.

Management Objective #22: Increase the amount of early successional shoreline forest habitat.

The planning team modified the area of concern prescription for areas with potential for beaver habitat, and set desired implementation levels and related targets to ensure shoreline disturbance could be promoted during harvest activities, thus enhancing and increasing the level of habitat on the Forest.

An important aspect of forest management in the North Bay area is the recognition of several commercial businesses delivering tourism opportunities on the Forest. At the beginning of the development of the 2009 Plan, NFRM had 34 resource stewardship agreements (RSA) with local tourism outfitters. NFRM is always striving to increase the partnership with other forest users, and the planning team has developed an objective to recognize this.

Management Objective #27: Respect the presence of resource-based tourism as well as other commercial businesses on the Nipissing Forest

Indicator(s):

34. Number of RSA in place.
35. Compliance with prescriptions for the protection of resource based tourism values (% of inspections in compliance)

Desired Level(*s*): An increase or maintenance from the 2004 Plan of 34 active resource stewardship agreements. Desired level selected to show initiative on NFRMs part in engaging in the RSA process with all interested parties.

The planning team recognized the importance of maintaining the Crown productive landbase and how it relates to the values dependent on forest cover. An objective was developed to track the size of the available productive landbase through time.

Management Objective #34: Maintain the area of Managed Crown Productive Forest available for timber production at the highest possible level and minimizing conversion of Crown forest area to non-forest land.

Indicator(s):

36. Managed Crown forest area available for timber production

Desired Level(*s*): The desire is to maintain 100% of current Crown productive forest into the future. This desired level has been set to ensure that as much productive forest as possible is available for management into the future. The team recognizes that forest management does result in some instances to loss of the productive landbase, and targets have been adjusted to account for this occurrence.

3.6.3 Silviculture

In order to achieve desired future forest conditions, the planning team developed two broad silviculture objectives that are mechanisms for achieving other management objectives related to forest composition in the Plan.

Management Objective #24: Conduct intensive forest management activities on the Nipissing Forest, to support timber quality and mill demand.

Indicator(s):

37. Percentage of area of total intensive silviculture program

Desired Level(*s*): 50% of harvest area. The planning team felt that half of the harvest area could reasonably be treated intensively, with unlimited budgets and ideal site conditions, to achieve the desired future forest condition. Targets will be set to reflect other components of the management strategy, like future forest condition and wood supply demand.

Management Objective #25: Ensure silvicultural activities create the desired future forest condition or successful regeneration in the areas harvested on the Nipissing Forest.

Indicator(s):

38. Percent of harvested landbase that is declared free-growing related to harvest area.

Desired Level(*s*): 100% silviculture success. Desired level is based on the premise that investment into any site would provide the anticipated result of a silviculture success all of the time. Targets have been created taking into consideration that forest managers do not always have control over climate and other environmental factors that may lead to a regeneration success, however not in the intended forest unit coverage.

3.6.4 Social and Economic

Several objectives related to road infrastructure, wood supply, First Nations communities, non-timber forest products, and public involvement in the development of the Plan have been included in the social and economic suite of objectives.

The FMPM (2004) recommends the use of road density on the landbase as an indicator to measure both social and economic well-being, as well as values dependent on the Crown forest cover. Among stakeholders on the planning team, LCC, DFBW and AWG, the varied interest made consensus on the right amount of roads in any particular landscape elusive. The team decided to set some broad desires, with the commitment to evaluate the indicator and provide more meaningful target setting into future management plans on the Forest.

Management Objectives #23: Evaluate changes to the road density indicator in the short term, in order to set realistic targets in future objective setting. Encourage the maintenance or decrease of present road density in remote EMA's through the

development of road use strategies. Medium term (20 year) objective is to maintain the present road density on the forest, subject to further assessment.

Indicator(s):

39. Kilometres of primary and secondary road within the total crown landbase.
40. Kms of forest access road available to public within the remote and wilderness EMAs.

Desired Level(*s*): Desired level is to have no change in the current levels of road density for either of the indicators. Desired level is intended to provide short term flexibility in order to properly evaluate changes to the road density indicator in the short term and to set realistic targets in future objective setting. Desired level for indicator #40 is intended to conform to access direction provided by the EMAs identified in the indicator.
A predictable long-term wood supply is critical for the survival, and growth, of the forest industry in Ontario. Long-term wood supply in the FMPM is based upon projections of available harvest area and volume, by species group. The planning team developed an objective that encompasses sustainable timber supply on the Forest. The objective contains ten indicators that are measured at various points of the Plan assessment. The key indicators are the available harvest volume in cubic meters, projected over the long-term (100 years) and the available harvest area, total and by forest unit, in hectares, projected over the long-term (100 years).

Management Objectives #28: Provide a sustainable, continuous and predictable wood supply from the Forest that will meet, as closely as possible and for as long as possible, the current recognized industrial demand of the Forest.

Indicator(s):

41. Available Long-term projected volume, by species group (m3/yr).
42. Available Long-term projected total harvest area.
43. Available Long-term projected harvest area, by forest unit.
44. Forecasted harvest area, by forest unit.
45. Forecasted volume, by species group.
46. Planned Harvest Area for 1st 5-year Phase, by forest unit.
47. Planned Harvest Volume for 1st 5-year Phase, by species group.
48. Actual Harvest Area, by forest unit.
49. Actual Harvest Volume, by species group.
50. Percent of forecast volume utilized, by destination.
51. Percentage of forest operations inspections in non-compliance for wasteful practices.

Desired Level(*s*):

Available Long-term projected volume, by species group (m3/yr)

The desirable level for the projected available harvest volume by species group is to meet the current industrial demand (CID) for each species group. The utilization task team developed the desired levels for the current industrial demand on the Forest, with consideration given to wood supply commitments of the Sustainable Forest Licence, as well as open market demand based on trends from the previous ten years of operations. Results of this work are documented in scetion4.3.6. The target has been set consistently with the ecological minimum of 70% of the CID. The individual targets for each species group can be found in FMP-13.

Available Long-term projected total harvest area

The desired level is to see zero decrease from term to term in the total available harvest area throughout the planning horizon. The desired level was set in order to provide fibre to mills and provide a stable harvest to licensees. The target was set to see no decrease of more than 10% from term to term during the planning horizon, in consideration of the balance required for other objective achievement.

Available Long-term projected total harvest area, by Forest Unit.

The desirable level is to maintain a forest unit mix, over time, in order to meet the projected available harvest volume (m3) by species group. Desirable levels cannot be fixed, in order to allow the optimization of the selection of forest units from term to term. The individual targets for each forest unit can be found in FMP-13.

Forecasted Harvest Area by Forest Unit

The target level for this indicator is for the forecast area to be greater than 90% of the available harvest area for each FU. The desirable level for this indicator would be the forecast area equals 100% of the AHA; however, the following factors make this an unrealistic goal: isolated stands which are not economical to access; NDPEG requirements (i.e. 80/20) and spatial wildlife considerations.

Forecasted Volume by Species Grouping

The target level for this indicator is for the forecast area to be greater than 90% or less than 110% of the available harvest volume for each FU. The desirable level for this indicator would be that the forecast volume equals 100% of the SFMM projection; however, because the strategic volumes are projected using an average forest unit condition in the SFMM, the stand level calculations from the selected allocations can vary from site condition to site condition.

Planned Harvest Area for 1st 5-year Phase, by forest unit.

The target level for this indicator is for the planned area to be 35-65 % of the available harvest area for each FU. Because the harvest allocations are determined for a 10-year period, the desirable level would be for the planned area to equal 50% of the AHA. Having 50% in the first five years and then another 50% in the last five years would ensure a balanced harvest. However, due to operational and economic reasons, achieving the 50% balance is not always possible.

Planned Harvest Volume for 1st 5-year Phase, by species group.

Because the harvest volume allocations are made based on a 10-year period, the desirable level for this indicator would be for the planned volume to equal 50% of the available harvest volume (AHV). This level was chosen to meet CID requirements for the identified mills. The target level for this indicator is for the planned volume to be 35-65% of the AHV for each species group. By having 50% in the first five years and then another 50% in the last five years, it would ensure a balance in harvest volume; however, due to operational and economic reasons and the variability of the volume by stand, achieving the 50% balance is not always possible.

Actual Harvest Area, by forest unit.
The target level for the actual harvest area by forest unit is for the depletions to be greater than 75% of the allocations for each FU. The desirable level for this indicator would be 100%: however, due to poor market conditions or poor wood quality, achieving 100% of the available harvest area may not be realistic. The depletions will be reported and tracked through the annual reports and year 7 and 10 will be used for target measurement.

Actual Harvest Volume, by species group.

The desirable level for this indicator is for the actual harvest volume to equal or exceed 100% of the planned volume for each species group. This level was chosen to meet CID requirements of the identified mills. In reality, there are a variety of possible operational and economic factors which prevent the 100% achievement. The target has, therefore, been set at the actual harvest volume being greater than 75% of the planned volume for each species group. These targets are linked to the AHA indicator targets. These targets will be tracked through the annual reports and the results will be monitored and reported at year 7 and 10.

One of the key outputs from the forest management planning process is the determination of sustainable wood fibre volume (MNR, 2005). This indicator aims at narrowing the gap between what is forecasted versus what is actually utilized by mill. This level was chosen to meet the CID requirements of the identified mills. The desirable level for this indicator would be 100% of the forecasted volume utilized; however, in reality, there are many factors such as: market conditions, wood quality, inventory discrepancies and/or operability that prevent full utilization. In light of these realities, the target utilization is 75% of the forecasted volume for each of the mills that receive volume from the Forest. These targets will be tracked through the annual reports and monitored for target achievement and sustainability.

Percentage of forest operations inspections in non-compliance for wasteful practices

Part of achieving several objectives in the Plan will rely on the manner in which the harvest is operated. This indicator is meant to show the full and proper utilization of the timber available for harvest according to the guidelines set out in the provincial scaling manual. Wasteful practices will not contribute to the sustainability of the timber supply, and therefore, the desired level is to have no incidents on the Forest within the 10-year harvest term. However, it is unrealistic to expect that there would never be an incidence of non-compliance at some level of significance. The target (refer to FMP-13) has therefore been set according to what the planning team felt would still be within the boundaries of sustainability. This target will be tracked through the annual reports and monitored for target achievement and sustainability.

The following objective aims at developing a consultation approach that will provide opportunities for Aboriginal, local communities, and the LCC to have input in Plan development. Many of these objectives and the associated indicators were developed with the Aboriginal communities through the AWG and some of the local interest groups on the Forest. Desired levels and targets were developed by the planning team in co-operation with each group.

Management Objectives #35: First Nations and Aboriginal Communities are involved in forest management both during the development of the forest management plan and also with the implementation of the plan.

Indicator(s):

52. Documentation of meetings and workshops and participation levels.

Management Objectives #36: First Nations and Aboriginal Communities will benefit economically through partnerships, employment opportunities and new business relationships.

Indicator(s):

53. Documentation of contracts/ agreements and economic figures to support objective

Management Objectives #37: First Nations and Aboriginal Communities will continue to benefit from forest management through educational and social opportunities.

Indicator(s):

54. Documentation of contracts/ agreements and economic figures to support objective

Desired Level(s): The desired levels set for objectives 35 through 37 are meant to ensure that NFRM continues a high level of consultation with the local First Nation communities in the area. Targets are the same as the desired level. Examples of the types of evidence for each indicator are documented in section 6.1.26. NFRM and the Aboriginal communities may not accomplish all examples, however evidence of accomplishment for some will prove achievement of these objectives. These targets will be tracked through the annual reports and monitored for target achievement and sustainability.

Local interest groups expressed the need for better communication between non-timber forest products (NTFP) users and NFRM/MNR representatives, as well as an increased awareness by field staff and operators of the more abundant NTFPs on the Forest.

Management Objectives #38: To facilitate opportunities for the harvesting of non-timber forest products on the Nipissing Forest.

Indicator(s):

55. Communication between NTFP harvesters and NFRM/MNR
56. Training and information provided to NFRM staff and contractors related to the identification and possible protection of NTFPs commonly harvested locally on the Nipissing Forest.

Desired Level(s): The desired levels for these indicators are intended to improve the communication and awareness of NTFP on the Forest, through the assignment of consistent contacts within NFRM and MNR, as well as basic training for the field staff working on the Forest as part of annual work training sessions. These targets will be tracked through the annual reports and monitored for target achievement and sustainability.

The level of herbicide use on the Forest has been a conflicting issue for several years with perspective on the treatment depending on the rationale for use. In most instances the treatment is being used to achieve other forest composition objectives, so reduction is not always possible. However, as a desire of local interest groups, the planning team had to develop an objective to show the Plan would move in a positive direction.

Management Objectives #39: To reduce and eventually eliminate the use of herbicides used in forest management on the Nipissing Forest.

Indicator(s):

57. The level of herbicides used.

Desired Level(s): The desired level for the indicator, as recorded by DFBW input and discussions with local interest groups, was the elimination of herbicide use on the Forest. It was agreed that this was an unrealistic target. Instead the team decided more information and study was required to set realistic targets in future planning. It was decided that by 2011, using a task team including members internal and external to NFRM, a comprehensive Herbicide Use Policy would be developed. This policy will include a decision matrix for rationalization of herbicide use, benchmarks to measure current trends in order to set future reductions, and specifics of participation in research and new technologies to replace the use of herbicides on the Forest.

The target will minimize herbicide use through judicious planning and application, while continuing to monitor advances made in field-proven science and technology. Additionally, the target will ensure the application of best management practices to make certain silviculture prescriptions are effective, and the forest management planning objectives related to the future forest conditions will be met.

Local citizen committee involvement was a key component to the development of the long-term management direction on the Forest, and recognition of this and other levels of participation was important to the planning team.

Management Objectives #40: To encourage support of the Local Citizens Committee in the development of the FMP for the Nipissing Forest.

Indicator(s):

58. Support for Objectives and Strategies.
59. Local Citizens committee's self-evaluation of its effectiveness in Plan development
60. Support for final Plan approval.

Desired Level(s): The Desired Level designed to indicate level of LCC participation in the development of the 2009 Nipissing Forest Management Plan. The planning team set a minimum level of 70% on the self-evaluation survey to account for different levels of involvement within the group for indicator #59. Other indicators are based on majority agreement of the group.

A basic compliance monitoring objective was set to encourage continuous improvement in the quality of operations on the Forest.

Management Objectives #41: Maintain and increase the level of compliance on the forest.

Indicator(s):

61. Non-Compliance in forest operations inspections (% of inspections in non-compliance by category.)

Desired Level(s): While the desired level is to have 100% of inspections in compliance ensuring prescriptions are being applied properly as a whole, the target has been set to promote continuous improvement from the 2004 plan, and throughout the term of the 2009-2019 Plan.

In response to the DFBW input, the planning team recognized the value of fuelwood to the general public. Due to the means in which fuelwood is provided on the Nipissing Forest, a qualitative objective was set to ensure that NFRM deals effectively with fuelwood areas made available each year, facilitating availability to the public in a sensible way. The objective has no distinct desired level associated with it, however achievement of this objective will be documented by the effective management of fuelwood access provided to the general public within the 10 year term of the plan.

Management Objectives #42: Volume of fuelwood made more readily available to general public.

3.7 Management Strategy

The management strategy is a balance in the achievement of management objectives. It was endorsed by MNR's Northeast Regional Director on April 18, 2008. The management strategy was then used to direct the detailed planning of operations on the Forest.

The available harvest area generated by the management strategy, in combination with other spatial considerations such as wildlife habitat, natural disturbance pattern emulation and area of concern prescriptions, was used to drive the selected allocations for the Plan. The management strategy and the preliminary determination of sustainability were presented to the Nipissing LCC and endorsed by the planning team.

The management strategy SFMM model run is included in digital format in the Analysis Package. The modeling outputs project how the forest will develop through time, in terms of its structure and composition, and the projected types and levels of activities required to achieve the management objectives. The model outputs include:

a) Projected forest condition for the Crown productive forest (FMP-7)
b) Projected habitat for selected wildlife species (FMP-8)
c) Projected available harvest area by forest unit (FMP-9)
d) Projected available harvest volume by species group (FMP-10); and
e) Projected operations, revenues and expenditures (FMP-11).

These tables can be found in section 9.0.

Table FMP-7 shows how the projected forest area by FU and age class changes over time. The source data for this table is from the Management Strategy (SFMM). The forest area is the SFMM value for productive forest in the available forest and all park and reserve area. A 1% reduction in the productive forest has been noted in the overall landbase over the course of 100 years. This is the inevitable effect of a small amount of the landbase requiring permanent access and/or landing over time. This decrease has been accounted for in the model and has resulted in an impact to harvest levels, preferred habitat and forest composition reductions.

The white birch forest unit shows a reduction over the 100 year period of approximately 24%. This is a reflection of the current ageclass structure succeeding on the forest, as well as the desire of the planning team to shift the overall level of intolerant species on the Forest to better reflect the historic levels. This change has an effect of the projected available birch volume in the long-term, as had been forecasted in the last two FMP's.

The desire to increase the levels of yellow birch (and other mid-tolerant hardwood species) is illustrated by a 24% increase over the course of 100-year period. This change will hopefully provide an increase in biodiversity on the Forest, as well as provide a higher quality of hardwood species to local veneer and sawmills.

Part of the trade-off to the previously mentioned mid-tolerant desire, is a reduction in the hardwood shelterwood forest unit over time, nearly 10%. This reduction is consistent with historic forest conditions, and will not likely jeopardize the hard maple supply a great deal. Species desired from this forest unit will also be available in the increasing yellow birch forest unit. The focus on the existing areas will certainly be in quality rather than quantity.

There is little change expected in the long-term projections for the hardwood selection forest unit, due to its uneven-aged cyclical nature.

An increase in the hemlock forest unit has been projected, consistent with DFBW input related to habitat provision and the historic forest condition. Since little of this forest unit is managed for timber supply, this increase may stimulate markets; however, biodiversity is the prime objective for this forest unit.

There is no movement in either lowland hardwood mixed or lowland mixed conifer forest units, and no serious management implications to these trends.
Mixedwoods are projected to decrease nearly 8% over the 100-year term. This is a reflection of the effort to restore many hectares in this forest unit to the white pine shelterwood forest unit, as mixedwood sites are typically good candidates for success.

Jack pine and jack pine/spruce forest units are projected to decline over the 100-year term, by 17% and 15% respectively. Being relatively small forest units, this change amounts to under 5,000 hectares in the long-term and is not likely to effect the management direction in any major way.

The poplar forest unit is set to increase by 20% over the 100-year term, a reflection of the management decision to reduce the amount of white and red pine restoration in this forest unit. This decision was made because the sites available for restoration have been the least favourable of those targeted for restoration (rich and productive – leading to high levels of competition). This increase will provide local mills with a steady supply for veneer and oriented strand board products into the future.

The red pine forest unit is increased by 3,000 hectare over the 100-year term. This is the result of site restoration to red pine and will have a positive effect on the supply of high quality sawlog to local mills. Also, the trend will contribute to the restoration of an element of biodiversity on the Forest that had been present in the past.

The white pine seedtree forest unit is set to decline just over 10% over the 100-year term, amounting to a 3,015 hectare decline. The majority of the decline is a result of white and red pine restoration efforts within this forest unit to a shelterwood condition.

The white pine forest unit is expected to rise by 24% over the 100-year term, reflecting the desire to increase this condition on the Forest consistent with many objectives set in the strategic direction of the Plan. Management implications of this increase would be the satisfaction of the social desire to see more white pine in the province, restoring an element of biodiversity to the Forest that has been present in the past. Local saw and pulp mills should expect an increase in available white pine volume as a result.

Trends in the spruce fir forest unit show little change over the 100-year term, illustrated by just a 6% reduction overall. There are no significant management implications as a result of this trend over time.

Table FMP-8 shows the projected habitat condition in SFMM for selected wildlife. A summary of the trends in table is provided below.

Provincially Featured Species

Moose (Fall) and deer (Summer) habitat increase through time, with small declines in the short term. Pileated woodpecker and winter cover for moose and deer all decline between 10 and 30 percent throughout the timeframe of the management strategy. These declines are related to several factors. The primary cause is a shift in current forest condition out of mature cover, and into over mature age classes. All habitat levels for provincially featured species were over the target level for all terms in the 100-year projection.

Old Growth Indicating Species

Black backed woodpecker, lynx (denning) and ruby crown kinglet are all indicators of over mature condition on the Forest. There are significant increases in preferred habitat levels of all three of these species. This is consistent with trends showing the Forest will accumulate older age classes through time. Only black bear (autumn) habitat showed a decline. This decline is consistent with the trend of the natural benchmark, likely due to a small reduction in the available oak and beech (HDUS forest unit); the fall mast species that are the staple of the black bear diet at this time of the year.

Species at Risk

Red shouldered hawk and southern flying squirrel, two species at risk, were modeled in the management strategy as it was thought that their abundance and habitat type would influence planning decisions. Southern flying squirrel habitat showed a very stable projection over 100 years. However, red-shouldered hawk preferred habitat illustrated a 20% decline over time. This trend was further investigated by the team in a spatial model designed to better predict current and projected habitat for this species. Results showed that the decline was not as severe as originally projected by SFMM. Further details regarding analysis related to the red shouldered hawk are provided in the analysis package, in section 6.1.6.

Locally Featured Species

Seven locally featured species were included in the management strategy for a number of reasons, but mainly to ensure monitoring and managing the full range of habitat conditions on the Forest. Another goal of the planning team was to include any other species of local or special interest. Hermit thrush, white throated sparrow, snowshoe hare and ruffed grouse all show an increase in habitat through time. This trend shows that there is an abundance of habitat for these species on the management unit and therefore there should be equally abundant populations of these species on the management unit. Marten habitat levels show a reduction in the short term with an increase into the long-term. This trend is similar to that of the natural benchmark. Eastern red-backed salamander and spruce grouse show a moderate decline through time. In the case of spruce grouse, the difference amounts to just over 1,000 hectares over the 100-year period, and the eastern red-backed salamander totals a 7% loss over time. All species have followed the trend of the natural benchmark in the strategy.

Overall, the strategy has done an exceptional job of maintaining habitat levels in comparison to those of the natural benchmark.

Table FMP-9 shows the projected available harvest area by forest unit. The total for the Plan is a drop in AHA until 2049 when it rebounds back to within 8,000 ha of the FMP start level by 2089. The primary implication of this trend is a decrease in harvest area over the next 40 years due to the age class structure of the management unit. This trend has been predicted in previous plans on the management unit, as illustrated in Figure 3.7.1. Secondary implications such as the social and economic impacts of this decrease can be found in the socio-economic report in section 6.1.22. The available harvest area is portrayed in a table within section 9, FMP-9.

Figure 3.7.1 Comparison of Projected Available Harvest Area to the 2004-2009 Plan.

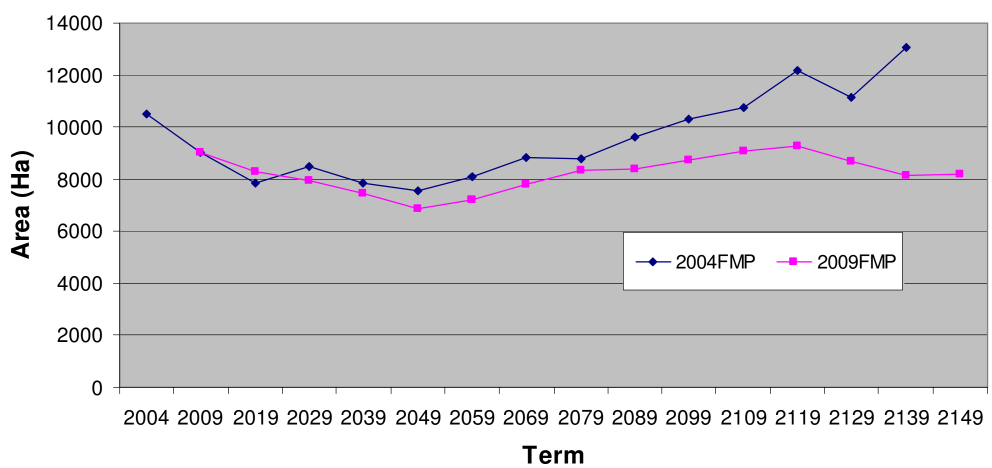


Table FMP-10 shows the projected available harvest volume by species group. The total for the Plan follows a trend similar to that of the AHA in Table FMP-9 with a decline until 2059. It then begins to rebound and ends up well above Plan start levels by 2089. On the whole, the strategy in the 2009 FMP aligns with past projections (Figure 3.7.2) indicating that the current forest condition is likely playing the largest role in limiting the volume available in the medium terms. However, enhanced ecological target setting in the 2009 Plan also plays a role. FMP-10 is supported by a series of graphs (following the table) located in section 9.0, FMP-10 and figures 3.7.6 to 3.7.11 to follow later in this section. The primary implication of this declining trend over the first 40 years of the plan is that there will be a decrease in the available harvest volume. Secondary implications such as the social and economic impacts of this decrease can be found in detail in the socio-economic report in section 6.1.22.

Figure 3.7.2 All Volume modeled long term annual wood supply compared to historic utilization, FMP projections and current industrial demand.

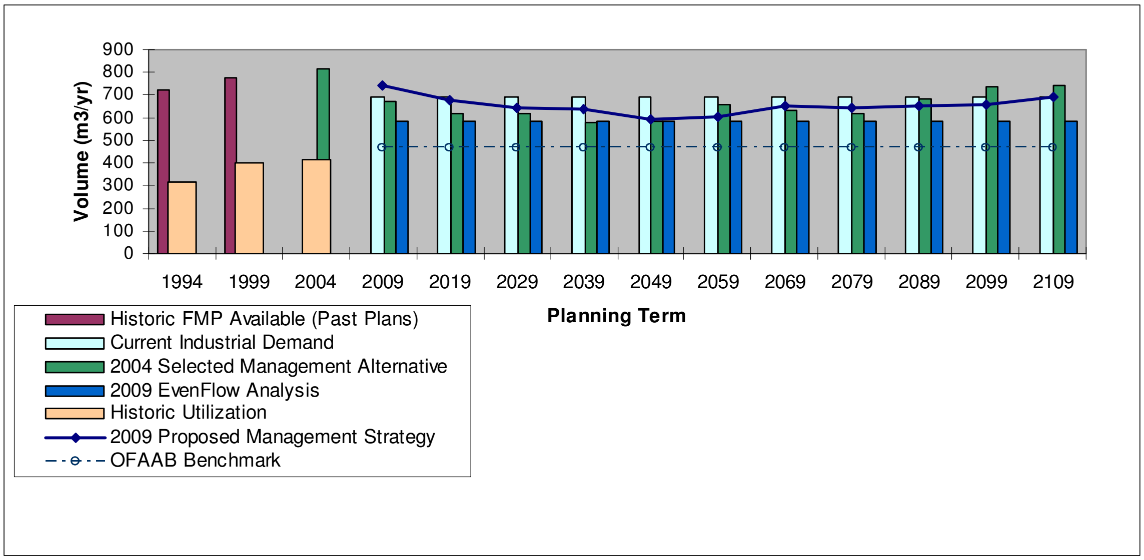


Table FMP-11 shows projected levels of operations, revenues and expenses over the ten year plan. It shows a total harvest volume of approximately 7.44 million m^3, Forest Trust Account revenues of approximately $33.2 million, and silvicultural expenditures of approximately $33.1 million. Crown revenues were determined using the June 2007 stumpage matrix and assumptions regarding product type. There is a difference in the annual harvest area and the renewal area of 31,868 hectares. This can be accounted for in the areas managed under the shelterwood and selection silviculture system that are prescribed for natural regeneration, as well as area lost to roads and landings.

Several modeling runs completed during the scoping analysis and the development of the proposed management strategy were used to determine appropriate ranges for the model in terms of setting white pine restorations levels. The renewal limits provided to the model by the planning team indicated that as little as 5% and as much as 20% of the harvested area for poplar, birch and mixedwood (10% maximum for mixedwood) forest units could be treated intensively with restoration as the intent. The model selected the appropriate levels depending on what the desired increase in the long-term projection of white pine was settled on by the team. Detailed results of this modeling output can be found in the analysis package in section 6.1.6.

The proposed management strategy and preliminary determination of sustainability were endorsed by the planning team and presented to the LCC.

3.7.1 Balancing of Objectives

The base model was used as the starting point for exploring the range of possibilities for management. Through the process of scoping, and the implementation of developed management objectives in SFMM, the planning team made trade-offs in an attempt to balance the achievement of a range of desired management objectives.

3.7.1.1 Ecological desired levels and targets

The consideration of the natural benchmark was used to determine appropriate desired levels and targets for objectives designed to represent natural features of the Forest. The desire of the team was to follow the trend of the natural benchmark and attempt to achieve maximum levels of non-timber objectives (as examined from a natural condition) within a management scenario. The most critical concept with any natural trend is the cyclical nature in which it is perceived. Natural conditions on the Forest have, and will continue to, rise and fall through time. The team felt this was an important trend to mimic in the proposed management strategy.

Initial inputs for the natural benchmark were based on the best available ecological scientific knowledge, data and the professional and technical experience of the planning team. The model was executed assuming no human intervention on the forest through the 160 year planning horizon with the development of the Forest left to natural disturbance and succession. Results of this model were used to build targets reflecting this natural condition by plan term for forest composition and structure, mature and over-mature (old growth) levels as well as preferred wildlife habitat (also referred to as the ecological grouping, see Figure 3.7.3). Note in figure 3.7.3, that the Natural Benchmark line (pink) shows an initial decline in habitat at the start of the planning horizon with the beginnings of an increase towards the end. When comparing this to the proposed management strategy it is clear that similar pathways have been created for this ecological indicator. This process of comparisons was followed for all ecological indicators on the Forest within the proposed management strategy.

The desired level in Figure 3.7.3 was determined in the scoping analysis as the maximum achievable level considering forest management and current silvicultural practices in replacement of natural processes such as fire and forest succession. No volume targets were considered in the determination of this ecological level. The model simply selects a level of harvest that is required to maximize the ecology on the Forest. The maximum ecological level is adopted as the ecological targets used immediately prior to two or more ecological levels conflicting in the solution of the model, or the last solvable solution prior to resulting infeasibility.

Assessment of achievement for the ecological objectives was easily accomplished. Targets were set in the model and infeasible solutions were provided if any term was violated. Through the course of the scoping analysis, and the development of the management strategy, determination of appropriate targets and the trade-offs for each management objective, were negotiated and compromise was reached.

Early in the development of the management strategy, it became clear that a reduction in available harvest area was likely to occur for the 2009 Plan. This reduction was attributed to a combination of enhanced modeling inputs, new and different methodologies in setting ecological targets and finally, the current forest condition. This reduction exceeded 20% (compared to 2004-2009 harvest levels) when ecological targets were placed at 75% of the natural condition.

This reduction would impact social objectives in a combination of ways, but the most worrisome to the planning team was the impact on smaller licensees.

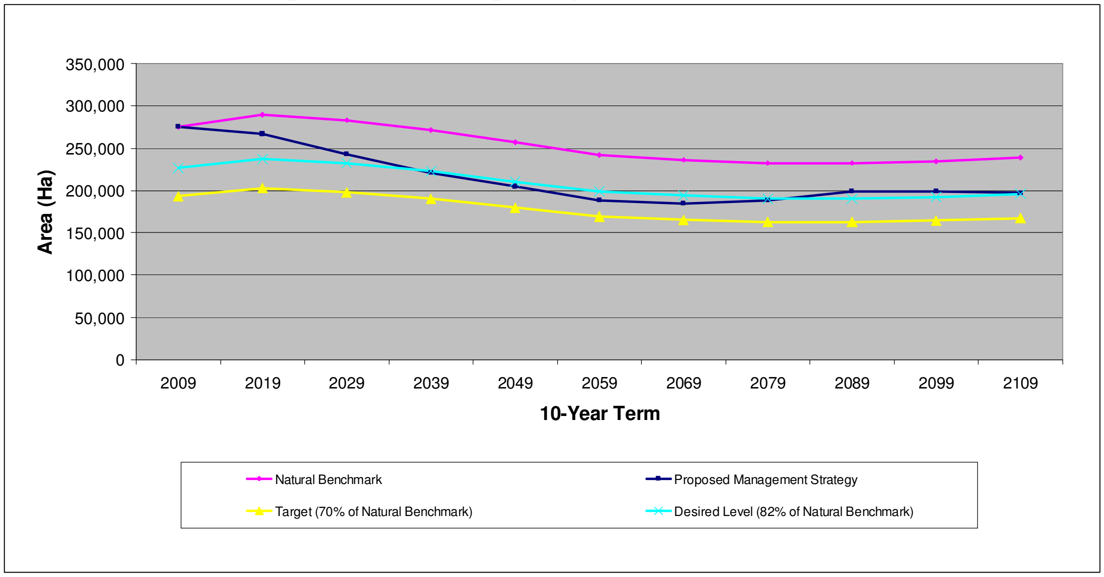
The team explored it options and decided that 70% was the most appropriate starting point to set as an ecological minimum for a few reasons:

1) the difference between 70% and 75% only moderately impacted 4 of 18 selected wildlife species, while the remainder stayed relatively consistent with the strategy at 75% (i.e. levels were higher than 75% and not changing significantly for remaining species)
2) available harvest area increased nearly 10% when 70% minimum targets were used, totalling a 13% overall reduction from the 2004 plan levels. This was a reduction that the team felt would be more appropriate from a social and economic standpoint, and is consistent with a recommendation from the 2006 Independent Forest Audit.
3) Presentation of the scenario at 70% minimum target and the related impact to the ecological and social/economic result to the Nipissing local citizen's committee was made, and the group agreed that the scenario was providing for as many objectives on the Forest as it could.

Based on a series of scoping runs and consultation with MNR regional specialists, district staff and the LCC, compromise was reached by the SFMM task team on a proposed management strategy of greater than or equal to 70% (refer to Figure 3.7.3) of the natural benchmark results by term for most ecological components (mature, over mature, old growth and preferred wildlife habitat for selected species). Red-shouldered hawk habitat was the only exception to this non-spatial ecological minimum. To ensure maintenance of the appropriate levels for this habitat condition in SFMM, but recognize the limitations of the model as it relates to the red-shouldered hawk habitat projections from OWHAM, modification was required to the aspatial targets for this species. In the aspatial analysis the target was set to 65% achievement of the natural benchmark through to T8. The habitat is maintained at 70% of the natural benchmark until T4. This decision was justified by the team when considering the limitations of SFMM causing a tendency to overestimate the availability of the preferred habitat for this species. The model does not incorporate spatial habitat requirements into its analysis. The preference of habitat conditions for the red-shouldered hawk is highly susceptible to various spatial factors. To properly assess the species' preferred habitat, a spatial analysis was performed, and a target was set using the results of this analysis as well.

Results projected in OWHAM were used in the preliminary test of sustainability which has been reported in Section 3.10.

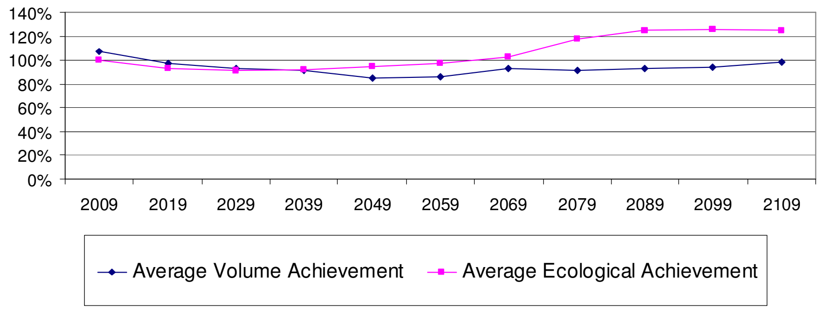
Figure 3.7.3 Example of the Natural Benchmark, the Desired Level (82% of the natural benchmark for this ecological indicator), Minimum Target Level (70% of the natural benchmark for this ecological indicator), and Proposed Management Strategy for the habitat of a Selected Species on the Nipissing Forest.



The targets established by the team were achieved for all mature and over-mature forest conditions as well as each preferred wildlife habitat levels for selected species. More detail of these findings can be found in the Analysis Package.

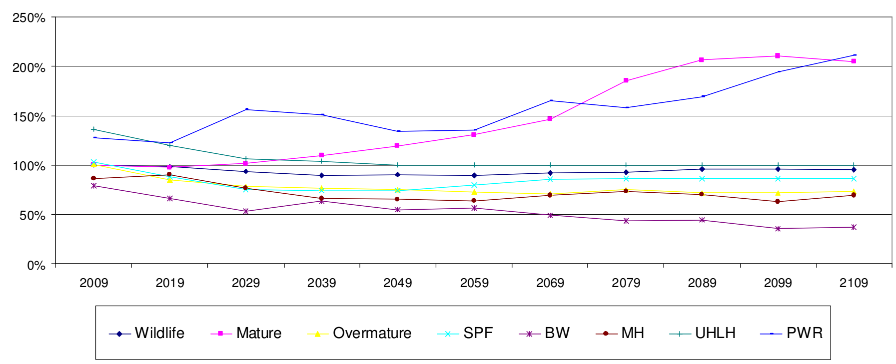
Figure 3.7.4 illustrates the collective achievement of objectives related to average ecological achievement as well as the average wood supply achievement throughout the planning horizon. This graph illustrates that ecological objectives have been given high regard in this Plan, rarely requiring the use of the minimum target levels in the proposed management strategy. In other words, many habitat and other ecological conditions far exceeded even the desired level of 82% of the natural benchmark.

Figure 3.7.4 Collective achievement of the ecological objectives and wood supply objectives



The following figure (Figure 3.7.5) details the achievement of individual objectives in the proposed management strategy as a percentage of the desired level.

Figure 3.7.5 Collective achievement of the individual Ecological objectives and Major Species Grouping Wood Supply objectives



Achievement in the mature, over mature levels and wildlife habitat was an average of 147%, 77% and 94% through the first 100 years.

In the mature category, 154 of a possible 225 measures met the desired level, and all 225 met or exceeded the target. For the over-mature category, 33 of the possible 225 indicators met the desired level, and all 225 met or exceeded the target. Results for the preferred habitat with respect to provincially featured species (deer, moose, and pileated woodpecker) showed 60 of a possible 75 measures meeting the desired level. All 75 measures met or exceeded the target. Habitat indicators for mandatory old growth species (black backed woodpecker, black bear, lynx and ruby crowned kinglet) showed achievement of the desired level in 15 of a possible 60 measures, with all 60 measures for these species meeting or exceeding the targets by term. Locally selected species showed 107 of a possible 120 meeting the desired level, with all 120 indicators meeting the targets.

All targets were met by the management strategy. These targets were designed by the planning team to follow the trends of the natural benchmark with consideration of the fact that the current forest condition, coupled with other objectives in the plan would not allow the team to achieve desired levels for all ecological conditions in all cases. The SFMM task team agreed, in consultation with the planning team, Nipissing LCC, MNR Regional and District staff, that trade-offs between ecological and volume targets provided a modeling solution that balanced social, economic and environmental considerations.

3.7.1.2 Wood Supply

The utilization task team developed the desired levels for the current industrial demand on the Forest, with consideration given to wood supply commitments of the Sustainable Forest Licence, as well as open market demand based on trends from the previous ten years of operations. Results of this work are documented in section 4.3.6.

When addressing the available harvest area reduction from the previous FMP, the team considered the short term volume at a higher level, while balancing the medium term decline in overall timber. Careful consideration was given to the flow policies while developing the strategy. Comparisons were made to the even flow harvest policy in all instances. This was to ensure that future terms did not dramatically decline as a result of mitigation of the short term impact.

Lower targets of 70% of the current industrial demand for objective achievement were set consistent with the targets in the ecological objectives of the Plan. Other targets related to wood supply included harvest flow policy declines of no more than 15% from term to term for most major species grouping. A related target (not modelled in SFMM but measured in the achievement of indicators) was designed to balance the available harvest area (AHA) projection. This was done by setting a goal of less than a 10% reduction from term to term on the AHA, throughout the planning horizon, as medium term declines are apparent in the strategy. The team felt this was the most appropriate way to ensure harvest levels could be more consistent from plan to plan.

The wood supply projections for the proposed management strategy are compared with historic utilization, Ontario Forest Accord Advisory Board (OFAAB) benchmark levels, even-flow harvest scenario from the 2009 analysis, as well as volume projections from past approved Plans on the Forest. (See Figures 3.7.6-3.7.11)

During its development, the proposed management strategy was repeatedly compared to all of the graphed data, and careful consideration was given to providing a more realistic harvest level, while managing the social impacts of significant drops in the available harvest area. Due to the mixed nature of the Forest, certain species groups may be available as incidental volumes, as a result of harvesting a species group that was more limited on the landbase. In many cases, the complication is that no market currently exists for these species. This complicates the wood supply scenario, and adds additional challenges for the licensee to ensure utilization of all species resulting from a harvested hectare.

The strategy also considers very recent trends of increased utilization by various licensees as a result of shifting wood supply strategies in other jurisdictions.

Figure 3.7.6 Spruce, pine, fir (SPF) modeled long term annual wood supply compared to historic utilization, FMP projections and current industrial demand.

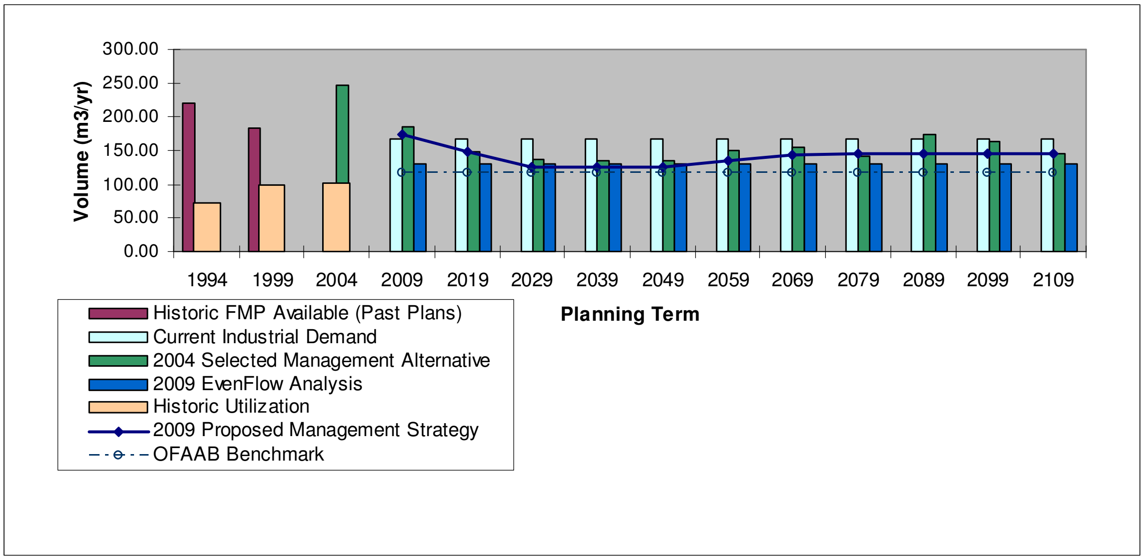


Figure 3.7.7 Poplar modeled long term annual wood supply compared to historic utilization, FMP projections and current industrial demand**.**

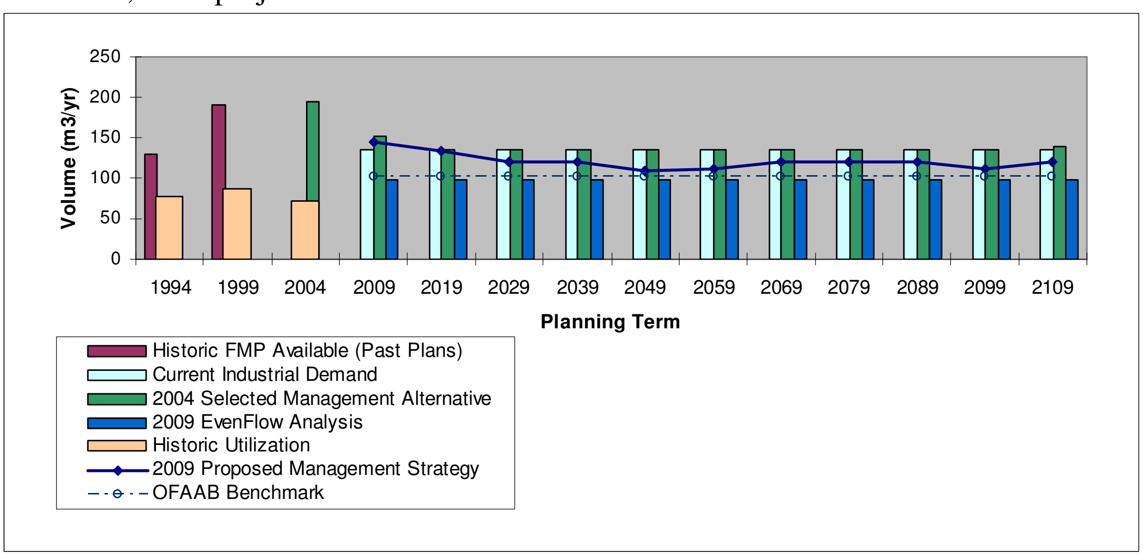


Figure 3.7.8 White birch modeled long term annual wood supply compared to historic utilization, FMP projections and current industrial demand.

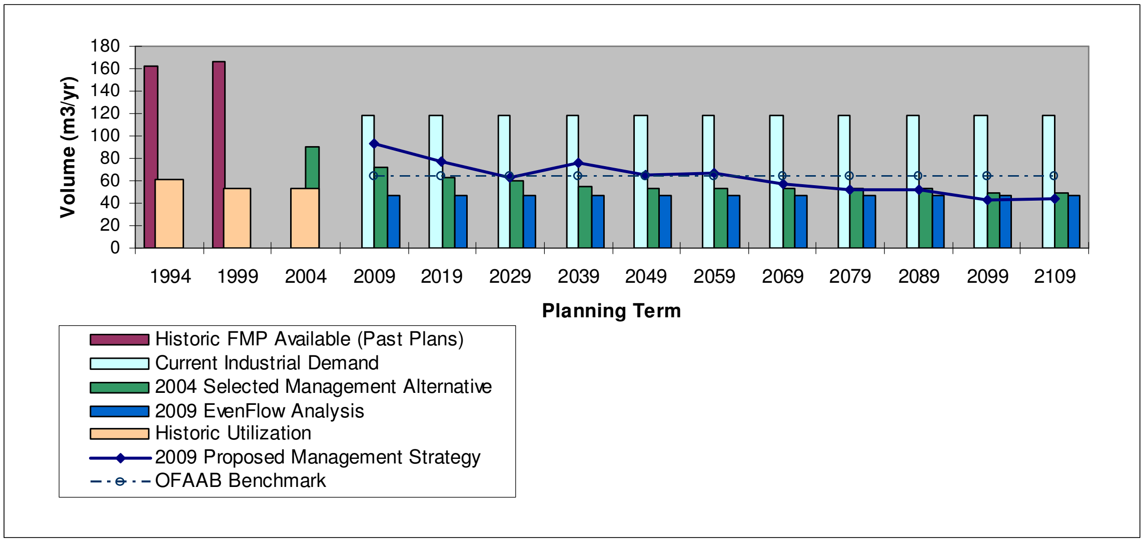


Figure 3.7.9 White and red pine modeled long term annual wood supply compared to historic utilization, FMP projections and current industrial demand.

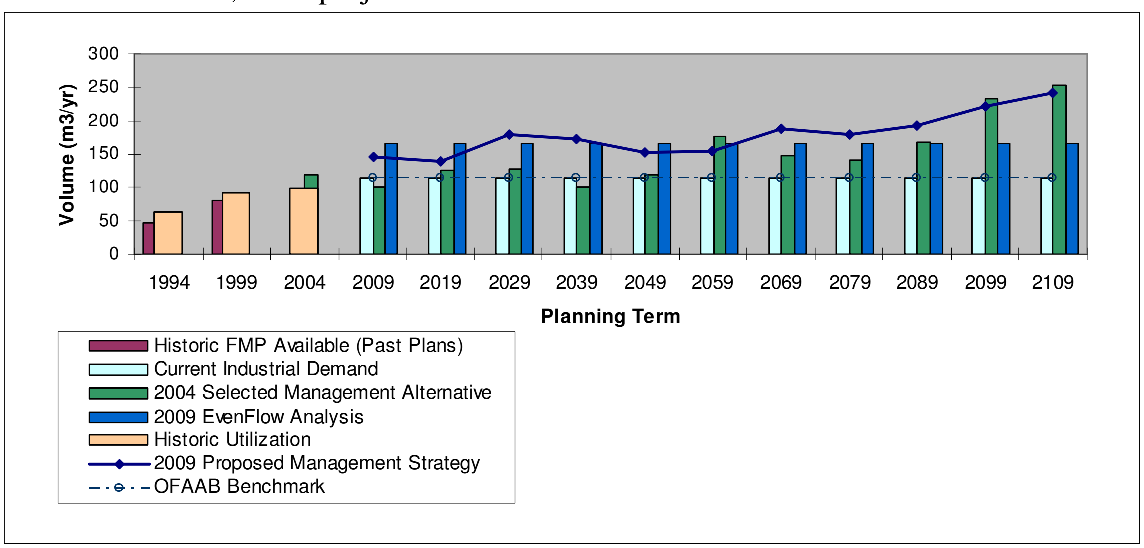


Figure 3.7.10 Tolerant hardwood (hard maple (MH) plus other tolerant hardwoods (UHLH)) modeled long term annual wood supply compared to historic utilization, FMP projections and current industrial demand.

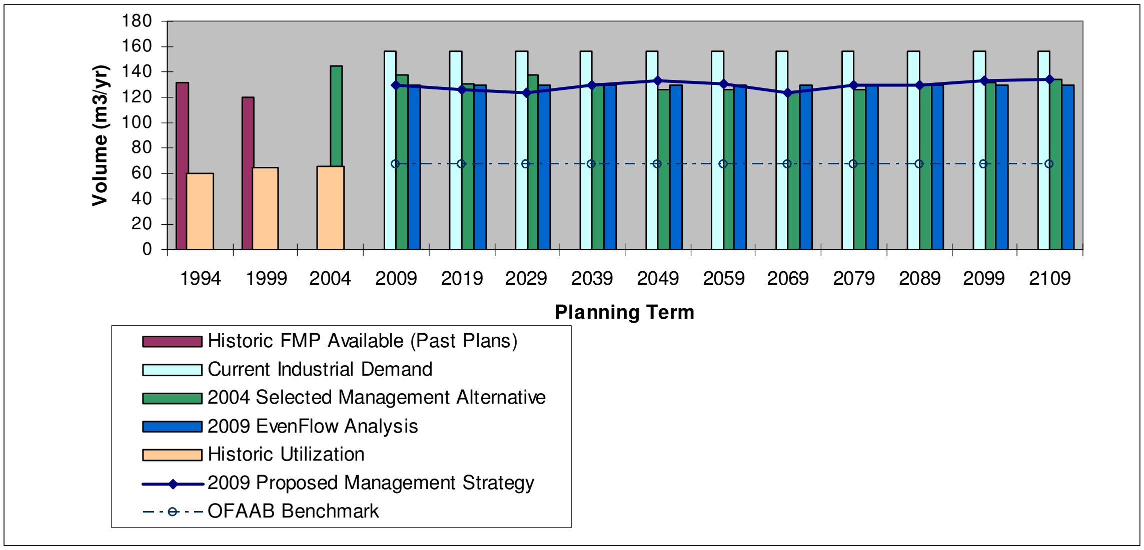
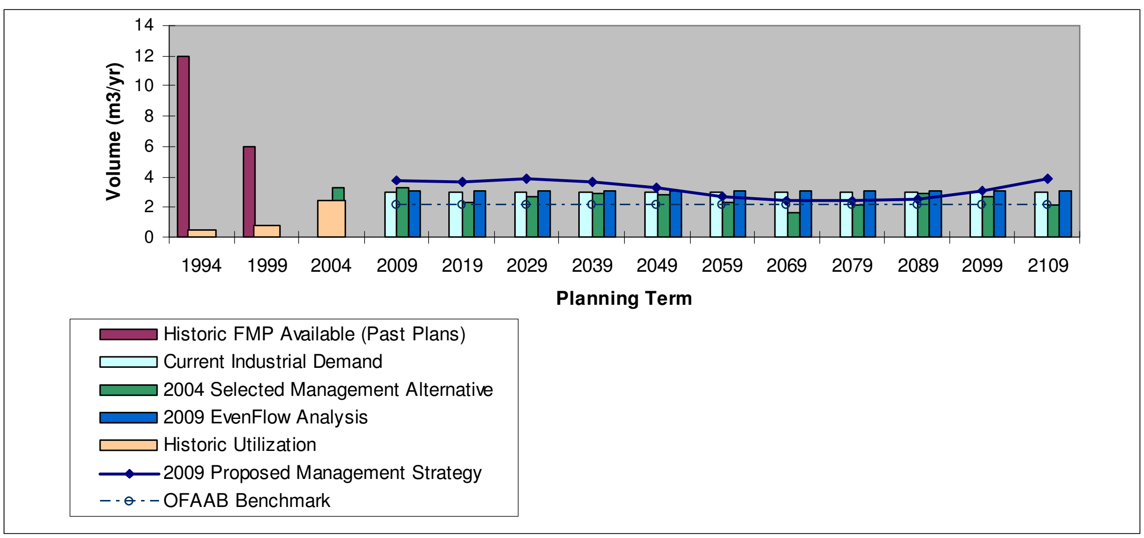


Figure 3.7.11 Cedar volume modeled long term annual wood supply compared to historic utilization, FMP projections and current industrial demand.



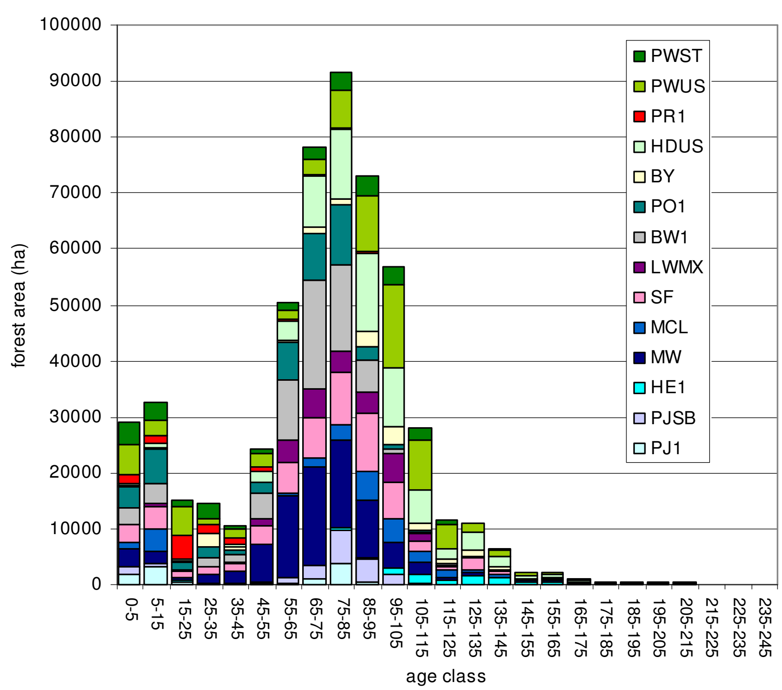
With reference back to figure 3.7.2, when comparing the average total annual cubic metres available for harvest in the 1st term (2009-2019) of the proposed management strategy to the 2004 forest management plan's selected management alternative, an overall decline of approximately 9% is apparent. However, when comparing the 2nd term in the 2004 Plan's selected management alternative (2014-2024), to the 1st term of the 2009 strategy (2009-2019), the volume and area projections are consistent with projections made in the 2004 selected management alternative. The medium and long term projections are also consistent with what was being projected from the 2004 strategy.

On the whole, the strategy in the 2009 FMP aligns with past projections. Another trend noted in the modeling results is an increase in available white and red pine volumes in the 2009 SFMM model. This can mainly be attributed to new methodologies for determining volumes left unharvested, new data supporting the development of growth and yield estimates supported by local science community, and finally updated stage of management information collected to support inventory update in the development of the planning database.

Targets were achieved in 84 of the possible 128 indicators measuring projected volume through time. Desired levels were achieve and/or exceeded in 34 of the possible 128 measures. Based on the current industrial demand, SFMM predicts an immediate shortage of white birch material and a reduction of both white birch and hard maple sawlogs into the future. Other tolerant hardwoods (i.e. yellow birch and oak) will have to subsidize this shortage. Supply is expected to be greater than or equal to demand in this species group. SFMM also predicts a reduction in SPF pulp and poplar into the future.

A trend impacting the medium term supply of timber, assuming data and modeling inputs do not change significantly in future plans, is the age-class gap in the current forest condition, see Figure 3.7.12. Assuming close to 100% utilization in all terms now and into the future, an age-class imbalance, combined with ecological targets in the model, will place pressure on operable timber from 2039 to 2069 in the current projection, forcing the desired levels related to wood supply to not be achieved in all cases within the strategy.

Figure 3.7.12 Nipissing Forest age-class distribution of the initial (2009) forest landbase**.**



To ensure term to term reductions were kept to a minimum, a 15% harvest flow policy was placed on the SPF, PO, MH and UHLH species groups. This is to ensure that wood supply does not decline more than 15% relative to the previous term. This resulted in a more balanced flow of wood in species groupings where the planning team believed wood could be balanced from term to term to mitigate the decline in wood supply related to the ageclass gap.

The vast majority of the 65 indicators of sustainability that were assessed are within, or moving toward, their desired levels. Rationale for setting targets at different than desired levels has been documented, and additional analysis has been conducted to ensure no negative impact to the sustainability of the Forest, such as:

1) Scoping analysis in the development of the management strategy;
2) Comparisons of ecological achievements to the natural benchmark and desired levels;
3) Comparisons of ecological achievements to the social and economic achievements;
4) Comparisons of social and economic achievements to even flow trends through time; and,
5) Comparisons of social and economic achievements to past management projections on the Forest.

All of this analysis has been presented in the analysis package, Section 6.1.6, and throughout sections 3.7 and 3.10 of this Plan.

In all cases, the indicators that are not within or moving toward the desired level are a result of the current forest condition (ageclass gap, limiting wood supply into the medium terms) or balancing multiple objectives (limiting wood supply vs. certain ecological objectives). In cases where indicators are not moving toward the range for each desirable level, rationale has been provided in section 3.10 (Assessment of Objective Achievement) and section 5.0 (Determination of Sustainability). In general, not meeting the desired levels for the harvest levels has potential social and economic implications for Ontario. In addition to this, not meeting the desired levels for wildlife habitat, old and mature seral stages could have potential implications for species abundance and productivity.

The task team, the planning team, and regional MNR staff all agree that the balance achieved best serves the long-term sustainability of the Forest.

An analysis was conducted by a Registered Professional Forester to determine the necessary levels of renewal and tending activities and associated expenditures requested to achieve the objectives described in the FMP. This assessment indicates that the forecast levels of renewal and tending meet the plan objectives. This analysis is located in the Management Strategy component of the analysis package, section 6.1.6. The Management Strategy component of the analysis package also contains the decisions and outputs of the forest modelling.

There are no situations where analysis principles were not followed.

3.8 Available Harvest Area

Table FMP-9 (located in section 9.0) details the available harvest area for the different terms of the plan by FU. The harvest area eligibility was determined by operability age and availability. These are discussed within section 3.9. All stands that meet or exceed the operability age and is available for forest operations, are determined to be eligible.

The available harvest area on the Forest drops consistently for approximately 50 years, until 2059 when it begins to climb back toward Plan start levels. The first term harvest has been reduced by just over 13% from the available harvest area in the 2004 selected management strategy. While this trend has been identified consistently for several plans on the Forest, it has severe management implications to the smaller licensees operating on the management unit who typically harvest 100% of their allocation in each plan, as previously discussed in the balancing of objectives in Section 3.7.

White birch harvest area drops by more than 50% from plan start (836 ha/yr) to the 100-year projection mark (601 ha). This long-term reduction in harvest area is stimulated by the current forest condition and has implications on the amount of available white birch fibre into the future. The available area for this forest unit has been reduced from the 2004 plan by approximately 14%.

Yellow birch harvest area increases by nearly 3 times the current (197 ha/yr) amount due to an increase in the overall amount of the forest unit projected at the 100-year mark of the strategy. Implications of this trend are an apparent mitigation of the reduction in harvest area in other tolerant hardwood forest units. This may also improve the higher quality yellow birch veneer and sawlog supply.

The hardwood uniform shelterwood has increased (1452 ha/yr) a great deal from the 2004 plan; this is largely related to the forest unit area shift discussed in section 3.2.1, from a selection silviculture system to a shelterwood condition, to acknowledge the lower quality hardwood condition on the Forest. The trend of the available area in this forest unit is a decline in the short term, a rise in the medium term and a fall again in the long term. The nature of shelterwood system forest units tends to be a fluctuation of the harvest area from term to term depending on the mix of seedcuts and final removals available to schedule. Another important factor causing this trend is the current ageclass of the forest unit, a large amount of it coming to maturity and moving onto old condition in the next number of planning terms.

Hardwood selection forest unit area is maintained through time (1844 ha/yr), calculated on the available area on the management unit and the cutting cycle length. The overall level in the first term is 30% lower than the 2004 for the simple reason that area was moved out of the forest unit and into the shelterwood system due to low quality stands not meeting the operable requirements in the field.
The hemlock forest unit area (260 ha/yr) shows a downward trend in available harvest area projections, mostly due to the lack of market demand for the species, and the high

biodiversity value of this type of area on the Forest for many types of habitat. The ageclass of this area is also moving mostly through the mature and over mature categories, which means little new area coming into maturity in the next 100-year, thus a reduction in the available harvest. The forest unit area has increased for this forest unit compared to the 2004 plan, mostly due to an accumulation of historically unharvested area due to lack of marketability.

Lowland mixed hardwood (183 ha/yr) illustrates the same trend as the hemlock forest unit, for the same reasons, and possesses identical management implications.

Mixed conifer lowland is a forest unit that has remained consistent from the 2004 plan projections (143 ha/yr). Due to its current ageclass, the available area trend declines in the next 100 years. With only small market demand for cedar in today's current industrial demand, this trend has little implications on management. However, if this demand ever changed, there could be implications in the future.

Mixedwood harvest levels have dropped significantly (747 ha/yr) from the last plan, largely due to the change in ecological target setting. Long term projections show the available area moderately declining in the short term with a return to current levels in the medium term. Due to current ageclass structures, the 100-year outlook is for a reduction in the available area within this forest unit. Implications to wood supply are minimized as this forest unit provides a mix of species that others can provide in its place.

The poplar forest unit (424 ha/yr) is the most consistent of all forest units in terms of aligning with historic levels, and stability into the future. This will allow for a relatively stable flow of poplar volume to local mills

The jack pine (81 ha/yr) and jack pine/spruce (232 ha/yr) forest unit availability has declined from the previous plan, and will continue to do so with an aging condition, and a gap in the medium term availability. Due to their small size, these forest units were particularly sensitive to ecological target setting in the management strategy. The harvest levels will rise for jack pine in the long term to levels available in the 2004 plan, but return to the current level by the end of the 100-year term. The jack pine/black spruce trend is a consistent decline through the 100-year period. Exclusively intensive renewal will be applied to the harvested hectares in these forest units in order to maintain the cover type, as dictated by the management strategy.

The red pine forest unit available harvest area has been reduced compared to the 2004 plan, from 43 hectares per year to 29 hectares per year. The long term trend is an increase in available harvest area in this forest unit. This is due to active renewal of areas to red pine, as well as the investment in plantations and tending becoming operable in the next 20 to 100 years.

Available harvest area in the white pine seedtree has declined (372 ha/yr) from the 2004 plan, and continues to decline as strategies to renew this forest unit to a more pure white pine shelterwood condition are implemented in the next 100 years, thus reducing the overall available hectares in a seedtree condition.

Pine shelterwood harvest had declined (1240 ha/yr) overall in the management strategy compared to the 2004 plan. This is the result of treating more first and final removals in the forest unit, and requiring less area overall. This was accelerated somewhat by the natural disturbance on the management unit in 2006, causing an acceleration of management stages in the previously managed areas. The available area in this forest unit is projected to increase, as more area is restored to white pine, and areas previously restored are added to the available pool of hectares.

The available harvest area in the spruce fir forest unit (994 ha/yr) has increased by nearly 20% from the 2004 plan, and is projected to fluctuate heavily in the short term. There will be a decrease, to return to current levels by the end of the 100-year term. This trend illustrates the impact of the current forest structure on the area available for operation through time. The observed increase from the last plan to this plan is important to the spruce/pine/fir wood supply in terms of subsidizing the jack pine, spruce and mixedwood areas that have all declined since the 2004 Plan.

Although there are some significant changes in the AHA within certain forest units, they have not had an impact on the management strategy.

The forest unit AHA graphs are located in sections 3.7 and 3.10 and illustrate the trends over time.

3.9 Selection of Areas for Operations

Once the management strategy is finalized, and has considered the balance of numerous management objectives, the non-spatial projection of harvest area by forest unit, ageclass and silviculture intensity will be identified on the landscape. The FMPM states that this identification of preferred harvest will consider MNR's applicable forest management guide relating to the emulation of natural disturbance. Several additional criteria were considered in the identification of preferred and optional harvest areas. They are listed, generally, in order of relative importance of each criterion on how it was considered in the development of the operational plan.

The key considerations for the development of the criteria included:

a) The maturity of the forest stands (age classes). The Strategic Forest Management Model selected the age classes by forest unit in the output for the proposed management strategy. Any stand that would come into the youngest age class selected by SFMM within the 10-year term of the plan, or older, was considered eligible for harvesting operations. Preferred harvest areas were selected from the eligible stands up to the allowable harvest area for each forest unit. All other eligible stands are considered as optional harvest areas.

b) Stage of Management Considerations in Shelterwood Harvest. Areas with previous silvicultural investment requiring a next intervention in a certain amount of time, had a influence on the layout of operations.

c) Areas that can be reasonably accessed within the term of the plan, prioritizing existing and progressive access construction. Areas were selected to reduce the overall requirement for permanent access, and to minimize hauling distances. Also important to effective access planning was the spatial proximity to current harvest allocation (progressive development).

d) Consideration was given to the spatial distribution of Old Growth on the forest, with objective to increase the size and frequency of larger continuous patches on the Forest. Made attempts to minimized allocation of White Pine Shelterwood areas greater than 131 years of age.

e) A number of wildlife guides would impact the candidate areas. These guidelines included:

    i) Forest Management Guidelines for the Provision of White-tailed Deer Habitat. Within the zone selected for the implementation of the deer guidelines, a desired level to retain 30% of the critical thermal cover in Stratum 1 of LDY, or 6879.6 ha. The target was to at least maintain or increase the current level of 9.5%. Preferred harvest areas would be limited in areas identified as severe and moderate thermal cover in order meet this objective.

ii) Timber Management Guidelines for The Provision of Moose Habitat. In large disturbance areas, suitable stands of timber greater than 6 meters in height would be left in order to provide late winter moose habitat.

f) The Forest Management Guide for the Natural Disturbance Pattern Emulation provides direction for the number and distribution of disturbance areas as well as areas where it is desirable to consolidate past disturbances to increase patch size and reduce forest fragmentation.

g) Minimized harvest in areas of special interest identified by Provincial GAP analysis, and by the planning team (i.e. species at northern end of range, objective to maintain genetic diversity). Consideration given also to self-sustaining trout lakes, minimizing allocation in the vicinity of these values and other known sensitive sites.

h) Priority areas were remote tourism is important, and it is desirable to carry out large scale operations within a short time frame.

i) Traditional operating areas of shareholders and licensees, as well as sliding scale for operational size of blocks, (i.e. smaller operators can only handle smaller parcels)

j) To provide a balance of winter and summer operating areas.

k) Consideration of private land limitations.

l) Let alone stands with unique tree species.

m) Although the need for insect pest management and salvage operations may become a consideration, no specific direction was applied for this criterion.

All the above criteria had a degree of influence on the selected allocations. Some criteria factored more prominently than others depending on the circumstances of the local area.

The area selected for harvest in the Plan does not exceed the available harvest area in any forest unit.

Age class played a major role in designing allocations, particularly in the clearcut forest units, where the intent was to avoid the younger age class stands as much as possible. Stage of management for the PWUS, HDUS, and BY forest units dictated the location of many allocations. The desire was not to lose the silvicultural investment already made in these areas and to follow through with first or final removals cuts and allow the regeneration to continue to grow.

Movement towards the NDPEG template and the 90/10 standard for disturbances affected the design of many allocations. Depending on the local conditions and forest types allocations were grown or reduced in size to be consistent with the above. Existing road access or old logging roads were examined and allocations were developed adjacent to or within close proximity to minimize new road construction. Progressive harvesting adjacent to blocks in the 2004 FMP resulted in a number of selected allocations.

The selected and optional harvest area maps are located in section 6.1.2.6. Optional areas were not ranked as the planning team felt that with all of the other spatial considerations to keep in mind, the ranking could become meaningless compared to a potential area that must be left for natural disturbance or preferred wildlife habitat. In the end, to rank the areas would mislead the public into thinking that sure priorities were being made.

The harvest area has been well balanced between the two phases. The balancing of the selected harvest areas by forest unit between term one and term two is discussed in section 4.3, Harvest Operations.

Harvest allocations were developed with the intent of emulating natural disturbances and moving towards the natural disturbance template as provided in the NDPEG. For all disturbance sizes classes (under 5001ha) as projected at plan end the percentage frequency of disturbances moved towards the template with the exception of the 201 to 500 ha size class. The template target in this size class is 8% which was achieved at plan start. Unfortunately at plan end the projected frequency increased to 10%. In general, clearcuts greater than 500ha are challenging to create on the Forest due to the mosaic of forest units and silviculture systems (shelterwood / selection). Challenges are also faced with the spatial arrangement of private land, water bodies and provincial parks on the management unit, making it difficult to disturb continuously on the Forest.

In the <100 ha size class there was a decrease from 73% at plan start to 71% at plan end in an effort to approach the template target of 69%. In the 100 – 200 ha size class there was an increase from 3% at plan start to 10% at plan end in an effort to approach the template target of 13%. In the 501 – 1000 ha size class there was an increase from 4% at plan start to 6% at plan end in an effort to approach the template target of 9%. In the 1001 – 5000 ha size class there was an increase from 2% at plan start to 3% at plan end in an effort to approach the template target of 8%. The frequency distribution of forest disturbance by size class is identified in FMP-12 located in section 9.0.

Public input has impacted the allocations to some degree. Consultation with local tourism operators has resulted in minor adjustments to the allocations. These adjustments have resulted in the maintenance of tourism values on the landscape. Issue resolution decisions have resulted in the adjustment of allocations in terms of which phase of the plan harvest will occur, not necessarily the location of any particular harvest area.

3.10 Assessment of Objective Achievement

This section reports on the results of the assessment of objective achievement for the Plan. Other objectives, related to measures of compliance or comparisons of forecast versus actual achievement, will be assessed at a later date and reported through annual reports. A summary of the timing of assessments is available in FMP-6, in section 9.0.

An indicator, a desired level and a target were developed for each objective. In many cases, objectives achieve or exceed either the target or the desired level of the indicator used to evaluate it. Where the strategy fails to bring the indicator within the range of the desired level or target, rationale is provided.

Several objectives have been assessed at the long-term management direction stage of the process, and followed-up at each stage of plan production. This subset of objectives and indicators that required measurement through time was assessed using SFMM, GIS, NFRM tool (NDPEG) and OWHAM and balanced as part of the requirements of the management strategy. A total of four objectives were assessed within the SFMM for achievement of sustainability of the Plan. In addition, 11 other objectives were assessed, outside of the SFMM model, to evaluate spatial disturbance pattern and preferred wildlife habitat as a result of selecting the preferred allocation on the landscape. Tools used to evaluate these objectives included OWHAM, GIS and NFRM tool (NDPEG analysis). The consideration of these 11 objectives will continue until the selected areas of operations are in place and approved in the final Plan.

One objective was assessed during plan at the long term management direction using a tool developed at the Ontario Forest Research Institute (OFRI) that evaluated carbon sequestering in the management strategy.

A final objective assessed at long term management direction was an evaluation of the Nipissing Local citizen's committee agreement with the management objectives developed in the strategic direction of the Plan.

Certain parts of several objectives were assessed for the first time at the draft Plan submission, including the Nipissing LCC and its self-evaluation, as well as certain indicators in the wood supply objectives that deal with forecast and planned harvest area and volume.

One objective was assessed for the first time at the final plan submission, again linked to the Nipissing LCC's support for the final plan.

Many objectives are assessed in the annual reports following implementation of the forest management plan. This is necessary as achievement is linked to how well NFRM and North Bay District MNR, as well as all others involved in the management of the forest execute the intentions of the forest management plan. The first objective to be assessed in the annual reports is linked to herbicide use on the forest, and will be assessed in the third year of plan implementation to measure achievement.

The remainder of the Plan objectives will be tracked annually and assessed in the 7 and 10 year annual reports, to prepare for the development of the next forest management plan (year 7), and to assess the sustainability of the Plan. (year 10).

Corresponding to the timing of assessment, some objectives will not appear in this assessment, but achievement will be documented as the Plan is implemented.

Representation of management objectives and how each has been represented in modeling is summarized in the following section. A summary can also be found in 6.1.27.

The following section discusses objective achievement for each objective required to be assessed upon completion of the Plan.

Management Objective #1: Move toward a distribution of disturbances that more closely resembles the expected natural disturbance landscape pattern.

Indicator(s):
26. **Frequency** distribution of **forest disturbance** (harvest and natural) area.
27. **Area** distribution of **forest disturbance** (harvest and natural) area.
28. **Frequency** distribution of **planned clearcut areas**.

Target(s): Move towards the natural disturbance template for indicators a) and b), and achieve a 90/10 ratio of planned clearcuts less than and greater than 260 hectares for indicator c).

Assessment
Moving towards the natural disturbance template means creating (stand replacing) disturbances on the Forest that more closely resemble the size and frequency of disturbances in the template. For instance, disturbances in the size class 0-100 hectares, have a template value or desired level of 69% or 4% less than the plan start of 73%. The disturbances are moving towards the natural disturbance because the net difference is less than the net difference of 4% regardless of whether it is less than or greater than the desired level.

None of the size classes are exactly at the desired level for any of the categories, however most are moving toward them. The 201-500 ha size class moved away from the desired level of frequency – from 8% to 10%, as the number of disturbances increased from a plan start level of 36, to a plan end allocation of 54. This category is heavily influence by the direction in the 90/10 standard, and it is not always possible to meet both the 90/10 standard and move towards the template, depending on the current disturbance pattern on the Forest.

The only size class to not meet the target for both frequency and area distribution, was the class greater than 10,000 hectares. In the template it shows 1% of the frequency and 16% of the area. While the target to move toward was not satisfied, the class still remains within the range of the desired level in terms of frequency (0% in a 0-1% range) and area (0% in a 0% -16% range).

The failure to meet the target in this size class can be largely attributed to the time required to implement a disturbance that size. Challenges are also faced with the spatial arrangement of private land, water bodies and provincial parks on the management unit, making it difficult to disturb continuously on the Forest. Finally, with only approximately one third of areas treated with a clearcut silviculture system, the management unit does not have the spatial range to facilitate a disturbance this large. The transitional nature of the Nipissing Forest, between Great Lakes/St.Lawrence and boreal forest, likely influences the presence of a disturbance of this magnitude in the natural template. However, the planning team has agreed that not moving toward the desired level in this instance is likely more appropriate for the Forest from a both an environmental and social perspective.

Figures 3.10.1 and 3.10.2 illustrate the area and frequency trends of the management strategy from plan start to plan end.

Figure 3.10. 1 The 10-year spatial assessment of the percent frequency distribution of forest disturbance size classes. Results from past management and natural disturbance (Plan Start **2009), as well as** Plan End with and without harvest allocations**, and the estimated** natural historic levels**.**

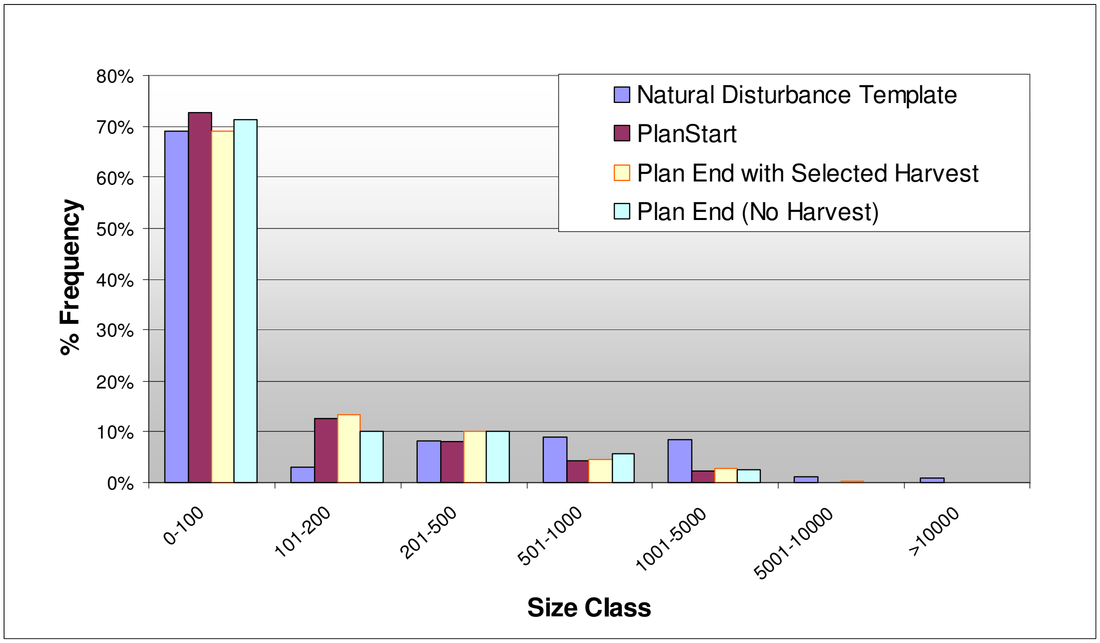
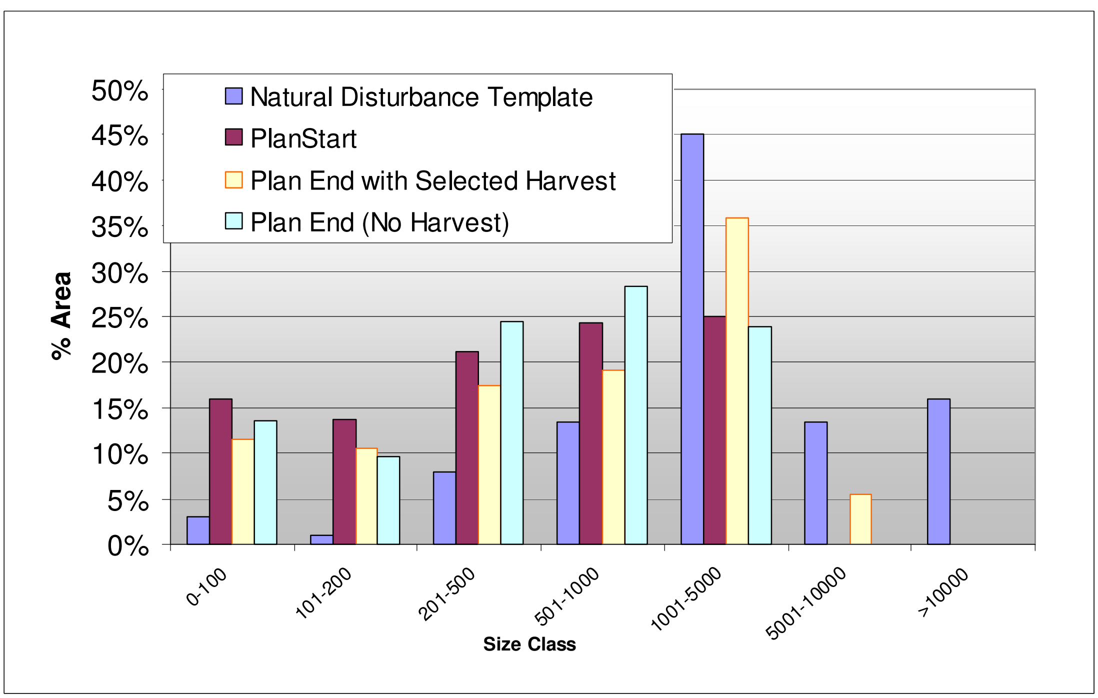


Figure 3.10. 2 The 10-year spatial assessment of the percent area distribution of forest disturbance size classes. Results from past management and natural disturbance (Plan Start **2009), as well as** Plan End with and without harvest allocations**, and the estimated** natural historic levels**.**



Clearcuts planned in Phase 1 (2009-2014), in relation to existing clearcuts that are less than three metres in height, or have a year of origin of less than 20 years from 2014, were also considered. The ratio of these planned clearcuts must be at least 90% less than 260 hectares in net size, and as a result 10% greater than 260 hectares in net size. Spatial tests illustrate the selected harvest allocation falls into a 90/10 ratio, or at least 90% of clearcuts currently smaller than 260 hectares.

Management Objective #2: Increase the frequency of old growth area occurring in larger patch sizes

Indicator(s):

a) **Mean size** and **frequency** of old growth patches, in large size classes.

Desired Level(s): Greater number of large patches and greater mean size of large patches than current levels.

Target(s): Maintain current number and mean size in large patches.

Assessment:

Stand or patch size is significant for old growth in that larger is generally better for retaining genetic reproductive fitness[29] and for certain types of wildlife habitat. Small remnant stands could also be important for retaining unique genetic information.

The task team had an in-depth discussion on what should and should not be considered old growth. In the end two definitions were accepted and analyzed - please refer to the definitions and Figures 3.10.3 and 3.10.4 below.

Old growth was estimated using several sources of information, including the old growth calculator tool, as well as the Old Growth Policy. Comparisons were made to each source of information and an ageclass was selected in SFMM. Figure 3.10.3 below illustrates these comparisons. MNR district staff and regional specialists were involved in the categorization process.

Both the policy and the tool identify onset and duration ages in Ecosite classifications. The tool proportions the age of onset, based on the estimated Ecosite content on the Forest. The model considers forest old growth until natural succession occurs. There is no upper limit of duration set in the model. Ages of onset selected in the 2009 model are in most cases identical, or very similar to the 2004 base model.

[29] Rajora, O.P., Mosseler, Alex, and Major, John E., 2002.

Figure 3.10. 3 Comparison of Age of onset of Old Growth

From Old Growth Tool	From Old Growth Tool	Selected Onset Age	From Old Growth Manual
NFRM Forest Unit	Start Age	Start Age	Old Growth Age of Onset
BW	101	101	100
BY	140	141	137
HDSEL	141	141	134
HDUS	136	141	129
HE	154	151	154
LWMX	115	111	114
MCL	117	111	110
MW	111	111	104
PJ	101	101	92
PJSB	108	111	98
PO	97	91	94
PR	139	141	129
PWST	120	121	115
PWUS	126	131	122
SF	113	111	102

In addition to onset age, stand condition was also discussed by the task team and the following definitions were agreed to. Figure 3.10.4 summarizes the two definitions.

Definition # 1
Stands that have had no stand initiating disturbances to the onset age.

a) Onset age is depended upon the forest unit
b) These are older stands that may have had some disturbance but not to the extent that would initiate new "cohort" regeneration
c) They have to be greater than or equal to 4 ha in size
d) Would include older:
    a. Hardwood selection stands that have been cut more than 10 years ago
    b. Hardwood uniform stands that have no record of being harvested since the 1998 inventory
    c. Pw & Pr stands that have only received a preparation cut
    d. Insular and peninsular patches

These stands will be referred to as "Older Aged Stands"

Definition # 2 (taken from the 1994 Old Growth Definition Paper)
Stands that have old growth trees, unique plant, animal and ecological processes and have little or no sign of disturbance.
These are "primary forests" and are considered true "old growth stands"

Figure 3.10. 4 Comparison of stand characteristics between the two definitions

Condition	Applicability
Large old trees	Both
Complex stand structure	Both
Large dead snags and downed woody debris	Both
Diverse tree and plant communities	Both
Few or little sign of intervention by man	Only to #2
Net growth less than or equal to 0 m3/yr	Both
Current age greater than natural disturbance age	Both
Presence of late successional /climax forest conditions	Both

The task team debated on whether there was a need to identify separately old growth stands occurring in parks & protected areas versus old growth occurring on the managed forests. NFRM identified that because there was "few or little sign of intervention by man" in much of the managed Crown forest that it did not really matter whether the stands occurred inside or outside a park. The group, including a local parks representative, agreed that the intention of lands set aside was to encapsulate much of this type of value on the Forest, and while it was important to have some on the managed landscape, the inclusion of parks was more representative of the landscape pattern within the Forest.

Old growth and old-age stands were measured at plan start and plan end (the stands were aged by 10 years) with the preferred allocations netted out of the scenario, to provide a conservative measure of old condition on the landscape. Large patches are defined as 51-500 hectares and greater than 500 hectares. Increases in mean size and frequency in both large size classes were achieved as illustrated in the figures below. This objective achieved the desired level.

Figure 3.10. 5 Old Growth and Old Age Mean Patch Size Measurements

Size Class	Plan Start 2009	Plan End 2019
51-500 ha	Mean 119 ha Frequency - 197	Mean - 120 ha Frequency 330
>500 ha	Mean 736 ha Frequency - 3	Mean - 831 ha Frequency - 12

Figure 3.10. 6 51-500 ha old growth patch mean and frequency comparison of plan start to plan end

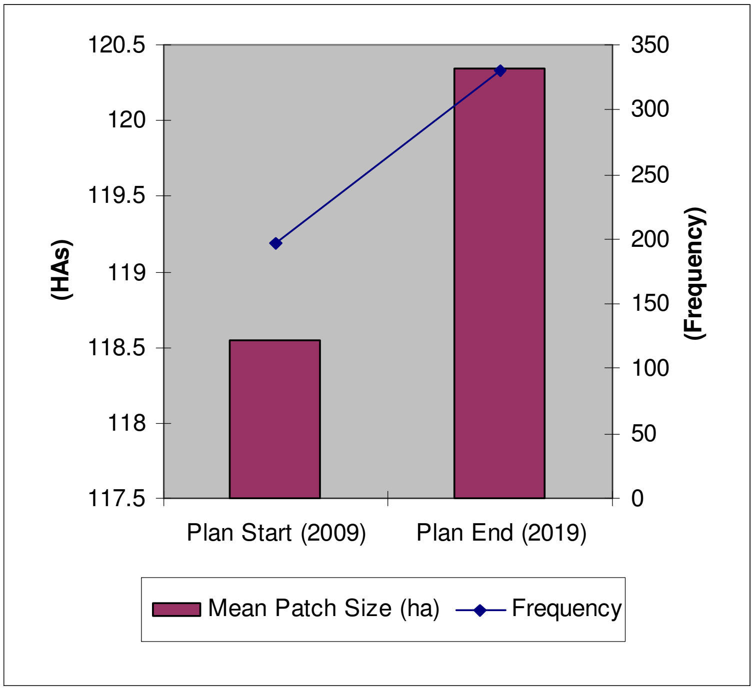
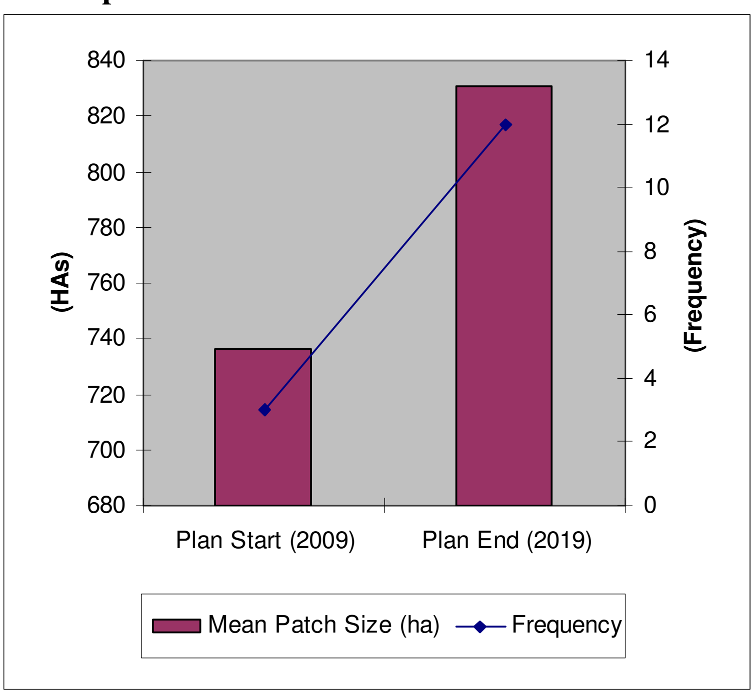


Figure 3.10. 7 500 ha old growth patch mean and frequency comparison of plan start to plan end.



The resulting old growth arrangement has been mapped and located in section 6.1.2.4 of the Plan.

Management Objective #3: With consideration given to the current landscape, ensure that a distribution across the forest of old growth stands, and old aged stands is allowed to occur.

Indicator(s):

b) Composition of old growth stands and old-aged stands by landscape sector (NE,NW,SE,SW)

Desired Level(s): An even distribution across landscape sectors.

Target(s): More even or equal distribution than current levels.

Assessment:

The definitions for old growth for this assessment were consistent with the ones used in Objective #2.

The area of old growth and old-age stands was measured at plan start and plan end (the stands were aged by 10 years) with the preferred allocations netted out of the scenario, to provide a conservative measure of old condition on the landscape. Allocations were completely netted out of the analysis in attempts to minimize forested stands that had been impacted relatively recently by logging activity. Forest sectors were based on highway divisions, providing a relatively even division on the management unit.

Figure 3.10. 8 Old Growth and Old Age area Distribution

Forest Sector	Old Growth Plan Start 2009	Old Aged Plan Start 2009	Total Old Plan Start 2009	Old Growth Plan End 2019	Old Aged Plan End 2019	Total Old Plan End 2019
NE	17,709 ha	395 ha	18,104 ha (49%)	33,395 ha	759 ha	34,154 ha (47%)
NW	9,124 ha	8 ha	9,132 ha (25%)	16,918 ha	78 ha	16,995 ha (23%)
SE	2,446 ha	884 ha	3,330 ha (9%)	7,820 ha	1070 ha	8,890 ha (12%)
SW	6,047 ha	195 ha	6,243 ha (17%)	13,117 ha	234 ha	13,351 ha (18%)

Observations of a maintained even distribution of old growth and old aged stands are apparent in the analysis. The target has been achieved for this objective, and movement towards the desired level has been achieved. The resulting old growth arrangement has been mapped and located in section 6.1.2.4 of the Plan.

Stand structure is another important component of old growth stands. Vertical structure refers to the number of canopy layers in a stand and horizontal structure refers to the patchiness of tree boles, canopy gaps and variation in diameter size[30]. In addition to the landscape level objectives, strategies have also been developed to retain or improve stand structure as it relates to old growth features, such as super-canopy trees, cavity trees and downed woody debris. Details are discussed further in section 4.2.2, prescriptions for harvest, renewal and tending.

Management Objective #4: Maintain the area of forest cover types that would occur naturally on the Nipissing Forest, similar to the expected natural landscape dynamics, with consideration of the pre-settlement forest condition.

Indicator(s):

a) Total area of Forest Cover Type

Desired Level(s): 100-year projection will show that no forest cover type declines below 82% of natural condition, and where possible, movement towards the pre-settlement forest condition should be achieved.

Target(s): Ensure that no forest type drops below 70% of the natural benchmark levels by term.

Assessment:

Forest cover area by type was evaluated in comparison to the natural benchmark, as well as the pre-settlement forest condition. See Figure 3.10.9 for a summary by forest cover type projected to 100 years. Figures 3.10.10 illustrates the projection of forest cover through time compared to the target level.

The desired level was met for all forest cover types with the exception of upland jack pine and black spruce and spruce fir, which both showed a decrease.

The total area of the jack pine spruce upland cover type on the Forest at plan start was 30,014 hectares. This cover type is projected to lose 4103 hectares over the course of 100 years. Although the desire to stabilize the level was not achieved, the management strategy achieves the targets of providing greater than 70% of jack pine spruce upland area compared to the natural benchmark by term through this 100 year projection. The natural benchmark projects this forest cover type to lose close to 50% of its area over the course of 100 years.

The total area of spruce-fir cover type at plan start was 58,607 hectares. This cover type is projected to change by 3,486 hectares over the course of 100 years. Although the desire to stabilize was not achieved, the management strategy provides greater than 70% of spruce-fir area compared to the natural benchmark by term through this 100 year projection. The natural benchmark projects this forest cover type to loose more than 50% of its area over the course of 100 years.

[30] Source – conifer guide, section 8, p. 11

The trend of the natural benchmark makes it difficult to maintain these forest cover types through time, because so many other objectives are linked to the trends provided for in the natural benchmark run.

Considering that the reduction is substantially less than the natural projection, and the timeframe that the loss occurs in is extremely long, the conclusion has been made that the result meets the intent of the objective which states, “Maintain the area of forest cover types that would occur naturally on the Nipissing Forest, with consideration of the pre-settlement forest condition”. The combination of a natural trend and the desire to consider the pre-settlement have lead to the subtle decline of jack pine and spruce upland on the landscape.

Figure 3.10.9 Forest Cover Projections through to 2109

Forest Cover Type – 2009 area	Desired Level (Pre-Settlement Condition)	Forest Cover Type 2109 Area and percentage of 2009 level	Assessment
PWST + PR1 + PWUS (112,478 ha)	Increase	PWST + PR1 + PWUS (130,558 ha) (116%)	Total area of forest type increases over the 100-year planning horizon, and remains greater than 70% of the natural condition in all terms. Desired Level achieved.
PO + BW (112,286 ha)	Decrease	PO + BW (105,548 ha) (94%)	Total area of forest type decreased over the 100-year planning horizon, and remained greater than 70% of the natural condition in all terms. Desired Level achieved.
MCL (24,596 ha)	Stable	MCL (24,537 ha) (99%)	Forest type stable through time; remained greater than 70% of natural condition in all terms. Target met.
PJ + PJSB (30,014 ha)	Stable	PJ + PJSB (25,378 ha) (85%)	Forest type decreasing through time; however, slower than the natural condition tendency, as long term exceeds the natural levels. Target met.
MW (82,567 ha)	Stable	MW (76,466 ha) (92%)	Forest type showing general stability, but slight decrease through time; however, the natural condition tendency is to increase dramatically. Cover type remained above 70% of the natural condition for all terms. Desired Level achieved
SF (58,607 ha)	Stable	SF (55,121 ha) (94%)	Forest type showing general stability. Cover type remained above 70% of the natural condition for all terms. Desired Level achieved

Forest Cover Type – 2009 area	Desired Level (Pre-Settlement Condition)	Forest Cover Type 2109 Area and percentage of 2009 level	Assessment
HE (9,777)	Increase	HE (11,458 ha) (117%)	Forest type showing increase through time. Cover type remained above 70% of the natural condition for all terms. Desired Level achieved
LWMX (26,557 ha)	Stable	LWMX (26,399 ha) (99%)	Forest type showing general stability. Cover type remained above 70% of the natural condition for all terms. Desired Level achieved
HDUS + HDSEL (130,257 ha)	Decrease	HDUS + HDSEL (123,101 ha) (95%)	Forest type showing general stability, but slight decrease through time. Cover type remained above 70% of the natural condition for all terms. Desired Level achieved
BY (16,265 ha)	Increase	BY (20,228 ha) (123%)	Forest type showing increase through time. Cover type remained above 70% of the natural condition for all terms. Desired Level achieved.

Figure 3.10.10 Forest Cover Projections term by term to 2109 (T11)

Term	Achieve (Ha) PWST+PR+PWUS	Target (Ha)
T1	112,478	78,735
T2	113,532	78,468
T3	116,326	78,240
T4	117,483	78,013
T5	118,465	77,821
T6	121,462	77,798
T7	122,246	77,690
T8	122,792	77,774
T9	123,437	78,186
T10	125,372	78,875
T11	130,588	79,440

Term	Achieve (Ha) PO+BW	Target (Ha)
T1	112,283	78,598
T2	113,481	81,294
T3	112,523	83,823
T4	113,010	86,031
T5	113,225	87,800
T6	111,277	87,785
T7	110,583	87,530
T8	107,957	86,159
T9	105,743	85,336
T10	106,784	86,462
T11	105,549	88,456

Term	Achieve (Ha) MCL	Target (Ha)
T1	24,596	17,217
T2	24,582	17,217
T3	24,569	17,217
T4	24,557	17,217
T5	24,547	17,217
T6	24,537	17,217
T7	24,537	17,217
T8	24,537	17,217
T9	24,537	17,217
T10	24,537	17,217
T11	24,537	17,217

Term	Achieve (Ha) PJ+PJSB	Target (Ha)
T1	30,015	21,010
T2	29,726	20,486
T3	29,404	19,976
T4	29,136	19,488
T5	28,898	18,995
T6	28,681	18,518
T7	28,380	18,012
T8	27,720	17,099
T9	27,038	16,267
T10	25,911	15,400
T11	25,378	14,792

Term	Achieve (Ha) MW	Target (Ha)
T1	82,567	57,797
T2	79,577	57,761
T3	77,019	57,808
T4	74,601	57,993
T5	72,842	58,434
T6	71,061	60,919
T7	70,250	62,649
T8	71,586	65,791
T9	73,760	69,175
T10	76,261	71,576
T11	76,466	72,659

Term	Achieve (Ha) SF	Target (Ha)
T1	58,607	41,025
T2	58,459	39,156
T3	58,527	37,317
T4	58,871	35,640
T5	59,672	34,115
T6	60,621	32,145
T7	61,644	31,285
T8	63,048	30,342
T9	63,125	28,202
T10	58,775	24,851
T11	55,121	21,818

Term	Achieve (Ha)	Target (Ha)
	HE	
T1	9,777	6,844
T2	10,003	6,844
T3	10,486	6,844
T4	10,713	6,841
T5	10,717	6,835
T6	10,759	6,818
T7	10,758	6,783
T8	10,928	6,783
T9	11,258	6,782
T10	11,401	6,756
T11	11,458	6,731

Term	Achieve (Ha)	Target (Ha)
	LWMX	
T1	26,557	18590
T2	26,504	18590
T3	26,456	18590
T4	26,399	18590
T5	26,399	18590
T6	26,399	18590
T7	26,399	18590
T8	26,399	18590
T9	26,399	18590
T10	26,399	18590
T11	26,399	18590

Term	Achieve (Ha)	Target (Ha)
	HDUS+HDSEL	
T1	130,258	91,180
T2	128,946	91,180
T3	127,051	91,180
T4	125,889	91,182
T5	125,859	91,186
T6	125,673	91,197
T7	125,559	91,243
T8	125,020	91,323
T9	123,986	91,318
T10	123,444	91,344
T11	123,101	91,369

Term	Achieve (Ha)	Target (Ha)
	BY	
T1	16,265	11,385
T2	16,739	11,385
T3	17,721	11,385
T4	18,185	11,386
T5	18,212	11,388
T6	18,356	11,394
T7	18,471	11,383
T8	18,839	11,304
T9	19,544	11,309
T10	19,943	11,309
T11	20,228	11,309

Management Objective #5: Provide Red and White Pine forest area not less than 1995 levels, consistent with the Conservation Strategy for Old Growth Red and White Pine Forests Ecosystems in Ontario, 1996.

Indicator(s): Area within PR, PWST and PWUS forest units through time.

Desired Level(s): Greater than 1995 level determined to be 79,671 hectares by 2019.

Target(s): Greater than or equal to 79,671 for all categories by 2019.

Assessment:
The plan start level for PR, PWUS and PWST exceeds the 79,671 hectares set out in the desired level. At plan end, or 2019, the level of white and red pine on the forest is expected to be 113,532 hectares.

The planning team utilized the 1995 level as a target guided by the conservation strategy document. The source for the 1995 level was the Nipissing Forest 1999 FMP, FMP-2, a summary of the PW and PR working groups. As comparisons through time have been made using different units (Working Group vs Forest Unit), the degree of increase should not be considered in the analysis, but it can be safely assumed that the total area has increased.

Management Objective #7: Move towards a more natural age class distribution for each forest unit over the entire forest in mature and old-aged condition, similar to that of a natural forest dynamic.

Indicator(s):

a) Total Area by Forest Unit in a mature state by term.
b) Total Area by Forest Unit in an over mature state by term.

Desired Level(s): To achieve a minimum of 82% of the selected forest unit in a mature and over mature state, by term, of the natural benchmark in SFMM.

Target(s): To achieve a minimum of 70% of the selected forest unit in a mature and over mature state, by term, of the natural benchmark in SFMM.

Assessment:
In the mature category, 139 of the measures of the indicators met the desired level, and all met or exceeded the target. For the over-mature category, 34 of the measures of the indicators met the desired level, and all met or exceeded the target, as illustrated in Figures 3.10.11 and 3.10.12 below.

This desired level is designed to illustrate the team’s desire to see the maximum ecological condition carried on through time on the forest, with no consideration of the current forest condition (ageclass gap, limiting wood supply into the medium terms) or balancing multiple objectives (limiting wood supply vs. certain ecological objectives). Due to the fact that forest management results in short term disturbance fluctuations on the landscape, it can only be assumed that some impact to the ecological levels are a possibility in the strategy. The planning team has attempted to mimic the natural trend of ageclass distribution through time within the strategy, and agrees that the current strategy is moving toward the desired level by executing these trends through time.

Figure 3.10. 11 Mature Condition Target and Achievement by Term

	BW		BY		HDUS		HE		LWMX		MCL		MW	
Term	Achieve	Target	Achieve	Target	Achieve	Target	Achieve	Target	Achieve	Target	Achieve	Target	Achieve	Target
T1	51,117	35,782	9,913	6,939	47,926	33,548	6,729	4,710	18,037	12,626	13,514	9,460	48,274	33,792
T2	44,209	30,580	8,888	6,837	49,337	37,301	5,793	3,869	16,768	11,618	9,787	6,707	50,278	37,475
T3	30,216	19,459	8,573	6,645	41,382	37,930	4,778	2,833	14,109	9,676	4,875	3,271	47,916	32,405
T4	18,250	8,694	6,964	5,746	35,334	34,710	4,086	2,381	10,417	7,071	2,369	1,556	35,491	22,614
T5	8,104	3,416	4,926	3,894	28,672	27,815	2,473	1,341	5,510	3,648	1,038	667	23,871	13,022
T6	6,122	2,464	5,994	3,632	22,437	18,400	1,162	622	2,845	1,103	381	240	11,044	6,173
T7	6,422	3,653	6,710	3,081	21,772	10,307	1,010	684	4,084	503	1,044	750	7,286	6,540
T8	10,329	6,640	5,350	2,618	16,983	4,939	1,408	385	5,997	474	2,018	1,312	8,994	8,994
T9	14,168	10,031	5,605	2,506	8,664	2,809	1,805	312	8,293	654	3,216	1,557	14,181	14,181
T10	12,949	12,280	3,507	2,529	5,426	2,234	3,299	340	7,841	787	3,964	1,843	20,820	19,989
T11	16,182	12,994	4,121	2,347	4,277	2,355	4,726	400	5,652	775	3,901	1,613	23,071	22,333
T12	13,006	12,223	4,484	1,094	5,626	2,705	4,735	459	3,942	923	4,162	1,358	23,115	23,115
T13	11,708	11,114	3,927	1,254	9,899	3,248	4,717	515	2,883	923	3,443	1,358	20,830	20,830
T14	10,578	10,285	5,541	1,798	10,416	3,418	4,462	349	3,436	923	2,785	1,358	17,770	17,770
T15	9,858	9,858	5,114	2,068	6,439	3,823	4,328	369	6,427	923	2,375	1,358	15,173	15,173
T16	9,811	9,811	2,979	2,843	5,264	4,217	4,302	426	8,487	923	2,162	1,358	13,807	13,807

	PJ1		PJSB		PO		PR		PWST		PWUS		SF	
Term	Achieve	Target	Achieve	Target	Achieve	Target	Achieve	Target	Achieve	Target	Achieve	Target	Achieve	Target
T1	5,598	3,918	14,081	9,856	26,008	18,206	476	333	14,740	10,318	44,647	31,253	33,582	23,507
T2	4,740	3,139	11,911	8,135	16,854	10,356	405	405	11,471	9,086	43,224	28,056	26,612	21,625
T3	1,492	765	7,977	5,097	9,041	4,876	415	415	7,727	6,883	35,479	21,543	17,880	16,037
T4	646	284	3,958	1,856	4,318	2,054	812	812	4,664	4,664	23,076	13,182	11,256	10,356
T5	744	279	1,970	783	3,846	1,628	1,207	1,207	4,127	3,901	13,479	7,954	8,015	6,469
T6	2,372	918	967	350	5,668	2,620	1,778	1,778	3,048	3,048	9,157	4,710	5,615	3,907
T7	2,991	1,272	699	474	6,617	3,431	4,023	3,426	3,194	3,194	12,343	5,572	3,587	3,318
T8	2,117	1,577	1,284	1,284	9,262	5,927	3,522	3,498	5,335	4,470	22,737	5,619	4,546	4,546
T9	2,213	1,781	1,558	1,558	9,486	7,628	3,888	3,861	5,516	5,515	35,842	6,271	9,047	4,871
T10	1,645	1,645	2,684	1,728	12,738	8,804	3,860	3,860	6,106	5,861	41,415	6,580	12,034	6,140
T11	1,656	1,656	3,223	1,722	11,723	8,701	4,024	3,869	6,831	6,831	43,041	7,257	10,333	7,383
T12	1,693	1,656	3,030	1,294	10,068	8,533	3,765	3,728	7,399	7,399	39,633	6,484	8,350	7,586
T13	1,872	1,650	1,811	1,153	8,479	8,414	2,905	2,905	7,327	7,327	28,840	6,507	7,969	7,969
T14	2,155	1,602	1,099	1,098	8,719	8,449	3,055	3,055	7,737	7,476	22,736	5,756	7,338	7,338
T15	1,704	1,545	1,166	1,166	8,615	8,615	3,038	3,038	7,598	7,598	22,918	5,409	6,073	6,073
T16	1,491	1,491	1,184	6,303	9,004	9,004	3,084	3,084	7,721	7,721	25,566	4,903	4,863	4,862

Figure 3.10. 12 Over mature Condition Target and Achievements by Term

	BW		BY		HDUS		HE		LWMX		MCL		MW	
Term	Achieve	Target	Achieve	Target	Achieve	Target	Achieve	Target	Achieve	Target	Achieve	Target	Achieve	Target
T1	1,554	1,088	1,324	927	3,529	2,470	2,455	1,718	2,337	1,636	2,337	3,360	3,832	2,682
T2	4,414	4,414	2,150	1,596	5,935	4,756	3,643	2,572	7,356	5,189	7,356	6,290	8,492	5,514
T3	11,975	11,975	2,036	1,997	7,328	6,141	5,113	3,577	10,040	7,778	10,040	9,494	11,215	11,215
T4	19,415	19,415	2,901	2,901	10,026	10,025	5,486	3,963	11,581	10,247	11,581	10,949	18,892	18,892
T5	21,255	21,255	5,192	5,039	16,875	16,875	6,856	4,934	14,576	13,480	14,576	11,614	26,190	26,190
T6	19,900	19,900	6,703	6,703	25,971	25,971	6,862	5,575	16,019	15,885	16,019	11,774	30,568	30,568
T7	16,130	16,130	7,354	7,354	33,749	33,749	5,873	5,657	16,497	16,497	16,497	11,565	30,329	30,329
T8	10,413	10,413	7,725	7,725	39,396	39,396	5,937	5,937	16,369	16,369	16,369	11,330	27,843	27,843
T9	4,573	4,573	7,893	7,893	41,249	41,249	5,950	5,950	16,189	16,189	16,189	11,130	25,279	25,279
T10	2,382	2,382	7,862	7,862	41,860	41,860	5,892	5,892	16,057	16,057	16,057	10,889	22,941	22,941
T11	2,428	2,428	8,046	8,046	41,762	41,762	5,809	5,809	17,188	16,068	17,188	11,161	23,064	23,064
T12	4,155	4,155	9,297	9,297	41,444	41,444	5,957	5,720	15,920	15,920	15,920	11,458	24,431	23,347
T13	5,939	5,939	9,090	9,090	41,437	40,950	6,005	5,660	15,920	15,920	15,920	11,498	27,546	25,580
T14	7,550	7,550	8,522	8,522	40,748	40,748	6,578	5,882	15,920	15,920	15,920	11,538	31,019	28,414
T15	8,279	8,278	8,239	8,239	40,294	40,294	6,742	5,925	15,920	15,920	15,920	11,577	31,092	30,215
T16	8,482	8,482	7,528	7,528	39,665	39,665	7,159	6,039	15,920	15,920	15,920	11,615	31,006	31,006

	PJ1		PJSB		PO		PR		PWST		PWUS		SF	
Term	Achieve	Target	Achieve	Target	Achieve	Target	Achieve	Target	Achieve	Target	Achieve	Target	Achieve	Target
T1	245	171	402	281	3,642	2,549	3	2	1,516	1,061	3,375	2,362	5,596	3,917
T2	465	465	1,284	1,284	10,322	8,940	20	15	2,452	2,452	7,261	4,822	7,961	7,957
T3	2,649	2,308	3,189	3,189	13,634	12,183	28	21	4,377	4,377	16,004	9,788	13,991	13,979
T4	2,810	2,366	5,445	5,445	14,563	13,397	92	71	6,176	6,176	19,745	17,202	18,895	18,883
T5	2,194	2,087	5,640	5,640	11,758	11,426	104	84	7,548	7,548	20,989	20,989	21,908	21,895
T6	1,812	1,812	5,226	5,226	6,274	6,273	161	140	8,109	8,108	22,569	22,569	22,538	22,525
T7	1,414	1,414	4,578	4,578	3,447	3,447	207	207	8,222	8,221	22,074	22,074	23,361	22,783
T8	706	366	3,870	3,870	1,617	1,601	260	259	8,323	8,018	21,036	21,035	21,330	21,317
T9	209	207	3,425	3,087	2,163	1,897	270	269	8,022	7,723	20,389	20,388	18,762	17,920
T10	517	517	2,896	2,267	2,695	2,692	545	545	8,153	8,147	19,453	19,422	12,973	12,960
T11	678	678	2,723	1,888	4,230	4,230	797	797	7,976	7,934	18,498	18,304	11,205	9,426
T12	843	843	2,823	1,974	5,732	5,731	1,185	1,185	8,431	8,120	18,847	18,550	8,837	7,742
T13	981	981	2,602	1,810	6,662	6,662	2,243	2,243	10,014	8,853	18,284	17,864	7,169	6,308
T14	1,100	1,074	2,462	1,691	7,304	7,304	2,315	2,315	10,811	9,372	18,578	17,838	7,424	6,460
T15	1,013	1,013	2,233	1,580	7,220	7,220	2,543	2,543	11,870	9,812	19,105	17,355	9,057	7,807
T16	1,016	1,016	2,018	1,475	7,098	7,098	2,694	2,693	12,138	10,103	20,249	16,969	10,020	8,798

Management Objective #11: Achieve wildlife habitat levels similar to the natural condition for forest-dependent provincially and locally featured species on the Nipissing Forest.

Indicator(s):

a) Area of preferred wildlife habitat for the provincially featured species by term.
b) Area of preferred wildlife habitat for mandatory old growth species by term.
c) Area of preferred wildlife habitat for locally significant species by term.

Desired Level(s): To achieve a minimum of 82% of the SFMM natural benchmark level for the selected species, by term.

Target(s): To achieve a minimum of 70% of the SFMM natural benchmark level for the selected species, by term.

Assessment:
Ecological conditions in the development of the management strategy were set at 70% of the natural benchmark, after several trade-offs were examined. All species remained at or above the 70% mark through the planning horizon. Figure 3.10.13 outlines the selected species and their respective coding in the tables.

Figures 3.10.14 through 3.10.16 illustrate the target level, achievement level and proportion of the natural benchmark by term for the 160 year planning horizon.

Figure 3.10.13 Selected Species Code Description Reference

Code	Species
BBWO	Black Backed WoodPecker
BLBEf	Black Bear Autumn
CALYb	Lynx
HETH	Hermit Thrush
MART	Marten
MOOSf	Moose
MOOSw	Moose Late Winter
PIWO	Pileated WoodPecker
RBSA	Redback Salamander
RCKI	Ruby-Crowned Kinglet
RUGR	Rough Grouse
SNHAw	Snow Shoe Hare
SPGR	Spruce Grouse
WTDEs	White-Tailed Deer
WTDEw	White Tailed Deer
WTSP	White Throated Sparrow

Figure 3.10. 14 Preferred habitat projections as a percent of the natural benchmark

	BBWO	BLBEf	CALYb	HETH	MART	MOOSf	MOOSw	PIWO	RBSA	RCKI	RUGR	SNHAw	SPGR	WTDEs	WTDEw	WTSP
T1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
T2	77%	94%	75%	118%	93%	132%	91%	92%	99%	73%	122%	91%	117%	135%	92%	108%
T3	73%	85%	72%	134%	86%	106%	87%	86%	98%	72%	131%	89%	95%	109%	90%	109%
T4	73%	81%	71%	142%	82%	91%	84%	81%	98%	72%	129%	86%	88%	93%	91%	99%
T5	72%	83%	72%	143%	80%	106%	82%	80%	99%	71%	123%	82%	81%	107%	98%	87%
T6	72%	86%	71%	147%	78%	108%	81%	78%	99%	71%	117%	77%	81%	109%	103%	83%
T7	71%	91%	70%	149%	79%	124%	81%	78%	99%	70%	110%	75%	85%	125%	104%	81%
T8	70%	93%	70%	145%	82%	126%	83%	81%	97%	71%	105%	79%	98%	128%	103%	86%
T9	71%	91%	70%	136%	87%	139%	87%	86%	97%	71%	104%	82%	123%	142%	101%	89%
T10	70%	89%	70%	136%	87%	140%	89%	85%	96%	72%	105%	87%	123%	142%	102%	92%
T11	73%	87%	70%	145%	85%	142%	87%	82%	95%	73%	108%	87%	91%	145%	103%	92%
T12	71%	85%	70%	157%	81%	138%	84%	78%	95%	73%	110%	85%	77%	141%	104%	91%
T13	70%	86%	70%	163%	80%	149%	81%	76%	95%	73%	108%	82%	89%	152%	105%	87%
T14	70%	86%	70%	165%	81%	154%	81%	76%	94%	72%	105%	84%	112%	158%	104%	90%
T15	70%	84%	70%	163%	82%	160%	81%	78%	93%	72%	102%	83%	128%	166%	103%	89%
T16	70%	86%	70%	160%	83%	165%	81%	80%	92%	72%	100%	86%	134%	172%	99%	93%

Figure 3.10. 15 Minimum Target Level for each selected species by term (70% of the Natural Benchmark)

	BBWO	BLBEf	CALYb	HETH	MART	MOOSf	MOOSw	PIWO	RBSA	RCKI	RUGR	SNHAw	SPGR	WTDEs	WTDEw	WTSP
T1	6,411	10,617	15,083	79,562	174,726	50,880	54,169	193,099	201,711	9,576	33,198	31,010	2,309	52,759	60,676	62,627
T2	12,233	11,074	27,377	70,498	185,515	47,960	56,950	202,672	196,695	18,460	25,367	45,600	2,197	48,933	59,263	76,129
T3	20,880	11,111	47,550	68,434	185,340	47,383	56,822	198,180	192,666	33,987	31,514	67,333	2,067	48,163	59,622	84,812
T4	29,845	10,948	67,814	69,549	180,111	46,710	55,291	189,877	191,123	49,605	38,710	87,392	2,050	47,483	57,862	95,397
T5	35,887	10,715	82,015	71,914	173,428	46,073	53,621	179,919	191,472	62,269	46,396	96,806	2,013	46,840	58,310	96,127
T6	38,423	10,469	86,940	75,040	165,605	45,504	51,706	169,533	192,286	69,390	53,790	100,092	1,977	46,266	56,285	98,317
T7	39,317	10,313	87,048	74,435	162,509	44,882	51,541	165,430	192,821	71,630	58,391	96,184	1,939	45,639	57,280	95,688
T8	38,074	10,205	82,604	74,949	160,964	44,285	51,644	162,635	192,834	68,128	60,399	91,490	1,898	45,034	56,295	96,566
T9	34,832	10,181	75,821	75,106	160,219	43,911	50,439	162,432	194,332	62,211	60,543	81,776	1,789	44,653	56,673	91,796
T10	30,303	10,238	69,784	74,342	159,981	43,846	48,774	164,321	196,130	56,162	59,556	76,936	1,694	44,583	53,853	90,784
T11	27,689	10,311	66,641	72,392	160,753	43,855	47,712	167,064	197,728	52,658	58,754	72,449	1,634	44,585	53,240	87,690
T12	26,648	10,369	67,167	70,562	161,295	43,683	46,875	169,279	199,484	51,897	58,334	74,131	1,588	44,406	50,887	88,888
T13	26,178	10,391	68,620	69,474	160,998	43,011	46,165	170,035	200,808	52,848	58,631	74,149	1,552	43,706	50,924	86,930
T14	26,759	10,390	71,617	68,401	160,831	42,179	45,818	170,744	201,649	54,596	58,936	78,112	1,521	42,854	49,312	89,083
T15	27,915	10,356	74,304	67,740	160,293	41,275	45,732	170,435	202,558	56,999	59,808	78,935	1,491	41,937	50,049	87,957
T16	28,774	10,297	75,743	67,456	159,621	40,095	45,653	169,881	203,183	58,618	60,549	81,406	1,453	40,724	49,145	89,909

Figure 3.10. 16 Achievement by term for the selected provincial, old growth and locally featured species preferred habitat

	BBWO	BLBEf	CALYb	HETH	MART	MOOSf	MOOSw	PIWO	RBSA	RCKI	RUGR	SNHAw	SPGR	WTDEs	WTDEw	WTSP
T1	9,159	15,167	21,547	113,660	249,608	72,685	77,384	275,856	288,159	13,680	47,425	44,299	3,298	75,370	86,680	89,467
T2	13,445	14,877	29,295	118,419	245,490	90,415	74,414	267,215	277,397	19,260	44,177	59,295	3,668	94,064	77,515	117,038
T3	21,711	13,462	48,586	131,388	227,498	71,750	70,627	242,640	269,371	34,958	58,778	85,725	2,810	75,318	76,244	131,604
T4	30,921	12,601	69,154	141,371	209,995	60,601	66,483	221,024	268,631	50,874	71,108	107,500	2,584	63,211	75,631	135,054
T5	37,145	12,693	84,459	147,269	198,650	69,628	63,051	204,840	269,753	62,974	81,562	112,879	2,343	71,872	81,982	119,262
T6	39,390	12,901	88,400	157,603	184,952	69,935	59,802	188,661	270,853	70,130	90,090	110,738	2,281	71,805	82,593	116,245
T7	40,064	13,423	87,048	158,502	182,772	79,500	59,384	184,898	271,665	71,719	91,378	103,621	2,354	81,695	84,799	111,167
T8	38,317	13,542	82,604	155,324	187,879	79,866	60,933	188,853	268,391	69,169	90,308	103,247	2,656	82,256	82,769	119,050
T9	35,116	13,272	75,821	145,689	198,062	87,057	62,477	198,564	268,236	63,172	89,522	96,229	3,156	90,275	82,174	116,698
T10	30,303	12,972	69,831	144,217	197,710	87,537	61,758	198,873	268,248	57,505	89,598	95,419	2,976	90,214	78,668	118,932
T11	28,680	12,780	66,641	149,444	194,926	88,945	59,595	196,544	269,295	54,835	90,827	90,297	2,122	92,153	78,242	114,859
T12	26,974	12,646	67,167	158,611	187,023	86,160	56,387	187,416	271,491	54,005	91,531	89,586	1,751	89,382	75,872	115,431
T13	26,269	12,759	68,620	161,745	184,292	91,404	53,730	184,304	272,921	54,999	90,187	86,812	1,978	95,156	76,369	108,011
T14	26,908	12,717	71,617	161,490	185,492	92,573	53,017	186,030	270,368	56,373	88,558	94,090	2,437	96,739	72,949	114,234
T15	27,915	12,497	74,304	157,787	188,276	94,128	53,174	189,920	269,873	58,523	87,321	93,643	2,727	99,250	73,632	111,477
T16	28,774	12,679	76,149	154,187	190,062	94,657	53,056	193,491	267,955	60,597	86,177	99,704	2,787	99,933	69,829	119,409

Results for the preferred habitat, with respect to provincially featured species (deer, moose and pileated woodpecker), showed 60 of a possible 75 indicators meeting the desired level, and all meeting the target. Habitat indicators for Mandatory Old Growth Species (black backed woodpecker, black bear, lynx and ruby crowned kinglet) showed achievement of the desired level in 15 of a possible 60 indicators. All indicators for these species exceeded the targets by term.

Locally selected species showed 107 of a possible 120 meeting the desired level, with all indicators meeting the targets.

It can be concluded that in light of other objectives on the forest, as well as the current forest condition the strategy was not able to meet all desired levels (while still meeting all target levels) for this objective, however in each case the condition is either increasing through time, or fluctuating in similar manor of the natural benchmark, and in most cases eventually begins to move back toward the desired level. The planning team interprets this objective to be following the natural trend and therefore moving toward the desired level.

Management Objective #12: To provide early successional forest over the 100 year term.

Indicator(s):

a) Non-spatial assessment of total pre-sapling, sapling and two-canopy uniform area by Ecosite type (ha) by start of each planning term.

Desired Level(s): To achieve a minimum of 82% for the selected Ecosite in a pre-sapling, sapling and two-canopy phase, by term, of the natural benchmark in SFMM.

Target(s): To achieve a minimum of 70% for the selected Ecosite in a pre-sapling, sapling and two-canopy phase, by term, of the natural benchmark in SFMM.

Assessment:

There are a total of 375 possible measures when considering 25 ecosite types by 15 planning terms. All but 9 of the 375 measures meet the target. All of the 9 targets that miss the 70% mark achieve at least 95% of the target, with 8 of the 9 being within <3% of achieving the full target. This forest condition is created by harvest activity on the landscape. Failure to meet the target for all terms is brought on by pressure in the medium terms to reduce harvest as a result of a projected shortage in harvest area due to forest ageclass. As well, ecological targets in the strategy, such as the provision of old growth and other preferred habitat, compounded the situation. In addition, the planning team's objectives to restore white and red pine to the landscape often leads to a reduction in the area found in other ecosite types when compared to the natural benchmark.

It can be concluded that other objectives, as well as the current forest condition, play a role in some missed targets in the middle of the planning horizon in this objective.

However, in each case the condition moves back into the target range in later terms, and eventually begins to move back toward the desired level. Figures 3.10.17 through 3.10.19 illustrate the target level, achievement level and proportion of the natural benchmark by term for the 160 year planning horizon.

Figure 3.10.17 Achievement of the natural benchmark for 25 conditions of pre-sapling, sapling and two-canopy stand conditions.

	ES11	ES12	ES13	ES14	ES15	ES16	ES17	ES18	ES19	ES20	ES21	ES22	ES23	ES24	ES25	ES26	ES27	ES28	ES29	ES30	ES31	ES32	ES33	ES34	ES35
T1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
T2	103%	99%	107%	110%	94%	156%	96%	101%	106%	108%	108%	156%	119%	129%	127%	130%	109%	153%	119%	167%	141%	171%	145%	135%	123%
T3	101%	90%	109%	98%	84%	209%	85%	91%	101%	109%	105%	201%	76%	73%	75%	80%	88%	125%	78%	164%	241%	325%	179%	138%	105%
T4	75%	81%	95%	82%	74%	190%	77%	82%	93%	87%	92%	205%	74%	71%	72%	75%	78%	106%	70%	146%	212%	303%	181%	123%	94%
T5	69%	68%	93%	87%	72%	165%	79%	78%	87%	80%	88%	161%	105%	119%	113%	117%	89%	125%	101%	137%	267%	373%	195%	115%	102%
T6	68%	75%	90%	88%	73%	144%	71%	72%	86%	79%	82%	137%	117%	144%	134%	136%	92%	141%	111%	132%	166%	200%	147%	91%	87%
T7	69%	81%	92%	96%	81%	157%	69%	72%	91%	77%	85%	151%	143%	187%	172%	174%	104%	169%	147%	130%	223%	308%	155%	99%	94%
T8	70%	94%	94%	102%	99%	167%	72%	77%	92%	78%	85%	169%	156%	208%	189%	190%	109%	187%	147%	125%	174%	240%	155%	106%	105%
T9	91%	100%	110%	112%	107%	204%	75%	80%	93%	105%	95%	207%	144%	188%	171%	177%	107%	190%	161%	151%	266%	451%	203%	140%	113%
T10	112%	93%	117%	123%	92%	188%	80%	83%	87%	127%	102%	198%	142%	180%	165%	169%	109%	178%	136%	149%	189%	289%	180%	122%	109%
T11	121%	88%	118%	128%	73%	182%	78%	79%	80%	136%	105%	204%	140%	181%	165%	177%	110%	190%	178%	180%	253%	447%	227%	164%	121%
T12	119%	80%	115%	126%	72%	171%	68%	69%	74%	133%	102%	173%	144%	195%	176%	191%	112%	204%	204%	188%	180%	261%	211%	158%	114%
T13	108%	77%	117%	124%	87%	190%	71%	67%	80%	120%	98%	165%	167%	237%	211%	227%	119%	230%	240%	187%	246%	369%	257%	203%	143%
T14	95%	86%	121%	123%	104%	192%	79%	72%	89%	111%	96%	159%	183%	266%	235%	250%	122%	259%	244%	201%	195%	253%	259%	232%	174%
T15	81%	94%	121%	113%	114%	217%	81%	74%	97%	99%	98%	174%	171%	250%	220%	239%	117%	260%	262%	210%	285%	406%	325%	284%	189%
T16	81%	107%	123%	116%	110%	235%	85%	80%	104%	99%	104%	213%	173%	259%	226%	242%	119%	256%	239%	204%	231%	336%	309%	282%	195%

Figure 3.10.18 Minimum Target (70% of the natural benchmark) for 25 conditions of pre-sapling, sapling and two-canopy stand conditions, by term.

	ES11	ES12	ES13	ES14	ES15	ES16	ES17	ES18	ES19	ES20	ES21	ES22	ES23	ES24	ES25	ES26	ES27	ES28	ES29	ES30	ES31	ES32	ES33	ES34	ES35
T1	9,798	6,697	2,128	2,217	3,831	4,384	7,319	8,765	516	6,493	6,615	2,530	269	77	262	348	3,464	4,014	5,429	1,623	890	912	2,037	381	634
T2	9,524	6,345	2,313	2,315	3,775	4,126	10,981	11,707	763	6,445	8,010	2,771	305	79	277	357	4,201	3,970	5,032	1,630	940	900	2,074	472	822
T3	9,219	4,477	2,404	2,348	3,633	3,310	13,959	13,902	919	5,981	9,119	2,280	334	77	284	360	4,797	3,916	5,203	1,594	448	444	1,722	474	956
T4	8,713	4,749	2,369	2,347	3,604	3,546	15,474	15,235	989	5,824	9,865	2,437	350	78	288	361	5,188	3,854	5,196	1,602	727	603	1,884	539	1,061
T5	8,150	4,621	2,269	2,330	3,552	2,934	15,824	15,605	981	5,261	9,886	1,942	351	78	291	364	5,330	3,839	5,298	1,648	321	264	1,459	499	1,142
T6	7,903	4,642	2,199	2,278	3,497	3,368	15,702	15,438	976	5,070	9,858	2,350	349	77	289	362	5,296	3,850	5,255	1,664	696	576	1,746	530	1,133
T7	7,655	4,662	2,128	2,219	3,436	2,802	15,730	15,327	963	4,881	9,692	1,903	347	76	287	359	5,260	3,814	5,210	1,648	312	260	1,428	493	1,123
T8	7,469	4,684	2,071	2,200	3,290	3,239	15,853	15,615	969	4,729	9,665	2,289	346	76	285	355	5,232	3,770	5,139	1,625	668	552	1,696	522	1,135
T9	7,369	4,712	2,023	2,164	3,126	2,725	15,632	15,428	954	4,638	9,493	1,890	341	75	281	351	5,170	3,716	5,080	1,601	306	256	1,396	488	1,126
T10	7,352	4,749	1,985	2,150	2,995	3,105	15,617	15,695	953	4,602	9,453	2,250	337	73	277	345	5,107	3,669	5,021	1,589	640	529	1,654	517	1,123
T11	7,337	4,790	1,941	2,155	2,907	2,587	15,790	15,996	943	4,566	9,298	1,878	335	73	274	341	5,057	3,628	4,972	1,577	295	250	1,370	486	1,135
T12	7,276	4,829	1,892	2,144	2,840	2,922	15,837	16,151	939	4,502	9,266	2,194	333	72	271	337	5,019	3,550	4,933	1,510	609	503	1,610	510	1,136
T13	7,170	4,862	1,838	2,106	2,783	2,439	15,949	16,281	927	4,412	9,116	1,839	324	68	259	322	4,932	3,398	4,762	1,472	283	241	1,319	470	1,115
T14	7,043	4,889	1,786	2,076	2,730	2,767	16,136	16,595	927	4,306	9,082	2,125	313	64	245	303	4,843	3,211	4,559	1,425	582	479	1,533	487	1,108
T15	6,879	4,906	1,733	2,026	2,668	2,332	16,168	16,565	916	4,179	8,944	1,799	302	60	232	286	4,754	3,027	4,363	1,367	275	235	1,271	454	1,095
T16	6,719	4,917	1,686	1,976	2,597	2,658	16,233	16,709	916	4,055	8,894	2,065	289	55	216	264	4,650	2,775	4,059	1,267	561	460	1,459	464	1,073

Figure 3.10.19 Management strategy achievement levels for 25 conditions of pre-sapling, sapling and two-canopy stand conditions, by term.

	ES11	ES12	ES13	ES14	ES15	ES16	ES17	ES18	ES19	ES20	ES21	ES22	ES23	ES24	ES25	ES26	ES27	ES28	ES29	ES30	ES31	ES32	ES33	ES34	ES35
T1	13,997	9,567	3,040	3,167	5,473	6,262	10,456	12,521	737	9,276	9,450	3,615	385	110	374	497	4,949	5,735	7,756	2,319	1,271	1,302	2,911	545	905
T2	14,075	8,966	3,527	3,636	5,055	9,181	15,062	16,912	1,161	9,920	12,327	6,159	520	146	501	665	6,517	8,701	8,525	3,892	1,896	2,201	4,295	909	1,448
T3	13,282	5,751	3,744	3,283	4,346	9,893	16,954	18,132	1,326	9,306	13,703	6,536	365	80	306	410	5,999	7,001	5,818	3,738	1,542	2,065	4,411	935	1,439
T4	9,394	5,468	3,229	2,736	3,791	9,614	16,999	17,922	1,312	7,255	13,001	7,122	368	80	298	389	5,787	5,855	5,186	3,340	2,199	2,604	4,884	950	1,427
T5	8,025	4,520	3,005	2,900	3,658	6,917	17,786	17,418	1,225	5,991	12,436	4,465	525	132	471	607	6,794	6,868	7,671	3,233	1,226	1,408	4,066	823	1,661
T6	7,716	4,999	2,838	2,879	3,622	6,939	15,821	15,903	1,203	5,715	11,532	4,587	585	158	554	702	6,964	7,771	8,345	3,140	1,648	1,642	3,670	686	1,415
T7	7,548	5,365	2,784	3,052	3,987	6,282	15,564	15,811	1,250	5,347	11,705	4,105	710	204	704	890	7,838	9,214	10,905	3,066	995	1,142	3,154	700	1,512
T8	7,515	6,317	2,778	3,220	4,640	7,729	16,394	17,266	1,271	5,238	11,742	5,518	773	224	769	965	8,112	10,050	10,793	2,908	1,663	1,892	3,751	791	1,695
T9	9,613	6,761	3,174	3,455	4,795	7,953	16,697	17,674	1,262	6,979	12,878	5,593	702	200	688	888	7,868	10,087	11,673	3,460	1,161	1,649	4,042	978	1,815
T10	11,744	6,322	3,314	3,792	3,943	8,316	17,867	18,536	1,182	8,362	13,727	6,349	683	189	654	832	7,978	9,328	9,744	3,388	1,727	2,183	4,265	901	1,748
T11	12,665	6,029	3,285	3,943	3,044	6,745	17,596	18,139	1,082	8,896	13,922	5,474	670	188	646	861	7,949	9,824	12,638	4,056	1,064	1,597	4,442	1,136	1,963
T12	12,373	5,489	3,121	3,858	2,913	7,150	15,391	15,937	993	8,533	13,547	5,432	685	200	684	918	8,014	10,351	14,374	4,051	1,567	1,877	4,852	1,154	1,845
T13	11,046	5,375	3,081	3,740	3,478	6,614	16,074	15,536	1,055	7,564	12,796	4,331	772	231	782	1,043	8,349	11,185	16,316	3,936	994	1,273	4,836	1,365	2,273
T14	9,552	6,015	3,090	3,634	4,059	7,583	18,284	17,037	1,185	6,804	12,409	4,817	820	242	820	1,083	8,432	11,868	15,882	4,083	1,620	1,736	5,668	1,611	2,751
T15	7,919	6,608	2,986	3,281	4,350	7,231	18,800	17,592	1,264	5,882	12,484	4,475	737	213	726	974	7,939	11,240	16,331	4,094	1,118	1,364	5,906	1,842	2,958
T16	7,801	7,540	2,963	3,280	4,075	8,924	19,614	19,150	1,361	5,726	13,153	6,275	716	203	698	911	7,895	10,131	13,866	3,686	1,847	2,208	6,435	1,872	2,994

Management Objective #13: to achieve wildlife habitat levels similar to the natural condition for forest dependent wildlife species at risk with known to occurrence on the Nipissing Forest.

Indicator(s):

b) Area of preferred wildlife habitat for the selected species by term.

Desired Level(s): To achieve a minimum of 82% of the natural benchmark in SFMM for the selected species, by term,.

Target(s):

a) To achieve a minimum of 70% for the selected species, by term, of the natural benchmark in SFMM for the southern flying squirrel
b) To achieve a minimum of 65% for the selected species, by term, until T8, of the natural benchmark in SFMM for the red-shouldered hawk habitat, and maintain at least 35,000 ha of habitat through to T16.

Assessment:
Desired levels were achieved for all terms of the planning horizon for the southern flying squirrel in the management strategy. Figure 3.10.20 illustrates the target level, achievement level and proportion of the natural benchmark by term for the 160 year planning horizon.

Figure 3.10.20 Target, achievement, and proportion of the natural benchmark by term for the southern flying squirrel habitat in the 2009 management strategy

Term	Target	Achievement	% of Natural
T1	5,649	8,070	100%
T2	5,805	7,977	96%
T3	5,825	7,431	89%
T4	5,796	7,161	86%
T5	5,748	7,316	89%
T6	5,700	7,562	93%
T7	5,671	7,721	95%
T8	5,642	7,551	94%
T9	5,626	7,210	90%
T10	5,637	7,075	88%
T11	5,654	7,157	89%
T12	5,670	7,298	90%
T13	5,681	7,419	91%
T14	5,686	7,355	91%
T15	5,686	7,095	87%
T16	5,673	6,965	86%

For red-shouldered hawk, the aspatial analysis target was set to 65% achievement of the natural benchmark through to T8, with the maintenance of at least 35,000 hectares until T16. The habitat is maintained at 70% of the natural benchmark until T4. Figure 3.10.21 illustrates the target, achievement and proportion of the natural benchmark in the strategy. This decision was justified by the team who considered that SFMM has a tendency to overestimate the availability of the preferred habitat for this species. The model does not incorporate spatial habitat requirements into its analysis. The preference of habitat conditions for the red-shouldered hawk is highly susceptible to various spatial factors. To properly assess the species' preferred habitat a spatial analysis was performed, and a target was set using the results of this analysis as well.

The analysis in the SFMM model over estimates the amount of preferred red-shouldered hawk habitat on the landbase at plan start, due to its lack of spatial insight. Habitat close to roads, buildings, water bodies, and grassland/meadows is not preferred. The natural benchmark shows a spiked increase in the first term, and then maintenance of this level through time, with slight decreases. This is largely attributed to the current ageclass distribution of the hardwood uniform shelterwood containing significant amounts of mature condition coming online in the first term of the planning horizon.

Figure 3.10.21 Target, achievement, and proportion of the natural benchmark by term for the red shouldered hawk habitat in the 2009 management strategy

Term	Target	Achievement	% of Natural
T2	40,144	40,214	74%
T3	40,795	40,870	72%
T4	39,601	39,631	70%
T5	37,174	37,213	65%
T6	36,812	36,812	65%
T7	36,872	36,934	65%
T8	36,904	36,928	65%
T9	35,949	35,995	63%
T10	35,571	35,603	62%
T11	35,104	35,120	61%
T12	35,000	35,000	61%
T13	35,000	35,000	61%
T14	35,000	35,000	60%
T15	35,000	35,000	60%

This was a trade-off made to satisfy social and economic indicators, as the hawk's habitat was in direct competition in the non-spatial model with harvest of the hardwood shelterwood forest unit. The caveat to this trade-off was agreement to assess the preferred hawk habitat in a spatial model – looking at the impact of harvest allocations on the preferred habitat level through the course of the plan (2009-2019). It was agreed that this analysis would provide far better indications of the species preferred habitat, due to its high spatial dependencies. Measures of this evaluation can be located in Management Objective #14.

Management Objective #14: Create and maintain a landscape that ensures the long term sustainability of preferred red-shouldered hawk habitat on the Nipissing Forest as modeled in OWHAM

Indicator(s): Area of preferred habitat as indicated in the Spatial (OWHAM) assessment of red-shouldered hawk habitat on Crown land over the next 10-years.

Desired Level(s): Spatial (OWHAM) assessment of red-shouldered hawk habitat will indicate no net loss of RSH preferred habitat on the landscape from 2009 Plan Start levels (>= 36,471 ha).

Target(s): Spatial (OWHAM) assessment of red-shouldered hawk habitat will not decline more than 5% of the 2009 Plan Start level (> 34,647ha by plan end (T2)).

Assessment:
Once the selected allocation harvests areas were determined, analysis using OWHAM was completed considering the landscape pattern resulting from harvesting the ten-year allocation. At the landscape scale, areas predicted by OWHAM modeling as preferred and useable red shouldered hawk habitat are examined to ensure that the supply of habitat is not disrupted in a spatial sense.

The test of sustainability projected a 2.59% decrease (or 35,527 hectares) in preferred red-shouldered hawk habitat by plan end (T2). This result meets the planning target which was intended to take the desired level and realities of forest management into consideration. This desired level is designed to illustrate the team's desire to see the entire current habitat on the forest maintained and where possible, increased. It does not however, take into consideration that the species is relatively rare on the Forest, and that all of this habitat may not necessarily be used. Due to the fact that forest management results in short term disturbance fluctuations on the landscape, it can only be assumed that some impact to the habitat levels are a possibility in the strategy. The planning team has attempted to keep these impacts to a minimum.

The resulting habitat arrangement has been mapped and located in section 6.1.2.4 of the Plan.

Management Objective #16: Create and maintain suitable white-tailed deer summer habitat on the landscape to ensure the long term sustainability of this condition on the Nipissing Forest

Indicator(s): Percent of Crown and private land base made up of forest openings, clearings, fields and early-successional forest.

Desired Level(s): Maintain 10 % (94,743 ha) of the crown and private land base as deer summer range.

Target(s): Greater than or equal to 7% (66,497 hectares) by plan end (2019).

Assessment:
The target for this objective was achieved by end of plan term. The indicator is a percentage of Crown and private productive land base made up of forest openings, clearings, fields and early-successional forest (the later being for Crown land only as there is no estimate of early-successional forest on private land). Table FMP-1, section 9.0, was used for this analysis. When calculating area in open fields, the following land

classes were used; agriculture, fields, meadows and recent disturbances. When calculating area in permanent openings the following land classes were used; agriculture, fields and meadows. The wildlife section of the analysis package, section 6.1.6, illustrates in more detail the procedures used to assess this objective.

Management Objective #17: Create and maintain a landscape that ensures the long term sustainability of pileated woodpecker feeding, nesting and roosting habitat on the Nipissing Forest as modeled in OWHAM

Indicator(s): Area of preferred habitat as indicated in the spatial (OWHAM) assessment of pileated woodpecker habitat on Crown land over the next 10 years.

Desired Level(s): the spatial (OWHAM) assessment of preferred pileated woodpecker habitat (ha) will not decline more than 12% of the 2009 Plan Start level (>246752 ha by plan end (T2)).

Target(s): same as desired level

Assessment:

The OWHAM model for pileated woodpecker estimates the amount of used and preferred habitat that occurs in territory-sized blocks. A plan start (forest condition in 2009) estimate was compared to plan end (forest condition in 2019).

The desired and targeted levels for pileated woodpecker preferred habitat were met by the end of the planning period. The preliminary test of sustainability revealed a 5.92% decrease of preferred habitat, and within the acceptable level indicated by the desired and target levels. The resulting habitat arrangement has been mapped and located in section 6.1.2.4 of the Plan.

Management Objective #18: Create and maintain a landscape that ensures the long term sustainability of suitable moose summer and winter habitat on the Nipissing Forest as projected in OWHAM.

Indicator(s): Spatial (OWHAM) habitat projections on crown and private land over the next 10 years as measured by moose carrying capacity.

Desired Level(s): Desired moose carrying capacity (as assessed by OWHAM) will be greater than or equal to 0.6 moose/km² as required to meet target population range of 0.2 to 0.4 moose/km².

Target(s): Greater than or equal to the current level of 0.45 moose/km^2

Assessment:
The tests of sustainability for the selected operations indicate that the allocation is creating and maintaining a landscape that ensures the long term sustainability of suitable

moose summer and winter habitat on the Nipissing Forest as projected in OWHAM. Current results indicate a 4.4 % increase in overall carrying capacity on the forest which is moving us towards desirable level of a carrying capacity estimate of 0.6 moose/km². The resulting habitat arrangement has been mapped and located in section 6.1.2.4 of the Plan.

In order to meet our established moose population targets, maintenance of the average carrying capacity must be above, roughly, 0.6 to 0.65 moose per km². Despite the fact that the average carrying capacity for each of the seasons currently meets or exceeds 0.6 moose per km², the total carrying capacity is only 0.47 moose per km². This is because the different habitats are not properly distributed on the landscape. In this light, the planned further 2% reduction in total moose carrying capacity and the 5% reduction in dormant season carrying capacity are potentially problematic.

In general, the supply of dormant season habitat is the single largest determinant of moose carrying capacity on the Nipissing Forest. In fact, about 60% of the landbase is limited by the lack of winter habitat. The component of winter habitat that appears to drive the decline is the availability of moose late winter habitat (MLW).

While the Plan continuous to strategically consider the current moose carrying capacity on the Forest, efforts are being made to increase this capacity from the achieved 0.47 moose/km² to the desired 0.6 moose/km² through the provision of moose cover via operation block layout.

The protection of moose thermal cover areas will be strengthened through operational components of the plan. Historically, operations were not permitted to reduce the amount of known MLW below 5% (by area) of the operating block. This amount was increased to 8% in the 2004 plan in areas having average or above average moose carrying capacity and to 12% in areas having below average moose carrying capacity.

The district biologist has recommended that for the 2009 plan these figures should be increased to 10% in areas of average or high carrying capacity, and 15% in areas of low carrying capacity. Enhance OWHAM analysis has been performed on the landbase and the estimated moose thermal cover (MTC) candidates have been identified across the landscape. The leave of 10 or 15% will be triggered by the overlap of the operating block with the MTC value. The residual area to be left can be the identified MTC values or any other areas that meet the criteria for MTC as described in FMP 14. The target percentages to be left may not be achieved on a block basis if the desired forest condition for MTC is not available in the block.

Additional operational planning has been completed within clearcuts greater than 260 to overlap insular and peninsular residual areas with the MTC values within the blocks.

As recommended in the 2004 plan, the planning team made extra effort to have the updated moose analysis completed before the selected operations were completed. This allowed for the spatial consideration of potential moose habitat while operational planning took place.

In addition to the mitigation provided by the two-pronged approach, it is possible that the modeling has tended, in general, to slightly overestimate the effect of harvest on the habitat arrangement, as the resolution of the depletion may not adequately represent the true detailed residual structure of a harvested block, due to mapping constraints and detail of the planning inventory. A careful look at the areas in question suggests that substantial portions of some stands will not be harvested, mainly due to constraints such as poor access. It's estimated that these constraints will result in about 10 to 15% of the stands depleted by the model to not, in fact, be harvested.

In summary, the planning team is confident that the approach reflected in this section will enable operations with only a minimal impact on moose carrying capacity. The resulting habitat arrangement has been mapped and located in section 6.1.2.4 of the Plan.

Management Objective #20: Measure carbon emissions changes in the forest influenced by harvest operations.

Indicator(s): Carbon Budget Measurement (OFRI FORCARB-ON Analysis)

Desired Level(s): Natural Levels

Target(s): Natural Levels

Assessment:
Figure 3.10.22 shows total carbon (in millions of tonnes of carbon) for available and reserved forest plus carbon in the wood products harvested from the Nipissing Forest during the plan period (2009-2109). Carbon in wood products is the sum of carbon in products still in use and carbon in products in landfill (fraction of carbon that has not decomposed by a given year). It illustrates the **complete effects** of harvest on forest carbon because it accounts for carbon not just in the standing forest, but also for carbon removed from the forest and retained in wood products; in other words, not emitted to the atmosphere.

Figure 3.10.22 Carbon budget measurements for the Nipissing Forest

	short term (10 yrs)	medium term (20yrs)	long term (100yrs)
desired level	109 million tonnes	110 million tonnes	111 million tonnes
target level	109 million tonnes	110 million tonnes	111 million tonnes
achieved level	109 million tonnes	111 million tonnes	118 million tonnes

It is clear from the results that between the harvest, growth, and regeneration of new areas, forest management likely results in a net increase of carbon sequestering. Also influencing the difference is the modeled forest fire suppression on the management unit in the management strategy model inputs, versus higher more frequent burning rates in the natural benchmark which assumes no fire suppression.

Management Objective #28: Provide a sustainable, continuous and predictable wood supply from the forest that will meet, as closely as possible and for as long as possible, the current recognized industrial demand of the forest.

Indicator(s):

a. Available Long-term projected volume, by species group (m3/yr).
b. Available Long-term projected total harvest area.
c. Available Long-term projected harvest area, by forest unit.
d. Forecasted harvest area, by forest unit.
e. Forecasted volume, by species group.
f. Planned Harvest Area for 1st 5-year Phase, by forest unit.
g. Planned Harvest Volume for 1st 5-year Phase, by species group.

Desired Level(s): See Assessment

Target(s): See Assessment

Assessment:
The available long-term volume, by species group, was projected as part of the modeling requirements in SFMM. Results of the wood supply modeling are illustrated in Figures 3.10.23 and 3.10.24, in thousands of cubic metres by species grouping, and expressed as achievement of the desired levels. Desired levels co-responding to the current industrial demand from the Nipissing Forest were developed by the utilization task team. Consideration was given to MNR's Northeast Regional Director's letter outlining legal commitments to facilities, as well as open market demand from the Forest. Targets of 70% of the current industrial demand for objective achievement were set to be consistent with the targets for ecological objectives of the Plan.

Targets were achieved in 84 of the possible 105 indicators measuring projected volume through time. SFMM predicts an immediate shortage of white birch material and a shortage of both white birch and hard maple into the future. Other hardwoods will have to subsidize this shortage into the future, as supply is expected to be greater than or equal to demand in this species group. SFMM also shows a shortage of SPF and poplar in the medium term, with a return to the average levels expected in the long term.

A trend impacting the medium-term supply of timber, assuming data and modeling inputs do not change significantly in future plans, is the ageclass gap in the current forest condition. Age class imbalance and other Plan objective targets in the model place pressure on operable timber from 2039 to 2069 in the current projection.

Other plan objectives also create an increase in the red and white pine volume available in the future, namely restoration and forest cover desires to increase the white and red pine based forest units.

Figure 3.10.23 Available long-term projected volume, by species group

Term	Species Groupings (Volume in 000's m3)							
	SPF	PO	BW	CE	MH	UHLH	PWR	AllProd
T1	174	145	93	4	78	92	145	744
T2	148	134	78	4	81	80	140	676
T3	126	120	63	4	69	71	179	643
T4	125	120	75	4	60	70	172	635
T5	125	110	65	3	59	67	152	593
T6	135	111	67	3	57	67	155	605
T7	144	120	58	2	62	67	189	651
T8	145	120	52	2	66	67	180	641
T9	145	120	52	3	63	67	193	652
T10	145	110	42	3	57	67	221	655
T11	145	120	43	4	62	67	241	691

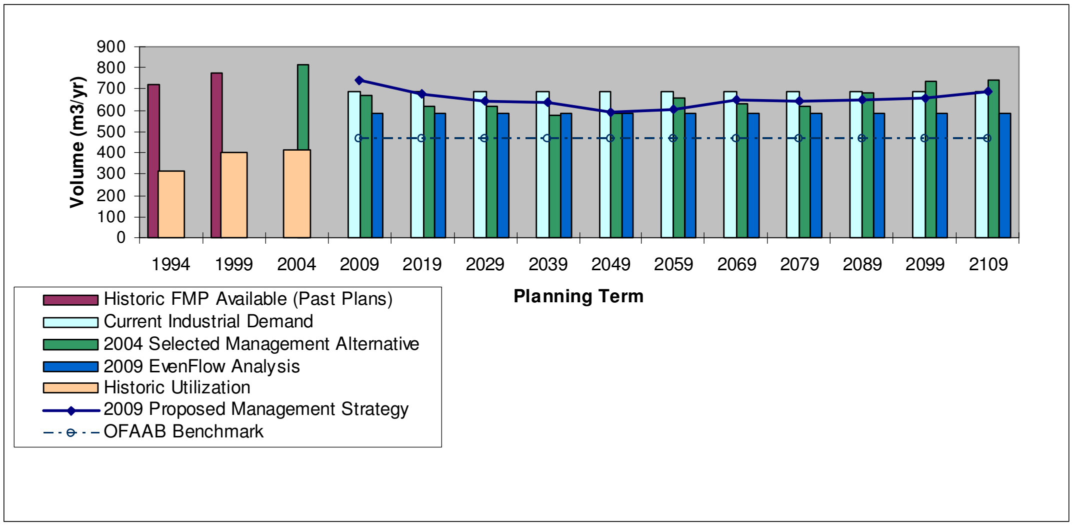
Figure 3.10.24 Achievement of Current Industrial Demand (CID) by Species Groupings

Term	Species Groupings (% of the CID)							
	SPF	PO	BW	CE	MH	UHLH	PWR	AllProd
T1	103%	108%	83%	124%	86%	131%	127%	107%
T2	88%	100%	69%	124%	90%	115%	123%	98%
T3	75%	89%	56%	129%	77%	102%	157%	93%
T4	74%	89%	67%	122%	66%	100%	151%	92%
T5	74%	82%	57%	109%	66%	95%	134%	86%
T6	80%	82%	59%	90%	64%	95%	136%	87%
T7	85%	89%	51%	81%	69%	95%	165%	94%
T8	86%	89%	46%	79%	73%	95%	158%	92%
T9	86%	89%	46%	85%	71%	95%	169%	94%
T10	86%	82%	37%	103%	63%	95%	194%	94%
T11	86%	89%	38%	127%	69%	95%	212%	100%
T12	86%	89%	38%	132%	70%	95%	206%	99%
T13	86%	89%	37%	117%	73%	95%	192%	97%
T14	86%	89%	36%	108%	74%	98%	173%	94%
T15	86%	101%	45%	96%	69%	95%	199%	101%

To ensure term to term reductions were kept to a minimum, a 15% harvest flow policy was placed on the SPF, PO, MH and UHLH species groups. This ensures that wood supply does not decline more than 15% relative to the wood available in the previous term and results in a more balanced flow of wood, in species groupings where the planning team believes wood could be balanced to mitigate the decline in wood supply related to the ageclass gap.

As previously seen, Figure 3.7.2 (shown again below) graphs total volume achieved in the management strategy, against historically predicted wood supply figures, as well as the desired and historic levels. In addition to this data, the benchmark for harvest levels in all species groupings from the Ontario Forest Accord Advisory Board. One trade-off made by the planning team involved today's available harvest area versus wood availability in the future. Total volumes approach the even flow figures in 2049. This decision was made by the planning team to mitigate the short term impact of a declining available harvest area. However, it was balanced by the target to never see available harvest area decline more than 10% per term, in order to flatten the harvest area projections.

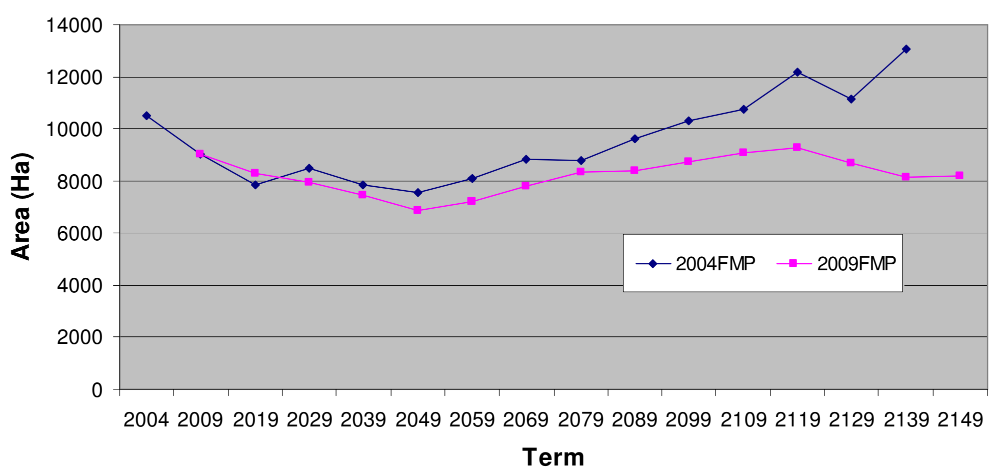
Figure 3.7.2. Wood Supply for the Nipissing Forest: All Species Groups (Total Volume)



Projected Long-Term Available Harvest Area

Although no modeling constraint was set, the planning team had a target for the total available harvest area not to decline more than 10% based on the previous term's total. This target was met – and intended to ensure projections through 2029 to 2069 would remain as stable as possible, mitigating the social and economic impacts as a result of ageclass gaps, and ecological constraints. Figure 3.7.1 (shown again below) compares the strategy in the 2009 Plan to the approved 2004 plan for the Nipissing Forest.

Figure 3.7.1. Projection of Harvest Area through Planning Horizon



Projected Long-Term Available Harvest Area, by forest unit

To ensure that the amount of area harvested by forest unit is relatively similar from one term to another, a modeling constraint was set for stability of harvest area by term. Targets area illustrated in Figure 3.10. 24. This objective was met, as illustrated in Figure 3.10.25, in the projection of available harvest area, through time.

Figure 3.10.25 Available Harvest Area Stability through Time

Forest Unit	+/- Fluctuation (%)
BW	50%
BY	50%
HDSEL	n/a
HDUS	50%
HE	10%
LWMX	50%
MCL	10%
MW	50%
PJ	30%
PJSB	50%
PO	50%
PR	35%
PWST	30%
PWUS	25%
SF	50%

Figure 3.10.26 Projection of Available Harvest Area

	Forest Unit (Ha)															
Term	PWST	PR1	PJ1	PO1	BW1	MCL	PJSB	MW	SF	PWUS	HE1	LWMX	HDUS	BY	HDSEL	Total
2009	372	29	81	424	836	143	232	747	994	1240	260	183	1452	197	1844	9036
2019	260	39	106	488	783	129	226	592	598	1414	234	275	1230	99	1832	8303
2029	182	53	74	512	567	116	204	653	299	1767	224	405	939	109	1820	7923
2039	164	71	80	368	850	104	207	568	150	1623	202	428	713	124	1808	7460
2049	143	96	104	343	538	94	143	852	219	1218	182	307	609	178	1808	6833
2059	186	130	135	312	609	84	157	806	328	1265	163	153	804	267	1808	7208
2069	196	175	175	457	576	76	169	474	493	1582	147	124	1050	270	1808	7772
2079	137	114	123	485	508	68	193	456	739	1977	132	185	1074	353	1808	8351
2089	96	74	86	337	761	66	97	261	837	2471	140	278	662	384	1808	8358
2099	67	59	64	506	401	73	109	392	763	2898	126	417	487	576	1808	8744
2109	47	79	78	466	601	80	163	285	663	2903	113	626	660	480	1808	9053
2119	35	95	91	521	493	88	245	427	497	2762	102	853	800	444	1808	9258
2129	45	128	118	501	483	97	210	523	507	2071	92	708	1012	374	1808	8678
2139	52	173	128	633	424	103	181	568	550	1553	83	354	1002	532	1808	8143
2149	37	224	90	543	634	94	183	546	799	1763	74	197	738	466	1808	8194

Forecasted harvest area, by forest unit

Upon agreement of the SFMM recipe by the planning team, the forecasted area was developed based on a set of selected harvest allocations. Targets were selected by the planning team to forecast at least 90% of the available harvest area for the first term of the planning horizon. Results of the preferred allocation illustrate the target has been met in all forest units, with the exception of red pine. This is the smallest forest unit on the management unit, and for this reason does not always occur in spatial arrangements that are feasible to allocate, depending on the planning of the allocation in other forest units. The primary harvest in this forest unit is in commercial thinning operations of plantation areas 60 years old or less. This accounts for 780 hectares and has been allocated to the full available levels. Of the natural portion for the forest unit, 184 or a possible 289 hectares was allocated. This forest unit is held in high regard by the public, and for this reason the planning team feels this under allocation was acceptable to assist in meeting other objectives on the forest.

Figure 3.10.27 shows by forest unit achievement of the target for this indicator.

Figure 3.10.26 Forecast Harvest Area compared to Available Harvest Area.

Forest Unit	10 Year Harvest Area Forecast	Available Harvest Area	Percentage of Available
BW	8,362	8,362	100%
BY	1,971	1,972	100%
HDSEL	18,441	18,442	100%
HDUS	14,520	14,520	100%
HE	2,603	2,604	100%
LWMX	1,830	1,831	100%
MCL	1,428	1,429	100%
MW	7,473	7,474	100%
PJ	813	814	100%
PJSB	2,324	2,324	100%
PO	4,244	4,244	100%
PR	964	1,069	90%
PWST	3,715	3,716	100%
PWUS	12,400	12,401	100%
SF	9,939	9,940	100%

Forecasted volume, by species group

Once the stands were selected for harvest based on the available harvest area limits, the stand volume for each individual stand was calculated and the sum for each species grouping compared to the projected available volumes. The target set by the planning team allows for a 10% fluctuation related to the expected variation between the average condition of each forest unit as modelled in SFMM, and the actual stand conditions. Figure 3.10.28 illustrates the results of the achieved volumes compared to the target set by the team.

Figure 3.10.27 Forecast harvest volume (m^3/yr) compared to available harvest volume.

Species Grouping	Forecasted Volume Range -10%	+10%	Achievement (m3/yr)
SPF	156,711	191,536	186,865
PO	130,500	159,500	128,378
BW	84,017	102,687	101,661
CE	3,346	4,089	4,230
MH	69,889	85,420	78,401
HE	11,980	14,642	14,107
UHLH	82,433	100,752	95,331
PWR	130,738	159,791	131,496
TOTAL	669,614	818,418	736,753

Two species groupings miss the lower end of the target range for the forecasted volume indicators, poplar and white and red pine. The cedar species grouping misses the 10% by 140 cubic metres per year, and can be considered insignificantly different than the target. The poplar figure is just over 2000 cubic metres a year, or 88% of the projected available harvest volume in the management strategy. There are several reasons for this. General variation of the forecasted stand level volumes with the projected available volumes is discussed in section 4.3 of the plan.

The primary reason for the variation in poplar volumes is the difference in age classes allocated versus the available harvest area recipe in the management strategy. Some stands in the 71-80 ageclass were allocated in the areas selected for operations instead of 81-100 ageclass. This has resulted in some stand level differences from the expected volume that would be realized if no ageclass substitution had occurred.

Ageclass substitution does occur in the forest management plan to some degree, and the implications of doing so are discussed in section 4.0 of the Plan.

Planned Harvest Area for 1st 5-year Phase, by forest unit.

The final area based indicator assessed as a determination of sustainability is the balance of planned harvest area for the first 5-year term, by forest unit. Selected and optional harvest areas are identified in section 6.1.2.6. The available harvest area has not been exceeded in any forest units. The area results for Phase 1 planned operations expressed as a percentage of exactly one half of the allocation can be found in Table 3.10.29.

Figure 3.10.28 Planned harvest area for Phase 1

Forest Unit	Hectares	% of 10 Year
BW	4,202	50%
BY	1,063	54%
HDSEL	8,854	48%
HDUS	6,325	44%
HE	1,012	39%
LWMX	891	49%
MCL	828	58%
MW	3,677	49%
PJ	352	43%
PJSB	954	41%
PO	1,992	47%
PR	499	47%
PWST	1,971	53%
PWUS	6,116	49%
SF	4,872	49%
	43,608	48%

The desire is to have 50% of the available harvest area in each of the phases of the 10-year operating plan. However, due to the proximity of certain stands to one another, as well as the location and/or size of the forest unit, this is not always spatially practical. The number of silviculture systems, forest units and stages of management force the planning team to consider the complexity of an operating plan on the Forest. For this reason, the target was set to achieve within +/-15% by forest unit of the available harvest area by term. The target was met in all cases.

Planned Harvest Volume for 1st 5-year Phase, by species group.

The final volume based indicator assessed as a determination of sustainability is the balance of planned harvest area for the first 5-year term, by forest unit. The area results for Phase 1 planned operations expressed as percentages of plus/minus 10% volume can be found in Figure 3.10.30. All levels are within target range for this indicator.

Figure 3.10.29 Planned harvest volume (m^3/yr), per year for Phase 1

Species Grouping	Planned Volume Range 40%	Planned Volume Range 60%	Achievement (m^3/yr) Phase 1
SPF	74,746	112,119	93,121
PO	51,351	77,027	61,014
BW	40,664	60,996	48,230
CE	1,692	2,538	2,384
MH	31,360	47,041	36,912
HE	5,643	8,464	6,250
UHLH	38,132	57,199	44,352
PWR	52,598	78,898	65,940
TOTAL	294,701	442,052	356,102

Management Objective #40: Encourage support of the Local Citizens Committee in the development of the FMP for the Nipissing Forest.

Indicator(s):

a. Support for Objectives and Assessment of Objective Achievement;
b. Local Citizens committee's self-evaluation of its effectiveness in plan development;
c. Support for the Final Plan;

Desired Level(s):

a. Supported
b. 70% or greater
c. Supported

Target(s): Same as Desired Level for all

Assessment:
The LCC has provided support thus far to the management direction contained within the management strategy for the 2009 Nipissing Forest Management Plan. A presentation of the Draft Forest Management Plan was made to the LCC on July 15, 2008 and the LCC provided a statement of agreement supporting the Plan, as well as an average self-evaluation score of 71.5%. A presentation of the final forest management plan was made on December 16, 2008 to the LCC, and a statement of agreement with the forest management plan can be found within the contributors section of this forest management plan.

Conclusion
Most of the indicators that could be assessed during the development of the draft plan achieved the desired levels and/or the targets.

There were many conflicting objectives in the strategy, including short- and medium-term wood supply and ecological targets like forest composition structure as well as preferred wildlife habitat. In addition to these conflicts, the current forest condition also played a role in constraining the wood supply projection through time; a fact that has been foreseen in many of the previous FMPs. Nevertheless, not all of the objectives were achieved at levels as high as the planning team may have desired, and concerns were heard and addressed to the best of the company's ability in the management strategy.

Taking into consideration all of the trade-offs, the planning team is satisfied that a balance has been reached in the development of the management strategy; one of the key requirement of the long-term sustainability of the Nipissing Forest.

3.11 Social and Economic Assessment

3.11.1 Introduction

A social and economic assessment is a required component of the analysis of the 2009 Nipissing forest proposed management strategy (*Forest Management Planning Manual for Ontario's Crown Forests - 2004*). The assessment is used to identify potential changes in key areas, primarily volume and forest operations expenditures, which will have social and economic impacts by implementing the management strategy proposed in the Forest Management Plan (FMP). Furthermore, the assessment will examine how these changes may affect the communities identified in the Social & Economic Description (Section 2.5).

This assessment will examine the impacts of the proposed management strategy in three areas;

1) <u>Timber Volume</u>
   A comparison of the average annual planned harvest volume between the 2004 FMP and the Proposed Long-Term Management Strategy developed for the 2009 FMP,
2) <u>Silvicultural Expenditures</u>
   A comparison of the average annual renewal program expenditures between the 2004 FMP and the Proposed Long-Term Management Strategy developed for the 2009 FMP,
3) <u>Non-timber Assessment</u>
   A qualitative assessment of the impacts that the proposed forest management strategy and the planning process may have on non-timber activities across the forest

3.11.2 Background

The Nipissing Forest is managed by Nipissing Forest Resource Management Inc. (NFRM) under a Sustainable Forest License (SFL). The Nipissing Forest contributes volumes of wood to several mills in the area. For a detailed background and description of the mills, wood supply commitments and licensees that have direct ties to the Nipissing Forest please refer to the Social & Economic Description document.

There were two options available to the FMP planning team when considering this assessment; quantitative or qualitative. If a planning team determines that a quantitative analysis is required then the provincially approved Socio-economic Impact Model (SEIM) is typically applied. If they decide to use the qualitative analysis it is based upon information contained within the social and economic description and any other supplemental information collected independent of the description.

The Nipissing planning team considered both strategies and decided upon using the qualitative analysis. One of the chief reasons for choosing this strategy was due to the impact of the Quebec mills utilization. The Quebec facilities consume 28% of the volume from the Nipissing forest. The Tembec Temiscaming facility represents the single largest user of roundwood from the Nipissing forest. SEIM would not take into account the Quebec impact on this FMP. The planning team felt that the assessment would be underestimating the economic impacts if the Quebec data was omitted.

Furthermore the impact of the Quebec mills, particularly the Temiscaming complex, is not strictly limited to the woodlands operations in Ontario, although these operations are significant. There are a number of employees of Tembec that live in Ontario and commute daily to Quebec. The viability of the Temiscaming mill and thus continued employment of those staff will continue to provide economic benefits to the Ontario communities they reside in (i.e. Thorne, Eldee, Rutherglen, Mattawa, and North Bay).

The primary data sources for this assessment are from Statistics Canada 2001 Census data and M.N.R. provincial harvest data (TREES) from April 1st 2001 through March 31st 2006. Information specific to Tembec's operations in Quebec (i.e. employee numbers) was provided by LCC member and Tembec employee John McNutt.

3.11.3 Assessment

3.11.3.1 Timber Supply

An analysis of wood flow (volume) from the Nipissing forest for the five year period from April 1st 2001 to March 31st 2006 illustrates that; two companies (consisting of 3 facilities) utilize approximately half of the harvested volume, eighty five percent of the harvested volume goes to ten facilities, the five year total volume flowed to over forty different facilities in Ontario and Quebec, and the Quebec facilities consume 28% of the harvest volume. These observations clearly illustrate that the forest industry reliant on wood flow from the Nipissing Forest is complex and diverse.

The Social & Economic Assessment of timber volumes is based on a comparison of the planned harvest levels for the 2004 FMP and the Proposed Management Strategy for the 2009 FMP. This analysis also investigates the resultant employment and income levels. These results were generated by combining the volume flow data with census data on community average income (of forestry workers), number of mill/woodlands employees, and mill utilization. The timber supply impact summary results are illustrated in Figure 3.11.3.1.

Figure 3.11.3.1 Timber Volume Impact Summary

	2004 Nipissing FMP	2009 Nipissing FMP Proposed Mgmt Strategy	Difference	
Total planned harvest volume (m3)	816,339	744,016	-72,323	-8.86%
Average employment per 1,000 cubic meters harvested (based on ratios of the major mills receiving wood from the Nipissing)	1.25	1.25	1.25	
Total estimated annual employment per 1,000 m3 harvested (# jobs)	1,017	927	-90.10	-8.86%
Estimated forest industry average annual income (based on all dependent communities receiving timber from the Nipissing Forest (Source: Statistics Canada, Demographic Profile)	$33,209	$33,209	$33,209	
Total estimated employment income generated from timber harvest	$33,774,123	$30,781,927	-$2,992,196	-8.86%

The overall volume declines from the 2004 FMP to the proposed 2009 FMP. In 2004 the total strategic, or modeled, volume of all species groups was 816,339 cubic meters annually. The proposed management strategy (PMS) for the 2009 FMP shows a total strategic volume of all species groups at 744,016 cubic meters annually. This is a reduction in volume of approximately 9%.

Although there is a 9% reduction in the planned volume, harvesting levels on the Nipissing forest have traditionally been lower than planned levels. The 2006 Independent Forest Audit of the 2004 FMP identified the historical shortfall between planned and achieved harvest levels. As a result the implementation of the proposed FMP should not show a significant decrease in the short term employment levels and employment income. The potential exists to provide additional volume in un-utilized areas to make up for the shortfall.

Over a longer horizon the general trend, for most of the forest units, is a volume decline until the sixth or seventh term where the forest begins to rebound. The implication of this long term trend suggests that employment indicators may be adversely affected. This negative trend may also impact new forest industry development. If the traditional users ramp up harvesting levels along with the trend in volume reduction this will result in less surplus volume for potential new forestry ventures.

Figure 3.11.3.2 provides a breakdown, by species group, of the total planned harvest volume as described in Table 3.11.3.1. This table illustrates that negative volume impacts occur within the SPF (spruce, pine, fir) and PO (poplar) groups and positive volume impacts occur within the PW/PR (white/red pine) and UHLH (hardwoods) groups. Mills that utilize these various groups will need to consider the volume impacts accordingly.

Figure 3.11.3.2 **Average Annual Management Unit Contribution by Species Group**

	Annual Volume (000 m3)							
	SPF	Po	Bw	Pw/Pr	MH	UHLH	Other	Total
2009-2019 Nipissing FMP	174	145	93	145	78	92	17	744
2004-2009 Nipissing FMP	247	194	91	119	71	74	21	816
Difference	-72	-49	3	26	7	18	-4	-72

3.11.3.2 Silviculture

The average annual silviculture expenditures for the 2004 FMP were $3,314,000. The 2009 FMP Proposed Management Strategy forecasts average annual silvicultural expenditures of $3,321,000. This represents a slight increase of $7000 or 0.2%. Due to the negligible change in forecasted silvicultural expenditures it is likely that employment levels associated with these operations will be maintained.

Although the expenditures are not significantly changing there is a focus by the NFRM to develop a silviculture protocol that will better define where monies will be directed for the most effective results. Historical data about silviculture operations is being compiled and field surveys are planned and ongoing to help measure the outcomes of those operations. The data will be compiled and analyzed for use in creating the protocol. As well, MNR continues to further develop a silviculture effectiveness monitoring (SEM) program. Future field surveys by NFRM along with the advancement of the provincial SEM program will help refine the protocol in the future.

3.11.3.3 Non-Timber Assessment

Contained within the Social and Economic Description (Section 2.5) are detailed sections describing the non-timber economic components of the Nipissing Forest. As it is often described, in previous and current forest management plans, one of the main impacts of forest operations on non-timber activities is the roads and access issue. Depending on the economic activity, access may be encouraged (hunting and fishing or mining) or discouraged (remote tourism). Decisions concerning new road development and access are considered on a case by case basis, comply with the Crown Land Use Policy, and utilize current strategic and operational planning tools (AOC timing restrictions, road abandonment, etc.).

An example of potential conflicting impacts is illustrated by a new primary road being considered on the Nipissing forest. The options selected by the planning team will have positive outcomes economically. Socially, the community has identified safety concerns to the planning team. The planning team has responded with several solutions to mitigate these concerns. The impact of this decision will only be determined once the road is built and hauling occurs. Ultimately the decision has been made considering input from the planning team, the local citizens committee, and the public in general.

4.0 Planned Operations

4.1 Introduction

Section 4.0 describes the planned operations for the first five-year term. The text in the following sections details the prescriptions for operations, harvest operations, renewal and tending operations, roads planning, revenues and expenditures related to operations, monitoring and assessment of operations, and finally compares the proposed operations to the LTMD. Maps of the areas selected for operations are located in section 6.1.2.7 and the areas are summarized in FMP-15 located in section 9.0.

The FMP tables have been completed for both five-year operational planning phases. The Phase II information is based on preferred harvest areas. Further consultation in Phase II planning is required to commence in year three of the implementation of the Plan and could result in changes to the Phase II portions of these tables.

In order to facilitate the placement of operational roads and areas for aggregate extraction, harvest areas within one kilometre of each other were pooled to form the area of operations (AOBs). Further refinements of AOBs were completed based on specific access strategies and/or aggregate source locations.

Once the proposed management strategy was finalized, and had considered the balance of numerous management objectives, the detailed block planning for the ten-year period from April 1, 2009 to March 31, 2019 was completed with all the AOC planning requirements. The first five years were selected based on the following criteria:

a) Maturity of forest stands (ageclass)
b) Operability and accessibility
c) Areas of Concern
d) Wildlife considerations
e) Stage of management (shelterwood & selection harvest prescriptions)
f) Traditional operating areas
g) Indicators of sustainability related to wood supply objectives

More detailed and specific criteria are documented in Section 3.9.

These criteria were used to balance the allocations between the two five-year terms. Overall, the more prevalent factors in the selection criteria were related to NDPEG requirements and access strategies. These areas have been selected for harvest within this ten-year period.

4.2 Prescriptions for Operations

Prescriptions for operations are prepared according to silvicultural ground rules. Where forest values may be adversely affected by forestry operations, prescriptions are prepared according to AOC planning requirements. Specific areas identified as areas of concern often contain operational prescriptions that may vary from those identified for normal operations. AOC planning is done on all areas of operations; area contained within an operating boundary and aggregate extraction zones.

4.2.1 Operational Prescriptions for Areas of Concern

Non-timber values (herein referred to as a “values”) to be protected in the Nipissing Forest are identified and shown on a series of values maps in section 6.1.2. These maps are based on data stored and maintained by the MNR in the Natural Resource Values Information System (NRVIS). Values data are updated periodically throughout the year to include newly discovered values and to correct any existing inaccurate information. Values that are within areas of forestry activities for the period of 2009 to 2014 form the basis of specific AOCs.

The AOCs and associated prescriptions are summarized in Table FMP-14 and are mapped on 1:15,840 scale harvest operations maps in section 6.1.2. When sites contain several values in close proximity and mapped AOCs overlap (e.g., a moose aquatic feeding area, other feature and a fisheries value) the most restrictive AOC prescription is mapped and applied. Timing restrictions and conditions on operational roads are mapped.

The planning team, with input from the LCC, developed AOC prescriptions using direction from the Crown Land Use Policy Atlas (CLUPA), approved implementation manuals (listed in section 2.1.1), on-site information, consultation with First Nations, resource-based tourism operators and public consultation.

More detailed information regarding management options, analysis of options, and the selection of the preferred option for each AOC is located in the AOC supplementary documentation (section 6.1.13). It also shows how public comments were considered in the selection of the preferred option. Public comments are kept on file at the North Bay District office.

The following points apply to information contained in Table FMP-14. Several modifications to the format of the Table FMP-14 described in the 2004 FMPM have been made to improve organization of the AOCs and to provide additional information to assist in their implementation. The following list describes these changes and other particulars in the table.

- An “AOC Type” category has been added to the table so that similar AOCs can be grouped and sorted;
- An AOC Map ID box has been added to indicate the AOC acronym that is displayed on the operational maps;

- A Table of Contents has been developed to facilitate locating the AOCs;
- An "Additional Information" section has also been added to allow for the inclusion of detailed information that forestry staff require to implement the AOCs;
- A section titled "To be included in Table FMP-23" has been added to allow someone who is viewing the AOC to see the range of restrictions and considerations that are relevant to the AOC but also found in FMP-23;

The following provides descriptions and definitions for terms used in the AOCs
- Sh/sel/c.thin = shelterwood/selection/commercial thinning;
- Shrubby Vegetation - measured, in the field at the shoreline where the edge of the vegetation with >= 25% canopy cover of trees and woody shrubs such as alder, willow, dogwood, dwarf birch, Labrador tea, leatherleaf, bog laurel or bog rosemary (with the exception of vegetation communities where sweet gale is present);
- Treed edge – defined as trees that are equal to or greater than 8 cm in diameter at DBH. Note: AOCs measured from treed edge will be shown on maps as measured from waters edge. When the prescription is applied in the field, it will be applied to the treed edge as defined. The map serves as a pictorial description (sketch).

All previously unknown values identified during operations under this FMP, as encountered in the field, will receive protection as identified in Table FMP-14, even if they have yet to be included in the NRVIS database. A stand listing for forest stands selected for harvest, which includes the modified and reserve prescriptions, by AOC type, is located in section 6.1.14. For stands with overlapping AOCs, the stand is listed with the most restrictive AOC.

The following sections provide a discussion of the various types of prescriptions identified in Table FMP-14 including the needs of each feature, rationale for protection and potential effects of timber management operations on the value. It should be noted that these sections provide information relative to the needs of common values, however, the information in Table FMP-14 and section 6.1.13 is specific to each AOC.

It should also be noted that there are several AOCs that indicate a range of potential activity within the AOC. These AOCs require additional consultation with the proponent of the value prior to forestry operations. Several values have been addressed in this manner because the level of detail required to determine acceptable levels of activity to properly mitigate the effects of forestry operations on the value cannot be ascertained at the FMP stage. These generally occur for the Native Value and RSA AOCs.

A typical example of this in Table FMP-14 is the AOC developed to address a resource-based tourism operator's (RBT) bear stand areas (L_BS). The flexibility provides the tourist operator the opportunity to have some trees removed within the AOC that may be affecting the effectiveness of a bear stand (*e.g.* lines of sight). Choosing whether to harvest no trees, a few trees or to proceed with normal operations can only be determined on the site in discussions between the RBT and the SFL, just prior to operations (AWS stage). Any decisions will be documented and forwarded to the MNR.

4.2.1.1 Resource Stewardship Agreements

Resource Stewardship AOCs have been developed through negotiations with resource-based tourist operators (RBT) using the Resource Stewardship Agreement (RSA) process. The guide for Resource Stewardship Agreements was released in June 2001 and identifies the requirements and timelines for the development of RSAs. This process requires that Sustainable Forest Licensees negotiate Resource Stewardship Agreements with local resource-based tourism operators. These are twenty-year agreements and are renewable every five years. [31]

The RSA process facilitates the identification of values, within a management unit, that are identified by RBTs as being important to their business. AOC prescriptions are developed and negotiated between the RBT and SFL; these prescriptions mitigate the effects of forestry operations on the values while minimizing the loss of production forest to the forest industry. The guide suggests that RSAs be signed before the first information centre of the FMP process whereupon the RSA AOC prescriptions can be available for public review.[32] The RSA AOCs are only valid once the forest management plan is approved by the Ministry of Natural Resources.

During the development of the 2004-2009 FMP many RSA AOC's were developed. The majority of these AOC's have been carried over to this plan. RBTs with RSAs were contacted and invited to discuss their current RSA and consider adjustments if required. No one requested any changes. As well, additional RBTs that might have an interest in an RSA were contacted by NFRM and invited to engage in this process. No one expressed any interest in entering into an RSA, so no new AOCs where developed.

During the development of RSA AOCs prescriptions on the Nipissing Forest, attempts were made to deal with groups of tourism operators within similar geographic areas. This provided for consolidation of similar values, consistency of protection measures and the reduction in the number of AOCs that would have resulted if individual AOCs had been developed individually with each RBT. In some instances, it was necessary to deal

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[31] Guide to Resource Stewardship Agreements, OMNR, 2001, page 12.
An ***evergreen*** RSA would have term provisions corresponding to Section 26 of the *Crown Forest Sustainability Act, 1994*:
• the term of the RSA would be 20 years, or some shorter period agreed by the parties,
• the parties would review the RSA every five years,
• if as a result of a review the parties agree to renew the RSA, the agreement's expiry date would be put off to 20 years (or the agreed shorter period) from the review date.
If the parties don't want an evergreen agreement, then the RSA has the same five year term as the FMP in which its provisions would be included, or longer if the parties agree.
A non-evergreen RSA must have **a *planning horizon* of at least 20 years**. In other words, if the RSA is not evergreen, and even if its term is only five years, it still needs to look at strategic issues from a long term viewpoint.

[32] Guide to Resource Stewardship Agreements, OMNR, 2001, page 20, Figure 1.

with RBTs individually. In either case, an RSA was signed between the SFL and each participating RBT.

As well, if an RBT value was similar between RBT groups, efforts were made to negotiate similar protective measures. This resulted in AOC prescriptions that, although representing different areas and therefore having different identifiers, offer the same protection to the same type of value. The following is an example:

> *Tomiko Lake, Marten River/Red Lake and Loring Lakes: AOCs identify local water systems that provide a natural experience to the RBTs' guests and therefore are important to the RBTs' business for that area. The AOCs (Tom_Lake, MR/RC, L_Lks) prescribe the same protection for all water systems.*

Most of the values identified by the RBTs were for point or linear features such as water systems and canoe routes. The RBTs also identified that it was important to their businesses to ensure that access was controlled in certain areas, usually within Enhanced Management Areas. Proposed access constraints within the EMAs are consistent with the direction provided by the CLUPA (see Figure 4.2.1.1) and are reflected in the General Road Use Strategies (section 6.1.12).

Figure 4.2.1.1 Enhanced Management Area Direction

EMA	Conditions
North Parry Sound (E119r)	- local resource-based tourism operators will be informed annually of planned activities within the AOC - decommissioned roads will be monitored for a three year period by the SFL to ensure effectiveness at restricting highway vehicles - if decommissioning is not effective, additional efforts will be undertaken in consultation with RBTs and MNR - all new primary and secondary roads within EMA-E119r to be closed to the general public by the MNR; MNR will provide the SFL with the signs and SFL will sign the roads when construction begins and signs will be erected at the beginning of the new road - all new primary and secondary roads will be decommissioned when road is scheduled for abandonment (refer to Road Use Strategies in section 6.1.12 of FMP) *i.e.* culverts and bridges removed when no longer required by the forest industry - existing tertiary roads to be maintained as required - culverts to be removed from new tertiary roads or berms established within 1 kilometer of start of construction once all operations have been completed
Marten River Enhanced Management Area (E154R) Includes McCallum, Thistle, Sisk, McLaren, Kenny, Gladman, Gooderham, Hammell and parts of Notman, Osbourne, Stewart, Lyman and LaSalle townships.	- local resource-based tourism operators will be informed annually of planned activities within the AOC - decommissioned roads will be monitored for a three year period by the SFL to ensure effectiveness - if decommissioning is not effective, additional efforts will be undertaken in consultation with RBTs and MNR - all new primary and secondary roads to be closed to the general public by the MNR; MNR will provide the SFL with the signs and SFL will sign the roads when construction begins and signs will be erected at the beginning of the new road - all new primary and secondary roads will be decommissioned when road is scheduled for abandonment (refer to Road Use Strategies in section 6.1.12 of the FMP) *i.e.* culverts and bridges removed when no longer required by the forest industry. - existing tertiary roads to be maintained as required - culverts to be removed from new tertiary roads or berms established within 1 kilometer of start of construction once all operations have been completed
McCallum Peninsula EMA (E162a)	- local resource based-tourism operators will be informed annually of planned activities within the AOC - decommissioned roads will be monitored for a three year period by the SFL to ensure effectiveness at restricting highway vehicles - if decommissioning is not effective, additional efforts will be undertaken in consultation with local RBTs and MNR - all new primary and secondary roads to be closed to the general public by the MNR; MNR will provide the SFL with the signs and SFL will sign the roads when construction begins and signs will be erected at the beginning of the new road - all new Primary and Secondary roads will be decommissioned when road is scheduled for abandonment (refer to Road Use Strategies in section 6.1.12 of the FMP) *i.e.* culverts and bridges removed when no longer required by the forest industry. - existing tertiary roads to be maintained as required - culverts to be removed from new tertiary roads or berms established within 1 kilometer of start of construction once all operations have been completed - harvest operations only permitted from November 15 to April 15 - normal renewal and maintenance operations; no timing restrictions

Some of the RBTs in the Loring, Marten River, Thistle Lake and Tomiko Lake areas identified bear stand areas as important to their business. The RBTs commented that conflicts could be avoided if they were notified where and when forestry operations were going to occur within their area so that they could avoid baiting bear stand areas where fall harvesting operations would conflict with their hunt. The AOC prescription for RBT bear stand areas for these areas is:

The RBT will submit a map or UTM coordinates to the SFL at the annual spring meeting identifying the locations of bear stand areas and trails to be considered during the year's operations. The timing of operations to be mutually agreed upon during the annual meeting and the RBT will be required to flag or otherwise identify trails and stands prior to harvest operations and a 20 m AOC will be applied to each identified bear stand.

An RBT in the Manitou Lake area was not concerned about the protection of specific bear stand areas but wanted to be notified when operations were planned in Pardo, McNish, MacBeth, Afton, Scholls and Clement Townships. This RBT will be sent the approved five-year allocation map and will be notified in the spring when operations are planned in these townships.

Another RBT in the Tomiko Lake area required consideration for his fall hunting business. It was agreed that the RBT would be notified when harvesting operations were scheduled within Grant, Fell, Bastedo, Charlton and Badgerow Townships and that harvesting operations would not exceed 20% of the area of BMA 52 or BMA 45 between August 1 and November 1.

The Resource Stewardship Agreement prescriptions and any road use strategies developed from the RSA process for this FMP were available for public review through the public consultation process. RSA AOCs are included in Table FMP-14 and labeled under AOC Type "Tourism-Resource Stewardship Agreement". As of April 1, 2009 34 RSAs were signed and a total of 29 AOC prescriptions developed. Section 6.1.2 contains the RSA maps. Only AOCs for RSA values that fall within or near areas scheduled for forestry activities for the period of 2009 to 2014 have been included in the FMP.

4.2.1.2 Tourism Lakes

North Bay District attracts large numbers of visitors and local users to its lakes annually. Lakes are an important resource and are enjoyed for a wide variety of purposes. Through direction from the CLUPA, the Resource Stewardship Agreement process and discussions with cottagers' associations, AOCs have been developed for outpost camp lakes, tourism lakes, cottaging lakes and Lake Nipissing.

Outpost and tourism lakes were discussed with RBTs during the RSA process and AOCs were developed for those that were deemed important to RBT operations see previous section. Lakes that were previously listed in CLUPA and were discussed with the RBTs include Greenwood, Richer, Rock Basin and Obabika. RSA AOC prescriptions were developed for these lakes as required. Since the RSA process has addressed these values on these lakes, the AOC prescription for outpost camps (CP/RTL) will not be applied to these lakes. Lakes that were not addressed during the RSA process that will continue to receive the outpost camp AOC are listed in the AOC and in the AOC supplementary documentation; these lakes include Gooderham, Otter and North and South Spruce lakes (Gooderham and Otter lakes are currently designated as candidate remote tourism lakes). To lessen the establishment of unplanned and undesirable new access, the plan restricts new roads and landings within 300 m of outpost camp lakes and within 200 m of tourism lakes and Lake Nipissing. Furthermore, to lessen the impact of noise on outpost camp lakes, the plan provides for the scheduling of operations within 1.5 km of waterways and places of accommodation.

Lake Obabika will have allocations within their vicinity in this ten-year plan. An RSA AOC has been developed for Lake Obabika (OB_Lodge).

4.2.1.3 Canoe Routes

Recreational canoeing is a popular sport in the Nipissing Forest. There are several clubs whose organized events, such as the annual North Bay to Mattawa race, attract many entrants. Major waterways are the French, Mattawa, and Ottawa Rivers, which are protected primarily by provincial park designations.

The plan provides for the protection of recognized routes and portages as identified in CLUPA. A 120 m AOC has been established along canoe routes with 60 m AOCs on portages. The intent of these prescriptions is to have no heavy cutting adjacent to these values and for any selective cutting not to be readily apparent when viewed from water, campsites or portages.

In addition, to minimize potential damage to portages by rutting and logging debris and to reduce the creation of unplanned new access, the prescriptions include measures that restrict the location and use of skid trails, landings and roads.

4.2.1.4 Recreation Trails

There is a well-established network of trails in the Nipissing Forest, with considerable potential for further expansion. Most are maintained by the private sector and make use of logging roads and skid trails for much of their length.

Trail users in the area have shown a high degree of tolerance to the presence of logging. In fact, they are continually seeking out new logging roads for their recreational use. While the appearance of fresh cutovers has had no effect on the use of trails, logging does have the potential to damage trail use by the blockage or rutting of trail beds or by the disruption of scheduled events. Public safety is also a major concern when logging and trail use occur at the same time.

Because timber operations and trail use show some degree of compatibility, the planning team has taken the approach to protect the primary concerns of trail users (e.g., public safety, trail bed damage, trail obstruction and special event disruption). In addition, visual aesthetics will receive some protection through the application of partial cutting systems along trails receiving non-motorized use.

4.2.1.5 Provincial and Municipal Roads

The Nipissing Forest is well accessed by provincial and municipal roads. Primary concerns associated with timber operations and use of these roads include the potential loss of aesthetics (especially landings adjacent to the road), public safety by improper felling, snow drifting adjacent to clearcuts, and road damage. A 30 m AOC has been established along these roads with harvest conditions imposed on operations directly adjacent to the roads. The intent is to lessen the visual impacts of timber operations while addressing expressed safety concerns. In addition, observation and enforcement of load limits by governing bodies may help to lessen potential road damage.

4.2.1.6 McConnell Lakes Recreational Area and Access Road

The McConnell Lakes area is a very popular and intensively used Crown land camping and day-use area. *An Interim Land Use Plan for the McConnell Lakes Area* was prepared in the late '70s and was later incorporated into the CLUPA. CLUPA designated 4 EMAs in the McConnell Lakes Planning Area. These are e122r, e133n, e135n and e132a. The first three are within the McConnell Lakes 'core' area, and allow for multiple uses, while recognizing recreation, tourism and natural heritage values. Direction from the McConnell Lakes Plan was incorporated into these EMAs." The Crown Land Use Policy Atlas (CLUPA) provides a detailed description of the acceptable activities for this area. The CLUPA provides land use direction and therefore a formal AOC for this area is no longer required.

The MNR has suggested that the McConnell Lakes plan should be amended to consider current factors and that this amendment process may overlap with the development of the 2009 – 2014 FMP. Any changes resulting from the amendment process will be incorporated in FMP when feasible.

4.2.1.7 Algonquin Park Buffer

A 120 m buffer is prescribed for the Algonquin Park boundary. The intent of the buffer is to restrict land use and resource management activities within the park buffer. "Guidelines for Resource Management and Land Use Activities in the AOC Surrounding Algonquin Provincial Park" provide detail on the prescription.

In general, the prescription permits normal timber operations to occur except within 15 m of the park boundary to protect its integrity immediately adjacent to known values. These may be lakes, nesting sites, canoe routes, etc., in which case the appropriate prescription for protecting that value will be applied. In addition, to discourage unplanned and undesirable new access to the park, no new roads or landings are permitted within 120 m of the park boundary.

4.2.1.8 Parks and Protected Areas Ecological Integrity Protection

Table FMP-14 includes an Area of Concern Prescription that provides a buffer along all Provincial Parks where ecological boundaries have not been established. This prescription will help ensure the ecological integrity of those parks within the Nipissing Forest is protected from illegal access and operation related impacts. For all other

Provincial Parks and Conservation Reserves where the boundary has not been established, and the cost of a survey would be prohibitive, the forest operator or licensee will leave a buffer between forest operations and where the property boundary is thought to be, in order to reduce the danger of trespass. The width of buffer left should reflect the level of uncertainty regarding the true location of the property boundary. This process will be consistent with *MNR Policy and Procedure FOR 05.01.04.*

4.2.1.9 Cultural Heritage Values

The Forest Management Guide for Cultural Heritage Values was released in 2007, replacing the previous guide: Timber Management Guidelines for the Protection of Cultural Heritage Resources (1991). Cultural heritage values are unique to the people who created them and the time they were created; therefore, they are non-renewable.[33] Forest management activities have the potential to cause a range of adverse impacts to cultural heritage values. Many of these impacts are considered to be long-term, permanent, and irreparable.[34] The principal focus for the protection of cultural heritage values should be to prevent or minimize physical damage to values through planning of reserves and modified operations. Indirect impacts, such as changes in visibility or accessibility of values as a result of operations, also need to be considered in the planning of operations.[35]

Cultural heritage values have five classes: archaeological sites, archaeological potential areas, cultural heritage landscapes, historical Aboriginal values, and cemeteries. Forest managers must consider the Guide when preparing forest management plans and carrying out forest management operations. The Ontario Ministry of Culture, through the Ontario Heritage Act, ensures that values like archaeological sites and archaeological potential areas receive the proper protection. Their legislation and policies must also be followed.[36]

For the purpose of understanding the AOC's that have been developed for cultural heritage values, the following definition has been included for the term "qualified individual".
The term qualified individual is used in this Guide to denote who is considered to have the proper experience, credentials, and/or legal or community support for the different classes of values. The qualified individual is dependent on the value class being assessed. For archaeological sites and archaeological potential areas, the qualified individual is a person licensed under the Ontario Heritage Act. For cultural heritage landscape values, a qualified individual is a person who has knowledge and experience with the specific landscape or similar ones, or has specialist skills (e.g. regarding built heritage structures). A qualified individual for historical Aboriginal values is an Elder or another individual who the community recognizes (e.g. chief and council appointed) as the person best able to provide information and guidance on their community's values. The Registrar of Cemeteries is the qualified individual for cemeteries.[37]

[33] Forest Management Guide for Cultural Heritage Values, 2007, section 1.2.1, pg 5.
[34] Forest Management Guide for Cultural Heritage Values, 2007, section 1.3, pg 6.
[35] Forest Management Guide for Cultural Heritage Values, 2007, section 3.0, pg 26.
[36] Forest Management Guide for Cultural Heritage Values, 2007, section 1.4, pg 7.
[37] Forest Management Guide for Cultural Heritage Values, 2007, section 3.0, pg 26.

These methods have been incorporated into the cultural heritage AOCs for this FMP.

According to the Ministry of Culture there are currently 101registered cultural heritage sites within the Nipissing Forest. The majority of these sites are located along the Mattawa River corridor. MNR, Nipissing Forest Resource Management Inc., and the Ministry of Culture all recognize that this list is by no means a complete inventory of all cultural heritage sites. Many sites have either not been discovered or have been reported to the Ministry of Culture for verification.
All registered cultural heritage sites on the Nipissing Forest have been identified as areas of concern. Operations can only occur in the AOC if consultation with the affected First Nation (if it is a native value) and the Ministry of Culture or an assessment of a site by a licensed archeologist indicates that these operations will not damage the value. In addition, a representative of the affected First Nation will be invited on any site inspection that involves native values.

In the event that new sites are discovered during the course of this FMP, the MNR, the Ministry of Culture and any affected First Nations will be advised immediately. Any timber operations in the immediate vicinity will be suspended until appropriate action can be taken to protect the cultural heritage value (*e.g.*, the establishment of an appropriate buffer zone).

4.2.1.10 Archaeological Sites

Regulations to the Ontario Heritage Act define archaeological sites as: any property that contains an artifact or any other physical evidence of past human use or activity that is of cultural heritage value or interest. Sites are, therefore, defined on the basis of the presence of physical traces of past occupation. Specifically, artifacts are defined in the regulations as: any object, material or substance that is made, modified, used, deposited or affected by human action and is of cultural heritage value or interest.[38] Ontario Ministry of Culture is the custodian for all registered archaeological site data and therefore sets conditions to access this data. Archaeological sites are classified data.[39]

Protection as noted in Table FMP-14 (CH-AR) will occur. The reserve must extend at least 200 metres from the defined centre of the site unless:
– the boundary of a site has been delineated through a Ontario Ministry of Culture Stage 3 archaeological assessment, in which case the reserve is a minimum of 10 metres from the boundary; or
– a Stage 4 excavation has been completed to meet Ontario Ministry of Culture standards and a recommendation has been made by a licensed archaeologist that no further archaeological work is required in which case a reserve is no longer required; or
– the sustainable forest license holder chooses to engage a licensed archaeologist to collect and report on information from the Ontario Ministry of Culture.
Then one of the following three situations could occur:

[38] Forest Management Guide for Cultural Heritage Values, 2007, section 1.4.1, pg 9.

[39] Forest Management Guide for Cultural Heritage Values, 2007, section 2.2.1, pg 21.

· If the review suggests that the archaeological site is possibly large or has great cultural heritage value or interest, then keeping the 200 metre radius reserve or creating a larger reserve will likely be recommended. An Ontario Ministry of Culture archaeological assessment can be done to establish the boundaries of the site and from this, a 10m buffer can be established from the boundary.
· If the review suggests that the site is small or registers the location of an isolated find (e.g. arrowhead), and this conclusion is supported by documentation such as field notes, a report, or the results of an archaeological assessment, then the archaeologist could make a recommendation to remove the reserve since it does not provide protection of a tangible material resource.[40]

4.2.1.11 Archaeological Potential Areas

Archaeological potential area models identify areas that might contain archaeological sites based
on the presence of specific landscape features that resemble the location and site conditions of known sites on the forest management unit.[41] Archaeological potential areas are identified since their characteristics (e.g. soil, topography) indicate there is a higher probability that an archaeological site(s) exists within in them. Therefore, the top 30 cm of mineral soil must be protected since most archaeological sites contain subsurface features lying within this depth.
Protection of archeological potential areas centres on the ability to minimize mineral soil disturbance while conducting forest operations.[42]

Archaeological potential areas are not considered classified information even though unknown classified sites might be contained within their boundaries. Archaeological potential areas are required to be shown on values maps and on maps showing proposed forest management activities.[43]

Within the archaeological potential area one of the following must occur:
- there is a reserve equivalent to the dimensions of the area of concern;
- regular operations following Ontario Ministry of Culture’s Stage 2 archaeological assessment
- where nothing has been found, the recommendation is that no further archaeological work is required, and the Ontario Ministry of Culture has reviewed the report;
- operations where the harvest, skidding, and renewal activities do not cause more than 5%
- mineral soil disturbance (on a weighted average basis) within the harvested portion of the archaeological potential area of concern within the block; and/or,
- for salvage operations within blowdown areas, the mineral soil disturbance is allowed to exceed 5% within the area of concern due to the previous disturbance of mineral soil by uprooted root mats on the site.

[40] Management Guide for Cultural Heritage Values, 2007, section 3.2, pg 29.
[41] Forest Management Guide for Cultural Heritage Values, 2007, section 1.4.2, pg 9.
[42] Forest Management Guide for Cultural Heritage Values, 2007, section 3.3, pg 31
[43] Forest Management Guide for Cultural Heritage Values, 2007, section 2.2.2, pg 21

The Forest Management Plan or compliance plan must state that "if the protection measures for an area of archaeological potential are not complied with, operations must immediately cease within the area of concern, and a Stage 2 archaeological assessment per Ontario Ministry of Culture's current standards and guidelines for consultant archaeologists shall occur."[44]

4.2.1.12 Cultural Heritage Landscapes

Cultural heritage landscapes include both built heritage (i.e. structures) and larger areas of cultural heritage interest. This operational definition excludes individual registered archaeological sites or historical Aboriginal values, but does allow for cultural heritage landscapes that may be identified based on groupings of these values, or combinations of archaeological or historical Aboriginal values with other cultural landscape attributes. A cultural heritage landscape is a defined geographical area which has been modified by human activities and is valued by a community. Individual buildings, structures or travel routes (among other things) represent individual cultural heritage landscape features. Where these also occur in combination and/or along with archaeological sites, historical Aboriginal values, and cemeteries require treatment as one cultural heritage landscape value polygon. It is also common for discrete values to be nested within a cultural heritage landscape. For example, structural remains (e.g. buildings, partial walls or chimneys, stone piles, mining headframes, and wrecks) may be found in association with archaeological values. A *cultural heritage landscape* is a relatively small polygon area compared to the *landscapes* referred to in the *Forest Management Planning Manual*.[45]

Most cultural heritage landscape data is unclassified, although occasionally a cultural heritage landscape may be classified due to specific classified values found within it.[46]

The Planning Team was fortunate to have the assistance of Mr. Roy Summers (an LCC member) in identifying potential cultural heritage landscapes. Mr. Summers spent a considerable amount of time searching historical records and maps. He has identified a wide range of cultural heritage values including such things as old abandoned mines, old logging camps, old railway beds, plane crash sites, POW camps etc. The Planning Team decided to only show the abandoned mines as AOCs on the allocation maps because these could also be a safety hazard. A separate set of maps showing the other values identified by Mr. Summers will be referred to by NFRM Field Staff and Tree Markers - so that the value can be verified, the exact location mapped and the appropriate Cultural Heritage AOC prescription applied (linear, point or polygon).

<u>Point Features</u>

Structural remains include features such as buildings, bridges, docks, and dams, while wrecks include old wrecked or abandoned vehicles and machines. Large artifacts such as mining equipment or abandoned vehicles (railway equipment, aircraft, boats, barges, early harvesting equipment, automobiles, and trucks) are sometimes present. The decision to protect these as cultural heritage landscape features or to remove them to an

[44] Forest Management Guide for Cultural Heritage Values, 2007, section 3.3, pg 33
[45] Forest Management Guide for Cultural Heritage Values, 2007, section 1.4.3, pg 10.
[46] Forest Management Guide for Cultural Heritage Values, 2007, section 2.2.3, pg 22.

alternate location should be made in consultation with the Ontario Ministry of Culture. It must be recognized that some cultural heritage point values, such as farm buildings or rivers modified for log drives, can signal that a larger cultural heritage polygon value is present.[47]

Protection of known values will be in the form of a reserve unless:

- the value is fully documented in a manner that conforms to the professional standards of a qualified individual; and
- any associated archaeological concerns have been addressed through the completion of the appropriate stage of archaeological assessment, and the Ontario Ministry of Culture has reviewed the report.

Reserves for structural remains must be established by encircling all associated remains and features with a minimum 10 metre reserve. Reserves for wrecks must be a minimum 10 metres from edges of the wreck.[48]

Linear and Polygon Features

Cultural heritage landscapes include physical features and patterns resulting from the intentional or traditional human use of the land. Planning operations needs to consider the protection of both the physical features and the patterning. Abandoned roads or railways may be documented and then reused. By documenting things like the alignment, surface treatment, edge, grade, materials, and infrastructure and condition of the linear feature this information can be preserved.[49]

For cultural heritage landscape polygon values, the mapped area is the minimum for the area of concern (e.g. including the 10m reserve around buildings) as shown in Figure 16.
For abandoned roads and railways:
– documentation and mapping of the feature is sufficient;
– the linear features may be reused (this protects the landscape pattern); and
– if you are aware of any other cultural heritage values along it, they must be protected.
Renewal and tending operations for cultural heritage landscape polygon values can only be prescribed:
– in areas where no structural remains or associated archaeological values are anticipated; or
– where a study by a qualified individual has concluded that no additional cultural heritage landscape point values are present.
Traditional travel routes across lakes or on rivers do not require the protection of the adjacent shoreline.[50]

4.2.1.13 Cemeteries

Burial sites and cemeteries are locations where human remains have been interred, usually accompanied by attendant ritual or ceremony at the time of burial. The *Cemeteries Act* distinguishes between cemeteries and burial sites. A cemetery is land set

[47] Forest Management Guide for Cultural Heritage Values, 2007, section 3.4.1, pg 36.
[48] Forest Management Guide for Cultural Heritage Values, 2007, section 3.4.1, pg 37.
[49] Forest Management Guide for Cultural Heritage Values, 2007, section 3.4.2, pg 38.
[50] Forest Management Guide for Cultural Heritage Values, 2007, section 3.4.2, pg 39.

aside to be used for the interment of human remains. A registered or approved cemetery is one which has been approved for use by the Registrar of Cemeteries. A burial site is defined as land containing human remains that has not been approved or consented to as a cemetery in accordance with legislation. As a consequence of the investigation process described in the *Cemeteries Act* there may be approved cemeteries, unapproved cemeteries, or irregular burials within a forest management unit.[51] Cemeteries and burial sites are both referred to as cemeteries in this AOC.

In the case of a new value being found during forestry operations, work must cease in the area of the find immediately.[52] The Registrar of Cemeteries is contacted about previously unknown cemeteries (whether they were reported to the OMNR or following a police investigation of human remains here the site was determined not to be of forensic interest) the Registrar of Cemeteries may:

- direct that an investigation be undertaken to determine, among other things, the boundaries, the cultural origin and cultural affiliation of the site; and/or
- make a formal declaration according to the *Cemeteries Act* pertaining to the type of burial site or cemetery; and/or
- give direction as to how wide the reserve around the cemetery must be.

When the Registrar of Cemeteries does not direct that an investigation be undertaken or only provides a recommendation to the width of the reserve, a site investigation may still be undertaken to establish the extent of the cemetery in order to better place the reserve boundary. With the consent of the Registrar of Cemeteries, a qualified individual may also conduct an investigation to indentify the cultural origin of the cemetery.[53]

Cemeteries must be protected with a reserve. If the Registrar of Cemeteries gives direction on the width of the reserve, this direction must be followed at a minimum. Protection measures must include the protection of cemetery markers as well as the land in which the interments are located.[54]

[51] Forest Management Guide for Cultural Heritage Values, 2007, section 1.4.5, pg 16.
[52] Forest Management Guide for Cultural Heritage Values, 2007, section 3.0, pg 27.
[53] Forest Management Guide for Cultural Heritage Values, 2007, section 3.6, pg 44-45.
[54] Forest Management Guide for Cultural Heritage Values, 2007, section 3.6, pg 45.

4.2.1.14 Native Values

Prescriptions for the protection of native values are used in this FMP. These prescriptions were developed in consultation with all the First Nations in the Nipissing Forest. If additional native values are identified or discovered during the implementation of the plan, the prescription appropriate to that value will be applied after the local First Nation has been informed of the value and the prescription that will be used to protect that value. Operations in and around the value will stop until the First Nation and the MNR have been informed and agree to the prescription to be used.

"Documented approval" has been referenced in the native AOCs and will be used as a method of recording discussions and approvals from First Nations. As required, NFRM will contact the appropriate First Nations and document the discussion, making note of any comments or decisions. A copy of the document will be forwarded to the applicable First Nation for their verification and records.

The local First Nations can identify additional native values anytime during the implementation of the plan. It is also expected that archeologists investigating high potential cultural heritage areas during the implementation of the Plan will discover new native values.

It should be noted that native values have not all been ground verified after they have been identified on a map. The Aboriginal Community has provided information on the location of the values, some of which are mapped accurately, some are approximate and others indicate the potential for a value. Work on verifying Native values is ongoing.

If a new type of native value is identified (i.e. where the plan does not identify a prescription) then all local First Nations and the MNR will be involved in formulating and approving a new prescription. Written agreement from all of the First Nations is required for the new prescription.

In February of each year, NFRM will meet with each of the local First Nations to review the annual work schedule. The purpose of the meeting is to inform each community the location and type of harvesting and silvicultural operations to be conducted during the year. At that time, timing conflicts need to be identified so that forestry operations do not interfere with those traditional activities planned by the First Nations such as hunting, trapping, cutting firewood, berry picking and gathering of traditional plants. An example of this would be where harvesting is planned to occur in the fall in a location where traditional hunting activities are planned at the same time.

When timing conflicts arise, there will need to be documented agreement with the local First Nations on how the conflict will be resolved. If no agreement can be reached, a formal conflict resolution process will be followed.

4.2.1.15 Rail Lines

Rail companies have expressed safety concerns about timber operations adjacent to rail lines. The main concerns are fire hazards from slash accumulation and obstructions from wind throw. As a result of consultations with affected rail companies and MNR Fire Operations, prescriptions have been prepared to reduce the amount of slash adjacent to rail lines.

4.2.1.16 Land Use Permits and Hunt Camps

Land Use Permits (LUPs) are considered by the forest management planning process as unavailable for forest management and therefore removed from the available production forest. When operations are planned within the vicinity of an LUP, the MNR will provide the SFL with a map of the location and boundaries of the LUP. As well, the LUP holder will be notified of the planned operations.

The main concerns of hunt camp LUP holders are the potential damages to existing camp access roads and trails by rutting and obstructions and disturbances immediately adjacent to the camp accommodations. During the development of this FMP, several hunters identified that they had trails in areas where operations may be occurring during the 2009-2014 term. These individuals were told that they would be notified at the time of operations and asked to identify the location of their trails so that the operators could remove the slash from the trails once operations in the area were complete.

4.2.1.17 Traplines

Trappers working within registered traplines are generally supportive of timber operations, but have expressed concerns about the damage and obstruction of trapline trails by logging debris and about insufficient cutting near watercourses to encourage the production of beaver food. To be sensitive to this concern, the plan requires operators to notify registered trappers at least 30 days prior to operations. Trappers will be responsible for identifying their trails prior to operations commencing and operators will remove debris from trapline trails prior to the completion of operations. Registered trapline trails on existing forest access roads used for forestry operations shall at a minimum be left in their original condition after operations are complete. Any sections of existing logging roads used as a trapline trail may be upgraded and used for forestry purposes. Any new tertiary roads crossing registered trapline trails require notification to the trapper.

4.2.1.18 Ontario Living Legacy and No-cut and Limited Access Areas

Since the development of the 1999-2004 Nipissing FMP the Ontario Living Legacy (OLL) Land Use Strategy was introduced. This strategy assessed land uses in Ontario and accounted for “No Cut” and “Limited Access Areas” previously identified within Crown Management Units. In the Nipissing Forest, all No-Cut and Limited Access Areas were considered and consolidated into OLL designated areas (see the Crown Land Use Policy Atlas for a description of the OLL areas). Therefore AOC prescriptions for No-Cut and Limited Access areas are no longer required.

McCallum Peninsula

The limited access area for the McCallum Peninsula was incorporated in CLUPA as remote access Enhanced Management Area-E162a and therefore a specific AOC for this area is no longer required. The CLUPA also makes reference and identifies conditions that may still be applied. For example, to ensure access remains limited during planned summer operations, the temporary bridge at Caribou Creek will remain in place and gated and locked from April 1 to November 15. When summer and winter operations are not planned, the bridge will be removed.

Only silvicultural operations are being proposed in the McCallum Peninsula during this Plan. Forestry operations will follow the conditions described in OLL, and the Crown Land Use Policy Atlas. Figure 4.2.1.1 outlines notification and access restrictions for this EMA. Modifications to access will need to be carefully planned in conjunction with silvicultural operations.

4.2.1.19 Private Land

Although a formal AOC has not been developed for private land in this plan, NFRM does have its own policy to address Crown operations adjacent to private lands (see Figure 4.2.1.2). This policy will be applied to patent land, cottage lots and Crown shelf lots (MNR to ensure that these lots are included on the values map or ownership layer).

Figure 4.2.1.2 NFRM Policy #004 - Planned Activities next to Adjacent Land Owners

Planned Activities next to Adjacent Land Owners, Policy #004

- Efforts will be made to contact the adjacent landowner to notify them of planned activities before they occur.
- All planned activities on adjacent property requires the written consent (or verbal consent with documentation) of the landowner.
- Every effort will be made to ensure that planned activities do not occur on adjacent properties.
- Planned activities include: harvesting, road construction, renewal, tending and protection.

Rationale:

- Adjacent landowners have the right to know what is being planned on the Crown land next to their property.
- No activities should be conducted on private property without the written consent of the landowner (or verbal consent with documentation).

Implementation Procedure(s):

- The name and mailing address of adjacent land owners collected (with the permission of the individual) during the development of the FMP will be used by NFRM to contact adjacent landowners during the preparation of the Annual Work Schedule (AWS), (or as required in the Forest Management Planning Manual for Crown Lands in Ontario).
- NFRM will send notification in writing to the adjacent landowner outlining and describing the planned activity
- Responses from the adjacent landowner will be addressed by NFRM in writing or in person.
- Copies of all correspondence and minutes of any meetings with the adjacent landowner will be provided to the MNR. If a complaint or objection is received from the adjacent landowner, effort will be made by NFRM to resolve the issue. If the objections cannot be resolved the issue will be brought to the attention of the MNR.
- Note: The requirements for contacting adjacent landowners varies with the activity planned. For the aerial application of herbicides all landowners within 1 kilometer must be notified. For prescribed burns and slash pile burning adjacent landowners up to 8 kilometers must be notified.
- Before any activity can commence on adjacent private properties, the permission of the landowner must be obtained (preferably in writing or with adequate documentation if given verbally). The written permission will include: a description of the activity that is planned, a map showing the location of the planned activity, and where required photographs of the area prior to the commencement of the activity (for example pictures of the road before being used). All documentation - letters of permission, maps and photographs should be signed by the landowner.
- When locating and marking the boundary between Crown land and an adjacent land owner, the following procedure will be used by Nipissing Forest Resource Management Inc., Tree Marking Contractors Overlapping Licensees:
- The location of the boundary will be jointly located with the adjacent landowner whenever possible.
- If the adjacent landowner is not available or unable to jointly locate the boundary, then efforts will be made to locate the surveyed “corner posts” of the property boundary and the “corner posts will be used to identify the correct boundary.
- If the corner posts cannot be located then Global Positioning System (GPS) co-ordinates will be used (offset by 20 metres away from the adjacent land owners property) to locate the boundary.

4.2.1.20 Wetlands

The Government of Ontario commonly defines wetlands as follows:

> *"Lands that are seasonally or permanently flooded by shallow water as well as lands where the water table is close to the surface; in either case the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic or water tolerant plants."*

Wetlands protect and enhance water quality, protect shoreline from erosion, aid in flood control and provide habitat for a wide variety of plant and animal species. They contribute substantial social and economic benefits, outdoor recreation and tourism-related activities. Forest management activities conducted within a wetland could damage or destroy fragile ecosystems.

The Provincial Policy Statement, Section 2.3, states that natural heritage features and areas will be protected from incompatible development. Development and site alterations on significant wetlands and adjacent lands in the Canadian Shield will only be permitted if it has been demonstrated that there will be no negative impacts on the natural features or the ecological functions for which the area is identified.

All provincially significant wetlands (PSW) on the Nipissing Forest and the adjacent lands within 120 metres of the wetland are protected. There will be no activity in this zone until an Environmental Impact Study is conducted.

Mapped non-provincially significant wetlands (open muskeg, treed muskeg, brush and alder) that are associated with standing or flowing water that do not support forest stands will be protected by the appropriate fishery AOC prescription within 100m of the fisheries value. Preliminary identification of non-forested wetland areas has been carried out through designation of areas specified on 1989 Forest Resource Inventory maps.

Areas showing evidence of standing or flowing water will be protected by the appropriate fisheries area of concern (AOC) prescription. The fisheries prescription is applied from the upland shrubby edge and will extend up to 100m from the fisheries value.

Hydric plants are also indicators of the presence of standing or flowing water. Examples of these plants are cattails, bulrushes, sphagnum moss, Labrador tea, bog laurel, sheep laurel, sedges, bog willow, bog rosemary, leather leaf, alder and sweet gale.

Areas where hydric plants are present but where there is no evidence of standing or flowing water, and the portions of wetlands extending beyond the fisheries habitat area of concern, will be protected using the following best management practices;

- fuel and other contaminants will be stored at a distance away from the edge of the wetland that will prevent potential spills reaching the wetland.
- Equipment washing, fuelling and maintenance will be conducted far enough from the wetlands that waste water and other materials do not impinge on the wetland.

- A minimum 3 metre undisturbed vegetation buffer will be maintained along the edge of the wetland.

Other wetlands that support forest stands (generally black spruce, cedar and black ash) are afforded protection from forest management activities, which may have negative impacts on the natural features or ecological functions of the area. This will be accomplished through the application of the appropriate silvicultural ground rules for each species and site condition and the application of the Protection on the Physical Environment Guidelines.

In addition to the harvesting, renewal, tending and road conditions set out in these prescriptions, FMP section 6.1.28 will outline any additional special conditions required that pertain to the protection of the physical environment, working in riparian areas along with environmental guidelines for access roads and water-crossings.

Wildlife - Birds

The AOC prescriptions were developed in reference to the species-specific regulated forest management guidelines along with the best available science. Each species has different tolerances, critical breeding periods and specific habitat requirements which have been incorporated into each specific prescription accordingly.

Stick nests that have been confirmed as being used within the last five years will have the "active" prescription applied. Those nests with birds on the nest or evidence (guano, decoration, feathers, etc…) of use within that particular year are to have the "occupied" prescription applied. Lastly, nests in poor condition (falling apart, loosely packed, only few remnants, etc…) and that have not had confirmation of use within the last 5 years will have the "inactive" prescription applied.

It is the responsibility of the SFL and tree markers to reference the appropriate literature available or contact the MNR where there is doubt regarding nest identification. If doubt exists, the MNR will be asked to inspect and identify the nest using knowledge of species indigenous to the area and the nest characteristics (e.g., nest size, nest location in the tree canopy, nest tree species, number of adjacent nests and presence/absence of decoration).

Noise and activity near active nests could disrupt breeding, egg laying, incubation of eggs or feeding of young by the adults. Disturbance of ground vegetation and formation of trails can lead to increased nest predation. These factors could all contribute to nest abandonment, failure and ultimately the loss of annual recruitment to the population.

Harvesting of trees can eliminate the habitat condition required by each species, as well as remove potential suitable nest trees in an area. The alteration of habitat around a nest during the breeding season could result in nest site abandonment due to a shift in the preferred habitat and increased risk of predation. This could mean the loss of annual recruitment to the population. Additionally, for those species that commonly reuse nest sites or where nest sites are uncommon, alteration of habitat around a nest site outside of the breeding season can have negative impacts on birds returning the following spring as this could mean the loss of annual recruitment to the population and/or diminished recruitment to the population in subsequent years, at least until the birds can re-establish at a suitable nesting site elsewhere.

Management of nest sites will concentrate on maintaining forest cover and limiting forest operation activities around the nest site during breeding season in order to prevent nest site abandonment or failure. For those nests found outside of the breeding season or which appear to be inactive, the focus will be to retain the forest cover adjacent to the nest site for potential future use, unless the nest site is found within a clearcut where there is no requirement to leave the nest tree as it will not be used again.

4.2.1.21 Broad-winged Hawk – BWH – Small Nests

(Also includes: sharp-shinned and unknown raptor nests)

Broad-winged hawks build a new nest almost every year. Their nests are usually small and poorly constructed. The nest is often located in the main fork of a tree, just below or inside the lower canopy. Smaller trees are frequently used. The typical forest type where broad-winged hawk nests are found is a denser, younger forest. Preferred nest trees are yellow and white birches, although poplar, maple, oak and pine trees are sometimes used.

Sharp-shinned hawks build small to medium-sized flattened nests that are normally well-hidden high in the foliage of conifers (cedar, spruce, hemlock, fir or white pine) (Szuba et al., 1998). They are typically found in young to medium aged stands with dense groves of spruce, hemlock and cedar (Szuba et al., 1998).

4.2.1.22 Bald Eagle – E

Bald eagles are a species at risk in Ontario. They are currently ranked as endangered south of the French River, Lake Nipissing, Mattawa River, Ottawa River waterways and special concern north thereof. Several active nests have been documented on the Nipissing Forest. These eagles are shoreline nesters and are usually associated with large productive lakes and rivers (Szuba et al., 1998). They select large-diameter super-canopy trees, and build their nest in the main fork of live poplars just below the canopy or high in the canopy of living white pines.

The management of these nest sites will focus on the retention of forest cover immediately adjacent to the nest sites in order to maintain super-canopy perches, reduce visibility and risk of predation and maintain the preferred microclimate. Additionally, it will focus limiting the amount of activity within close proximity of the nest during the breeding season. Due to the probability of reuse, there is a requirement to maintain the preferred habitat condition outside of the breeding season as well.

4.2.1.23 Northern Goshawk and Great Gray Owl - G

Goshawks, although not listed as rare for the province, are relatively uncommon in this area. The most recent Ontario Breeding Bird Atlas (OBBA) indicates they may be on the decline (Cadman *et al.*, 2007). Nests are found in large dense stands of mature or old growth hardwoods or conifers that are relatively undisturbed near water (Szuba et *al.*, 1998). This species will re-use a nest from year to year, and often there will be alternate or satellite nests in close proximity to the one currently in use. More importantly these nests are commonly confiscated by two SAR – the red-shouldered hawk and the great gray owl when their preferred nesting habitat is limited (OMNR, 2006).

Recent research has indicated goshawks exhibit a low tolerance to clearcut harvesting within close proximity to occupied nests (OMNR, 2006). This in combination with the potential for these nesting sites to be taken over by great gray owls has resulted in an increase in the modified area around occupied nests.

Management of Goshawk Hawk nest sites will concentrate on maintaining forest cover around both the occupied and satellite nest sites both during and outside of the breeding season. Additionally, it will limit forest operations within the AOC during the breeding season.

The great gray owl is a species at risk in Ontario and has a rank of special concern. This is a new AOC for the Nipissing Forest. These birds do not actually build their own nests, but use abandoned hawk or ravens nests, with abandoned goshawk nests being the most commonly used nest sites (OMNR, 2007). Great grays typically nest in mature-to-over-mature lowland conifer, hardwood or mixed-wood forests with moderate to high canopy closure (OMNR, 2007). They hunt in mature open stands, clearcuts, partial cuts, recent burns, bogs, agricultural fields and meadows (OMNR, 2007).

Due to their affinity for mature and over-mature forest for nesting, management of these nest sites will focus on maintaining forest cover around nest sites both during and outside of the breeding season and will specify the level of forest management activities adjacent to occupied nests during the breeding season. Harvesting can actually prove to be beneficial for this species as harvesting creates new hunting habitat.

4.2.1.24 Great Blue Heron Nest & Heronry – H_N & H_R

Great blue herons are widely distributed across Ontario. However, the most recent atlas results indicate a significant decline (Cadman, *et al.,* 2007). Great blue herons are typically colony nesters, but on occasion single or double nests will be found. It is in the colonies, where large numbers of birds, concentrated in a relatively confined area during the breeding season make them especially vulnerable to disturbance or habitat alteration. As such, an AOC prescription was developed to distinguish between colonies (≥3 nests) and individual nest sites (1-2 nests). Disturbance of a heronry during the breeding season has the potential to severely limit annual recruitment of the species in the area.

Disturbance of ground vegetation and formation of trails near a heronry can lead to increased nest predation. Noise and activity near the heronry can disrupt incubation of eggs or feeding of young by the adult birds. It can also cause the young to scramble out of the nests and fall to the ground before fledging. These factors would all result in a loss of annual recruitment to the population.
Excessive disturbance during the nesting season, or alteration of the habitat around the heronry could result in colony abandonment. This would mean diminished recruitment to the population in subsequent years, at least until the birds can re-establish a heronry elsewhere.
Maintaining vegetation in the area immediately around the heronry reduces disturbance of, and predation on the colony. It provides additional nesting potential and may also provide some protection from the weather. The prescription will maintain vegetation adjacent to the heronry and minimize disturbance during the breeding season.

4.2.1.25 Least Bittern and Yellow Rail – LEB

The least bittern is a species at risk on the Nipissing Forest. It is currently ranked as threatened. This is a very secretive bird that inhabits predominantly cattail marshes at least 5 ha in size. According to the most recent breeding bird atlas, the least bittern appears to have declined from historical levels (Cadman et al. 2007). In accordance, the Marsh Monitoring Program data also indicate significant decline (-8.5%) per year from 1995-2003 (OMNR, 2007 – SS).

These birds build small shallow nests of twigs, sticks, and dead plant material supported by rushes, grasses, shrubs, or small trees which are typically not reused from year-to-year (SS).

This is a new AOC which will focus its management efforts on keeping machinery and construction of roads out of inhabited wetlands in order to ensure the suitability of the habitat condition remains, along with the hydrologic function of the wetland. Additionally, it will specify the acceptable level of forest operations within the AOC during the breeding season.

4.2.1.26 Osprey - O

Osprey feed on fish, and their nests are almost always located on the shores of a lake or river, in a marsh, bog or beaver pond, or on an island. They will use either a coniferous or a deciduous tree for their nests, and it is often either dead or open-topped. They will even occasionally nest on an artificial structure such as a utility pole. Osprey will use the same nest for more than one breeding season.

Management of osprey nest sites will concentrate on maintaining forest cover around both the occupied and satellite nest sites both during and outside of the breeding season. Additionally, it will specify the acceptable level of forest operations within the AOC during the breeding season.

4.2.1.27 Peregrine Falcon – PF

This is a new AOC prescription for the Nipissing Forest. The peregrine falcon is a species at risk in Ontario and is currently ranked as threatened. This prescription was developed as there are nest sites within the Nipissing Forest, but none of which at this time are found within an operational block. This is a unique prescription in that, a Nest Site Management Plan must be completed for each nest site and therein, the specific conditions on harvest, renewal, tending, and roads will be determined. If and when a nest site is found within an operational block, all operations will have to cease until the site specific Nest Site Management Plan is completed by the Planning Biologist.

Management of these nest sites will concentrate on maintaining forest cover around traditional and used ledges both during and outside of the breeding season, ensuring adequate hunting areas are maintained and will specify the acceptable level of forest operations within the AOC during the breeding season.

4.2.1.28 Red-shouldered Hawk and Cooper's Hawk – RSH

The red-shouldered hawk is a species at risk that inhabits the Nipissing Forest. It is currently ranked as special concern. The red-shouldered hawk prefers mature-to-over-mature tolerant hardwoods in close proximity to riparian hunting grounds away from human infrastructure such as roads and buildings. These birds build medium-sized nests that may be reused from year to year, if not by themselves, but other species for over a decade. The nest is typically found in the main fork of the tree at the base of a live crown and is thickly decorated with greenery (Szuba). Several satellite nests can also be found within a 300m radius of the nest (Szuba).

The Cooper's hawk is classified as rare to uncommon in Ontario (EC, 2005). This species builds medium-sized nests in natural or planted, mature-to-over-mature, large stands of mature tolerant hardwoods, mature mixed hardwoods or stands of mature hardwoods mixed with conifers (Szuba et *al.*, 1998). They will sometimes use younger, more open stands with a greater conifer component. They hunt near water, so their nests are often close to small ponds, creeks or other water bodies. They will re-use a nest from year to year, and often there will be alternate or satellite nests in close proximity to the one currently in use.

Management of these nest sites will concentrate on maintaining forest cover around both the occupied and satellite nest sites both during and outside of the breeding season. Additionally, it will specify the acceptable level of forest operations within the AOC during the breeding season.

4.2.1.29 Red Tailed Hawk – RTH – Large Nests (Also includes: Merlin, common raven, barred owl, great horned owl, long-eared owl)

Red-tailed hawks build large nests in large trees. The most commonly used tree species are elm, white pine, beech, maple and oak. Occasionally ash, basswood, black cherry or poplar trees are used. The nest is usually two thirds up in the middle of the crown in the secondary fork or on a lateral branch well within the canopy. Often the nest tree is located in a very old stand with an open canopy and substantial regeneration. Nests are almost always near forest edges or open areas, or along shorelines. Red-tailed hawks frequently re-use nests, so often there are alternate nests in close proximity to the active nest (Szuba et al., 1998).

Ravens build large diameter nests with very short, thick sticks in the upper third of the crown or lowest main fork of conifers, typically white pine or spruce (Szuba et al., 1998). They are typically found in mature-to-over-mature stands near lakes (Szuba et al., 1998).

Merlins use old raven or crow nests. They are an edge species that can be found in forest openings, recent cutovers, burns or marshes (Szuba et al., 1998).

Barred owls will nest in large old cavities, old hawk nests (especially red-shouldered, Cooper's or goshawk nests) and old squirrel nests within close proximity to wetlands or water (Szuba et al., 1998).
Great-horned owls nest in natural cavities or old hawk nests (especially red-tailed hawk nests) and can often be found in areas modified by humans (Szuba et al., 1998).

Long-eared owls prefer to nest in old crows nests in live conifers, but will also reuse old hawk and squirrel nests (Szuba et al., 1998).

Management of these nest sites will concentrate on maintaining forest cover around the occupied nest sites both during the breeding season. Additionally, it will specify the acceptable level of forest operations within the AOC during the breeding season.

Wildlife - Fish Habitat
Fish habitat comprises the majority of the area set aside in AOCs on the MU. The Nipissing landscape has an incredible amount of both warmwater and coldwater lakes and streams scattered across its broken topography.

In order to ensure the long-term sustainability and viability of the Nipissing Forest's fisheries to provide recreational opportunities into the future, area of concern planning is used to minimize the impact of forest operations adjacent to this precious resource. The AOCs serve to protect critical fish habitat and maintain the water quality on the management unit.

Forest management operations in riparian areas can affect the watershed and fish habitat within it. Forest management may affect water yield; result in increased erosion and sedimentation; increase organic debris entering the water; affect the nutrient balance of a watershed; reduce food production and cover; and increase water temperature. The fish habitat area of concern prescriptions for cold and warm water fisheries will serve to ensure there are no significant impacts on fish habitat and will afford protection to the maintain water quality on the unit. This will in turn ensure the requirements of the federal *Fisheries Act* which states the following are met:

> Section 35 (1): No person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat.
>
> Section 36 (3): No person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.

In addition to harvesting, renewal, tending and road conditions for Areas of Concern associated with standing or flowing water (known brook trout fishery, coldwater fish habitat, self-sustaining lake trout fishery, warmwater fish habitat and wetlands), the supplementary document Prescriptions for Harvest, Renewal and Tending, found in Section 6.1.28, outlines any additional special conditions required pertaining to the protection of the physical environment, working in riparian areas, along with environmental guidelines for access roads and water-crossings.
Prescriptions to address the width of various fisheries buffers were based on the prior determination of the ground slope for each Area of Concern. The slopes and reserve widths were determined during the planning process by running a slope buffer program on the Ontario Base Maps (OBM). Depending on the accuracy of these maps, slope determination may not be exactly the same as that found in the field. Actual slope measurements will be confirmed at the time fishery AOCs are established in the field. In instances where slope estimation is found to be inaccurate, AOC widths will be adjusted accordingly.

The slope-dependent reserve widths for the fish habitat AOCs were developed in reference to the last plan, the *Timber Management Guidelines for the Protection of Fish Habitat* (OMNR, 1988), the best available science, discussions with local experts and other districts.

For this plan, the slope-dependent reserve will be measured from the continuous shrub layer. This results in the retention of vegetation along the shoreline as the high water mark is usually found at the interface between the riparian vegetation and the upland forest. Additionally, this provides the tree markers with a better reference point when laying out the harvest blocks and AOCs. The retention of this vegetation will moderate changes in seasonal distribution of flows of surface run-off; reduce potential damage by erosion and sedimentation; reduce the likelihood of logging debris and machinery entering the water; reduce the impact of phosphorous and nutrient loading to watercourses; and result in maintenance of food supply, cover, and water temperature for riparian fauna. Additionally, conditions on roads and landings further reduces the potential for damage as a result of compaction, sedimentation and nutrient enrichment and ensures the long-term sustainability of Nipissing's riparian habitat and water quality, along with meeting the requirements outlined in the federal *Fisheries Act*.

As a result of this planning process both a district and public review of the fisheries values resulted in an updated set of values maps. As such, the allocation maps will depict known coldwater fisheries, brook trout fisheries, warmwater fisheries, self-sustaining lake trout and brook trout lakes and unknown fisheries. As per previous plans, the decision was made to default unknown fisheries to coldwater fisheries. This is a cautious approach that ensures no significant adverse effects result due to the forestry operations proposed in this plan.

The main concern with harvesting operations occurring adjacent to these fisheries is the potential for bank erosion, mineral soil exposure and soil compaction which all lead to potential nutrients and sediments entering into the waterbody. As such, in order to ensure the long-term sustainability of this resource for future generations to enjoy, management of this resource will focus on both sediment and nutrient loading which can have significant adverse effects on the system and can alter the composition and thermal regime of the waterbody and in turn the fish community it supports. As per the last plan the timing restrictions for the each fishery remains the same for in-water work depending on the species present.

4.2.1.30 Known Brook Trout Fishery – BTF

As previously stated, there are a total of 949 km of cold water streams that are considered significant to the coldwater fisheries, and more specifically the brook trout fishery on the unit. Only 12.8 percent of the surface area of water in the management unit is made up of cold water lakes, rivers, and streams. Brook trout tend to be quite sensitive to variations in temperature, water quality and to shoreline habitat. The prescription for known brook trout fisheries is one mechanism used in this plan to manage this declining fishery (FMP-14).

4.2.1.31 Coldwater Fish Habitat – CWF

As previously stated, only 12.8 percent of the surface area of water in the management unit is made up of cold water lakes, rivers, and streams. A large percentage of these water bodies occur in the easternmost portion of the unit, including McConnell, Timber, and Guilmette Lakes, while the majority of the remaining cold water sites are located in the north-west corner (Emerald, Manitou and Red Cedar Lakes). Cold water fish species tend to be quite sensitive to disturbances to temperature, water quality and to shoreline habitat. The prescription for coldwater fisheries is one mechanism used in this plan to further enhance or protect existing coldwater fisheries (FMP-14).

4.2.1.32 Self-sustaining Trout Lakes (Lake Trout and Brook Trout) - SSTL

For this plan, a new AOC was developed to ensure the long-term sustainability of the self-sustaining lake trout and brook trout lakes. Due to the high demand and limited supply for self-sustaining lake and brook trout lakes, and the potential for significant adverse effects due to increased access into these lakes where access is currently limited, the planning team developed an AOC prescription restricting new access into these lakes. This AOC prescription includes the slope-dependent reserve width and conditions of the CWF prescription plus has a 400-metre modified area in which, no new roads, water crossings or landings can be constructed. A list of lakes was developed by district biologists based on a set of criteria and modified through public input. The criteria were as follows:

1) Must be a self-sustaining lake trout or brook trout lake (does not apply to stocked lakes);
2) Currently has no or very limited access into the lake (effort is required to get into the lake); and
3) Increased access into the lake will be detrimental to the long-term sustainability of the fishery.

4.2.1.33 Warmwater Fish Habitat - WWF

As per the last plan the warmwater AOC is a slope-dependent reserve and modified area wherein which modified operations are permitted.

Wildlife – Mammals

4.2.1.34 Beaver and Mink forage/habitat along with early successional habitat along riparian areas – BH

The Beaver Habitat (BH) prescription has been part of the WWF prescription for the last several plans was developed to address trapper and management objective in this plan. In the last two plans, this prescription was embedded in the WWF prescription. As such, it now stands that on low slope conditions, clearcutting is permitted on up to 50% of the shoreline where no conflicting values exist. Permitting harvesting to the shoreline will serve to emulate natural fire patterns (as they would naturally burn to the shoreline), create early- successional forest (browse or cover for not only beaver but also moose, white-throated sparrows, hermit thrush, black bear) and create or maintain a diversity of riparian habitats on the Nipissing Forest.

Management of this habitat condition will focus on the creation of early successional forest while protecting the integrity of the water body as per the WWF prescription.

4.2.1.35 Black Bear and Wolf Dens – DEN

This is a new AOC prescription. The SFL wanted to incorporate this into the plan to address instances wherein which staff came across dens in the field. This prescription speaks to the requirements for both black bear and the gray wolf.

Black bears enter their dens, mid-to-late October. They use anything from upturned root masses, to crevices or caves, to excavated mounds or brush piles. Cubs are born in these over-wintering sites in early January. They remain in their dens until favorable conditions arrive in early spring.
Management around black bear dens will focus on minimizing damage to the den site along with minimizing disturbance in the immediate area during the denning season.

Gray wolves rear their young in dens excavated in well-drained sandy soils on knolls or hillsides, they will however, use other features such as rock caves, hollowed logs, stumps and beaver lodges. They generally enter their dens early spring and will remain in the area for the remainder of the summer.

Management around gray wolf dens will focus on minimizing damage to the den site along with minimizing disturbance in the immediate area during the denning season.

4.2.1.36 Deer Wintering Habitat – DWH- 1 / DWH-2

The limiting factor for deer on the Nipissing Forest is deer wintering areas. Due to the nature of this condition, mature-to-over-mature conifer dominated stands greater than 10 m in height deer are in direct competition with the forest industry for this habitat feature which takes years to establish. As such this AOC prescription was developed to not only ensure the long term sustainability of the deer wintering areas on the forest but also, the critical features therein. Specifically, due to the size and nature of the Loring Deer Yard, in that it is a traditional wintering yard for thousands of deer that migrate into the yard each year from the surrounding districts and due to the fact that thermal cover is already limited within the yard, 30% of the crown productive forest within the core area (Stratum I) of this particular yard is to be maintained in critical thermal cover during the term of this plan. Despite local deer population estimates that indicate we are at or above carrying capacity – we are managing for this condition at this level in order to prevent a mass die-off in the wintering season. It is also due to the fact that this habitat condition takes years and years to establish. In addition to protecting the critical thermal cover within the yard, management will also ensure the integrity of the major migration routes and travel corridors is maintained, along with affording protection to bedding sites and ensuring mast producing trees are left on site when available. These later measures will be afforded to all other known wintering areas on the forest.

Modified harvesting within wintering areas will ensure adequate thermal cover, migration routes, travel corridors and bedding sites are not adversely effected by forestry operations and at the same time will serve to create browse another key habitat feature for deer in these areas.

Moose

General moose habitat considerations (mafa's, cover to cover distance, thermal cover), as detailed in the *Timber Management Guidelines for the Provision of Moose Habitat* (1988), will be dealt with in concert with Natural Disturbance Pattern

Emulation Guidelines in order to create efficiencies and provide appropriate levels of protection when possible.

4.2.1.37 Moose Aquatic Feeding Areas - MAFA

As indicated previously, moose have several key habitat features that are critical for their survival. Moose aquatic feeding areas are an important food source starting in late spring when vegetation becomes available through the summer months. These areas provide high sources of sodium that satisfy their high nutritional demand. Moose will travel long distances to access traditional aquatic feeding areas that exhibit desired physical (easy access, low slope, thermal and escape cover) and biological (specific vegetation such as potemegeton spp.) attributes. The value of aquatic feeding areas is increased when forest cover is nearby and provides both lateral and overhead protection from predators and solar radiation.

For this plan we will continue to use the MAF AOC prescription developed in the last plan. However, for this plan all mafa's ranked 2-4 will be afforded protection in order to ensure we are maintaining the summer thermal cover, forested strips for both thermal and escape cover associated with this key habitat feature for moose on the Nipissing Forest.

4.2.1.38 Moose Thermal Cover - MTC

Another important moose habitat feature is "Cover to Cover Distance". It is a specific requirement outlined in the guidelines that states that clearcut blocks do not have cover to cover distances in excess of 400 meters. A comparison of the 2009 forest condition and the post harvest 2019 forest condition using habitat supply analysis predicted where moose late winter cover and summer thermal cover were potentially limiting or were being affected by the proposed operations. The analysis identified isolated (thermal cover stands >400m from another) moose summer or late winter cover stands that were going to be removed from their current condition as a result of the proposed operations. These stands were then flagged and incorporated into operational planning and layout of NDPEG residual patches to ensure we were maintaining adequate, <400m cover to cover distances in these large disturbance areas where moose habitat had been identified.

The retention of lowland conifer dominated sites (70%+ canopy closure) that would be unlikely to burn in a fire and which may contribute to summer thermal cover is one tactic that was employed to address not only summer thermal cover requirements, but also cover to cover distances and NDPEG residual patch requirements. Similarly, retention of 70% conifer cover on steep slopes or inaccessible areas, or as identified as later winter cover was also employed to accomplish the same requirements. The moose late winter cover AOC prescription was carried over and modified in this plan. For this plan we have now included summer thermal cover to the prescription and have created a new identifier MTC. This will serve to mitigate concerns expressed in regards to the long term sustainability of this condition on the forest.

Designs within clearcut blocks will also focus on the reduction of visibility, particularly from roads for predators, particularly man, to ensure that moose populations within the area remain viable. Cutovers serve as important habitat for moose and it is important for them to be able to take advantage of improved browse conditions to increase the moose herd.

Wildlife – Species at Risk

4.2.1.39 Atlantic Coast Plain Plant Community – ACC

AOC has been developed for this rare emergent marsh plant community· The plant community contains 1 endangered species (Engelmann's quillwort) and 1 threatened species (branched bartonia) and 6 additional species that are provincially rare. These species are found along open undisturbed, gently-sloping, sandy or gravelly (relatively infertile) shorelines of small, shallow lakes and ponds with fluctuating water level.

In Ontario, this type of community is comprised of 14 species typically associated with the eastern seaboard and gulf coast of the US. Two members are species at risk (branched bartonia, Engelmann's quillwort) and 6 others are provincially rare (algae-like pondweed, Carolina yellow-eyed-grass, hidden-fruited bladderwort, panic grass, ridged yellow flax, Tuckerman's quillwort).

4.2.1.40 American Ginseng – AGI

American ginseng is a species at risk in Ontario and is currently ranked as endangered. There have yet to be any confirmed occurrences of the species on the forest, but potential is there. This plant is commonly associated with mature tolerant hardwood forests and renowned for its medicinal properties. This prescription was developed by the Planning Team in reference to the best available science as there is no existing provincially regulated guideline to date for this specie.

Management for this species will focus on maintaining the preferred habitat conditions along with minimizing site damage. Access will also be managed accordingly.

4.2.1.41 Blanding's Turtle – BT

The Blanding's turtle is a species at risk that exists on the Nipissing Forest. It is currently ranked as threatened in Ontario. There are numerous documented occurrences of this species on the Nipissing Forest. This prescription was developed by the Planning Team in reference to the best available science as there is no existing provincially regulated guideline to date for this specie.

Management for this species will focus on protecting inhabited nesting and hibernation sites.

4.2.1.42 Eastern Massassauga Rattlesnake, Eastern Fox Snake, and Eastern Hognose Snake – EMR

The Eastern Massassauge Rattlesnake, Eastern Fox Snake and Eastern Hognose Snake are all species at Risk in Ontario and are ranked threatened. There are currently documented occurrences of the EMR and EHS on the Nipissing Forest. This prescription was developed by the Planning Team in reference to the best available science as there is no existing provincially regulated guideline to date for this specie.

Management efforts will focus on protection of nesting/gestation and hibernation sites and will specify the acceptable level of forest operations within the AOC during periods of movement in and out of hibernacula and the breeding season.

4.2.1.43 Wood Turtle – WT

The wood turtle is a species at risk in Ontario and is currently ranked endangered. This is a new AOC prescription for the Nipissing Forest. This prescription was developed by the Planning Team in reference to the best available science as there is no existing provincially regulated guideline to date for this specie. There are currently no documented occurrences of wood turtles on the forest, but they are highly likely and as such the Planning Team decided to incorporate this prescription into the 2009 FMP.

Wood turtles are the most terrestrial species of turtle found in Ontario and hence, are the turtle species most likely to be impacted by forest management activities. In spring wood turtles are found in mixed forests near rivers, streams or creeks which have hard sand or gravel bottoms, a moderate current, and a mean width of at least 7m (OMNR, 2007). Nesting occurs in mid-June in areas that have sandy soil, receive full sun, and are in close proximity to vegetative cover, such as long grass (OMNR< 2007). They can and will use road shoulders, railway beds, clearcuts, utility rights-of-way, agricultural fields, pastures, old fields, and aggregate pits (OMNR, 2007). The females tend to remain terrestrial over the summer months and can be found in alder swales, young open mixed forests, fens, bogs, and marshes (OMNR, 2007). They are primarily aquatic by October, where they hibernate in deep pools, under overhanging roots, or logs along shorelines, beaver lodges, and muskrat burrows (OMNR, 2007). Hibernacula can support numerous individuals and will be used on a reoccurring basis (OMNR, 2007).

Management for wood turtles focuses on protecting hibernacula and nesting sites along with setting acceptable levels of forest operations within the AOC during the breeding season.

4.2.1.44 West Virginia White - WVW

The West Virginia White Butterfly is species at risk in Ontario and currently ranked special concern. There are currently no documented occurrences of this species on the forest, but the potential exists. This prescription was developed by the Planning

Team in reference to the best available science as there is no existing provincially regulated guideline to date for this specie.

Management for this species will focus on maintaining suitable habitat via modified harvesting during the growing or frost free season.

4.2.2 Prescriptions for Harvest, Renewal & Tending Areas

The Silvicultural Ground Rules presented in table FMP-5 (located in section 9.0) detail the prescriptions for harvest, renewal, and tending activities for all stands eligible for treatment in the ten-year period of the FMP. The Silvicultural Ground Rules will also serve as the prescriptions for operations including naturally depleted areas for the same period.

There is a set of Operations Maps for Harvest and a set for Renewal and Tending that are located in section 6.1.2. The eligible stands are indicated on the set of Renewal and Tending maps.

Prescriptions for each stand are based on stand characteristics including ecosite, species composition, and forest unit. The Forest Units are identified for each stand on the Harvest Operations Maps for the first five-year term. The legend on those maps includes several attributes associated with those Forest Units. The "SGR Code" attribute documents the most commonly used Silviculture Ground Rule. The choice for the clearcut forest units was made using a table on page 15 of the Analysis Package Selected Management Strategy (SMS) located in section 6.1.6. The table titled "Results: Areas treated for T1 in the selected management strategy" documents the specific number of hectares to be treated in each forest unit by Silvicultural Intensity. Essentially for each forest unit, the highest proportion of total area indicated for treatment by Silviculture Intensity (ranging from Extensive to Intensive2) became the most commonly used SGR Code. For example: PO- Extensive was 87% and Intensive1 was 13% therefore SGR Code becomes PO-PO-E. For the Shelterwood forest units, the most commonly used SGR Code was essentially the SGR that maintains the forest unit. For example: HDUS-HDUS rather than HDUS-BY-US or HDUS-BY-ST as the later SGR's would be implemented a relatively small proportion of the time. Associated with each of the SGR Codes indicated on the map legend are the Most Common Treatment Packages identified in table FMP-5 which describe the most likely silviculture system and methods of logging, site preparation, regeneration, and tending to occur. This information represents the best estimate of proposed operations at the time of plan preparation, and will not limit the selection of any acceptable alternative silvicultural treatments in the silvicultural ground rules at the time of implementation of operations. The list of harvest, renewal and tending operations documenting stand level attributes (Forest Unit, Management Stage, SGR Codes, etc.) is located in section 6.1.14.

The locations where silvicultural treatments of special public interests are likely to occur during the first five-year term are also portrayed on the operations maps for Renewal and Tending located in section 6.1.2.8. These include:

- o candidate high-complexity PB's-for site preparation and tending of red oak;
- o areas proposed for aerial application of herbicide-most sites where artificial regeneration may occur;
- o areas which have been identified as eligible for insect pest management- tree improvement sites and specific research areas

All harvested blocks indicated on the Areas Selected for Harvest Operations could be fuelwood harvest areas. Fuelwood will be available in the harvest blocks at roadside or in landings after the licensee has removed all merchantable material and met all obligations in the block. Personal fuelwood permits can be obtained from the MNR.

4.2.2.1 Forest Operation Prescriptions

The forest operations prescription (FOP) is a process that links the strategic and operational planning in the FMP to actual implementation through harvest and silvicultural operations. The FOP process begins in the planning stage where actual site conditions (i.e., forest unit, ecosite and SGR) are confirmed to be consistent with the FMP. The minimum components within a FOP include a geographic extent (e.g. stand boundaries) and a SGR consistent with the confirmed forest unit and ecosite combination. If the forecasted site condition and SGR in the FMP is not consistent with actual site conditions, an alternative SGR must be selected from table FMP-5. Furthermore, the FOP must be certified by a registered professional forester in Ontario working within his/her scope of practice as defined by *The Professional Foresters Act, 2000*. By certifying the FOP the professional forester is stating that the forest operations described within the document are appropriate for the actual site conditions encountered.

The records and information related to the forest operations prescription for each site is compiled over time and maintained over the life cycle of the forest stand. This provides the opportunity to track what was planned, what treatment was actually implemented and the results of the treatment(s). The tracking of this information is key in the analysis / evaluation of silvicultural effectiveness.

The FOP process for the Nipissing Forest includes three elements.

1. A Pre-Harvest Assessment Compilation Sheet which:
   - o Records results of pre-harvest inspection for Selection and Shelterwood prescription areas including; BA by size and quality class by species; summary of conifer and living trees; description of regeneration; other block attributes;
   - o Enables prescription writer to set removal and residual BA targets by size class;
   - o Provides explicit direction to tree markers;
   - o Provides for including results of tree marking audits to be compared to prescription;
   - o Provides percentage AGS improvement calculations for Single Tree Selection.

2. General Instructions and Generic Prescriptions for Tree Marking and Harvest Instructions are located in section 6.1.28 which:

- Describes how to use the document in conjunction with FOP Control Document and pre-harvest assessment compilation sheet;
- Provides general instructions to tree markers and harvest supervisors in terms of: assessing tree vigour and risk; wildlife trees; tree species diversity; areas of concern; paint application; boundary line marking;
- Provides generic prescriptions for tree marking to markers and harvest supervisors specific to: Hardwood Single Tree Selection; Prep Cut, Seed Cut, First Removal, Final Removal for Conifer Shelterwood; Seed Cut and Final Removal for Hardwood Uniform Shelterwood; Hardwood Shelterwood harvested by Yellow Birch Seed Tree method; White Pine Seed Tree and Red Pine forest units; Clearcuts w/Cedar Considerations; Clearcut w/o Cedar;
- Provides general harvest instructions to tree markers and harvest supervisors specific to: obtaining permits and approvals; MNR FOP requirements; heavy equipment and wet areas; operations around water and traplines; site tailoring, aggregate management;
- Provides specific harvest instructions to tree markers and harvest supervisors specific to: damage to residual trees and advanced regeneration.

3. Forest Operations Prescription Control Document that:

- Facilitates comparison of Plan stand attributes (Silv Sys., FU, Mgmt. Stage, SGR Code) to the record of confirmed stand attributes;
- Facilitates reporting changes to FOPs for harvesting;
- Enables long-term monitoring as the Document is specific to a Forest Management Plan and FMP designated Harvest Block;
- Records proposed Silviculture Treatments from SGRs and identifies Exceptions which trigger a monitoring program;
- Facilitates supplementing the Generic Tree Marking Prescriptions and the Harvest Instructions with specific stand level details;
- Provides lists of stand level AOCs including moose biological data
- Provides a list of Block Issues (if any), developed during the FMP process;
- Documents the Natural Disturbance Residual Target Areas for the FMP Block;
- Includes an attached operating conditions map indicating many attributes including the approximate location of peninsular and insular NDPEG patches;
- Facilitates inclusion of any additional site specific strategies identified at the FMP level.
- Facilitates ongoing RPF approval and version recording as more portions of a particular FMP harvest block are operated.

Section 6.1.28 “Prescriptions or Instructions for: Tree Marking, Harvesting Operations, Forest Access Roads, and Aggregate Management on the Nipissing Forest” describes a typical process that would occur to prepare and implement the required elements of Forest Operation Prescriptions.

Prescription development on the Nipissing Forest is guided by:

1. Silviculture Ground Rules - Specific stand condition requirements to implement certain treatments; long term management objectives.
2. Pre-Harvest Assessment Compilation Sheets -Core elements of prescriptions for Selection and Shelterwood.
3. Considerations for Prescriptions (section 4.2.2.2) - Additional considerations beyond other FMP components.

In general, tree marking on the Forest is guided by five elements. In a possible order of priority they are:

1. Pre-Harvest Assessment Compilation Sheet -which trees to mark.
2. Section 6.1.28 "Prescriptions or Instructions for: Tree Marking, Harvesting Operations, Forest Access Roads, and Aggregate Management on the Nipissing Forest"– all required considerations for marking and harvest; scheduled annual review.
3. Forest Operations Prescription Control Document - any supplemental considerations for marking and harvest.
4. Silviculture Ground Rules - range of treatment opportunities.
5. Considerations for Prescriptions - concepts supporting specific elements of prescriptions.

In general, harvesting on the Nipissing Forest is guided by:

1. Forest Operations Prescription Control Document -any supplemental considerations for harvest.
2. Section 6.1.28 "Prescriptions or Instructions for: Tree Marking, Harvesting Operations, Forest Access Roads, and Aggregate Management on the Nipissing Forest"– all required considerations for harvest; scheduled annual review.
3. Silviculture Ground Rules-specific limitations for Silviculture System and Logging Methods.

4.2.2.2 Considerations for Prescriptions

The documents described in Section 4.2.2.1 include many required practices and specific operating details documented in a variety of sources related to practicing silviculture and conducting harvest operations on the Nipissing Forest. The following section will document additional or supplemental considerations for use when preparing prescriptions for harvest, renewal, and tending.

Pre Harvest Inspection Considerations

Pre-harvest inspections or assessments will be conducted:

- In areas exhibiting variable levels of quality, stocking, structure or species;
- In areas with unreliable inventory;
- In areas where an error in judgment related to choice of harvesting systems will have a significant impact on attainment of stand level objectives.

The following Plan Forest Units/Management Stage/Stand conditions (FMP based inventory) will be subject to a pre-harvest assessment:

- HDSEL;
- HDUS where AGS approaches 9 m2/ha;
- HDUS where mid-tolerant species are abundant;
- HDUS where Mh quality is very poor and where mid-tolerant; species are abundant and where HDUS-BY-ST or HDUS-BY-SC-EX1 SGRs are being contemplated;
- PWUS Seed Cut where BA approaches 12 m2/ha and white pine seed tree is being considered.

The forest units within the Clearcut silviculture system would be validated to confirm the stand level forest unit, stage of management, and SGR Code. Validation may be done by aerial photography, fly-over inspection, or an informal walk-through.

Tree markers would traverse an average of 50% of the operating area in a clearcut harvest block during the boundary and AOC layout procedure. During marking for Selection or Shelterwood, essentially a 100% survey of the area including the inspection of almost every tree is conducted. This is when the majority of AOC updates would occur.

Old Growth Considerations

As indicated in the old growth strategy in section 6.1.25 of the Plan, various stand level consideration will be made when possible as part of prescription development. They are as follows:

- Reduce site and stand damage, such as compaction, rutting, soil erosion, damage to residual trees, advanced regeneration and understorey plants, by ensuring that all operators adhere to NFRM's standard operating procedures for reducing site and stand damage – this will be done through NFRM's annual training program for operators (Tables 10.0.2 and 10.0.3 in the conifer silviculture guide are examples of the standards used by NFRM to mitigate stand and site damage).

- In all stands retain cavity trees, snags, down woody debris, mast trees, solitary conifers, solitary hardwoods, super canopy trees and veterans as per the silviculture and tree marking guides. Apply direction in the Natural Disturbance Pattern Emulation Guide to clearcuts and final removal cuts.

- Following the Natural Disturbance Pattern Emulation Guide, incorporate small remnant pockets of old growth encountered into insular or peninsular patches - leave mature forest in insular or peninsular patches to become old growth.

- Avoid using wind rows for site preparation. When using the tree-length harvesting system, leave tops in the harvested area; when using the full-tree harvesting system, disburse large unmerchantable material back on to the harvested area.

- After stand stocking falls below 30%, the stand moves into the barren and scattered (B&S) category – as part of the free-to-grow (FTG) surveys, NFRM will track residuals in these low stocked areas.

- When mapping depletions, NFRM will map reserves, bypass and other residual areas containing old growth.

- When conducting field work to prepare Forest Operations Prescriptions, white pine & red pine and tolerant hardwood areas that exhibit old growth characteristics and appear to have never been disturbed by humans, will be deferred from harvesting. These areas will be identified as potential areas to meet future old growth targets and/or potential candidates for protection under the parks system.

- During the Forest Operations Prescriptions that are conducted prior to harvesting, areas may be discovered that contain old growth white and red pine. Where the stocking to white/red pine is adequate (as defined by the Silviculture Guides for Conifer Forests in the Great Lakes St. Lawrence) these areas will be managed under the shelterwood system to perpetuate these species.

- Identify natural red pine stands that are 50-60 years old now for potential old growth in the future.

- For tolerant hardwood stands that have been selected to have more old growth features and functions, use the relevant proposed prescriptions provided by Southcentral Science and Information for this purpose (see Appendix 1 of the Old Growth Strategy, section 6.1.25).

Mast Considerations

Harvest activities typically result in a proliferation of mast-producing shrubs such as raspberries, blueberries, cherries, serviceberries and hazels due to the sudden increase in sunlight and resulting heating of the forest floor. While this results in a significant increase in the availability of food for wildlife, these same shrubs interfere with renewal of the forest. Mechanical, or more commonly, chemical control is required to give target crop tree seedlings an opportunity to become established and thrive. Even with these control efforts, the abundance of these mast-producing shrubs commonly remains higher than what was available on the site prior to harvest until the canopy of the renewed forest closes 15 to 25 years following renewal.

Ecosite 14 can have a large red oak component. These ecosites may be extremely important mast producing areas for wildlife such as deer and black bears. When mast-producing areas are relatively scarce, managers may elect to manage these sites to enhance and perpetuate the oak component, especially if within 2 km of a deer yard.[55]

Genetic Diversity Considerations

Genetic diversity is important for maintaining healthy tree populations that are able to respond favourably and adapt to changes or disturbances in their environment. Changes to genetic diversity can result from mutations within individuals, through the isolation of small populations or the elimination of unique individuals or groups.

Humans can affect the rate of change in genetic diversity accidentally or deliberately, such as through the sustained selective removal of individuals in (high grading) harvesting operations, selection and the propagation of certain individuals, or the introduction of new genetic material through unregulated movement of genetic material in artificial regeneration operations. Successful, sustainable forest management practices must include maintenance of natural levels of genetic diversity as a major priority.

Genetic diversity is the entire complement of genetic characteristics associated with populations or species. Genetic diversity drives, and is the result of, evolution, initiation of genetic mutation, gene migration and exchange, and natural selection. The following considerations are inherent to the maintenance of genetic diversity:

- **Identify, designate, and manage as large a natural population** as possible, while also considering other endemic species populations, using Ontario's seed zones. Seed zones are geographic areas with similar climatic conditions within which local plant populations are believed to have adapted.
- **Use Ontario's seed zones** to manage the movement of native tree seed and planting stock for artificial regeneration.
- **Limit the potential for inbreeding and genetic drift.** Both factors increase as the potential for related individuals to mate increases. Small, isolated populations of trees, such as white pine, pitch pine, hemlock, and red spruce are particularly vulnerable.
- **Maintain the genetic legacy** of the old forest into a new, young white pine, red pine or hemlock forest. The genetic legacy of the forest is maintained by ensuring that population viability (genetic diversity, reproductive success, *etc.*) is maintained within the residual population following harvesting and/or silvicultural operations.

Genetic Diversity of White Pine: For conservation of white pine genetic diversity, forest managers will apply silvicultural prescriptions that emphasize large, well-stocked stands and populations that are growing on suitable sites. Regeneration must come from trees that have cross-pollinated with distantly or unrelated neighbours.

[55] OMNR. 1998. A silvicultural guide for the Great Lakes-St. Lawrence conifer forest in Ontario. Ont. Min. Nat. Resources. Queen's Printer for Ontario. Toronto. Glossary of Technical Terms.

Genetic Diversity of White Spruce: Morphological variability and genetic diversity are high across the natural range of white spruce as shown by inbreeding depression after selfing, high heritability for polygenic traits, such as height growth, and from studies using molecular biology and genetic markers. Because of this variability, extensive clearcutting may be expected to lead to population isolation, reduced gene flow between populations, reduced population sizes, and decreased genetic diversity. Genetic management of white spruce includes identifying and maintaining large, diverse, uneven aged stands growing with a mixture of other species. Site, stand and ecosystem characteristics will determine whether shelterwood, selection, or clearcut silvicultural systems are applied. Because inbreeding reduces white spruce seed set, survival and growth, silvicultural prescriptions must optimize opportunities for cross pollination

Genetic Diversity of Red Pine: Red pine displays relatively little variation in morphology, and is considered to be genetically very uniform. As a function of its low genetic variability, red pine is self-compatible and self-fertile. Because of this low genetic variability, large breeding populations are not as critical as they are for other species. Even single, isolated trees can produce self-fertilized offspring without any genetic depression.

Genetic Diversity of White Cedar and Red Spruce: Cedar is morphologically varied across its range. Some genetic variation exists and no natural races or hybrids exist. There are at least 120 ornamental cultivars. On the Nipissing Forest, red spruce exists as a small isolated population. Natural hybridization with black spruce does occur. It is recommended that these isolated populations of red spruce with fewer than 100 individuals not be harvested unless: the area is already regenerated or seed from the appropriate seed zone is available to regenerate an equivalent site within the seed zone.

Prescriptions that are mindful of genetic conservation are critical for those species that are on the edge of their natural range. This is where genetically unique populations may exist and populations are vulnerable to extirpation due to naturally lower population levels. The following considerations should be addressed in the genetic management of any stand:

- be aware of the species that are uncommon in the site district where the stand is located, particularly for species that are at the edge of their natural range;
- note species of concern and determine the population levels in adjacent stands within pollination distance;
- where species of concern exist as isolated populations, ensure retention of healthy populations within the stand and modify prescriptions to encourage regeneration.

Healthy, viable populations require enough trees to avoid inbreeding. Inbreeding may result in inbreeding depression, which manifests itself in the form of lower seed set, reduced vigour of seedlings and reduced resistance to pests. The number of trees of a particular species that must be retained within the stand to provide a healthy viable breeding population increases when the trees are separated by a distance large enough to prevent breeding with trees of the same species in another stand. Few pollination distances have been determined for hardwoods. However, it can be assumed that the effective pollination distance for wind-pollinating species such as white ash is approximately 100 metres. Thus, the 100 individuals forming a viable population must occur within an area of not more than 25 ha. However, greatest opportunities for pollination likely occur when the 100 individuals occupy 10 ha or less. Therefore, when dealing with an isolated stand of a regionally rare species, retain at least 10 individuals per hectare and a total of 100 or more individuals in the stand.

Tolerant Hardwood (Sugar Maple) Management Considerations

The shelterwood system is the method of choice where regeneration to mid-tolerant species is a primary objective. It is recommended for sugar maple if growth and quality of the stand are inferior because of site limitations (e.g. dry moisture regime; shallow soil; imperfectly drained soil; heavy-textured soil) or on productive sites where the overstory does not meet the quality criteria for selection.

The preparatory cut is designed to improve and develop the crowns of thrifty seed-bearers of the desired species. This is done by targeting for removal, undesirable species and individuals competing with the potential seed trees. This treatment is normally scheduled when the stand is in the 61-80 year age class. A seeding cut is done when new regeneration is required. Thinning must take place from below and concentrate on removing the most defective and least vigorous trees, leaving better-quality trees for seed, site protection and high-quality wood production. Removal cuts are implemented when the regeneration is well established.

If the current stand is primarily sugar maple and is overmature or of poor quality, even-aged procedures such as liberation cuttings (in fact, the final removal of the shelterwood system) can be applied if advance growth is well established (1 metre or more in height); a two-cut uniform shelterwood can be employed if new regeneration is required. In this case, a seeding cut from below, retaining a crown density or canopy closure of 60 per cent should be employed.

Hardwood Three Cut Progressive Strip Clearcut Management Considerations

Unless otherwise prescribed and justified in the stand Forest Operation Prescription, the progressive strip clear cut system will be used in tolerant and mid-tolerant hardwood stands, where the site is more suited to yellow birch than hard maple. The long term objective on these sites is to create conditions favourable to yellow birch uniform shelterwood. If and when implemented, this procedure will receive Exceptions Monitoring as documented in Supplementary Documentation 6.1.11 Monitoring for Exceptions.

This progressive strip cut approach provides an alternative to using uniform shelterwood to move poor quality hard maple stands towards the yellow birch dominant condition. The cost for the harvest contractor to layout and operate in clearcut strips is lower than for a uniform shelterwood operation on the same site, especially when the pulp portion of the harvest exceeds 80%. There appears to be evidence where similar treatments (implemented 25-35 years previous) on the appropriate site have resulted in desirable yellow birch stands.

To implement the three-cut progressive strip clear cut, the area is compartmentalized and adjacent strips are cut in sequential order. The strips are 30 to 40 meters wide, or about two tree-heights in width (bole to bole). This strip width will ensure enough crown spacing to provide sufficient sunlight to the floor for mid-tolerant species (By/Or/Cb). Yellow birch will require sufficient light to maintain competitiveness with the anticipated presence of hard maple and intolerant hardwoods (Po, Bw). On the first entry into the stand, every third strip will be cleared of timber. Once regeneration in the cut strips meets the silvicultural ground rules regeneration standards, the strips adjacent to the cut strip will be harvested. Finally, the last strips will be harvested after regeneration standards are met on the remainder of the area. The orientation of the strips will be determined by topography, wind direction and light intensity in the cut strips. Light conditions must be sufficient to allow rapid growth of yellow birch regeneration while inhibiting development of intolerant species.

Site preparation in the cut strips will be timed to coincide with a good yellow birch seed year. To regenerate the last strips harvested, yellow birch seed trees will be left in the strip and/or yellow birch seedlings will be planted to meet the regenerations standards.

Tolerant Hardwood (Yellow Birch) Management Considerations

Yellow birch regeneration can often be achieved by retaining a relatively small number (from 5 to 12) of good quality seed-producing trees per hectare throughout the stand and in the vicinity of the canopy gaps. The recommended diameter of the canopy openings is normally equivalent to the height of the stand (0.04 ha) and should never exceed 50 m (0.20 ha) in order to provide partial shade and exclude competitive intolerant species. If the current stand is over mature or of poor quality, even-aged procedures such as liberation cuttings (in fact, the final removal of the shelterwood system) can be applied if advance growth is well established (1 metre or more in height); a two-cut uniform shelterwood can be employed if new regeneration is required. In this case, a seeding cut from below; retaining a crown density or canopy closure of 60 per cent should be employed. Overstory canopy density or crown closure should be reduced to 50 to 60 per cent on scarified sites or 60 to 70 per cent on burned sites. It is recommended that when understory vegetation is abundant (e.g. ecosites 24.1, 24.2 and 25.1) residual crown cover after the first shelterwood cut should be at least 70 per cent. Under these conditions a cut resulting in a lower crown closure may result in severe understory competition. If the understory vegetation is sparse (e.g. ecosites 23.1 and 23.2) or has been reduced by vegetation management treatments the overstory could be reduced to 50 per cent in the initial cut.

Group Selection Considerations

Stands qualifying for selection management generally have a minimum of 9 m2/ha in trees 9 cm DBH and larger (or 7 m2/ha in trees 24 cm DBH and larger) of crop quality (AGS). Stands with less than this can be managed under the shelterwood system;

however, it will take longer to realize the expected improvements in volume and value production.

Initial stand entries into forests previously managed in an unregulated fashion normally must focus on stand improvement. Stocking targets are addressed while removing much of the poor-quality material. Future cuts continue this process and also serve as conditioning cuts. In the process, stand structure and quality are improved. The best-quality trees are retained as residual capital in order for them to grow and increase in value. The major goal of the selection system is to concentrate or transfer growth to the best quality trees in the stand by releasing them from competing trees. Forest operations must maximize the number of residuals and regeneration that are free from damage. Group Selection can be applied in stands for the following two reasons:

- to provide sufficient light for mid-tolerant species such as white ash, yellow birch, basswood, red oak and even black cherry to regenerate and develop in stands where they would normally be lost to suppression in the light-deficient understory;
- as a tool to promote quicker conversion of even-aged stands to an all-aged condition.

The application of the group selection system as the main system for regeneration across entire stands is new to Ontario but holds promise in areas more heavily dominated by mid-tolerant species. Other considerations are:

- where it is more practical to deal with regeneration in manageable small openings
- where the open appearance or biological effect of heavy or total canopy removals associated with the shelterwood system is unacceptable.

White Pine Uniform Shelterwood Management Considerations

Unless otherwise prescribed and justified in the stand Forest Operation Prescription, stands with greater than 12m2/hectare basal area of white pine and red pine, with lesser components of white spruce, red oak and hemlock, as verified by the pre-harvest assessment, will be managed under a uniform shelterwood system. These stands will be managed under a 3 or 4 cut uniform shelterwood system. A four cut shelterwood will normally be used in stands that have at least 50% white and red pine, are stocked at a minimum of 70%, and the proportion of white pine is greater than red pine. The three cut shelterwood will be used where white pine and red pine compose at least 30% of the stand.

A four cut system consists of a preparatory cut, regeneration cut, first removal and final removal. A 3 cut system combines the preparatory cut and regeneration cut.

The purpose of the preparatory cut is to create space around selected trees to allow for the expansion of tree crowns. This stage applies to stands where crown diameter is in the 4 to 5 metre range.

The purpose of the regeneration cut is to create understory conditions favourable to pine seedling establishment and growth, and is usually applied in stands where tree crowns are at least 6 to 8 metres in diameter.

The first removal cut will occur when the regeneration is between 30 cm to 1.5 m in height.

A final removal of the overstory occurs when the understory regeneration achieves a total height of 5-6 metres. Minimum-damage logging techniques in felling and skidding operations are implemented to ensure that the regeneration targets for pre and post harvest conditions, as defined in the Harvest Method of the silvicultural ground rule, are achieved.

White Pine Seed Tree Management Considerations

The clearcut silvicultural system is used in stands with a basal area of 4 to 12 m2/hectares, and where white pine and red pine comprise less than 30% of the species composition.

Application of this system generally requires retention of 10 to 35 white or red pine trees per hectare, well distributed across the site. The intent, however, is to retain sufficient trees of the proper quality and seed-producing capability to provide seed to regenerate the stand, and not to simply meet a target of a minimum number of seed-trees per hectare.

Artificial regeneration treatments following harvest may be needed to ensure minimum stocking and density of pine.

In these stands, understory vegetation management is critical, as the site will be quickly occupied by regenerating intolerant hardwoods and residual tree species that may not be harvested, such as balsam fir and red maple.

Cedar Management Considerations

Where cedar is being actively managed for regeneration, specifically on upland sites, mechanical site preparation in the vicinity of the cedar may promote good regeneration.

Winter logging and CLAAG is recommended whenever possible to protect as much cedar and advance regeneration as possible.

Cedar will need tending on most sites – ground back pack or other precision target spraying is recommended.

Species at Risk Considerations

NFRM acknowledges that management staff, Licensee staff, and tree markers will require directed training in the recognition of species at risk and the associated habitat.

Bio-Fibre vs Down Woody Debris Considerations

Maintenance of the productive forest landbase is paramount to ensuring sustainability. There are current procedures and efforts in place to minimize the impact of concentrated logging debris at roadside primarily in clearcut operations. This debris has historically been piled and burned, however, the option exists to return it to the cutover. That practice has been implemented on a limited basis. In the event that bio-fibre demand becomes reality, then perhaps these roadside accumulations would serve some of those requirements. The potential additional requirements may impact the relative amount of down woody debris remaining on the forest from current practices. A balanced approach would have to be developed that considers maintaining current levels of DWD on the forest and meeting, to some degree, the potential requirements of future opportunities for bio-fibre.

Tree Girdling Considerations

Girdling operations must follow PROVINCIAL TREE GIRDLING POLICY FOR 16 -02 -01. The licensee shall notify, in writing, the Ministry of Labour and the Ministry of Natural Resources prior to the start of tree girdling operations.

4.3 Harvest Operations

Table FMP-15, section 9.0, details the harvest level and distribution over the two five-year terms. The areas planned for harvest operations for the first five-year term and the areas proposed for harvest operations for the second five-year term, are identified on the operational maps in section 6.1.2.

The selected harvest area is reasonably balanced between the two five year terms. Overall there is 44236 ha (48.6%) planned for term one, and 46735 ha (51.4%) planned for term two.

All of the forest units are closely balanced between the two five year terms with the exception of PJ. The PJ forest unit is a relatively small forest unit and spatially concentrated in a few areas in the northern portion of the Forest. The limited distribution of the PJ forest unit restrictions the ideal balancing of the area by term. In term one 245ha (31.3%) is allocated with 555ha (68.6%) allocated in term two. The PJSB forest unit has a similar spatial situation as PJ with 950ha (41%) in term one and 1367 (59%) in term two. The three largest forest units on the Forest HDSEL, HDUS, and PWUS are closely allocated by term with 50.6%, 47.7% and 48.6% respectively of the forest unit total AHA in term one.

4.3.1 Harvest Areas

Table FMP-15 summarizes the level of forecast and planned harvest area in comparison to the available harvest area by forest unit and age class. This table is located in section 9. The total projected available harvest area plus the mid-rotation tending figure from SFMM (commercial thinning of red pine plantations) and the total forecast harvest area for the ten-year period is 91,144 ha and 91,027 ha respectively.

The selected harvest allocations do not exceed the available harvest area for any forest unit. All forest units are allocated to within 0.0 % to 0.6% of the 10 year AHA with the exception of the PR forest unit. The PR forest unit is small with an AHA of 289 ha over 10 years. Many of the PR forest unit stands are isolated and relatively small in area and therefore not economically feasible to fully allocate.

Note : Harvest and road construction operations in harvest blocks #09-74, #09-75 and #09-76 will occur in the second five year term of the plan (2014-2019).

4.3.1.1 Substitution

There was a significant effort to improve upon the substitution levels from the 2004 FMP. This process resulted in a considerable decline in the overall level of substitution. However, an evaluation of FMP-15 indicates that there is still some minor age-class substitution to a certain degree for most forest units. It was not operationally feasible to meet the forest unit/age-class combination dictated by SFMM for a variety of reasons.

The Nipissing Forest can be best described as a mosaic of relatively small stands with a varied interspersion of forest types and ages. Most noteworthy is the relatively high level of forest type and age-class interspersion that exists between adjacent stands.

This is the combined result of the Great Lakes St. Lawrence and the Boreal Forest transitional ecology of the management unit as well as the long history of harvesting spanning more than a century. Developing commercially viable harvest blocks within this type of setting is challenging and has contributed to some level of substitution in both ageclass and stage of management for some forest units. The impacts of this substitution have been examined in Section 4.8.

The Strategic Forest Management Model (SFMM) for the management strategy prescribes the amount of area by forest unit, age-class and, in the case of shelterwood forest units, stage-of-management (SOM). SFMM does this based on an 'optimum' solution arrived at by processing and calculating non-spatial inputs and constraints provided to the model. The planning team is to match the areas selected for harvest as closely as possible to the management strategy output.

4.3.1.1.1 Ageclass Substitution

The most substantial area amount of substitution of younger age classes was required in the PO, MW, and BW clearcut forest units with forecast harvest area substitution levels representing approximately 21%, 21% and 24% of the total forest unit AHA respectively. The reason for the substitution was a combination of spatial, economic and administration constraints which forced the development of some younger age class allocations. The spatial distribution of primarily clearcut forest units on the Forest is not uniform. In general, the western portion of the Forest has a greater proportion of younger age classes than the eastern part of the Forest. This in addition to utilizing existing access, creating efficient harvest allocations and licensee traditional operating areas resulted in some selected allocations containing younger stands in order to create operationally feasible harvest blocks for a number of licensees.

Areas selected for harvest operations that are outside of the age-class or SOM output from SFMM are generally known as 'substitutions'. Substitution implies a level of risk for meeting FMP objectives and sustainability depending on a number of factors including the total amount of area, degree of substitution (i.e. how many age-classes outside management strategy ages) and the current forest condition. Several factors arising during the development of the FMP contributed to the relatively significant amount of substitution noted in some forest units.

The intent of this discussion is to identify the level and degree of substitution by forest unit, why the substitution occurred, the implications of substitution relating to objectives and sustainability, and strategies to limit substitution in future FMPs.

4.3.1.1.2 Stage-of-Management Substitution

Stage-of-management (SOM) is an additional criteria prescribed by the management strategy for harvest allocations in shelterwood forest units (i.e. HE, LWMX, HDUS, BY and PWUS). The amount of SOM substitution is small in the selected harvest areas, and has been noted in Table FMP-15. While it is present in all shelterwood forest units, in comparison to past plans, it occurs in significantly smaller amounts.

4.3.1.2 Rationale for Substitution

The following section describes in detail the various reasons related to the ageclass substitution in the forecast harvest area. Each reason varies in the amount it may have contributed to the differences.

4.3.1.2.1 Process Related

Experience with the implementation of past FMPs has demonstrated that early selection and ground confirmation of harvest allocations is key to successfully implementing FMP strategies and achieving targets. Unfortunately, this early selection is undertaken at risk of 'getting ahead' of the FMP process. This type of risk management occurs throughout the planning process on many different fronts.

The early selection of harvest area was guided by an initial estimate of the Available Harvest Area (AHA) and the minimum operability age by forest unit. Minimum operability ages were established based on yield curves, professional opinion and the previous 2004 FMP. Typically, the minimum operability age was set:

1. Within the silviculturally appropriate age range for the forest unit; and
2. Approximately 20 years younger than the yield peak of the major species in the forest unit.

Please refer to the analysis package, section 6.1.6 for details regarding operability ages.

The intent of the early selection process was to identify prime candidate stands and then adjust the areas selected for harvest based on the output of the management strategy. Finalizing the management strategy however, was delayed. When the management strategy was finalized allocations prescribed by SFMM were often noted to be older than the minimum operability age guide that was used during the allocation selection process. In essence, the management strategy often prescribed age-classes at and above the peak of the forest unit yield curve, hence, some stands selected for harvest operations were younger than these criteria.

Figure 4.3.1.1 illustrates the percent of clearcut area that has been allocated outside of the operability ranges set in the management strategy. There is a number of hectares identified outside of SFMM operability ranges for shelterwood forest units, however, this can be largely attributed to the timing of the stage of management within forest stands. The model uses an average condition for entry times, and some variation should be expected when planning operations from stand to stand, particularly in stands that have already received management.

Figure 4.3.1.1 Operability Range Substitution by Clearcut Forest Unit

Forest Unit	Area Outside of Operability (Ha)	% of Total Available
PWST	115	3%
PR1	4	1%
PJSB	166	7%
SF	437	4%

The strategy to carefully select harvest allocations with the goal of choosing stands that have a reasonable likelihood of being operated yet remain within the tolerances of meeting FMP objectives and tests for sustainability was achieved.

4.3.1.2.2 Real World and Spatial Constraints

The management strategy prescribes the ‘optimum’ age-class and SOM distribution of the allocation based on non-spatially explicit inputs and constraints. The model is only able to solve the problem as it is framed within its technical capabilities. SFMM has limited capabilities when it comes to considering the numerous spatial constraints that are real-world factors during the selection of harvest allocations.
Spatial constraints that drive allocation decisions not considered by the model can include:

1. economic considerations (e.g. proximity of stand to existing roads and other stands),
2. administrative considerations (e.g. traditional operating areas) and
3. policy considerations (e.g. Natural Disturbance Pattern Emulation Guide).

4.3.1.2.3 Economic Considerations

Economic considerations must be part of the allocation equation. If an FMP harvest block is not economically feasible to operate it simply won't be operated. Without operations there is little doubt that some FMP objectives will not be achieved. The planning team solicited ample input from licensees in order to develop harvest blocks that have a high probability of being operated. Under-utilization of the AHA has been cited as an issue in the ten year annual report and historic independent forest audits.

In essence, an informal economic analysis was undertaken in each case. Considerations such as the management strategy, estimated standing volume, block operability (e.g. slope, harvest season, skidding distance, etc.) proximity to existing roads, water crossing installations and haul distance to processing sites were examined by the licensees as well as the planning team.

Some stands outside of the management strategy age-class and SOM criteria were selected in consideration of the economic feasibility of the harvest block as a whole. Again, the goal of this process was to carefully select areas for harvest operations that are most likely to be operated while remaining within the tolerances of meeting FMP objectives and tests for sustainability. This goal was achieved. This consideration accounts for a relatively high proportion of the age-class and SOM substitution area.

4.3.1.2.4 Stage of Management Considerations

Another reason for not scheduling a next stage of management is related to the silvicultural condition of the stand, and the fact that the regeneration in all stands may not reach the standard required for height and stocking in the understorey, making it less favorable for operation. These stands either need more time, or additional silviculture treatment to qualify for the next stage of management.

The company surveyed a large portion of the shelterwood forest units in 2006 to prepare for the development of the planning inventory. These surveys were intended to update unknown stages of management, in stand that the company had not operated in, but had historically received treatment. In many cases, the stands had established regeneration in the understorey, and were ready for a first removal. SFMM would naturally select these stands as ready for operation in the management strategy, however, because they had not been in previous operational plans (near other areas of shelterwood management), they were not always a spatially favorable fit in the operational plan. These stands have been established for several years, and will continue to wait with little silvicultural risk until the next operational plan.

The company has made a decision in these areas to delay next stage of management for at least one planning period, considering previous silviculture investment and present stand condition. For the most part, decisions made to delay one period will not jeopardize the silvicultural status of stands that are ready for a next stage of management.

4.3.1.2.5 Administrative Consideration

Nipissing Forest Resource Management Inc. is organized as a Cooperative Sustainable Forest Licensee. Five shareholders and ten independent operators work concurrently on the Nipissing Forest. Each shareholder and the group of ten independent operators work within their own SFL administrative areas known as "traditional operating areas". Each shareholder generally harvests trees within their own traditional operating area. There are a total of six traditional operating areas on the Nipissing Forest.

Each of the operators (shareholders and independents) is entitled to a proportion of the AHA equal to the owned share-proportion of the company. For example: if 'Shareholder X' owns a 12% share of Nipissing Forest Resource Management Inc. they are essentially entitled to 12% of the AHA in the management strategy. Because each traditional operating area has a proportion of forest unit area differing from the proportion across the entire forest (from which the AHA is calculated), the harvest area from the management strategy is distributed by using a weighting factor calculated from the proportion of eligible area by forest unit within each traditional operating area.
To summarize, traditional operating areas add an element of constraint to the selection of harvest allocations. This, in some cases, required areas outside of the management strategy prescribed age-classes and SOM to be allocated in order to meet the licensees' AHA proportion, even though more age-suitable area may have been available in a different traditional operating area. This consideration accounts for a relatively moderate proportion of the age-class and SOM substitution area.

4.3.1.2.6 Policy Considerations

Several policy considerations such as the Natural Disturbance Pattern Emulation Guide are spatially explicit constraints and cannot be accounted for in SFMM. Ideally, draft areas selected for harvest operations are chosen consistent with the management strategy and then tested for compliance with spatially constraining policies using various computer tools such as the Ontario Wildlife Habitat Assessment Model (OWHAM) and the Natural Disturbance Pattern Emulation Guide Tool. If the allocations do not pass the tests, the harvest areas must be adjusted and re-tested. An allocation adjustment may solve one issue but inadvertently create another. This process is very time consuming and inconclusive until the tests have all been satisfied.

In order to satisfy spatially explicit policy issues in a timely manner during the production of the FMP some areas outside of the management strategy prescribed age-classes and SOM were selected for harvest allocation. These considerations account for a relatively small proportion of the age-class and SOM substitution area.

A summary of the residual stand structure for each planned disturbance is provided in table form and is located in section 6.1.4.

The planned harvest areas are portrayed on the operations maps located in section 6.1.2. A list of all planned harvest areas is provided in section 6.1.14.

There are no stands identified in this FMP for harvest as a result of an insect pest management strategy.

4.3.2 Surplus Harvest Area

There are no surplus harvest areas declared available in this plan. The reasons for surplus areas not being identified include:

a) Due to the mixed nature of the stands on the Nipissing Forest, all stands are considered to contain some of the species and products required to meet the industrial demand,

b) NFRM has put in place a policy to make unneeded harvest areas available to the other licensees on the forest. This policy is intended to improve utilization of available volumes from the forest. If a licensee realizes, during the implementation of the Plan, that it is not going to be able to harvest all of its areas, it is encouraged to make those areas available to the other licensees. This policy has been in place for approximately three years and has been working well. For example, Grant Forest Products has allowed Tembec to harvest a number of its allocations in the 2004 FMP.

c) Market conditions/requirements are fluctuating dramatically between species and products so it is difficult to predict what species and products will actually be surplus. For example, stands of red & white pine are currently being left unharvested in order to operate in low quality stands where there is a market for pulpwood. This is something that was unheard off until just recently.

d) During the preparation of this Plan, companies, such as Grant Forest Products Ltd., have been making arrangements with companies like Goulard Lumber Ltd. to harvest some of its allocations. This practice is also intended to improve utilization.

In order to meet the industrial demand for some species and products, SFMM identified the required harvest level for each of the forest units. This process resulted in the inclusion of some volumes in allocated stands which exceed the volumes needed to meet the current industrial demand. These excess volumes are projected as “unutilized” in FMP-18 located in section 9.0 of the Plan.

While historically the level of utilization on the Forest has been low (approximately 55% of the planned AHA), NFRM is currently working with the MNR’s Forest Secretariat in

Sault Ste Marie, and other interested parties, to make these volumes available for hydro co-generation and pellet plant facilities. Presently there is considerable pressure on the Ontario Power Generation Corporation to switch some of its coal fired generating stations over to wood pellets, which are a renewable resource and considered carbon neutral. A new pellet plant or hydro co-generation facility in the North Bay/Sudbury area would not only utilize these excess volumes but would also utilize some volumes currently going to facilities in Quebec

4.3.3 Completion of On-going Harvest Operations from Previous Plan

No harvest operations have been identified from the 2004-2009 FMP as candidate areas for bridging or for second-pass harvest operations.

Provisions for bridging and second-pass would allow the harvest operations to continue into the first three months of the new FMP until June 30th.

However, typically the active harvest operations late into the final AWS period (2008-2009) are under winter ground conditions with limited all weather road access during the spring period. The anticipated benefit of bridging these operations, if required, is considered minimal.

There are presently no examples of harvest operations in the 2004-2009 FMP which would meet the second-pass criteria.

4.3.4 Planned Clearcuts

In the first five-year term of this Plan 90% (163 clearcuts) of planned clearcuts are less than 260 hectares while 10% (18 clearcuts) of planned clearcuts are larger than 260 hectares.

Table FMP-16 lists all the planned clearcuts with associated rationale. There are 181 planned clearcuts in total with 18 being larger than 260 hectares.

In general, the majority of clearcuts on the Forest include a variety of forest units and are often mixed with other silviculture systems such as seedtree, shelterwood and selection.

A strategy for residual planning relating to the emulation of natural disturbance pattern is identified by disturbance in section 6.1.4 of the Plan. This section also contains the identification of the amount of stand level residual area required by disturbance, considering the planned harvest for the first 5-year term. Clearcuts less than 100ha in size do not require residual area for stand level insular or peninsular patches. Biologically the Nipissing Forest is very diverse as it is located in the Great Lakes St. Lawrence Forest Region which is a transitional forest between the Hardwood Forest Region to the south and the Boreal Forest Region to the north. Planning for residual areas in small clearcuts

(>100ha) has minimal benefit, as the harvested area is generally diverse in structure and configuration due to the variety of forest types and conditions.

All clearcuts greater than 260ha have the proposed stand level residual patches identified on the operational maps. These patches are considered to be a preliminary identification of stand residuals, to be confirmed and possibly adjusted at the time of forest operation prescription development. This process was completed in conjunction with the help of the MNR District Biologist. Many of the proposed insular or peninsular residual areas overlap with moose thermal cover habitat values.

An evaluation of residual stand structure resulting from the proposed stand level residual patches will take place in the 3rd year annual report, to assess the effectiveness of preliminary identification, and the resulting residual patches left as a result of the forest operations prescription.

The maximum planned clearcut size is 2,752 hectares. This clearcut is comprised of 934 ha of planned harvest area in the first 5-year term and 1,818 ha of existing clearcut disturbance. The average planned clearcut size is 158.5 hectares.

While attempting to move the landscape towards the natural disturbance template in terms of size, distribution and frequency of disturbances, the following provides additional description, including biological and silvicultural rationale, for the planned clearcuts greater than 260 ha.

Disturbance Identification # 15:

This planned clearcut totals 556 ha in size and is comprised of 125 ha of planned clearcut allocation and 431 ha of existing clearcut. This planned clearcut is located west of the McLarens Bay Road and south of the Porcupine Creek Road. Green Creek and the Webb Lake creek system form the disturbance boundaries.

This block is assembled around a two large 90-91year old BW stands. The forest management objective is to allocate the mature intolerant hardwood and to create a clearcut that contributes towards the movement to the disturbance template.

The stands are off site white birch and poplar with a white pine component. These BW stands have excellent road access and therefore may be suitable for rehabilitation to a PWUS or PR forest unit.

Planned NDPEG residual patches are located around low lying wet areas and are designed to maintain a distance to cover for moose at less than 400m.

Disturbance Identification # 16:

This is the largest planned disturbance with a total clearcut area of 2752 ha, which is comprised of 1818 ha of existing clearcut and 933 ha of planned clearcut.

Disturbance # 16 is located in the northeastern portion of the Nipissing Forest west of McConnell and Emerald Lakes. Within the disturbance there are many smaller lakes including Jimmy, Mug, Pole and Raft Lakes. Opimika Creek flows through the middle of the disturbance. AOC include moose aquatic feeding areas, coldwater fisheries and warm water fisheries as well as RSA 44. The Lasalle Extension primary and Spider Lake branch road corridors are planned within this disturbance.

Disturbance # 16 attempts to complete a fragmented area of existing clearcuts and natural features and results in an irregular shaped disturbance which emulates a natural disturbance. Planned NDPEG residual areas are primarily identified moose thermal cover values. Existing residual areas are lowland cedar/black spruce. There are many small stands of 20 to 30 year old seeded jack pine within the disturbance.

The planned portion of this clearcut is primarily comprised of MW, PO and SF forest units. Silviculturally much of the area will be naturally regenerated to mixedwood or poplar and other intolerant hardwoods. This will provide excellent moose and deer browsing opportunities. Other sites will be planted to maintain the SF forest unit. Access is good being adjacent to primary roads therefore suitable stands of off sites poplar may be rehabilitated to white and red pine. Much of the existing clearcut area is regenerated naturally to poplar or planted to jack pine.

<u>Disturbance Identification # 95</u>:

This is the second largest planned clearcut with a total disturbance area of 1860 ha, which is comprised of 1153 ha of existing clearcut and 706 ha of planned clearcut.

Disturbance # 95 is located in the northwestern portion of the Nipissing Forest west of Temagami River. Within the disturbance Azen Creek and Martin Creek flow through the middle of the clearcut area. AOC include canoe route, heronry, moose aquatic feeding areas and coldwater fisheries. The Dana secondary road is within this disturbance.

Disturbance # 95 attempts to defragment an area of existing clearcuts and natural features and results in an irregular shaped disturbance which emulates a natural disturbance. Planned NDPEG residual areas are situated around low wet areas and or identified moose thermal cover values. Existing residual areas are lowland cedar/black spruce, inoperable areas and AOC.

The planned portion of this clearcut is primarily comprised of PJ, PJSB and PO forest units. Silviculturally much of the area will be regenerated artificially to jack pine and spruce. Much of the total stand area of PJ and PJSB is concentrated in large stands. Larger blocks scheduled for planting and follow-up tending provide silvicultural efficiencies in productivity and economics.

Disturbance Identification # 107:

This planned clearcut totals 1115 ha in size and is comprised of 668 ha of planned clearcut allocation and 447 ha of existing clearcut. This planned clearcut is located west of the Clarkson Road. The Jocko River Park forms part of the western and southern disturbance boundaries.

This block is assembled around a large 110 year old SF stand of 382 ha. This stand and numerous other adjacent 100 plus year old SF stands form the majority of the block. The forest management objective is to allocate the mature spruce / fir and to create a clearcut that contributes towards the movement to the disturbance template.

Much of the total stand area of SF forest unit is concentrated in large stands. Larger blocks scheduled for planting and follow-up tending provide silvicultural efficiencies in productivity and economics.

The existing clearcut to the west of the planned area was harvested during the 2004 FMP. The allocation provides for progressive road and block development from the existing access to the west.

Planned NDPEG residual patches are located around low lying wet areas, moose thermal cover stands and AOC (moose aquatic feeding areas) with the intend to maintain a distance to cover for moose at less than 400m.

Disturbance Identification # 121:

This planned clearcut is 1489 ha in size with 606 ha as planned clearcut and 882 ha as existing clearcut depletion. The existing clearcut is south of Banchee Lake and west of Azen Creek. The planned clearcut is north of the Sturgeon River. Highway 805 forms the southern boundary of this disturbance.

This planned clearcut assembles a concentrated area of eligible stands for one pass harvesting and renewal treatments while protecting known values. The majority of the planned harvest area is PO forest unit of approximately 85-90 years of age. BW forest unit contributes the second largest area. Renewal strategies will likely include a mixture of natural regeneration in the PO / BW forest units with possibly some rehabilitation to PWUS or PR.

AOC in this planned clearcut include canoe route, cold water fishery, and provincial road. The planned NDPEG residual areas are generally associated with these AOC. Additional area is planned around low wet areas, rocky inoperable areas and identified moose thermal cover stands.

Disturbance Identification # 127:

Disturbance # 127 is 478 ha of which all area is new planned clearcut. No existing clearcut contributes to the total disturbance area. This clearcut is located west of Bidwell Lake and east of Holdridge Lake. The Gooderham Road and the Holdridge Lake Road transect the disturbance with Highway 11 passing approximately north to south through the planned clearcut.

This clearcut is composed of a number of mature (85-105 years of age) SF forest unit stands. The intent is to harvest and treat this SF sites in one pass. The majority of these stands will be maintained as SF through artificial or natural regeneration. A large concentration of similar sites will benefit silviculturally in terms of planning and operational efficiency.

AOC within the planned clearcut include moose aquatic feeding areas, cold water fishery, heritage trails and RSA 16 / 21. There are a number of small streams with the planned clearcut adding diversity. Many stand boundaries are adjacent to treed muskeg sites creating a natural clearcut boundary with increased edge. Planned NDPEG residual areas will include overlap with the above AOC and selected conifer patches to maintain the distance to cover for moose at less than 400m.

Disturbance Identification # 135:

This is the fourth largest planned disturbance with a total clearcut area of 1778 ha, which is comprised of 1154 ha of existing clearcut and 624 ha of planned clearcut.

Disturbance # 135 is located in the central portion of the Nipissing Forest south and east of Bear and Hammel Lakes. Within the disturbance there are many smaller lakes including Little clear and Noble Lakes. Many small ponds, wetlands and streams are within the disturbance. AOC include canoe route, moose aquatic feeding areas, coldwater fisheries and warm water fisheries. The Noble Lake, Notman and Hammel Roads exist within this disturbance.

Disturbance # 135 is intended to complete a fragmented area of existing clearcuts and natural features and results in an irregular shaped disturbance which emulates a natural disturbance. Planned NDPEG residual areas are identified moose thermal cover values, partial harvest stands (HDUS / HDSEL) and selected conifer dominated sites to break up the clearcut distance to cover.

The planned portion of this clearcut is primarily comprised of BW, MW, SF and PJSB forest units. Silviculturally much of the area will be naturally regenerated to mixedwood or birch and other intolerant hardwoods. This will provide excellent moose and deer browsing opportunities. Other sites will be planted to maintain the SF or PJSB forest units. Much of the existing clearcut area is regenerated naturally to poplar or white birch.

Disturbance Identification # 137:

This planned clearcut is 923 ha in size with 830 ha as planned clearcut and 93 ha as existing clearcut depletion. The disturbance is located south of Holdridge Creek and southeast of Highway 64.

This planned clearcut assembles a concentrated area of eligible stands of multiple forest units and age classes for one pass harvesting and renewal treatments while protecting known values. The majority of the planned harvest area is BW, SF, MW and PWST. forest units. Renewal strategies will likely include a mixture of natural regeneration in the BW / MW forest units with some artificial regeneration in the SF and PWST forest units.

AOC in this planned clearcut include cold water fishery, and moose thermal cover. The planned NDPEG residual areas are generally associated with these AOC. Additional residual area is planned around low wet areas, rocky inoperable areas and conifer dominated sites (Ce in MCL/SF) located to achieve the maximum distance to cover for moose. An oak dominated hardwood shelterwood stand will also serve as an insular NDPEG area.

<u>Disturbance Identification # 154</u>:

This planned disturbance has a total clearcut area of 1235 ha, which is comprised of 877 ha of existing clearcut and 358 ha of planned clearcut.

Disturbance # 154 is located in the western portion of the Nipissing Forest south and east of the Sturgeon River. Within the disturbance there are many small ponds, wetlands and streams. AOC include moose thermal cover and cold water fisheries.

The Henry Crerar Road and Highway 805 exist within this disturbance.

Disturbance # 154 is intended to complete a fragmented area of existing clearcuts and natural features and results in an irregular shaped disturbance which emulates a natural disturbance. Planned NDPEG residual areas are identified moose thermal cover values, unallocated stands within the planned clearcut and selected conifer dominated sites to break up the clearcut distance to cover.

The planned portion of this clearcut is primarily comprised of MW, SF, BW and PWST forest units. Silviculturally much of the area will be naturally regenerated to mixedwood or birch and other intolerant hardwoods. This will provide excellent moose and deer browsing opportunities. Other sites may be planted to maintain the SF or MW forest units. Much of the existing clearcut area is regenerated naturally to poplar or white birch.

<u>Disturbance Identification # 174</u>:

This is the third largest planned disturbance with a total clearcut area of 1853 ha, which is comprised of 1404 ha of existing clearcut and 449 ha of planned clearcut.

Disturbance # 174 is located in the central portion of Nipissing Forest north and south off the Weyerhauser Road. The disturbance is bounded by Pinewater Creek in the south and a stream system connecting Brule and Malone Lakes in the north.

This disturbance is comprised of two distinct planned clearcut areas separated by two large areas of existing clearcut. The objective was to connect these areas and create one large disturbance.

Moose thermal cover areas were targeted as planned NDPEG insular and peninsular residual areas. The existing clearcut is diverse with patches of lowland spruce/cedar and areas of hardwood shelterwood mixed amongst the clearcut. Much of the existing clearcut has regenerated naturally to poplar and white birch.

Disturbance Identification # 186:

Disturbance # 186 is 1150 ha in size of which 753 ha is existing clearcut depletion and 397 ha is planned clearcut allocation. The Henry Crerar Road roughly creates the divide between the planned and existing clearcut. The existing disturbance has a number of residual patches throughout which serve as suitable NDPEG patches. Two areas private land protrude into the disturbance. Stream and natural boundaries form the majority of the disturbance boundary.

BW forest unit stands form the vast majority of the planned portion of the clearcut. The allocation was developed around a large mature 90 year old BW stand 892056 of over 250 ha in size. Silviculturally this large area will be efficient to treat and mange in one pass. Much of the area will be left for natural regeneration however suitable sites may be rehabilitated to a PWUS or PR forest unit. Many of the stands in this clearcut are classified as protection forest reserve (PFR). This suggests that there are areas of thin soils within this clearcut and site protection will be a management objective.

NDPEG residual areas are planned to overlap with with moose aquatic feeding and cold water fishery AOC. Other residual areas were created around wet or thin soil sites with the intent of reducing the distance to cover for moose to less than 400m.

Disturbance Identification # 190:

This planned clearcut totals 320 ha in size and is comprised of 314 ha of planned clearcut allocation and 6 ha of existing clearcut. This planned clearcut is located south and west of the Little Jocko River and east of Mitchell Lake. Jocko River Provincial Park and stream systems flowing in and out of Mitchell Lake form the disturbance boundaries.

This block is assembled primarily around a large (178ha) hardwood shelterwood stand (805930) which had previously received a seeding cut. The regeneration is now established and the stand is ready for a final removal treatment. Adjacent mature intolerant hardwood stands were added to this disturbance therefore creating a larger clearcut that contributes towards the movement to the natural disturbance template.

The intolerant hardwood stands are generally off site white birch. These BW stands have excellent road access and therefore may be suitable for rehabilitation to a PWUS or PR forest unit.

Planned NDPEG residual patches are located around low lying wet areas and are designed to maintain a distance to cover for moose at less than 400m. A hardwood selection and seeding cut stage shelterwood stand also contribute to the planned residual areas.

<u>Disturbance Identification # 228</u>:

Disturbance # 228 is 497 ha in size of which all area is new planned clearcut. No existing clearcut contributes to the total disturbance area. This clearcut is bordered primarily with stream systems including private land along the south boundary. AOC such as canoe route and RSA along the Sturgeon and Tomiko Rivers respectively also form the disturbance boundary. This area is accessed by the proposed Field Township branch road corridor.

In general this planned clearcut is an aggregate of mature PO, MW, SF forest unit stands bounded by natural features creating a one pass harvesting treatment mimicking a natural disturbance event. It is anticipated that the majority of the area will be regenerated naturally to an intolerant forest type. This will provide excellent moose and deer browsing opportunities.

A mosaic of moose aquatic feeding and cold water fishery AOC bisect the disturbance. These AOC as well as moose thermal cover values and selected conifer dominated low lying areas are identified as planned NDPEG insular and peninsular areas. A hardwood selection stand also provides diversity and structure within the planned clearcut.

<u>Disturbance Identification # 248</u>:

This planned clearcut totals 404 ha in size and is comprised of 324 ha of planned clearcut allocation and 80 ha of existing clearcut. This planned clearcut is located southeast of Valin Lake. Stream systems and stand boundaries form the disturbance edge.

This block is assembled primarily around a concentration of hardwood (HDUS / BY) shelterwood stands which have previously received a seeding cut. The hardwood regeneration is now established and the stands are ready for final removal treatments. With the adjacent existing clearcut added to this disturbance a larger clearcut that contributes towards the movement to the natural disturbance template was developed.

Planned NDPEG residual patches are located around low lying wet areas or inoperable terrain and are designed to maintain a distance to cover for moose at approximately 400m. An unallocated corridor was created through the planned hardwood final removal to serve as a peninsular residual area.

Disturbance Identification # 308:

This planned clearcut is 329 ha in size of which the majority is existing clearcut. Of the total disturbance area 275 ha is existing clearcut and 54 is planned clearcut.

Disturbance # 308 is located south of Highway 17 and west of the Klocks Road. The existing portion of the disturbance is broken with stream systems and shelterwood stands.

The planned clearcut (SF and MW) is surrounded by white pine shelterwood stands. This allocated clearcut area is a function of treating the entire block, within the adjacent stream systems, at the same time.

Small NDPEG residual areas are planned around drainages and low lying areas.

Disturbance Identification # 350:

Disturbance # 350 is a total area of 470 ha of which 300 ha is existing clearcut area and 170 ha is new planned clearcut. The existing clearcut connects the two separate planned clearcut areas.

This clearcut is located west of Perch Lake and is bounded on the southern and western boundary by Boom Creek. The Sturgeon Lake municipal road is west of the disturbance.

This clearcut is composed of a number of mature PWST, SF and MW forest unit stands. The intent is to harvest and treat these sites in one pass. The planned clearcut portion of the disturbance completes an area within and adjacent to Boom Creek similar to a natural disturbance event. A large concentration of similar sites will also benefit operationally and silviculturally in terms of planning and stand management.

AOC within the planned clearcut include moose aquatic feeding areas and cold water fishery. Planned NDPEG residual areas will include overlap with the above AOC and selected conifer patches to maintain the distance to cover for moose at less than 400m.

Disturbance Identification # 366:

Disturbance # 366 is a total area of 328 ha of which all area is new planned clearcut. No existing clearcut contributes to the total disturbance area. This clearcut is primarily bordered with stream systems and wetlands.

In general this planned clearcut is an aggregate of mature PWST, MW and PJ forest unit stands bounded by natural features creating a one pass harvesting treatment mimicking a natural disturbance event. It is anticipated that the majority of the area will be regenerated naturally to an intolerant forest type with some artificial regeneration to maintain the jack pine and white pine component. This will provide excellent moose and deer browsing opportunities.

Cold water fishery AOC and wet sensitive sites such as alder and open muskeg polygons bisect the disturbance. These AOC as well as moose thermal cover values and selected conifer dominated low lying areas are identified as planned NDPEG insular and peninsular areas. Two small white pine shelterwood stands provides diversity and structure within the planned clearcut.

<u>Disturbance Identification # 420</u>:

This planned clearcut is a total of 399 ha comprised of 62 ha of existing clearcut and 337 ha of planned clearcut. The disturbance is located in the eastern portion of the Nipissing Forest north of the Brent Road in Cameron Township.

Disturbance # 420 is an aggregate of mature clearcut MW, SF, BW forest unit stands bounded by a natural edge (water system) to the north of the disturbance. The harvest allocation is intended as progressive development from the recent existing clearcut area north of the Brent Road.

Planned NDPEG residual areas include overlap with AOC such as moose thermal cover values, moose aquatic feeding areas and cold water fishery. Other identified insular and peninsular areas are conifer dominated low lying areas selected to maintain the distance to cover at less than 400m for moose. A hardwood shelterwood stand and selection stand are also proposed to serve as NDPEG residual areas.

4.3.5 Harvest Volume

The forecast harvest volume for the 10-year period is 7,367,533 m^3; 4,037,709 m^3 is hardwood and 3,329,824 m^3 is conifer.

This information is provided in greater detail in FMP-17, section 9.0.

The available volume projected in the forest management model consisted of 4,076,000 m^3 of hardwood representing a 1.4% variance from the forecasted levels. 3,364,200 m^3 of conifer represents a 1.8% variance from forecasted levels. The forecast volume is averaged at approximately 81 m^3/ha, which is increased from the 2004 FMP by approximately 4 m^3/ha. This value is more consistent with actual volume achievement analysis in recent annual reports.

When comparing the available to the forecast, the variance of 1.5% can be explained by a number of different factors. The first is related to the way the model generates an average condition by forest unit. It applies a similar volume recovery to each hectare harvested, depending on its forest unit classification and age. The methodology used to calculate the forecast volume involves individual volume estimates on a stand by stand basis, using the stand level volume generator in SFMMTool. Stocking, site class and species composition are considered on an individual basis rather than an average condition. It is easy to see that spread over 7 million m^3, some variance is to be expected.

Another reason for subtle variance can be attributed to the data used to calculate the stand level volumes in comparison to the data used to calculate the strategic volumes. The planning team utilized both modified Plonski and MOSSY to generated strategic volumes for plan development, depending on most appropriate application by forest unit. Complications with the stand level calculations in the calculator within MOSSY did not allow for forecast volume to be generated using empirical yield assumptions. The planning team decided to use SFMMTool for all forest units in the allocation.

The consideration of operationally modified harvest operations in a portion of the allocation would slightly reduce the expected yield for some stands. This extends beyond the consideration of the strategic direction in the model results and could be a factor contributing as depending on the amount that was allocated.

Overall the variance experienced is not considered to be significant, and forecasted volumes satisfy wood supply commitments in the same manor as the strategic analysis has. Further discussion on utilization is presented in section 4.3.6.

Harvest net down methodologies are found in the supplementary documentation in section 6.1.32 of the Plan.

Planned harvest volumes have been summarized by species and licensee grouping in FMP-18, section 9.0.

4.3.6 Wood Utilization

FMP-18, located in section 9.0, details the wood that is utilized and unutilized by licensee grouping in this Plan and FMP-19, also located in section 9.0, details the wood utilization by mill for the Plan. Both tables identify some surplus volume in cedar, other conifer, hemlock, yellow birch and other hardwoods. Unutilized conifer is found in a combination of pulp and sawlog products, where unutilized hardwood is in pulp products only.

As noted in FMP-19, all but two of MNR’s wood supply commitments are projected to be achieved. Shortages in birch sawlog are subsidized with tolerant hardwood sawlog for the supply agreement for Tembec’s sawmill in Mattawa, Ontario. With the exception of white birch sawlogs, Tembec’s mill requirements can be met from the Nipissing Forest through open market purchases. Wood directives and open market purchases to Tembec’s Mills in Mattawa and Temiskaming are more complicated. Some volumes of species and products cannot be obtained from Tembec's traditional operating area as originally planned. These shortages, however, can be met with open market purchases and or by substituting other species to meet the total demand for the two mills.

While all of the tolerant hardwood veneer is being directed to Columbia Forest Products in Rutherglen, Ontario, the supply is short of the demand by approximately 11,000 m^3 for the 10-year period. This shortage is expected to continue over the entire period of this Plan. However, NFRM's Memorandum of Agreement (MOA) with Columbia Forest Products is to "make available all veneer white birch and tolerant hardwood logs". This will ensure that all available volumes are delivered to Columbia Forest Products' mill in Rutherglen. Similarly, the MOA with Grant Forest Products is to "sell all volumes of non-veneer poplar" to ensure that the current wood supply commitment will be met.

Achievements of the majority of supply agreements (Figure 4.3.6.1) contribute to the long-term stability of the mills. The outcome shown in FMP-19 was produced by first fulfilling the supply commitments as described in the letter from the Northeast Regional MNR office and then assigning any remaining volume to the open market demand developed by the planning team, via the utilization task team.

Figure 4.3.6.1 Summary of Wood Supply Agreements on the Nipissing Forest

Processing Facility	Commitment Type	Requirement(s) Met?	Comments
Grant Forest Products Inc., Englehart	Wood Directive (Ministerial Letter) for 97,967 m^3 of non-veneer aspen	Current wood directive met.	Planned allocation will provide 121,518 m^3/yr of non-veneer aspen which is short of Grants desire to increase demand to 134,400 m3/yr
Precut Hardwood	Wood Directive (Supply Agreement, conditional Minister's Letter) for 16,000 m^3 of birch suitable for pallets	Wood directive met	Planned allocations will provide up to 16,000 m^3/yr.
St Mary's Paper Ltd., Sault Ste Marie	Wood Directive (Ministerial Letter) for a target volume of 48,000 m^3/yr of conifer timber	Wood directive met.	Planned allocations will provide up to 48,000 m^3/yr of spruce, balsam and pine fibre, however some of the volume will be from sawlog quality material
Columbia Forest Products, Rutherglen	Wood Directive (Supply Agreement) for a target volume of 8,900 m^3/yr of veneer hardwood	Wood directive not completely met but all available white birch and tolerant hardwood veneer volumes available are identified as going to the mill.	Planned allocations will provide up to 7,788 m^3/yr (which is just short of the Wood Directive).
Tembec Industries Inc, Temiskaming	Wood Directive (Supply Agreement) for 41,000 m^3/yr of tolerant hardwood and 46,000 m^3/yr of white birch (all volumes to be supplied from their licenced areas)	The wood Directive for tolerant hardwood and white birch pulp met.	All white birch and tolerant hardwood pulpwood planned to be harvested on Tembec's licence are shown as going to their mill in Temiskaming. (41,600 m^3/yr of tolerant hardwood and 46,000 m^3/yr of white birch pulpwood)
Tembec Industries Inc. Mattawa	The Wood Directive (Supply Agreement) for 19,950 m^3/yr of tolerant hardwood, 22,800 m^3/yr of red & white pine, 41,600 m^3/yr of SPF, and 25,900 m^3/yr of white birch.	Wood directives met for Red & White Pine and SPF sawlogs but not met for white birch sawlogs, tolerant hardwoods sawlogs met and make up the difference for the white birch shortage.	Planned allocations to Tembec from their licensed area will provide 23,446 m^3/yr of tolerant hardwood, 22,800 m^3/yr of red & white pine, 43,232 m^3/yr of SPF and 22,304 m^3/yr of white birch.

In addition to supply agreements on the Nipissing Forest, the Plan makes wood available on the open market. These demand levels were generated by the utilization task team by considering recent utilization, historic demand and use, and early scoping analysis during the development of the Plan.

Figure 4.3.6.2 identifies all of the potential open market demand (in addition to the supply agreements). In most cases open market demand has been met with the desired species grouping, or with another similar species grouping in the case of shortages.

Quebec facilities have traditionally consumed 28% of the volume from the Forest. The Tembec Temiscaming facility represents the single largest user of round wood from the Forest. A small volume of open market wood has been identified as available to other facilities in the province of Quebec. This open market demand is important to achieve the full utilization levels from the Nipissing Forest, and for this reason, it has been recognized in the Plan.

With the exception of the Tembec's mill in Temiscaming, (which is subject to a supply agreement recognizing Ontario Crown wood flow outside the province), wood being shipped to Quebec must first be offered to Ontario mills (as required by the "Northeast Region Procedure for Shipment of Round wood Outside the Province"). While NFRM would prefer to see all of the harvest being utilized in Ontario, the wood going to Quebec does help increase the level of utilization on the Forest and helps maintain current employment levels for the licensees.

During the implementation of this Plan, it is expected that either a co-generation facility or a pellet plant facility will be constructed in the North Bay/Sudbury area. Such a facility would probably require at least 150,000 m3/yr and any open market wood now going to Quebec would be made available to this new facility first. This potential demand not only exceeds the levels declared unutilized in this Plan, but may also increase utilization in species which have been traditionally underutilized in the past on the Forest.

Figure 4.3.6.2 Demand for Wood Supply on the Nipissing Forest

Demand for Wood Supply on the Nipissing Forest

OpenDemand
Directive

Species Group	Reciever	Desired Level/Target m^3/year	Product	FMP Achievement m3/year
BW	Precut	16,000	Sawlog/Pulp	Met
BW	Tembec - Mattawa	25,900	Sawlog	Met with Other Species
BW	Tembec - Mattawa - Open	2700	Sawlogs	Met
BW	Tembec - Temiskcaming	46,000	Pulp	Met
BW	Columbia	2,966	Veneer	Met
BW	Tembec - Open	18,600	Pulp	14,101
BW	Fryer	780	Sawlog	Met with UHLH
Total BW Fibre		112,946		
PO	Levesque	500	Veneer	Met
PO	Norbord	500	Veneer	Met
PO	Longlac	700	Veneer	Met
PO	Grant - Engleheart	97,967	Non Veneer	Met
PO	Grant - Open	33,533	Pulp/Saw	23,551
PO	Temlam	500	Veneer	Met
PO	Fryer	700	Sawlog	Met with UHLH
Total PO Fibre		134,400		
PWR	Fryer	10,000	Sawlog	Met
PWR	Shaw	6,600	Sawlog	Met
PWR	North PT	4,500	Poles	Met
PWR	Tembec - Mattawa	22,800	Sawlog	Met
PWR	Tembec - Mattawa - Open	10550	Sawlog	Met
PWR	Goulard	28,600	Sawlog	Met
PWR	Smurfit	4,500	Pulp	Met
PWR	Holkum	12,000	Sawlog	Met
PWR	Domtar - Espanola	14,000	Pulp	10,540
PWR	Chartrand	500	Sawlog	Met
Total PWR Fibre		114,050		
SPF	Bowater	4,200	Pulp	Met with UHLH Pulp
SPF	Domtar - Nairn	51,000	Sawlog	Met
SPF	Domtar - Espanola	14,000	Pulp	Met with PWR Pulp
SPF	Tembec - Mattawa	34,760	Sawlog	Met
SPF	St, Marys	48,000	Conifer	Met
SPF	Holkum	6,900	Sawlog	Met
SPF	Liskeard	3,000	Sawlog	Met
SPF	Tembec - Bearn	6,640	Sawlog	Met
Total SPF Fibre		168,500		
MH	Fryer	2,200	Sawlog	Met with MH and UHLH
MH	Tembec - Open	18,500	Pulp	Met
MH	Tembec - Mattawa	19,950	Sawlog	Met with MH and UHLH
MH	Tembec - Mattawa - Open	360	Sawlog	Met with UHLH
MH	Columbia	2,966	Veneer	778
Total MH Fibre		43,976		
UHLH	Tembec - Mattawa - Open	240	Sawlogs	Met
UHLH	Tembec - Temiskcaming	41,600	Pulp	Met
UHLH	Tembec - Open	18,500	Pulp	Met
UHLH	Smurfit	4,500	Pulp	Met
UHLH	Fryer	2,200	Sawlog	Met
UHLH	Columbia	2,966	Veneer	Met

In addition to identifying utilized timber, FMP-18 and FMP-19 also identify approximately 35,000 cubic metres a year of tolerant hardwood pulp, cedar, other conifer and hemlock sawlog and pulp as unutilized fibre. Please refer to Section 4.3.2 on Surplus Harvest Areas for a discussion of the reasons for not identifying surplus area and the steps NFRM has and is taking to increase utilization on the Forest.

In the event of utilization problems during the 2009 Plan, NFRM and North Bay District MNR will follow the guiding principles outlined in the Northeast Region Operations Guide for Marketability Issues, released in April, 2008, located in section 6.1.30

The approval of this FMP is not an agreement to make areas available for harvest to a particular licensee, or an agreement to supply wood to a particular mill, but rather an identification of the wood available for market, and the demand associated with the Forest.

4.3.7 Salvage

Presently, there are no salvage operations planned during the period of this FMP.

However, if there are any occurrences of damage on the Forest from natural disturbances such as windstorms, wildfires or insects, there may be opportunity for salvage operations in the future.

Should potential salvage opportunities arise during the term of this FMP, proposed amendments will be presented to the MNR for their approval.

4.3.8 Contingency Area and Volume

Unforeseen circumstances such as blowdown, wildfire, insect damage or disease may cause some of the planned harvest area to become unavailable for harvest during the ten-year period of the FMP. In order to accommodate such circumstances contingency areas for harvest have been identified. The contingency area is intended as replacement area for lost harvest opportunities. Often contingency areas are later proposed as regular allocation harvest areas in the following FMP. The contingency areas are identified and portrayed on the operations maps in the section 6.1.2. The stand listing of the contingency areas is provided in section 6.1.14 of the Plan.

Contingency areas were selected spatially across the Forest to support opportunities for all the licensees. In general, contingency areas were located near existing roads or adjacent to proposed allocations to allow for operational feasibility.

FMP-20, section 9.0, records the amount of contingency area by forest unit and age class with associated conifer and hardwood volumes. The total contingency harvest volume equals 1,607,348 m^3 which is comprised of both conifer and hardwood volumes of 809,310 m^3 and 798,038 m^3 respectively.

There are 18,093 ha of contingency area identified in the plan. This total contingency area represents two years (20%) of the available harvest area. In general, on a forest unit basis the intent was to approach or exceed two years worth of contingency particularly in the clearcut forest units and PWUS. The exceptions were the hardwood forest units

HDSEL and HDUS which are both large in size and not typically prone to natural disturbances.

4.4 Renewal and Tending Operations

4.4.1 Renewal and Tending Areas

The forecast and planned levels of renewal and tending operations associated with harvesting and natural disturbances are summarized by treatment in table FMP-21 in section 9.0. The treatments in the table will be consistent with the acceptable alternative silvicultural treatments in the silvicultural ground rules in FMP-5 in section 9.0. The areas selected for renewal and tending operations for the first five-year term are shown on the operations maps for renewal and tending in section 6.1.2.8.

The planned regeneration treatments that are proposed for the first five years of the plan include:

- natural regeneration in clearcut, shelterwood, and selection silviculture systems for a total of 31,691 hectares;
- planting in regular harvest areas for a total of 7,245 hectares;
- planting in natural disturbance areas (previously salvaged and with a Forestry Futures Trust program) for a total of 503 hectares;
- there are no re-treatments planned at this time;
- supplemental planting treatments within the HE, PWUS, SF, MW, MCL, HDSEL, HDUS forest units for a total of 2,731 hectares.

The planned site preparation treatments that are proposed for the first five years of the plan include:

- mechanical treatments for a total of 6,549 hectares;
- aerial chemical treatments for a total of 3,064 hectares;
- ground chemical treatments for a total of 2,743 hectares;
- an estimated 647 hectares of slash pile burning.

The planned tending treatments that are proposed for the first five years of the plan include:

- manual tending of plantations evolving on harvest and natural disturbance sites for a total of 819 and 75 hectares respectively;
- aerial chemical treatments of plantations evolving on harvest and natural disturbance sites for a total of 2,493 and 30 hectares respectively;
- ground chemical treatments of plantations evolving on harvest and natural disturbance sites for a total of 1,390 and 150 hectares respectively;
- high complexity prescribed burn on approximately 25 hectares;
- stand improvement concurrent with harvest operations for even-aged silviculture systems (HDUS and BY forest units) for a total of 1,395 hectares;

- stand improvement concurrent with harvest operations for uneven-aged silviculture systems (HDSEL forest unit) for a total of 1,395 hectares.

The planned levels were derived based on consideration of: previously harvested areas and the associated planned treatments; previously salvaged natural disturbance areas with planned treatments; and, a review of the proposed harvest areas for the first five years of the 2009 FMP. Recent effectiveness monitoring surveys are indicating that perhaps the better time to conduct vegetation management treatments are prior to planting rather than 2 to 3 years after planting. This important consideration was reflected in the planned levels of site preparation and tending. Reflected in the planned level of mechanical site preparation was the provision for scarification. This treatment is critical to ensure the best chance for natural regeneration of white pine and yellow birch.

The planned level of treatments described above must be compared to the level of treatments by silvicultural intensity described by the proposed management strategy (PMS). Figure 4.4.1.1 summarizes the planned treatment level by forest unit and silviculture intensity to facilitate comparison with the PMS.

Figure 4.4.1.1 Comparison of Areas Treated for Term 1 in the proposed management strategy (PMS) to the planned levels reflected in table FMP-21.

FU	PMS Prsnt	PMS Ext	Plan Ext	PMS Bas	Plan Bas	PMS Int1	Plan Int1	PMS Int2	Plan Int2
PWST	0	447	472	0	0	1374	1485	0	0
PR	0	0	0	0	0	138.7	77	0	0
PJ	0	0	25	0	0	386.6	229	0	0
PO	0	1814.7	1736	0	0	264.7	244	0	0
BW	0	3813.2	3919	0	0	200.7	194	0	0
MCL	0	495	522	0	0	0	0	212.2	224
PJSB	0	0	95	0	0	0	0	1138.8	855
MW	0	1831.2	2409	1098.7	1097	366.2	366	366.2	366
SF	0	0	464	0	698	0	0	4821	3482
PWUS	2243.3	0	0	0	0	0	0	0	0
HE	1229.8	0	0	0	0	0	0	0	0
LWMX	874.7	0	0	0	0	0	0	0	0
HDUS	4751.4	0	0	0	0	0	0	0	0
BY	455.7	0	0	0	0	0	0	0	0
Totals	9555	8401	9642	1099	1793	2731	2595	6538	4927
Plan % Of PMS	-	-	114.81	-	163.2	-	95.0	-	75.4

Figure 4.4.1.2 facilitates an overall comparison of the ratios between extensive level treatments and basic + intensive1,2 level treatments for the PMS and the planned levels.

Figure 4.4.1.2Comparison of Extensive versus Basic+Intensive1,2 between PMS and planned levels reflected in table FMP-21 by % of total harvested/treated area.

	PMS	PLAN
Extensive	44.7	50.9
Basic+Intensive1,2	55.3	49.1

Figure 4.4.1.2 indicates that the PMS suggests a ratio of 45% versus 55% for total levels of Extensive renewal treatments versus basic + intensive 1 & 2 treatments respectively for the clearcut forest units. In the same manner, the planned levels of those treatments reflected in table FMP-21, indicate a ratio of 51% versus 49%. Essentially, a 6% shift from basic+intensive1,2 to Extensive level treatments resulted from the development of the planned treatments.

The planned level of extensive treatments exceeds the PMS levels by 15% or 1,241 hectares. This difference is due to two factors. Recent operational experience has indicated that approximately 10% of the harvested SF and PJSB area cannot be planted due to various site conditions. The PMS forecasted that 100% of the harvested areas in those forest units could be planted. Secondly, it is anticipated that an approximate total of 950 hectares of natural disturbance areas in PO/BW/MW/PWST forest units will be prescribed for natural regeneration (extensive).

The planned level of Basic treatments exceeds the PMS levels by 63% or 696 hectares. This difference is solely due to the expectation that 15% of previous and proposed SF harvest areas can receive supplementary planting treatments upon successful implementation of the Careful Logging Around Advanced Growth (CLAAG) harvest method. The PMS forecasted that 100% of the harvested areas in those forest units would receive Intensive 2 level treatments (site prep/plant/tend). If the scenario evolves where the level of successful CLAAG is lower than anticipated then more Intensive 1 or 2 level treatments will be required. This action would be consistent with the direction indicated by the PMS.

The planned level of intensive1 (plant & tend) treatments are 95% of the PMS levels or 136 hectares less. Recent operational experience has indicated that approximately 10% of the harvested PJ area cannot be planted due to very shallow soil conditions. The proportion of total harvest area for PJ in the first five years is also lower than 50 % for the 10-year period. Also included in the planned level is 30 hectares of treatment on natural disturbance areas in the PWST forest unit.

The planned level of intensive2 (site prep & plant & tend) treatments are 75% of the PMS levels or 1,611 hectares less. This is primarily due to the anticipation that only 75% (25% treated either extensive of basic as discussed previously) would receive site prep/plant/tend treatments. Also, the proportion of total harvest area for PJSB in the first five years is 40 % for the 10-year period. Recent operational experience has indicated that approximately 10% of the harvested PJSB area cannot be planted due to various site conditions (shallow soils). The combined effect of reduced planned harvest area than normal and a 90% treatable factor accounts for this difference.

In conclusion, the variances from the PMS by the planned levels do not appear significant. The operational experience related to the PJ/PJSB/SF forest units will be enhanced during the first five-year period. The next time the Strategic Forest Management Model is developed, the limitations on levels of specific renewal intensity will be carefully reviewed to reflect these anticipated operating conditions.

4.4.2 Renewal Support

Cones will be collected from natural stands in the three seed zones on the Nipissing Forest (Zones 26, 27 and 28). Red pine, white spruce and red spruce cones may be collected from the Gurd Tree Improvement Area. Contracts for cone collecting will include measuring, tagging, storing, and shipping cones to the Ontario Tree Seed Plant in Angus, Ontario.

NFRM plans to continue with the commitment of purchasing nursery stock locally. Currently, Webb's in North Bay supplies the white pine, jack pine, red oak, cedar, hemlock and portions of the red pine requirements. White, black, and red spruce and a portion of red pine requirements are currently sourced from Millson Forestry Services in Timmins.

Figures 4.4.2.1 and 4.4.2.2 document, for the first five-year period of the Plan, the forecasted seed collection, seed for seeding requirements, and nursery stock requirements for tree planting.

Figure 4.4.2.1 Forecasted Seed Collection for the 2009 to 2014 period.

A. Seed Collection Requirements			
Species	**Seed Zone/ Breeding Zone**	**Source of Seed Collection**	**Seed or Cones Required (hl)**
Red Pine	26	Bulk Stand	20.0
Red Pine	27	Bulk Stand	20.0
Red Pine	28	Bulk Stand	
Red Spruce	26	Bulk Stand	
White Spruce	26	Bulk Stand	80.0
White Spruce	28	Bulk Stand	
Eastern Hemlock	26	Bulk Stand	
Eastern Hemlock	28	Bulk Stand	0.5
Black Spruce	26	Bulk Stand	100.0
Black Spruce	28	Bulk Stand	5.0
White Pine	26	Bulk Stand	30.0
White Pine	27	Bulk Stand	
White Pine	28	Bulk Stand	25.0
Jack Pine	26	Bulk Stand	10.0
Red Oak	26	Bulk Stand	1.0
Red Oak	28	Bulk Stand	1.0
Cedar	26	Bulk Stand	0.5
Cedar	28	Bulk Stand	0.5

Figure 4.4.2.2 Forecasted Seed Requirements for Seeding and Nursery Stock Requirements for the 2009 to 2014 period.

B. Seed Requirements for Seeding		
Species	**Seed Zone/ Breeding Zone**	**Number of Seed Required (000s)**
Red Oak	26	10
Red Oak	28	10

C. Nursery Stock Requirements for Tree Planting			
Species	**Seed Zone/ Breeding Zone**	**Stock Type**	**Number of Trees Required (000s)**
Red Pine	26	Container	1,185
Red Pine	27	Container	79
Red Pine	28	Container	316
Red Spruce	26	Container	126
White Spruce	26	Container	2,840
White Spruce	28	Container	316
Eastern Hemlock	26	Container	3
Eastern Hemlock	28	Container	13
Black Spruce	26	Container	3,693
Black Spruce	28	Container	410
White Pine	26	Container	3,794
White Pine	27	Container	253
White Pine	28	Container	1,012
Jack Pine	26	Container	1,173
Red Oak	26	Container	11
Red Oak	28	Container	11
Cedar	26	Container	3
Cedar	28	Container	3

Red pine cones will be collected during all bumper crop years because red pine is an unreliable cone producer and the current inventory is aging. The white and black spruce targets for seed collection are directly related to supporting the forecasted harvest and renewal levels associated with the SF forest unit. Both inventories of white and jack pine are aging and should be refreshed at the earliest opportunity. Red oak cannot be stored but will be collected on a periodic basis to meet growing and sowing needs. If Cedar seedlings are required to plant, then seed will be collected at the first opportunity. In

general, NFRM intends to have a minimum of five to ten years worth of available seed for each species.
The sowing of red oak acorns is expected to continue but principally in good seed crop years in an effort to minimize predation by rodents. It is anticipated that only one sowing effort may occur every five years.

The planting stock forecast includes provision to possibly continue with hemlock and initiate the planting of cedar.

NFRM manages tree seed consistent with the current policies, directions, and technical requirements for the Province of Ontario. The most pertinent aspects of those documents are included here.

From Seed Zones of Ontario Directive FOR 06 02 01: In addition to these broad directions, the following principles provide specific direction when addressing the movement of tree seed or stock:
• The tree seed source with the best general adaptation (vigour and reproduction) to a site is from the immediate vicinity of the area to be reforested. Without species-specific studies, there is no way to predict the exact distance of seed movement associated with a significant loss of general adaptation to a planting site.
• In the absence of biological information, a system of climatically-based generic seed zones provide an effective means for preventing the use of poorly adapted tree seed and stock. Since they are generic, the climatically-based seed zones are conservative.
• Seed movement across zones is acceptable only if the origin of the seed lot is well documented and the environment of the seed origin is similar to that of the planting site.
• The Seed Zones of Ontario map can be improved only if good records of seed sources and subsequent performance are kept.
• As biological information becomes available, species specific seed transfer guidelines may be developed and used.

DIRECTION**:**
Use climatically-based seed zones to ensure that tree seed and stock used in planting and direct seeding regeneration activities are adapted to local climatic conditions. The Seed Zones of Ontario map is an operational interpretation of these climatically-based seed zones. This map will be updated and re-issued whenever the seed zone boundaries are refined.

Seed Collection

Source-identified tree seed may be either from a general collection when only the seed zone origin is known, or stand collection when the latitude and longitude (or Universal Transverse Mercator coordinates) of the parental stand is known.

Seed and stock Deployment

• Movement of tree seed and stock within seed zones is unrestricted.

• Movement of general collection tree seed and stock across seed zone boundaries is prohibited.
• Movement of stand collection tree seed and stock across seed zone boundaries requires the approval of the appropriate regional tree improvement specialist and provincial forest geneticist.
• When biological information is available, the generic climatically-based seed zones may be replaced with species-specific seed zones or seed transfer guidelines.
• Deployment of genetically improved tree seed and stock will be based on breeding zones.
For auditing purposes, forest managers must keep records that allow for the tracking of the chain of custody for tree seed and stock.

Tree Improvement activities on the Nipissing Forest SFL are primarily conducted on a site located in Gurd Township. The Gurd Research and Demonstration Area is located approximately 60 kilometers south of North Bay. The research area is composed of 200 hectares of land that has a long history of forestry research; this history dates back to the mid 1960's. This site is documented on the operations maps for Renewal and Tending located in section 6.1.2.8.
The Forestry Research Partnership supports annual projects. This partnership is a collaborative effort between the MNR, Canadian Forest Service, Canadian Ecology Centre and Tembec Industries Inc. Many of the projects are conducted under the direction of NFRM. Anticipated tree improvement activities for the Nipissing Forest during the term of this plan are as follows:

<u>Gurd Tree Improvement Area</u>

White Pine Progeny Test:
- Annual maintenance (tending) for competition control
- Annual pest control treatments as required for white pine weevil and white pine blister rust

White Spruce Seed Production Area:
- Possible topping of trees to facilitate cone collection
- Maintenance (tending) to remove competition
- Cone collection as required to meet seed demand

White Pine Seed Production Area:
- Possible crown management to facilitate cone collection
- Maintenance (tending) to remove competition
- Cone collection as required to meet seed demand

Red Pine Seed Production Area:
- Possible crown management to facilitate cone collection
- Maintenance (tending) to remove competition
- Cone collection as required to meet seed demand
-

Red Spruce Seed Production Area:

- Thinning as required promoting retention of lower branches
- Possible crown management to facilitate cone collection
- Maintenance (tending) to remove competition
- Cone collection as required to meet seed demand

White Spruce Super Seedling Area:

- Thinning as required promoting retention of lower branches
- Possible crown management to facilitate cone collection
- Maintenance (tending) to remove competition
- Cone collection as required to meet seed demand

White Spruce Natural Seed Collection Area:

- Thinning from below to maintain the seed producing spruce in a competition-free state

<u>Mattawan White Pine Clonal Seed Orchard</u>

- Tending to promote seed production on the surviving representatives

This site is documented on the operations maps for Renewal and Tending located in section 6.1.2.8.

There is a formal advisory group charged with the ongoing management of the Gurd site. Its membership includes representatives from Forest Genetics Ontario, NFRM, Ontario Forest Research Institute, Tembec Inc/Forestry Research Partnership, and MNR from North Bay. The long term strategies for tree improvement at the Gurd site were originally developed by the MNR but now reside within the Forest Genetics Ontario entity.

4.5 Roads

4.5.1 Roads and Road Corridors

Primary and branch road corridors are identified as 1 km wide as per the FMPM. The primary and branch road corridors are included on the operations maps in section 6.1.2. FMP-22, section 9.0 identifies each new primary and branch road to be constructed anytime during the ten year period of the forest management plan (unlike harvest allocations road construction is not subdivided by phases). Road construction may take place anywhere within the approved corridor and area of concern crossings. Within the corridor Category 14 aggregate pits and landing areas for road right-of-way wood may also be developed.

Existing primary, branch and road networks are recorded in the Existing Roads table in section 6.1.12. This table describes the maintenance, monitoring, access control, and abandonment and decommissioning activities for the five-year terms. Section 6.1.12 provides the use management strategies mentioned above in more detail.

4.5.1.1 Primary Roads

Primary roads provide principal access for the Forest and are constructed, maintained, and used as part of the main road system.

Six primary road corridors are proposed for construction in the 2009-2019 FMP. These primary roads will access harvest areas and allow for access to conduct silviculture treatments for the next 10 years. The roads are also intended to provide long term access to future harvest areas for the next 20 to 30 years.

Two of the above corridors (the Lasalle Extension Road and the Gooderham Extension Road) were approved in the 2004-2024 FMP, but have not been constructed to date, so they have been included in the 2009-2019 FMP. During the 2008-2009 year, it is expected that the Lasalle Extension Road will be constructed to approximately 120m south of Ottertail Creek. No further planning is required since the primary corridors being carried over are consistent with the previously approved FMP. The 500m primary road corridors are mapped exactly as before and the use management strategies remain the same.

The Lasalle Extension Road provides new access to harvest areas in Angus and Parkman Townships. It is within a remote access enhanced management area and therefore access restrictions apply. A bridge and gate will be installed at Ottertail Creek, and the SFL will post signs indicating that, under the Public Lands Act, motorized access is restricted beyond the gate. When the area above the Ottertail Creek crossing is harvested and has reached free-to-grow status, the bridge and gate will be removed, ensuring long-term access control.

The Gooderham Extension Road development would facilitate more efficient movement of wood from the northeast portion of the Forest to mills north of the Nipissing Forest along Highway 11, such as Grant Forest Products mill in Englehart. In order to maintain tourism values in the area, access will be restricted along the new corridor. Access restriction will be achieved by installing gates at the beginning of either end of the connecting corridor. Similar to the Lasalle Extension, the SFL will post signs indicating, under the Public Lands Act, that motorized access is restricted to the public.

The four remaining primary corridors are new proposals. Below is a list of the six primary roads and the associated new construction length:

Ottertail Creek Road (3.7 km)
Schell Lake Road (12.0 km)
Odorizzi Road (19.9 km) - reconstruction
Sand Lake Road (11.3 km) - reconstruction
Lasalle Extension Road (7.7 km)
Gooderham Extension Road (10.5 km)

There are 65.1 km of new primary road proposed to be constructed during the ten year term of this FMP, of which 18.2 km (Lasalle Extension / Gooderham Extension Roads) have been approved in the 2004 FMP.

The forest management plan identifies two selected Primary Road corridors to the west of the town of Restoule. These corridors are Odorrizi Road and Schell Lake Road.

The Odorrizi Road was a route originally selected by the planning team, however, it required private land negotiations to take place before use in the forest management plan could occur. The Odorizzi Road corridor remained selected as a result of decisions made through the issue resolution process. Refer to documentation regarding issue resolution in Section 6.1.15 Summary of Public Consultation for further details on the decision.

Following the submission of the draft forest management plan, the Schell Lake Road corridor was developed in response to public input solicited during informal discussions with the citizens of the community of Restoule. This route was originally deemed not suitable by the planning team since it did not provide public access due to the existing road crossing private property. Upon further investigation, the Schell Lake Road corridor has been declared a viable option, provided a reasonable agreement can be made between private land holders and local forest industry. The addition of the Schell Lake Road corridor through private property provides another potential alternative access route to the allocations west of Restoule.

Sand Lake Road is an existing traditional forest access route north of Lake Restoule. It accesses Patterson Township extending to south of Lake Nipissing. The existing road is a total of 14.5 km in length of which 11.3 km is proposed for reconstruction and covered by a primary road corridor. The majority of the existing water crossing structures on the Sand Lake Road require replacement. Six area of concern water crossing sites are identified within the road corridor.

Note : Hauling on the Sand Lake Road will only occur between the Tuesday following Labour Day and the Friday proceeding the Victoria Day weekend of the following year. There is also an associated requirement for mitigation measures. Tembec representatives will meet with a few nominated Restoule residents to discuss mitigation measures. MNR District staff will participate in, and facilitate if necessary, the discussions between the representatives of the Restoule community, Nipissing Forest Resource Management, and Tembec. The MNR's District Manager will make a decision should there be a disagreement on a specific proposal. These discussions must occur prior to any hauling occurring via Sand Lake Road. The mitigation measures are to be determined by September 1st of the year operations are scheduled for this area.

For each new primary road corridor, an environmental analysis is provided in section 6.1.12. This analysis includes a description of each corridor, advantages and disadvantages, road use management strategy, and a cost analysis.

4.5.1.2 Branch Roads

Branch roads are roads that branch off existing primary and secondary roads or proposed new primary roads. If a new road is required to provide access to, through, or between separate areas of operations, the road will be classified as a branch road.

There are a total of ten branch roads forecast to be constructed during the period of the plan with a total construction length of 56.6 km. Five branch roads are planned during the first term of the FMP with a total construction distance of 28.3 km. The following are the branch roads and the associated new construction planned for the first five-year term of the plan:

Field Township Road (4.8 km)
Gwynfa Lake Road (4.5 km)
Scud Lake Road (6.0 km)
Sobie Lake Extension Road (6.8 km)
Spider Lake Road (6.2 km)

The branch road corridors were located to minimize the number of AOC crossings and provide for feasible access to the area of operations. Many of the planned branch corridors follow old existing logging roads which require reconstruction and or new construction.

Section 6.1.12 contains a description, rationale and use management strategies for all the branch road corridors.

4.5.1.3 Operational Roads

Operational roads are contained within the boundaries of an area of operations. They provide short term access for harvest, renewal and tending operations. Operational roads are normally not maintained after they are no longer required for forest management purposes.

FMP-22 lists the networks of operational roads to be constructed during the ten-year period of the FMP.

Each area of operations has an associated use management strategy for the operational roads within its boundary as described in section 6.1.12. The boundaries of the area of operations are greater than or equal to 1km apart. Therefore, a network of operational roads within an area of operations may overlap more than one harvest block. The operations maps in section 6.1.2 depict the boundaries of the areas of operations. Detailed operational road planning will be identified at the Annual Work Schedule stage.

4.5.1.4 Existing Road Networks

New roads constructed by the forest industry from 2005/2006 to the end of the 2004 plan term are considered to be the responsibility of the forest industry. These are typically classified as tertiary roads. The North Bay MNR initiated a program of signed

Memorandum of Understandings (MOU) with the Licensees for the installation of water crossings in 2005/2006.

Existing road networks are coded by Licensee by 2004 FMP block number. For example existing road network equals Tembec # 04-59. An overview map set identifies the location of the existing road networks to date. This map set is located in section 6.1.2.9.

Use management strategies for these road networks are identified in the section 6.1.12.

The forest industry does not require all these existing road networks. These roads will be assessed during the term of this FMP. If the roads meet provincial standards industry will propose to transfer the responsibility for monitoring and maintaining these roads to the MNR. If all or parts of the roads do not meet provincial standards then the road will remain the responsibility of the Licensee. In these instances the Licensee will be required to repair the road or water crossing to achieve provincial standards before again applying to transfer them to MNR.

4.5.2 Roads and Areas of Concern

In order to access the approved harvest allocations, many roads need to cross through areas of concern (AOCs) due to terrain conditions or when no other reasonable alternative exists for the location. In general, to minimize the impact on the AOC the intent is to cross within the modified portion of the AOC and not the reserve portion, with the exception of water crossings.

Road construction through an area of concern must adhere to direction in the Operational Prescriptions for Areas of Concern found in Section 4.2.1 of this FMP. The areas of concern prescriptions are located in FMP-14, Section 9.0, and further supplemental documentation in section 6.1.13.

The primary and branch 100m wide road locations shown on the maps are preliminary locations. The locations and any special conditions required to minimize the impact on the AOC will be finalized in the applicable annual work schedule (consistent with the acceptable variation described in the forest management plan). The 100m wide primary and branch road water crossings and AOC crossings are identified on the operations maps in section 6.1.2.

These maps identify the preferred AOC crossing location and any restricted areas. All other sites along the selected AOC may be considered as acceptable variations for the crossing location. A description and rationale of the primary and branch road AOC crossings is included in section 6.1.13.

Primary and branch roads that cross an area of concern are identified in FMP-23, Section 9.0. The table lists the AOC identifier, road identifier and the location identifier. AOC crossing locations are identified numerically consecutively by road. For example, the first water crossing on Ottertail Creek Road is Ottertail Creek Road WX1. The first AOC crossing (not involving a water crossing) is Ottertail Creek Road AX1.

Operational road AOC crossings will be consistent with direction in the applicable part of FMP-14. The 100m wide AOC crossing locations will be identified and finalized at the annual work schedule stage. Road right-of-way for operational roads will be reduced to 10 metres through areas of concern unless other factors such as safety, are needed to be considered.

No new primary or branch road corridors are planned to traverse a provincial park or conservation reserve during the 10-year term of the FMP.

4.6 Revenues and Expenditures

Table FMP-24 summarizes the forecast of estimated revenues and silvicultural expenditures for the Nipissing Forest for Phase 1 and 2 of the 10-year planning term. The forecast for revenue includes an estimate of the money generated through stumpage fees. The stumpage charges have been estimated by multiplying the current stumpage charges by forecast harvest volumes for each species (Table FMP-17). The stumpage rates and renewal rates are from the July 2007 rates as posted monthly on the MNR website. Rates used in the model can be found in the analysis package in section 6.1.6. For hardwood and red and white pine sawlogs, the estimated grade split was determined based on species product proportions used in the modeling, and consistent with the assumptions used to develop product proportions used for the forecast of wood utilization in FMP-18 and FMP-19, section 9.0.

The forecast of silviculture expenditures for phase 1 and 2 were derived using the planned level of treatments documented in table FMP-21 and the associated renewal support forecasts documented in Section 4.4.2. Those forecasts were then associated with current actual costs to produce the estimated expenditures. Silviculture expenditures for phase 1 are forecasted for both the renewal trust fund and the forestry futures trust fund. This forestry futures trust expenditure relates to the final year of a three-year program of Shelterwood Restoration due to the 2006 Windstorm. A review of the results for phase 1 indicates that Renewal Trust expenditures are forecasted to exceed revenues by 3%. A similar comparison for phase 2 reveals that renewal trust revenues are forecasted to exceed expenditures by a similar amount. Over the 10-year period of the Plan, the forecasted expenditures and revenues are in balance.

This comparison appears to confirm that the current renewal stumpage rates when combined with forecasted harvest levels by species results in providing sufficient revenue to implement the planned renewal program. The current economic climate and associated market situation for the forest industry is causing rigorous reviews of all operating costs. NFRM and the Shareholders will be closely reviewing the current renewal rates as they relate to the renewal program. The review will be done to ensure that the current rates for each trees species and product are consistent with renewal expenditures required to maintain them. This process may identify opportunities to possibly adjust and balance rates. If so, NFRM will initiate discussion with the MNR.

4.7 Monitoring and Assessment

4.7.1 Forest Operations Inspections

The Nipissing Forest 10-year strategic compliance plan has been developed in accordance with the requirements of the MNR's *Guideline for Forest Industry Compliance Planning,* and MNR's *2008 Forest Compliance Handbook*. In general, the compliance plan describes the methods, intensity and frequency of forest operation prescriptions, particular circumstances for which inspections will be conducted, and the submission of inspection reports to the MNR. The compliance plan provides further information and detail for unique situations, past, present and anticipated compliance problems, compliance goals, objectives strategies and expected results, corrective actions, inspection techniques, and roles and responsibilities. The compliance plan is located in supplemental documentation section 6.1.24. A more detailed compliance plan, which is consistent with the 10-year strategic compliance plan, is developed annually and included as part of the annual work schedule.

The North Bay MNR will follow provincial direction and audit ten percent of forest operations including harvest, access and renewal and maintenance. The District uses an approach for inspections which considers the specific values and AOC on the individual sites and the compliance history of the licensee to determine which inspections are audited annually.

The Forest Operations Information Program (FOIP), which is a MNR web-based program, will be used to document inspections, compliance issues and, if required, to track whether remedial actions have been completed.

The LCC has opportunities to be involved both the field portion of forest operations inspections and the review and reporting. NFRM and the MNR have an initiated an informal program with the LCC where members accompany and assist staff with conducting the field portion of compliance inspections. The MNR and NFRM on a quarterly basis present an update of compliance inspections to date for a given year to the LCC. The LCC are invited to attend and participate in the IFA and FSC audits.

4.7.2 Exceptions

There are essentially two exceptions to the Silviculture Guides that require a specific monitoring program. They are: full tree skidding of soft limbed trees in seeding cuts managed under shelterwood silviculture systems such as the PWUS, LWMX, HE, HDUS, and BY forest units; and, implementing the clearcut silviculture system using a strip harvest method within the HDUS forest unit.

The full tree skidding exception was included in the 2004 FMP. In the 2004 plan, seeding cuts in the PWUS forest unit were the only occurrence that this logging method was implemented along with the prescribed monitoring program. Results to date have been favorable to the extent that future use of full tree skidding during seeding cuts in the PWUS forest unit can be monitored through normal processes with normal documentation requirements.

The remaining forest units where full tree skidding is proposed do require a specific monitoring process. The process is composed of two components. There is an operations conduct component and a plot assessment and reporting portion. The focus of this monitoring program is logging damage to residual trees and any advanced regeneration.

The exception of implementing clearcut silviculture system using a strip harvest method within the HDUS forest unit is new. In a similar manner, the process is composed of two components. There is an operations conduct component and a plot assessment and reporting portion. The focus of this monitoring program is on securing yellow birch regeneration subsequent to harvest or scarification.

Section 6.1.11 includes methodologies, timing and duration of monitoring, the documentation and reporting of results, and the opportunity for LCC members to participate in data collection.

4.7.3 Assessment of Regeneration Success

4.7.3.1 Free Growing Surveys

Table FMP-25 identifies the forecast of regeneration success to be assessed by forest unit and silvicultural ground rule for years 1-5 and 6-10 of the 2009-2019 plan term. For the first term, 21,465 ha of harvest and 798 ha of naturally disturbed area is expected to be assessed. For the second term, the forecast increases to 29,202 ha of harvest and 1,576 ha of naturally disturbed area. These forecasts include three elements: 1) all depleted area (harvest and salvaged natural disturbance) currently on record and scheduled for survey during the plan period, 2) a total of 10,525 hectares of XYZ lands, currently on record as clear cuts, to be surveyed over the 10-year period, and 3) consideration of the planned harvest areas for the 2009 to 2019 period.
These particular surveys, known as “Free to Grow”, are one checkpoint in time where the degree of success of applied silvicultural treatments in achieving the standards contained in the SGRs is measured. These surveys will be conducted using a variety of techniques. For homogenous areas of regeneration, a calibrated ocular assessment of the regeneration by a trained and skilled forester or technician will be conducted. In these cases, the surveyor will conduct a measured survey on a variety of blocks, and then with results in hand conduct an ocular survey of those same blocks. Once a surveyor’s judgment is calibrated, he/she continues surveying other blocks by thorough traverses and note taking. For areas where there is greater variability in regeneration success and species, a

more detailed sampling procedure will be implemented to ensure that the surveyed area results are an accurate reflection of the state of regeneration for that area. The results of the surveys are reported spatially in GIS coverages, and summarized in table AR-14 of the Annual Report. The results are also used to update the Forest Resource Inventory before production of the next forest management plan.

The scheduling of free growing surveys is partially driven by a disturbance block reconciliation process. A map is produced annually that depicts all disturbances by silviculture system/development stage/harvest year. It is then overlapped with all areas previously declared free growing. This aids in the planning of efficient survey programs and ensures that all disturbed area is accounted for.

A Forest Renewal Monitoring Protocol, section 6.1.29, identifies the method and timing of surveys at the free growing stage of effectiveness monitoring. The "SOI" or Site Occupancy Index survey method is a variant of the provincially approved STARS method. Both systems provide stocking results and confidence intervals for both crop and acceptable species, however, SOI predicts minimum densities based on 1 well spaced tree per plot, while STARS provides densities based on actual tree counts (up to 5/plot) It is anticipated that in the near future MNR will be providing new direction with respect to survey methodologies.

Free growing surveys are one component of balanced effectiveness monitoring system. The NFRM system includes the following components: treatment implementation, operational monitoring, and focused trial monitoring.

4.7.3.2 Treatment Implementation

The silvicultural treatments described in the SGRs are harvest and logging method, site preparation, regeneration, and tending. As these treatments are being implemented on the ground, a variety of quality control or performance measures are being administered and documented.

The harvest and logging methods are continuously monitored for compliance to standards for site damage, residual tree damage, skid trail coverage, area of concern protection, tree or patch retention requirements, etc.

During the implementation of mechanical site preparation quality control is monitored in terms of site coverage and mineral soil exposure amongst other aspects. For chemical site preparation efficacy monitoring is conducted to ensure judicious and effective use of herbicides. The information is used to refine future treatment prescriptions.
Trees being grown by nurseries are subject to quality specifications including foliar nitrogen levels. Mandatory stock testing is being implemented where frozen stored trees are procured.

During tree planting projects quality assessments are conducted continuously and are used to support payment levels to contractors. Tree handling procedures and specific planting methods are also monitored.

During any manual tending projects plot based assessments are conducted in support of contractor payment. Quality control to ensure that the prescription is properly followed is critical to success of this high cost treatment. All chemical tending treatments receive efficacy monitoring. This information provides a base upon which options for application rates/methods and alternatives can be analyzed in a logical manner.

Once all the previously described treatments have been implemented, they are reported annually to the MNR. These activities are documented in several GIS coverages and recorded in a minimum of 8 Annual Report tables.

On a periodic basis the LCC members are sent an email by the NFRM Silviculture Forester identifying opportunities to job shadow and perhaps assist in recording data in any portion of the NFRM monitoring program. A list of activities (usually more than one is occurring), and contact names are provided.

4.7.3.3 Operational Monitoring

The operational monitoring program strives to:

a. ensure the effectiveness of high cost artificial regeneration treatments;
b. capture as much low cost natural regeneration as possible in the partial cut systems;
c. build a robust database of forest unit/ecosite based treatments and their related performance to facilitate analysis that would identify best bet practices or treatment combinations.

Once the renewal treatments have been implemented the operational portion of the effectiveness monitoring process begins. The process in place for NFRM, namely the Forest Renewal Monitoring Protocol, is documented in detail in section 6.1.29. The approach is separated into 4 Silviculture systems being Clearcut, 2 or 3 Cut Conifer Shelterwood, Selection, and 2 Cut Hardwood Shelterwood. For each system the period of time before free growing and at free growing are separated. For each of these periods of time, the Decisions and Data Required; Survey Timing; and, Survey Method are documented. The final characterization of the process is related to renewal intensity. The specific data to be collected from any survey is described in the protocol.
The Clearcut Silviculture system separates the possible treatment pathways or renewal intensity into Artificial and Natural. Artificial includes monitoring processes for Chemical Site Preparation/Tending and Planting or fill planting. The chemical efficacy rating survey is documented for any herbicide use. A temporary sample plot system is described for planting/fill planting with the intent of: monitoring crop tree performance, determining tending requirements, detecting insect, disease, and wildlife problems; and monitoring ingress of natural regeneration. The 10 meter X 10 meter plots will be re-assessed 1, 2, and 5 seasons after planting. The process for monitoring Natural renewal during the pre-free growing period is essentially focused on conifer. Verification of natural regeneration prescriptions and reporting of the same is to occur any time within 2 years of the completion of harvest activities. Supplemental treatments directed at conifer dominated areas, if required, will be prescribed at that time.

The 2 or 3 Cut Conifer Shelterwood system separates the treatment pathways into no scarify/plant, scarify, chemical site preparation/tending, and planting. Regardless if a seed cut has been scarified or not, pending post-harvest site conditions, fixed-point circular sample plots are established. The intent is to detect changes in: light levels, seed crops, mid-storey interference, crop tree ingress and growth, development of competitive vegetation, presence of insects or disease. The plots will be re-assessed every 2 or 3 years until crop tree regeneration is established. If a seed cut or first removal cut requires supplemental planting the process described for planting is initiated. A Free to Proceed survey, conducted at a fixed time from a seed cut, will serve to document the status of the regeneration. If the regeneration establishes prior to that fixed time, and if specific conditions are met, the first removal cut can occur. In some cases, if the specified time has elapsed and the Free to Proceed survey reveals that the regeneration has not fully established then management decisions will intervene to address concerns including but not limited to site preparation, fill planting, tending and/or reinitiating a harvest to create more suitable conditions (both light and ground) for supplemental or retreatment activities. The Free to Grow survey would then be conducted after the final removal so that the effects of harvesting are accounted for.

The 2 Cut Hardwood Shelterwood system separates the treatment pathways by management objectives. The separations are based on managing for hard maple, or, moving towards or maintaining mid-tolerant species (By, Or, Cb) with or without scarification, or, with supplemental planting/sowing. Where the probability of successfully acquiring hard maple regeneration is quite high only a Free to Proceed survey at a specified time would occur. Where mid-tolerant species management w/without scarification is the focus, fixed-point sample plots are established. The intent is to detect changes in: light levels, seed crops, mid-storey interference, crop tree ingress and growth, competitive vegetation, presence of insects or disease. The plots will be re-assessed every 1 or 2 years until crop tree regeneration is established. If the site requires supplemental planting or sowing the process described for planting is initiated. A Free to Proceed survey conducted at a fixed time from a seed cut and before the final removal cut, will serve to document the status of the regeneration. The Free to Grow survey would then be conducted after the final removal so that the effects of harvesting are accounted for.

Under single tree selection, regeneration of the shade-tolerant species occurs naturally, after each periodic partial harvest, and cohorts of many different ages develop, eventually achieving the all-age structure (size classes) prescribed for management. Normally, regeneration recruits in abundance, and is released with each subsequent harvest. Prior to each harvest, the stand condition is surveyed and documented on a pre-harvest assessment compilation sheet (PHACS). That sheet will prescribe to the tree marker the species, size and quality classes to mark for removal. The sheet will document: the residual Basal Area target; movement toward ideal size class structural targets as established in FOP; the desired AGS/UGS ratio target and the resulting percentage AGS improvement to be achieved by the marking. The tree marking audit results will be documented on the same sheet and the resulting percentage AGS improvement will be recorded. Harvest compliance inspections will reveal if logging damage to site and the residual stand is within tolerance limits. If not, then a formal damage assessment survey will be done and the results recorded and reported in the Annual Report. It is anticipated that the MNR may soon require additional post-harvest stand attribute data (BA of AGS/UGS by species) to be submitted as part of the Annual Report. This information would also be used to update the Forest Resource Inventory.

Another possible pathway of management for a Selection stand is when Opportunistic Group openings are implemented in an effort to maintain the presence of mid-tolerant species (By, Or, Cb). In these cases, an ocular survey will be conducted every 2 years from harvest or annually from the year of supplemental treatments until the crop trees are established.

4.7.3.4 Existing PSP and Focused Nursery Stock Trials

In 2002, NFRM initiated a thrust to establish a network of formal permanent sample plots to:

- Monitor the general effectiveness of artificial regeneration practices on the Nipissing Forest; and
- Monitor the effectiveness of specific artificial regeneration procedures.

In 2002, permanent sample plots were initially established to monitor the effectiveness of fall planting versus spring planting. In 2003, a more extensive PSP program was set up to track the performance of specific nursery seedlings. Soon after planting, the PSP's were established throughout the Nipissing Forest to monitor the performance of seedlings that had received various treatments in the nursery (e.g. nutrient status, mycorrhizal inoculation, seed pre-treatment, stock age and overwinter storage).

In addition to tree growth, information is gathered regarding the plot location (i.e. slope aspect and position), soil type and depth, and competing vegetation.

NFRM will continue to re-assess these existing plots (130 in total) for a period of five years after establishment. Results and conclusions drawn from the information will be included in the text of the annual reports and used in future prescriptions and growth modeling.

There are an additional 30 specific research trials focused on the post-planting performance of nursery stock. Attributes like crop size, crop age, container size, nutrient spiking prior to shipping, slow release fertilizer, and nursery fertilize regimes are being tested. This is being done in an effort to increase the probability of success of artificial regeneration. Also, superior post-plant performance beyond what we are currently experiencing *may* assist in reducing, to some extent, the use of herbicides to control competing vegetation provided the regeneration standards are achieved

4.7.4 Roads and Water Crossings

The following describes the monitoring program for roads and water crossings and the methods of monitoring these during the first five years of the Plan.

A list of existing primary and secondary roads and their associated water crossings, where the forest industry has been identified as being responsible for monitoring and maintenance can be found in the Existing Roads table located in section 6.1.12. Theses roads and water crossings will be monitored annually commencing after the spring freshet. For inactive roads, the monitoring will be carried out by the SFL. Records of these inspections will be kept by the SFL. For active roads, the Licensees will be responsible for monitoring as part of their day to day routine. No record of these observations is required. It will be the responsibility of the Licensee to correct any safety or environmental problems identified until such time as the responsibility is transferred to the MNR or some other third party. Please note that the Existing Roads table will be updated once the depletion mapping for the 2008-2009 period has been completed in the fall of 2009.

Planned primary, branch and operational roads, and their associated water crossings, constructed by the forest industry during the period of the FMP will also be monitored annually in a similar fashion as identified above for existing primary & secondary roads.

The monitoring program will involve formal inspections with documented results in a checklist format. The SFL intends to create a custom road and water crossing checklist form. Other inspections may involve general observations and noting of issues of concern gained from the regularly travelling on the road. Inspections will also be conducted when there is a suspected environmental or safety concern (usually after an unusual weather event) or when concerns are reported by the public. In general, the licensees will maintain those roads that are being used for current forest management activities. Identified environmental and safety issues will be addressed and mitigated on a case by case basis after consultation with the MNR. Licensees are not obligated to conduct repair work on behalf of other users or where the road or water crossing is not the responsibility of the forest industry.

Results of the road and water crossing monitoring will be documented as required in the Annual Report. In some cases compliance inspection reports, as per FOIP, may need to be completed for circumstances requiring follow up rehabilitation work.
Operations maps identifying the primary and branch road corridors, existing roads and road networks in located in section 6.1.2.

The road crossings of Areas of Concern (AOC) and conditions on road crossings are located in Table FMP-23. Detailed information relating to individual primary and branch road crossing and conditions as per FMPM Appendix VII Roads and Water Crossings is found in section 6.1.12
All water crossings scheduled for installation will be included in the applicable annual work schedule in AWS-5. These water crossings and supporting information will be submitted to MNR in order to complete the review as required under the Fisheries Act.

4.8 Comparison of Proposed Operations to the Long-Term Management Direction

Once the proposed management strategy was finalized, and had considered the balance of numerous management objectives, the non-spatial projection of harvest area by forest unit, ageclass and silviculture intensity was identified on the landscape. A preliminary comparison of the operation plan against the strategic direction was performed. Results were summarized as part of the long-term management direction, as well as the proposed operations phases of consultation.

After consultation with the public and areas selected for operations were finalized, another verification run was executed and the results were re-evaluated based on changes to the allocations. This section outlines consideration given to the areas selected for harvest, and how they continue to progress toward achievement of the long-term management direction, and any impact on short, medium and long term objective achievement.

In order to successfully run the model with the selected allocations entered as planned operations, a few small adjustments had to be made to the planned operations input to facilitate a feasible solution.

There were two items documented as problematic for the (SFMM) model. The first was a simple decimal problem. Several forest unit age class totals had to be reduced because a decimal place exceeded the operable area in the model, either via GIS processing errors, or operability limitations related to shelterwood forest units, or model order of operation processed (disturbing the area before it could be harvested). While the disturbance could be a realistic event, it is not possible with any certainty to predict the timing of any one disturbance on the landscape. Nevertheless, the area was moved to the age class above or below, decimal places fixed for simple accounting purposes. The final was related to area in deferrals as a result of the forecast depletion exercise. If an area was forecasted for depletion, and then re-allocated on the basis of new information provided to indicate the area would not be harvested in the current Plan, the result is allocated area that the model believes to already be depleted. The forecast triggers a shelterwood deferral for one term, making the area temporarily unavailable. This area would obviously be a high candidate for allocation into the new Plan, and yet, scheduled for deferral in the model. This caused complications, and was usually related to dozens of hectares in a few forest units.

These are normal complications with the forest units that make forecasting and scheduling challenging in the development of the Plan. The modeling run remains very similar to the management strategy. Adjustments were made to the planned operations input in all cases. These adjustments will have no bearing on the results of the analysis, but have been documented in the analysis package in section 6.1.6. The total area adjusted account for 130 hectares of area within the allocation, with 65% of this related to operability and timing associated with shelterwood harvest. The total area adjusted accounts for 0.14% of the 10-year allocation.

Comparison of projected and forecasted harvest areas are summarized in FMP-15 in section 9.0. The available projected harvest area calculated by SFMM is an optimal allocation which does not take into account spatial constraints or administrative boundaries such as traditional operating areas. In the management strategy, SFMM allocates age classes to minimize volumes lost to succession and stand decline. The actual planned allocation is subject to other constraints, as discussed in Section 3.0 and earlier in this section, which accounts for the variability between the available projected harvest area and the forecast harvest area.

Details and rationale for age class substitution are discussed in section 4.3.1. The average age of the forest units for all harvest allocations for the management strategy is 108 years. The average age of the forest units for all harvest allocations in the forecast harvest is 100 years, or 8 years younger than the figures from the management strategy. This is an improvement of over 7 years from the 2004 forest management plan.

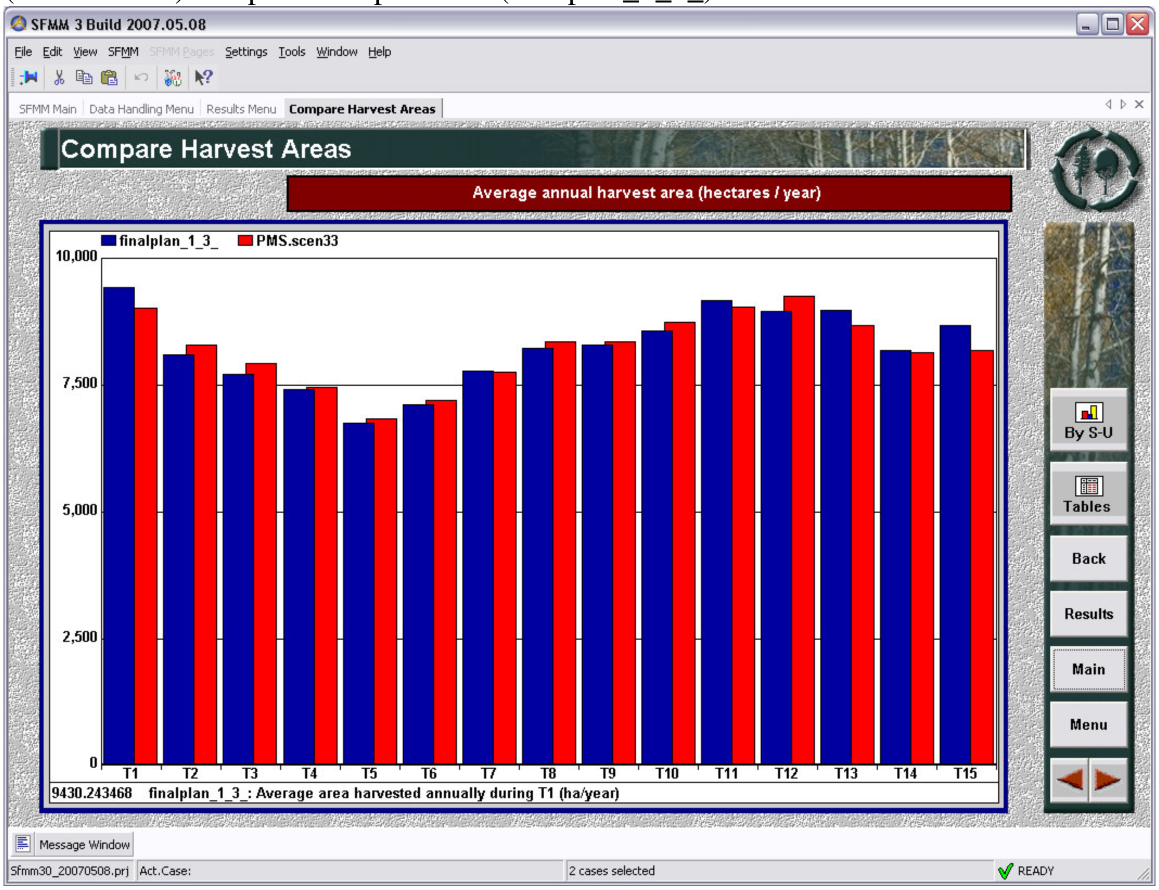
The management strategy was a binding run, meaning that the volume targets were absolute minimums, just as the ecological and common management assumption targets were in every run completed as part of the plan. In a binding scenario, if the model cannot achieve the volume targets without breaking ecological or silvicultural rule sets, the solution is an infeasible one. In a non-binding scenario, the model will strive towards volume targets, but will solve on the basis that the volume achieved was the maximum available with consideration of other objectives. Initial assessments of the comparison of planned operations to the management strategy were tested in a binding environment. This was re-evaluated when the solution appeared to harvest more hectares in order to meet the exact volume figures as the management strategy. In reality some acceptable variation could be expected in the volume projection results, depending on specific site and stand conditions of the allocations. What is more important to consider is the ecological targets set in the management strategy and what the impact to harvest on the ground will have on achievement of those targets. The team was more interested in the subtle variation in volume achievement of the planned operations than it was with an unrealistic representation of harvest on the ground. This decision is consistent with the FMPM (2004) direction to use modeling and analysis similar to what was used to develop the long-term management direction.

Results of the binding model run can be found in the analysis package; however the remainder of the discussion in this section will focus on the non-binding run for the comparison of planned operations to the management strategy.

The major initial impact of the substitution of younger stands for those allocated in the management strategy is to lower volume by approximately 0.2% for the first term achievement. The results in the analysis package show that volume projections are similar throughout the planning horizon. Some more significant difference in the projected volume arise in T4 (2039-2049) and T10 (2099-2109) in the poplar species grouping with 6% (7,000 m^3/year) variation from the management strategy. All other species groupings averaged 100% of the projected volumes in the management strategy run for the 100-year term.

The results also show that available harvest area projection is similar for the planned operations model run. There is variation of approximately 4% in the first term made up of various forest units. Figure 4.8.1 illustrates the difference in the projection of available harvest area between the two model runs.

Figure 4.8.1. Comparison of available harvest area between management strategy (PMS.scen33) and planned operations (finalplan_1_3_) model runs



	PLANFU															
	PWST	PR1	PJ1	PO1	BW1	MCL	PJSB	MW	SF	PWUS	HE1	LWMX	HDUS	BY	HDSEL	Total
Finalplan_1_3	372	27	90	445	861	143	270	747	994	1418	271	204	1514	233	1844	9430
PMS.Scen33	372	29	81	424	836	143	232	747	994	1240	260	183	1452	197	1844	9036

The model attempts to harvest the planned operations as well as additional hectares to make up for the differences related to slight shortfalls in volume as a result of some differences in ageclass of some allocated stands. The model harvests these hectares within the bounds of ecological and silvicultural target setting built into the management strategy. Refer to the analysis package for detailed comparisons of the projected harvest area for the planned operations run.

The overall silvicultural trends for treatment levels between the management strategy and the planned operations run are similar. Total programs are within 100 hectares for total treatment levels/yr. Intensities of treatments for each model run are summarized in Figure 4.8.2, 4.8.3 and 4.8.4.

Figure 4.8.2 Renewal program for management strategy model run

		Silvicultural Intensity / Stage of Mgmt				
	Total	Prsnt	Exten	Basc1	Intn1	Intn2
PWST	364.19		89.40		274.79	
PR1	27.75				27.75	
PJ1	77.33				77.33	
PO1	415.88		362.93		52.95	
BW1	802.79		762.65		40.14	
MCL	141.44		99.01			42.43
PJSB	227.76					227.76
MW	732.47		366.24	219.74	73.25	73.25
SF	964.19					964.19
PWUS	448.66	448.66				
HE1	245.95	245.95				
LWMX	174.94	174.94				
HDUS	950.29	950.29				
BY	91.15	91.15				
		1,910.99	1,680.22	219.74	546.20	1,307.63

Figure 4.8.3 Renewal program for planned operations model run

		Silvicultural Intensity / Stage of Mgmt				
	Total	Prsnt	Exten	Basc1	Intn1	Intn2
PWST	364.06				364.08	
PR1	28.33				25.98	
PJ1	83.72				85.38	
PO1	431.11		414.02		21.79	
BW1	828.55		784.88		41.31	
MCL	141.49		99.01			42.43
PJSB	264.35					264.24
MW	731.99		454.68	131.19	73.23	73.23
SF	963.99		124.76			839.34
PWUS	541.15	531.14				
HE1	252.28	249.12				
LWMX	197.70	193.74				
HDUS	944.36	963.70				
BY	140.55	140.72				
		2,078.42	1,877.34	131.19	611.77	1,219.25

Figure 4.8.4 Renewal program for planned operations model run

Model Run	Total Ha/yr	Exten	Basc1	Intn1	Intn2
Management Strategy	3,838	48%	8%	10%	35%
Planned Operations	3,754	45%	6%	15%	35%

Comparing the two silviculture programs, the results indicate that slight variation between the two runs does exist; however the magnitude is small, and largely influenced by the planned operations harvest recipe including more harvest area. There is no significant difference between any particular treatment levels.

Comparisons have been made for the average site class and stocking conditions of the selected operations with the average conditions on the Forest. Figure 4.8.5 illustrates that a close comparison can be made.

Figure 4.8.5 Comparison of Average Site Class and Stocking of areas selected for harvest compared to the average condition on the Forest, by forest unit.

	Average Condition Comparison					
Forest Unit	MU SC	P.Ops SC	Difference	MU STKG	P.Ops STKG	Difference
BW1	2.0	2.1	-0.1	0.87	0.89	0.02
BY	1.5	1.8	-0.3	0.85	0.80	-0.05
HDSEL	1.0	1.0	0.0	0.86	0.86	0.00
HDUS	1.5	1.6	-0.1	0.79	0.78	-0.01
HE1	1.5	1.7	-0.2	0.77	0.83	0.06
LWMX	1.5	1.9	-0.4	0.80	0.79	-0.01
MCL	1.5	1.9	-0.4	0.72	0.68	-0.04
MW	1.7	2.0	-0.3	0.73	0.70	-0.03
PJ1	1.7	2.1	-0.4	0.92	0.79	-0.12
PJSB	1.2	1.6	-0.4	0.74	0.72	-0.02
PO1	2.0	2.5	-0.5	0.78	0.75	-0.03
PR1	1.2	1.5	-0.3	0.86	0.94	0.08
PWST	1.8	2.1	-0.3	0.58	0.56	-0.02
PWUS	1.5	1.8	-0.3	0.75	0.70	-0.05
SF	1.0	1.3	-0.3	0.68	0.69	0.01

Comparisons made with preferred habitat levels for the two model runs illustrated that the planned operations provide for similar projections of available wildlife habitat for all of the selected species in the long-term management direction. All targets met in the management strategy are met in the planned operations run. The planned operations run was graphed against the management strategy for each selected species in figure 4.8.6 to 4.8.23.

Figure 4.8.6 Comparison of black-backed woodpecker habitat through time in the management strategy, planned operations run and the natural benchmark run.

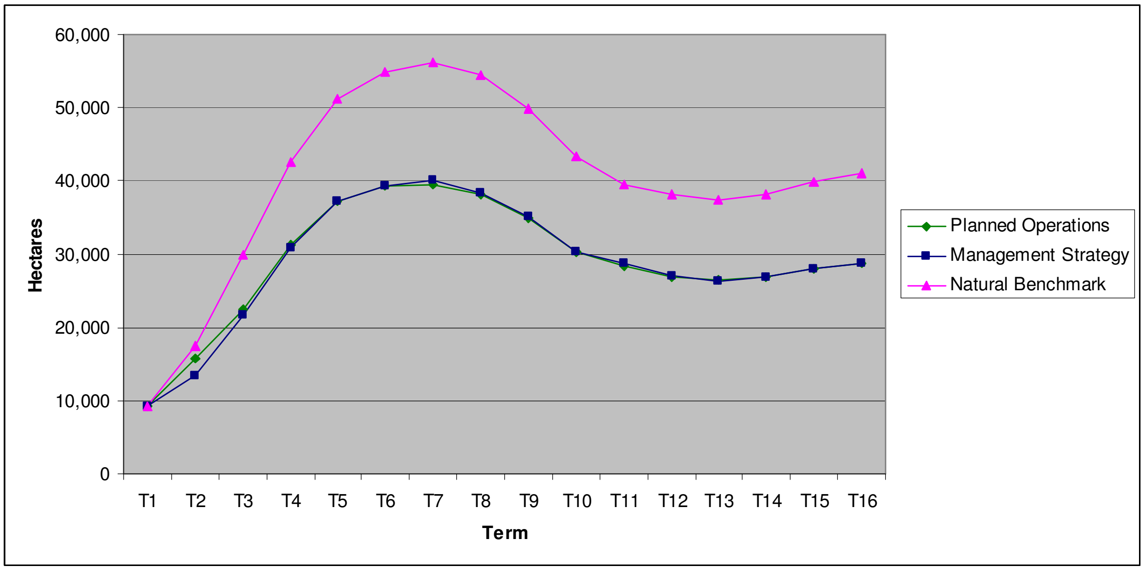


Figure 4.8.7 Comparison of black bear forage habitat through time in the management strategy, planned operations run and the natural benchmark run.

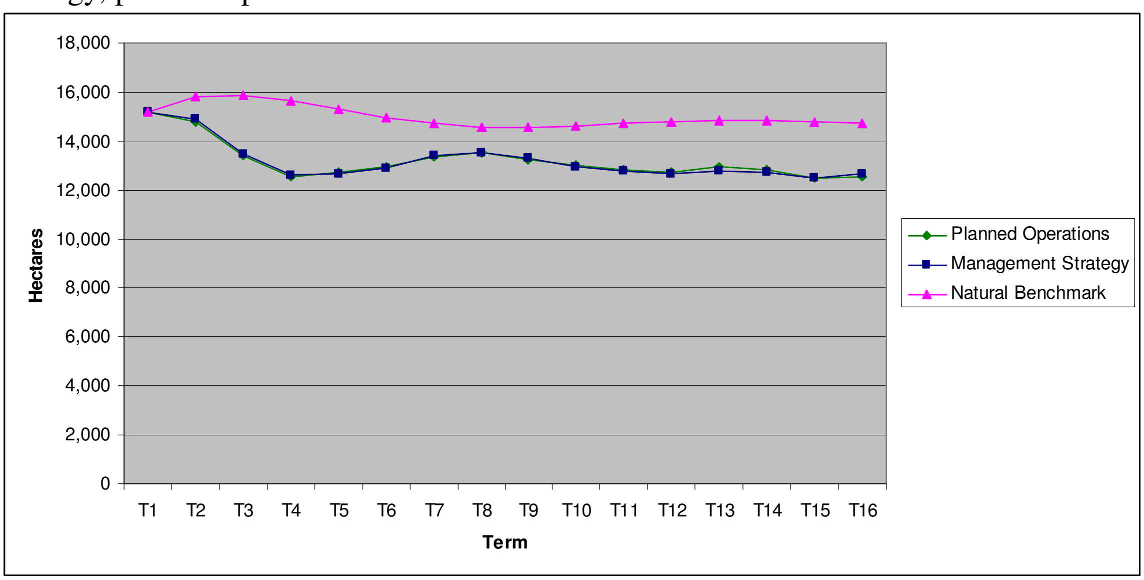


Figure 4.8.8 Comparison of lynx habitat through time in the management strategy, planned operations run and the natural benchmark run

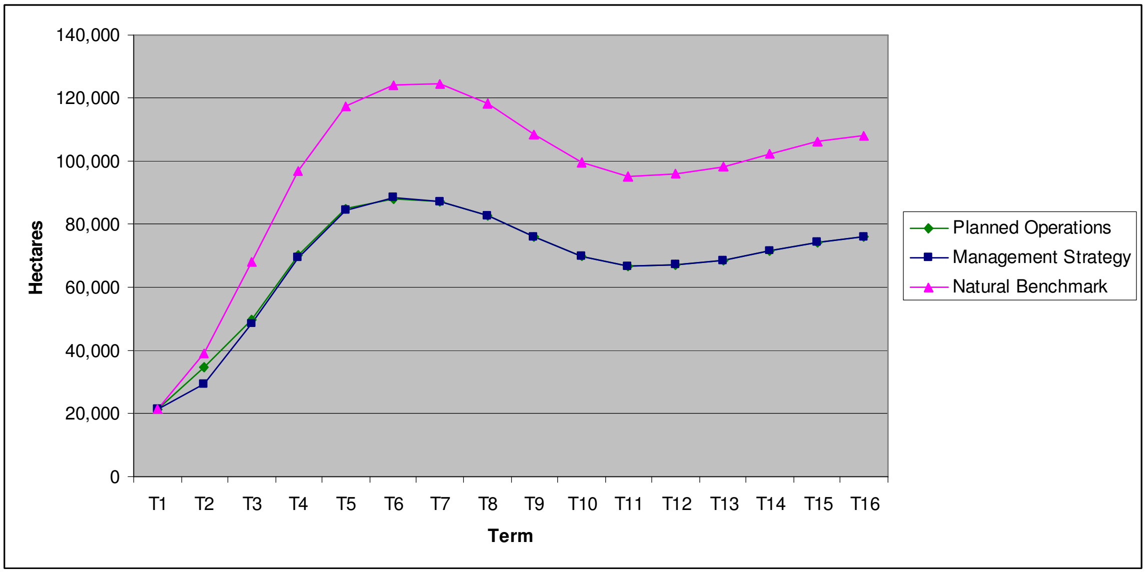


Figure 4.8.9 Comparison of hermit thrush habitat through time in the management strategy, planned operations run and the natural benchmark run

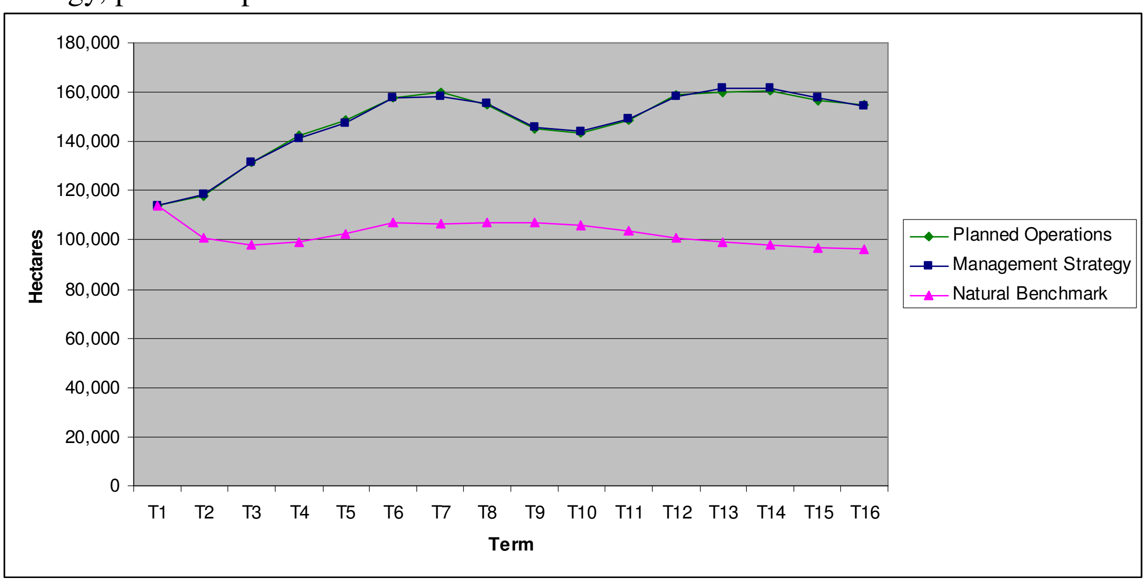


Figure 4.8.10 Comparison of marten habitat through time in the management strategy, planned operations run and the natural benchmark run

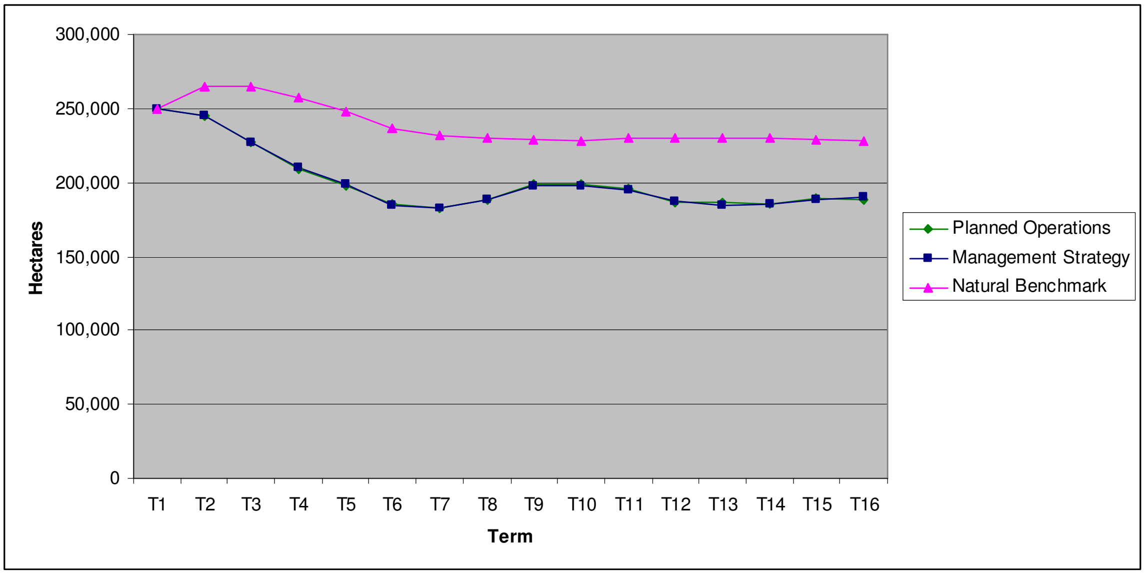


Figure 4.8.11 Comparison of moose browse habitat through time in the management strategy, planned operations run and the natural benchmark run

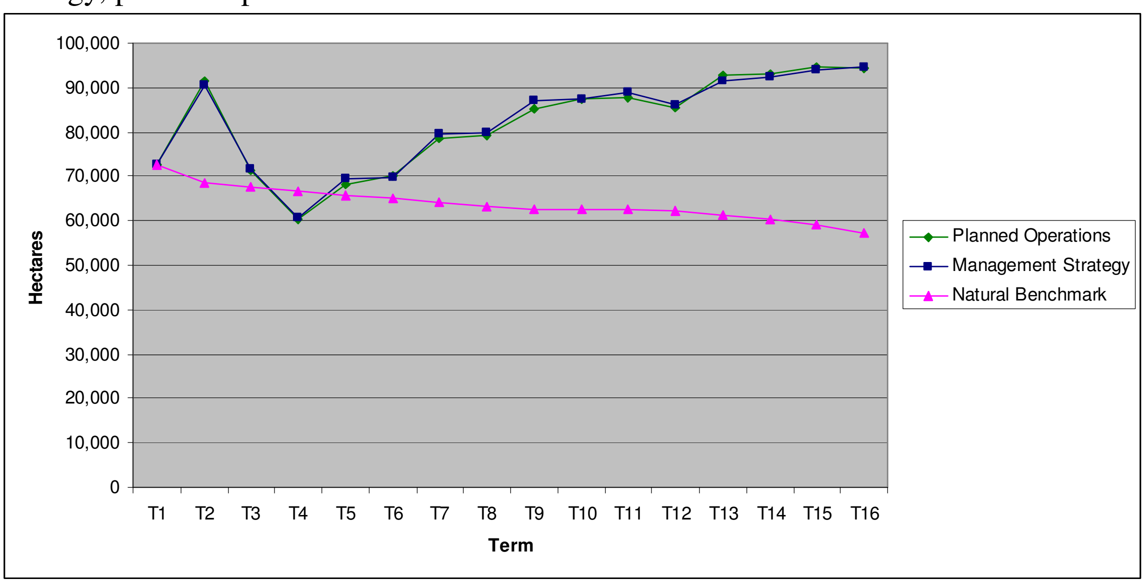


Figure 4.8.12 Comparison of moose late winter habitat through time in the management strategy, planned operations run and the natural benchmark run

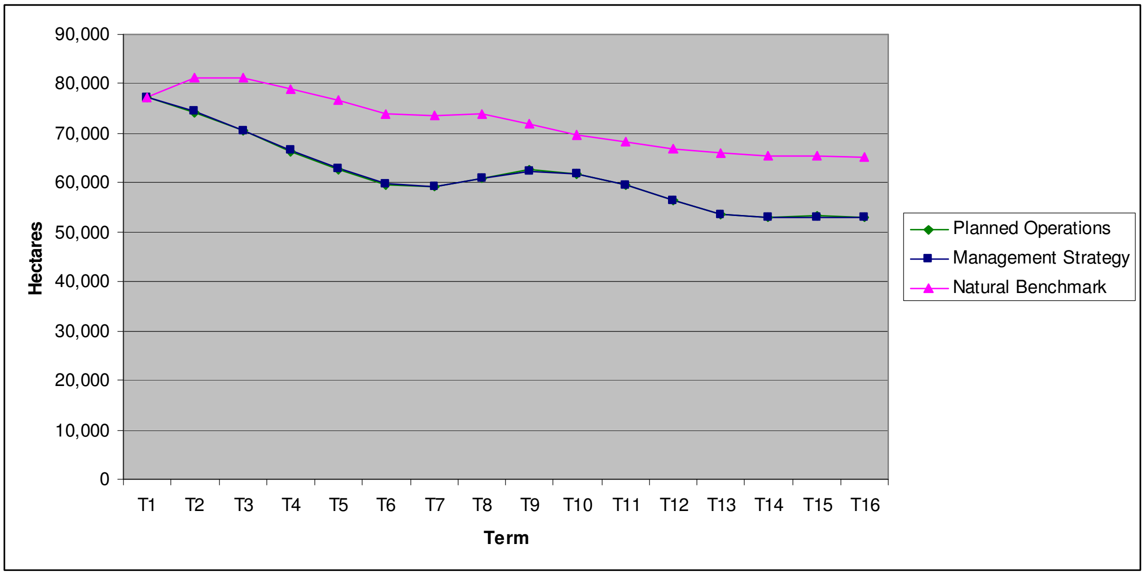


Figure 4.8.13 Comparison of pileated woodpecker habitat through time in the management strategy, planned operations run and the natural benchmark run

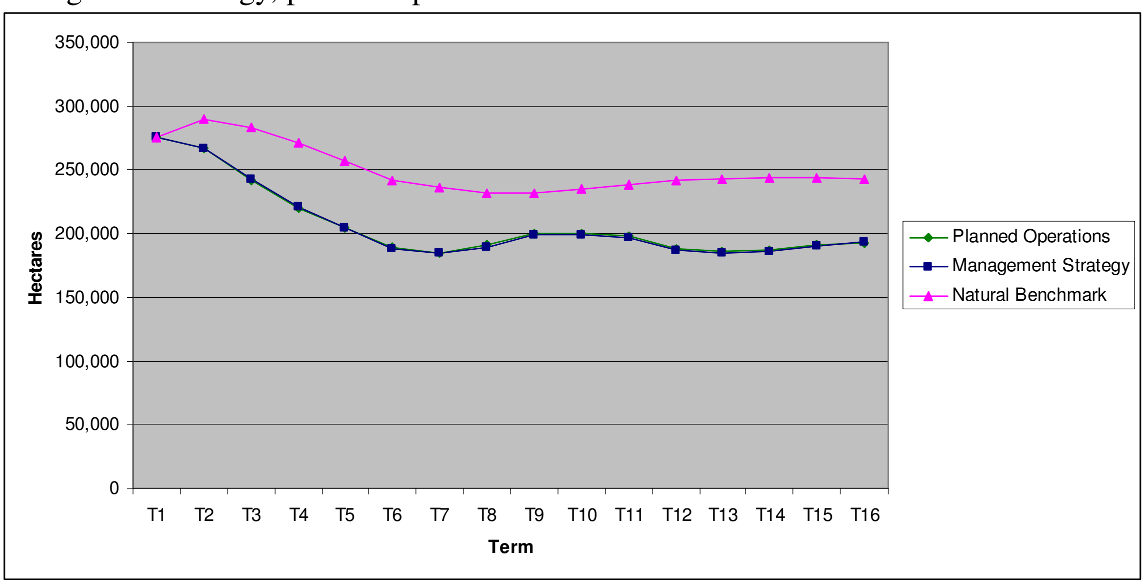


Figure 4.8.14 Comparison of red-backed salamander habitat through time in the management strategy, planned operations run and the natural benchmark run

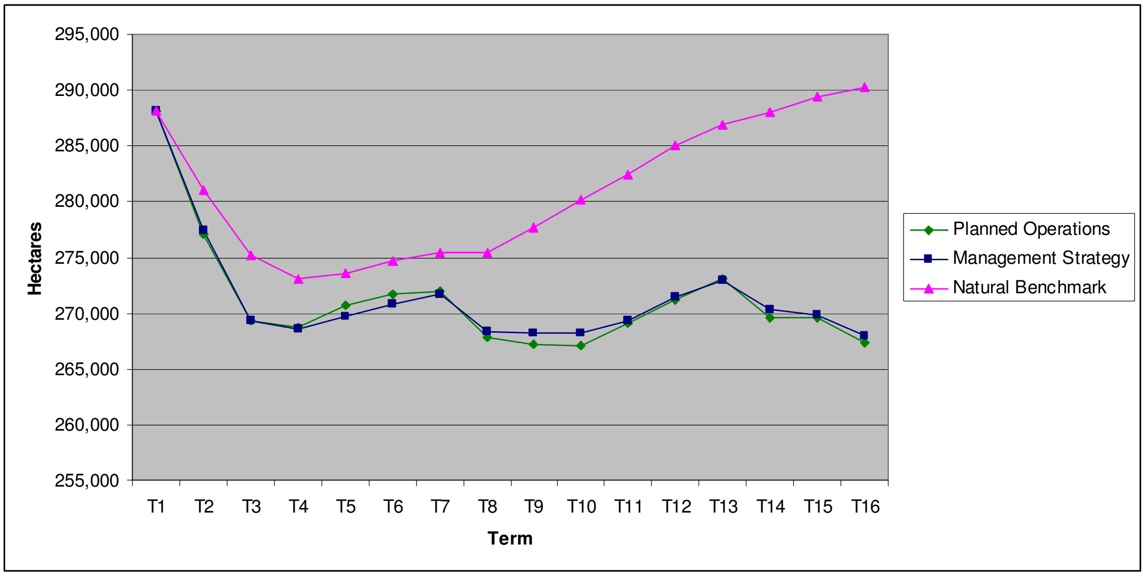


Figure 4.8.15 Comparison of ruby-crowned kinglet habitat through time in the management strategy, planned operations run and the natural benchmark run

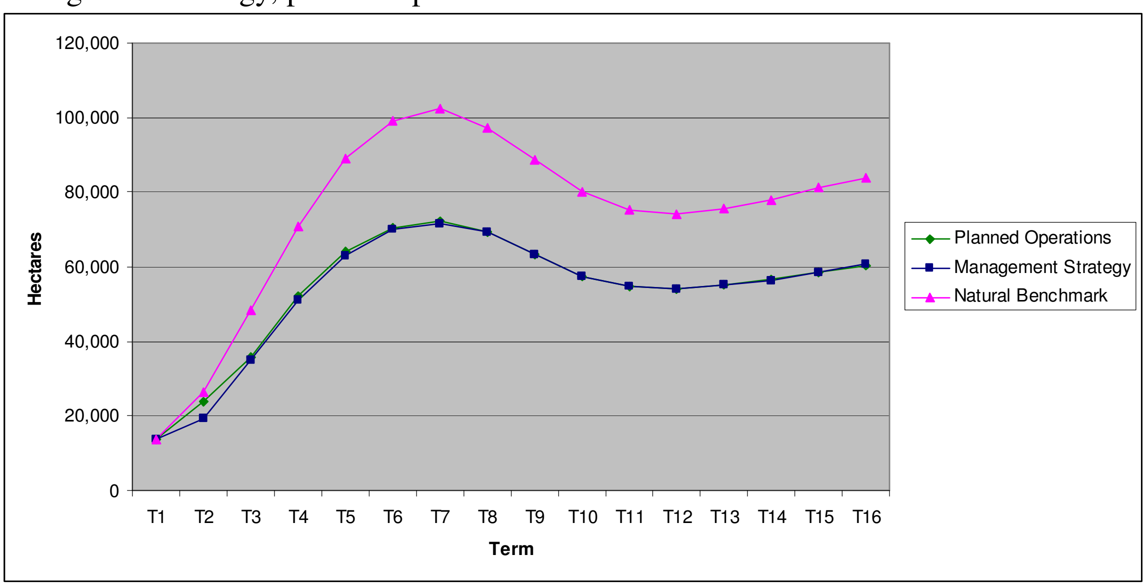


Figure 4.8.16 Comparison of red-shouldered hawk habitat through time in the management strategy, planned operations run and the natural benchmark run

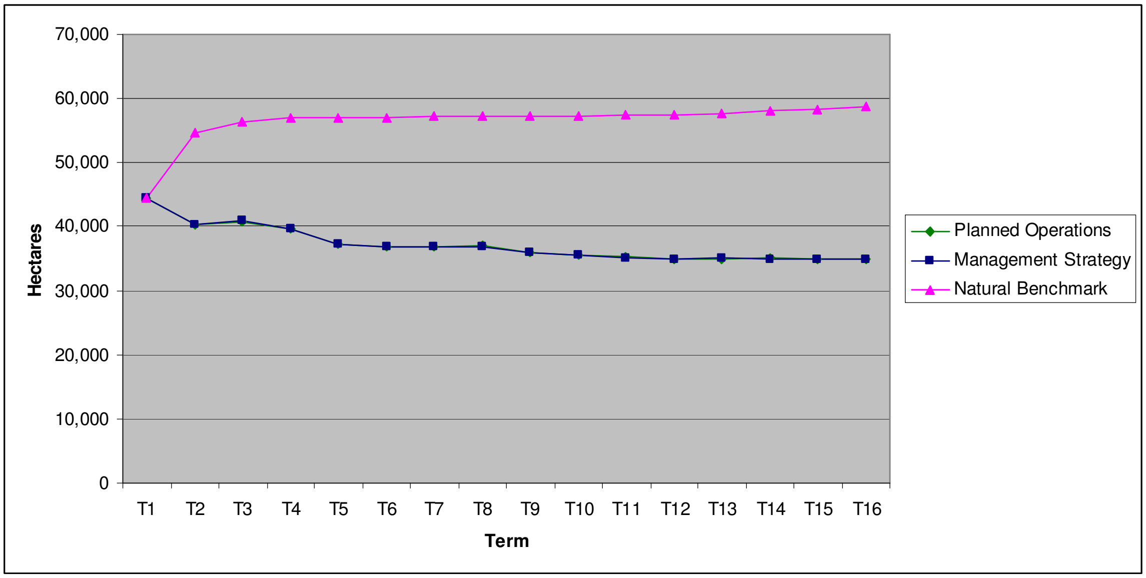


Figure 4.8.17 Comparison of ruffed grouse habitat through time in the management strategy, planned operations run and the natural benchmark run

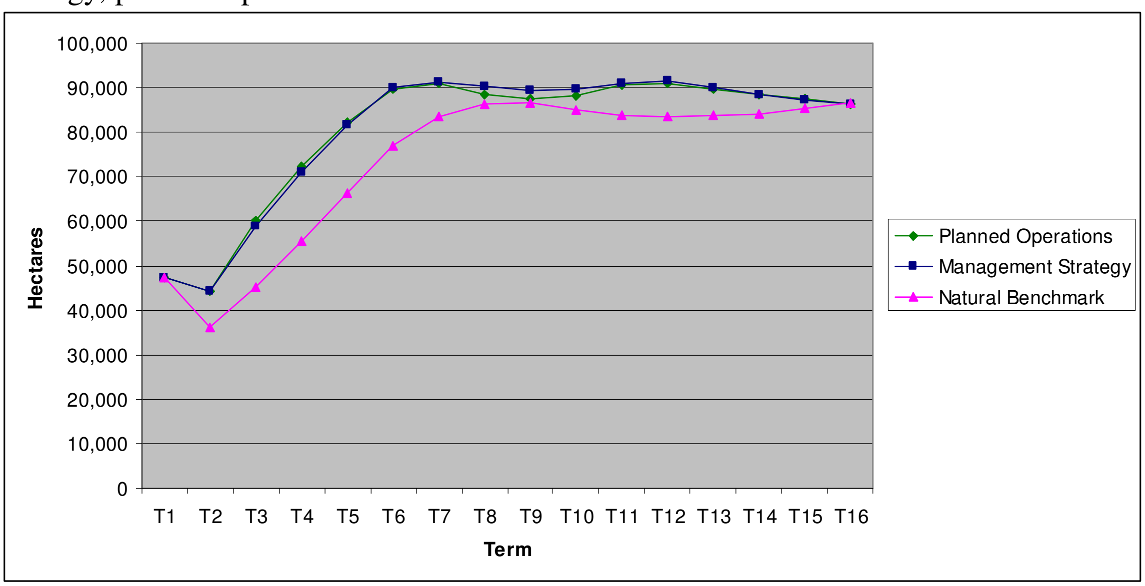


Figure 4.8.18 Comparison of southern flying squirrel habitat through time in the management strategy, planned operations run and the natural benchmark run

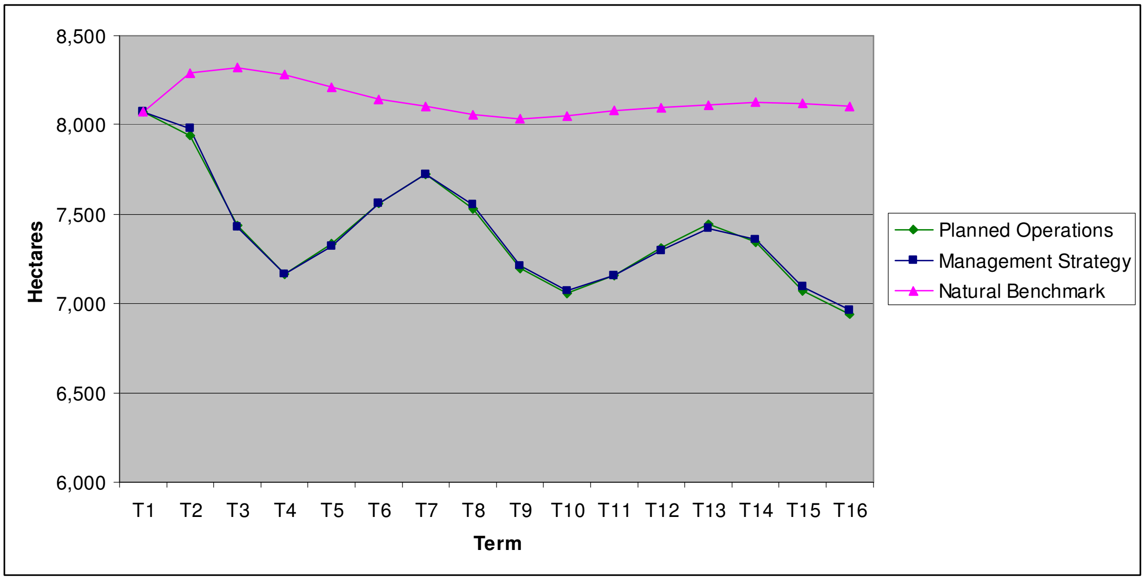


Figure 4.8.19 Comparison of snow shoe hare habitat through time in the management strategy, planned operations run and the natural benchmark run

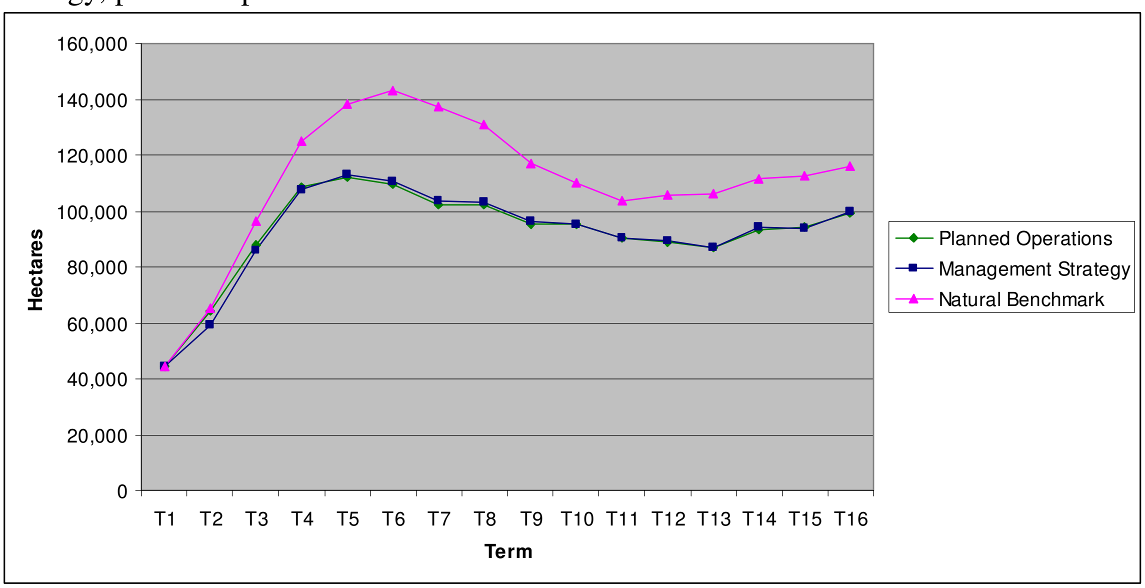


Figure 4.8.20 Comparison of spruce grouse habitat through time in the management strategy, planned operations run and the natural benchmark run

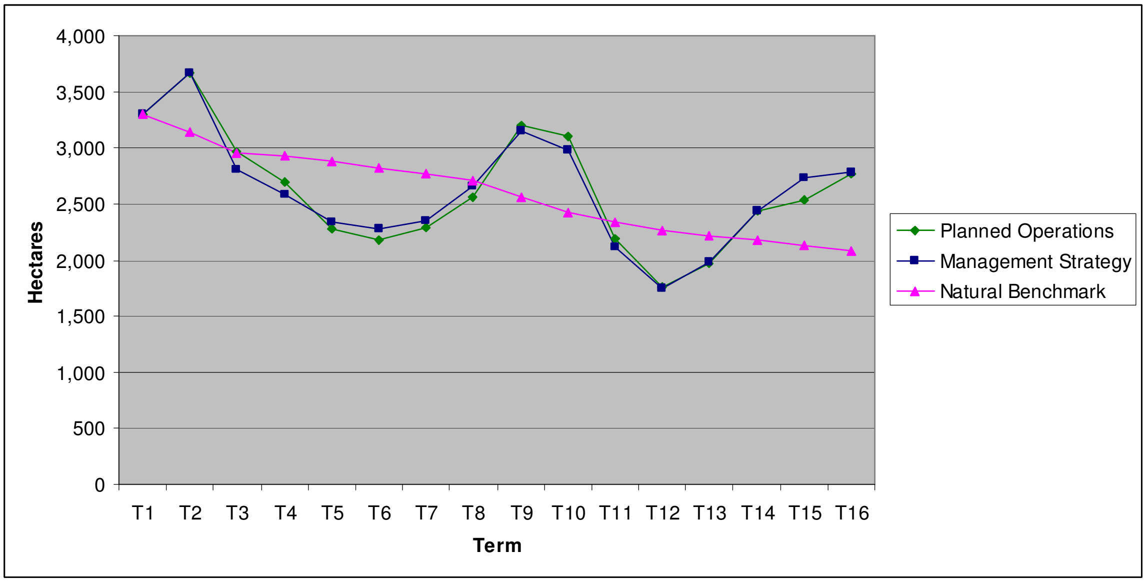


Figure 4.8.21 Comparison of white-tailed deer summer habitat through time in the management strategy, planned operations run and the natural benchmark run

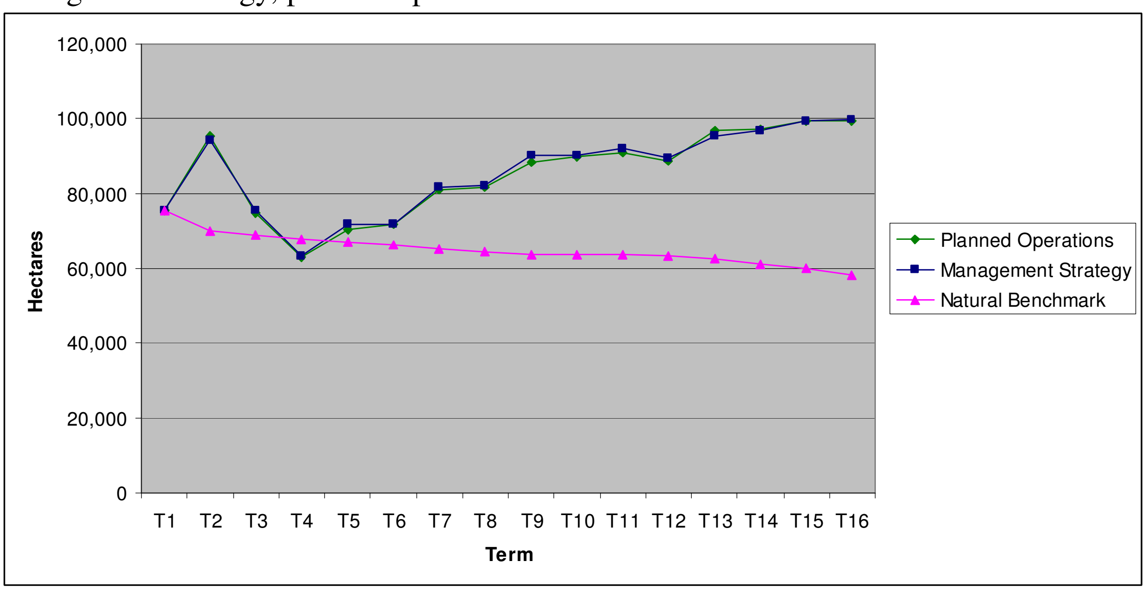


Figure 4.8.22 Comparison of white-tailed deer winter habitat through time in the management strategy, planned operations run and the natural benchmark run

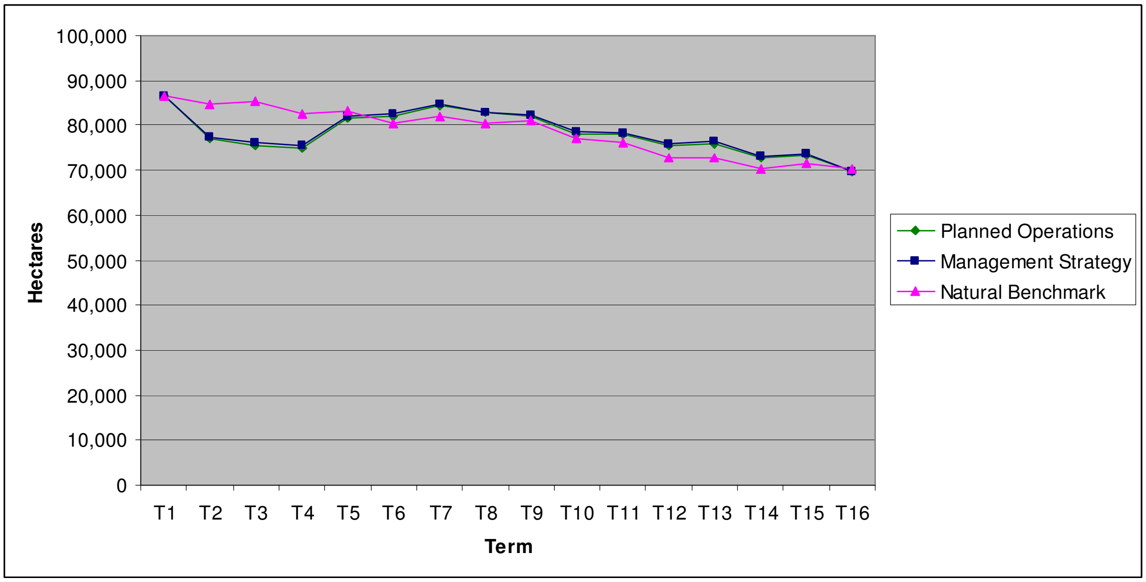
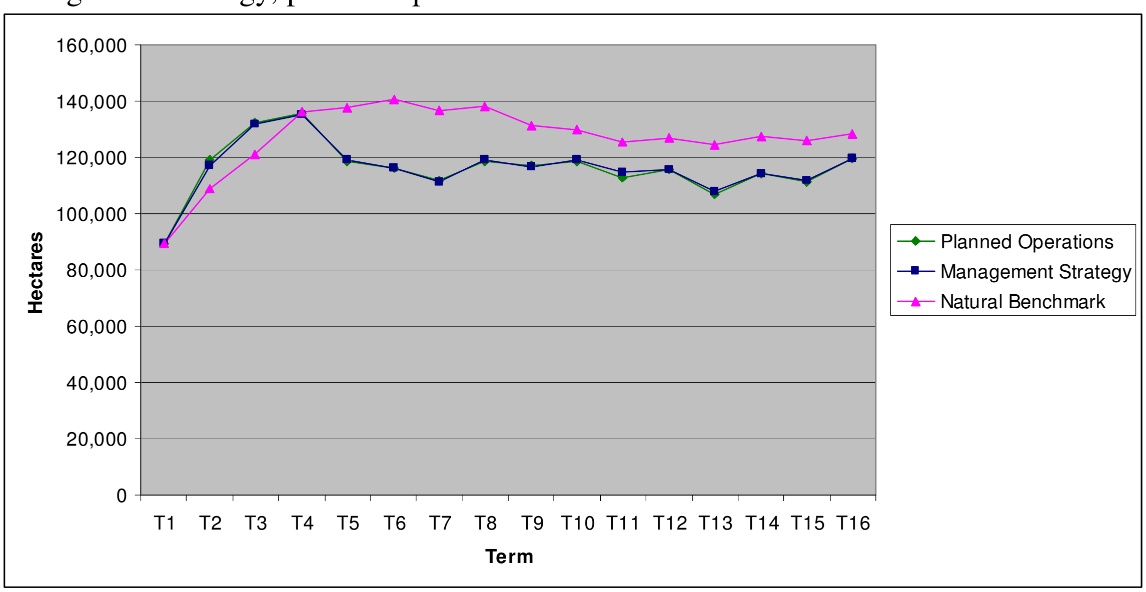


Figure 4.8.23 Comparison of white-throated sparrow habitat through time in the management strategy, planned operations run and the natural benchmark run



In addition to wildlife habitat, trend comparisons were made to the management strategy for objective achievement for forest composition projections, and no significant deviation was present. These are shown in figure 4.8.24 to 4.8.51

Figure 4.8.24 Comparison of white birch mature condition through time in the management strategy and planned operations run.

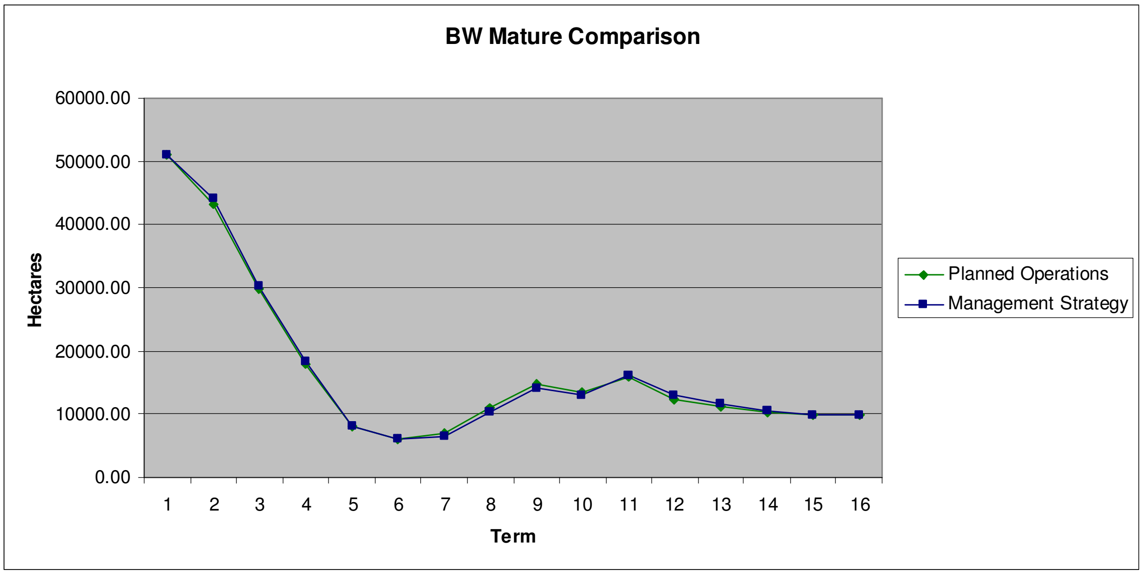


Figure 4.8.25 Comparison of yellow birch mature condition through time in the management strategy and planned operations run.

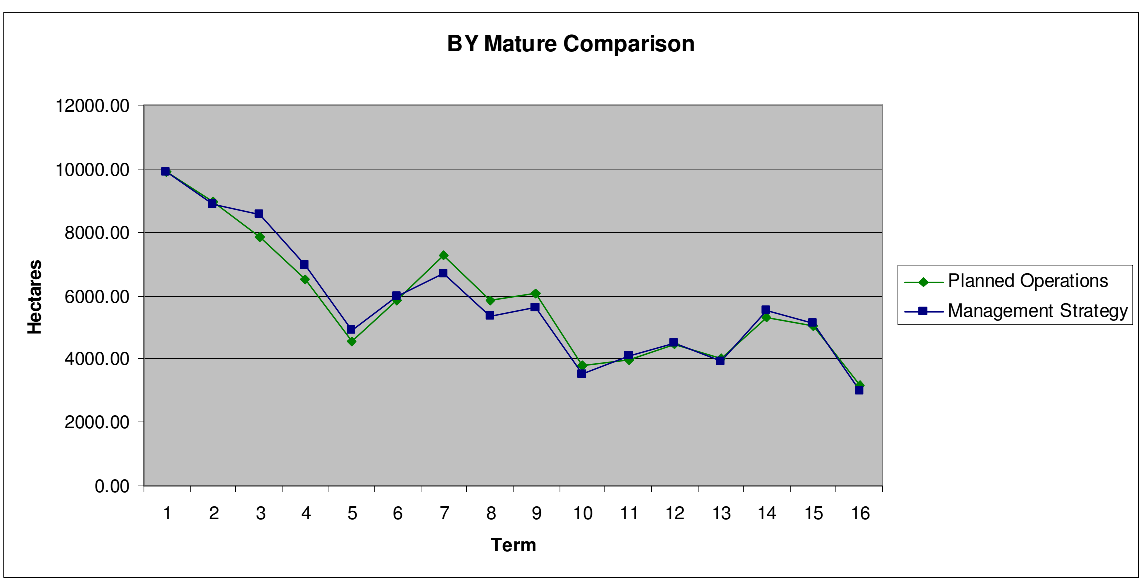


Figure 4.8.26 Comparison of hard maple uniform shelterwood mature condition through time in the management strategy and planned operations run

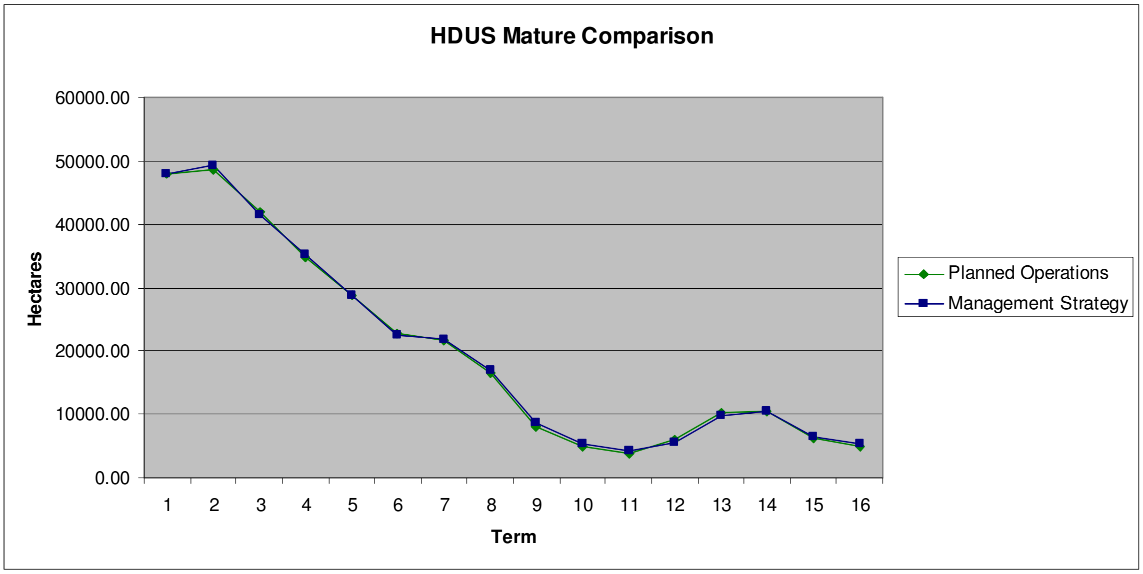


Figure 4.8.27 Comparison of hemlock mature condition through time in the management strategy and planned operations run

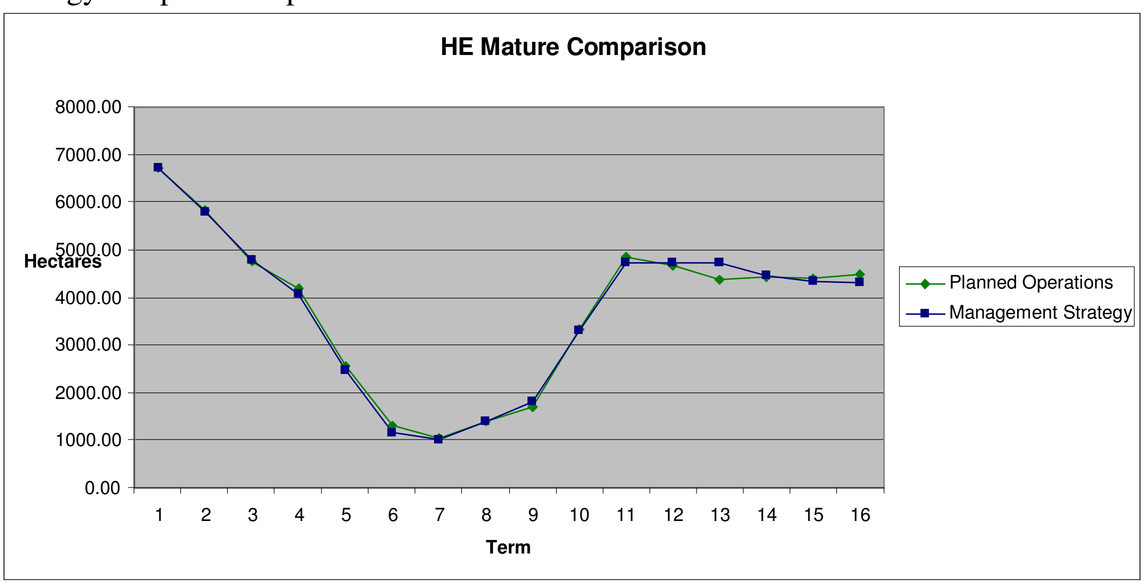


Figure 4.8.28 Comparison of lowland mixedwood mature condition through time in the management strategy and planned operations run

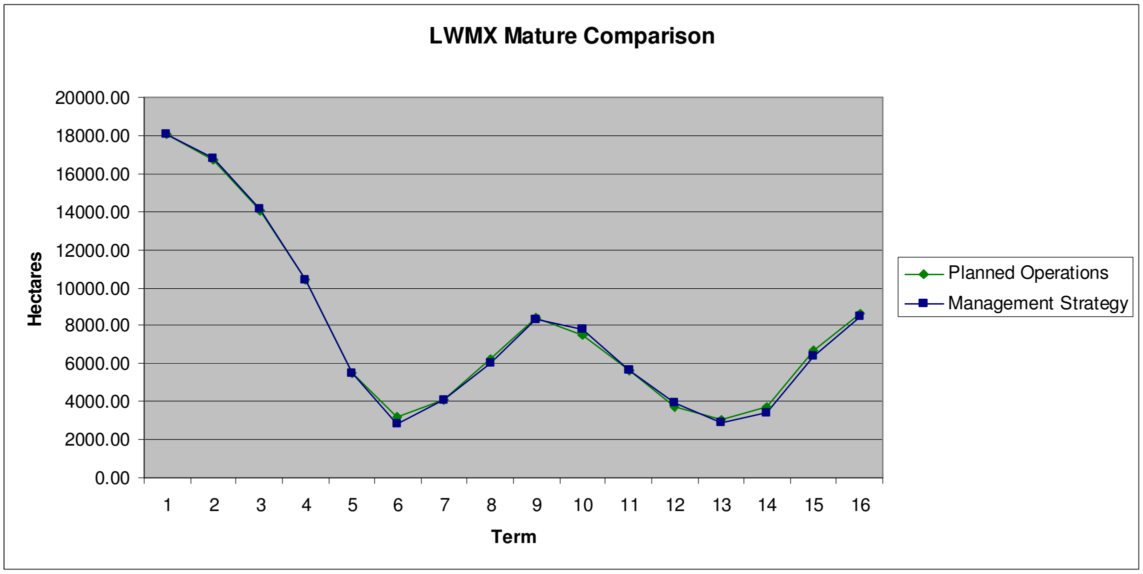


Figure 4.8.29 Comparison of mixed conifer lowland mature condition through time in the management strategy and planned operations run

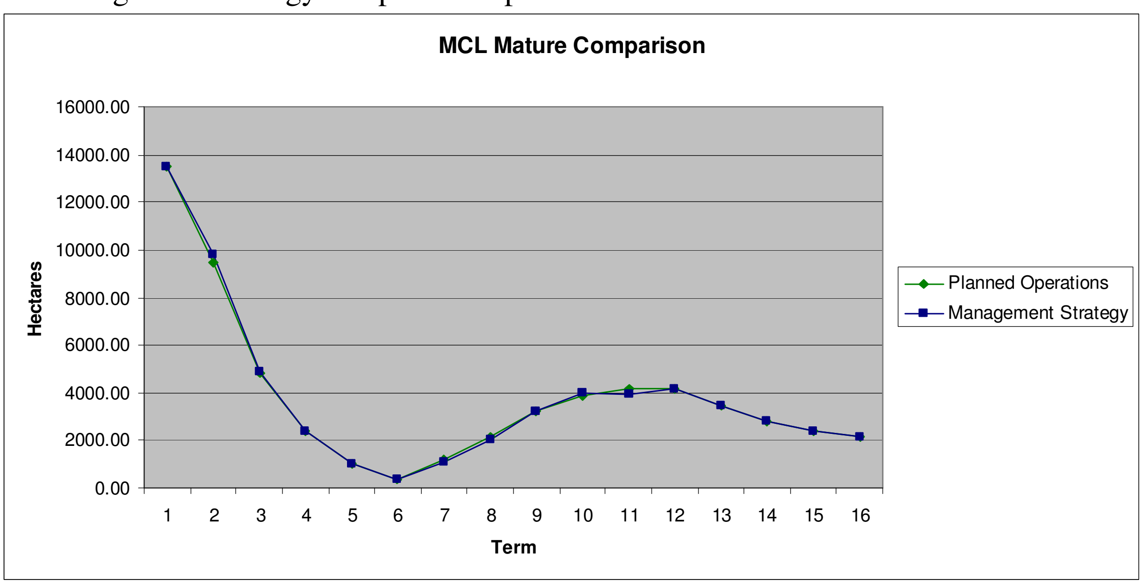


Figure 4.8.30 Comparison of mixed wood mature condition through time in the management strategy and planned operations run

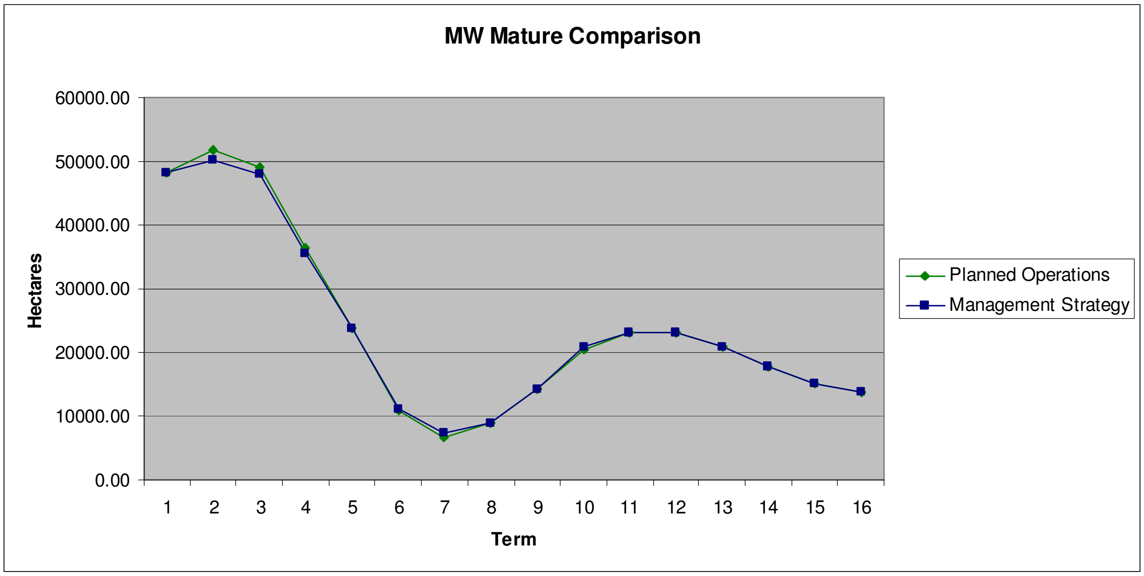


Figure 4.8.31 Comparison of jack pine mature condition through time in the management strategy and planned operations run

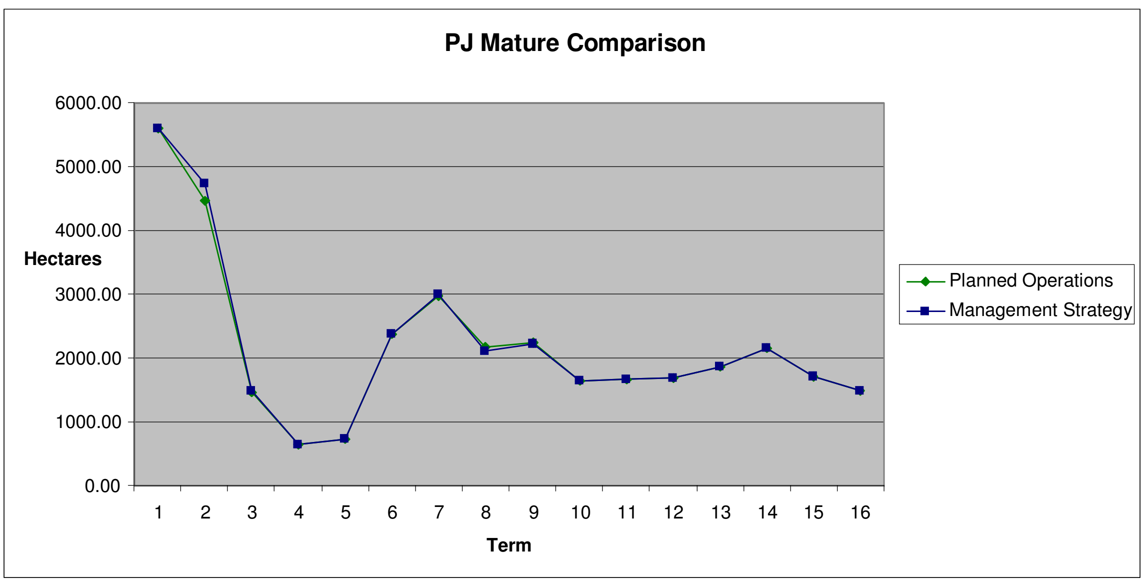


Figure 4.8.32 Comparison of jack pine/black spruce mature condition through time in the management strategy and planned operations run

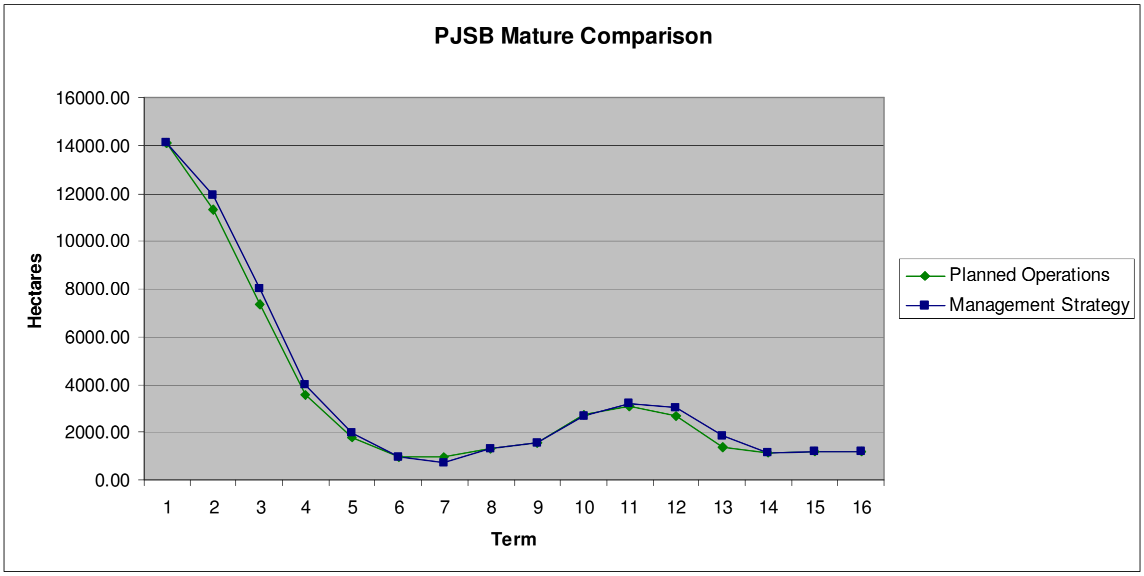


Figure 4.8.33 Comparison of poplar mature condition through time in the management strategy and planned operations run

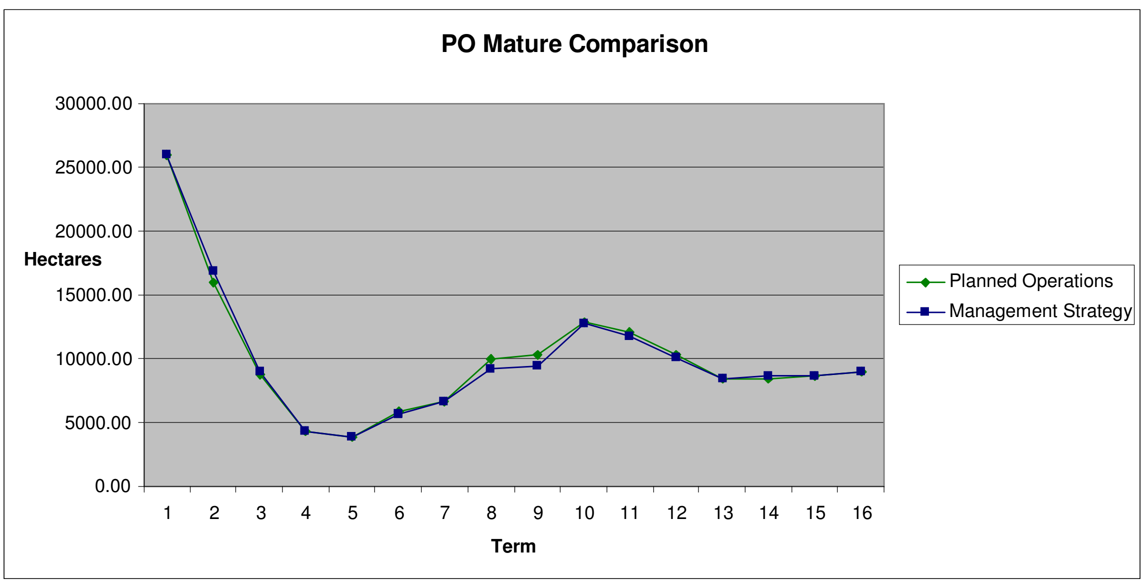


Figure 4.8.34 Comparison of red pine mature condition through time in the management strategy and planned operations run

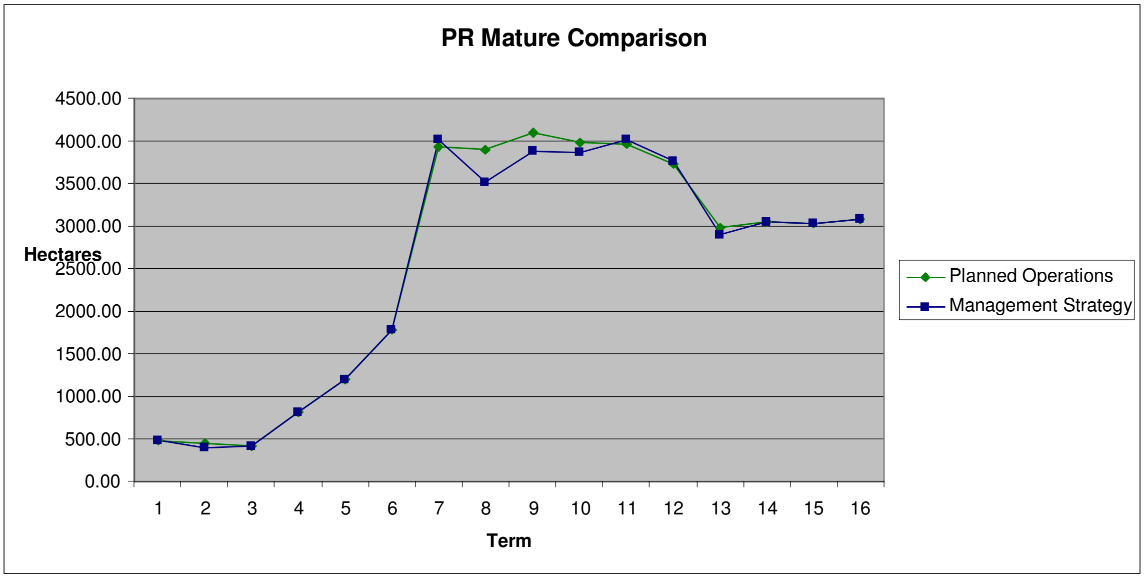


Figure 4.8.35 Comparison of white pine seed tree mature condition through time in the management strategy and planned operations run

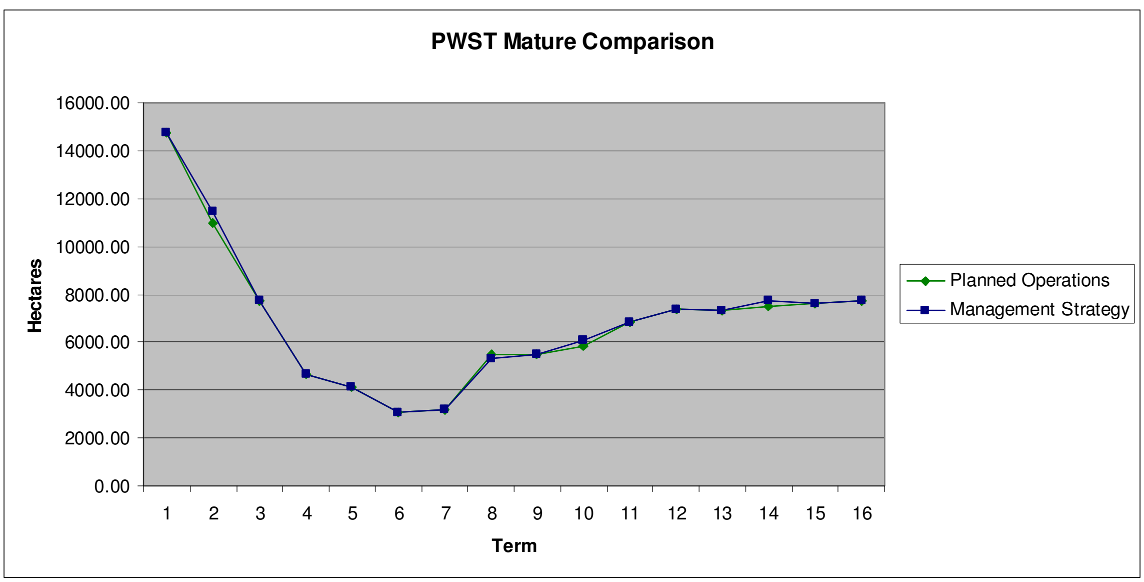


Figure 4.8.36 Comparison of white pine uniform shelterwood mature condition through time in the management strategy and planned operations run

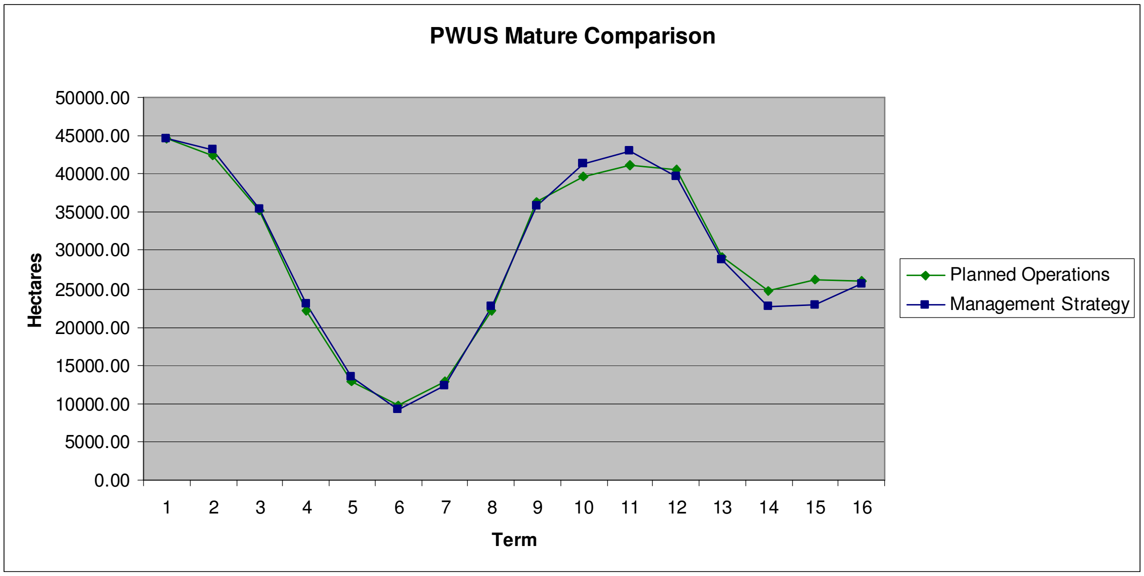


Figure 4.8.37 Comparison of spruce/fir mature condition through time in the management strategy and planned operations run

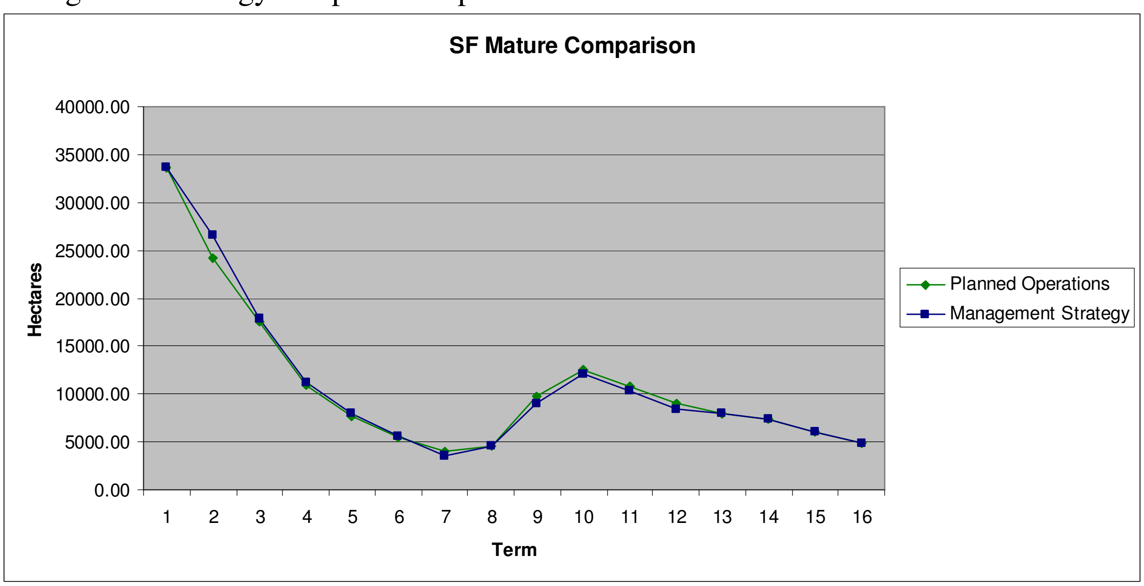


Figure 4.8.38 Comparison of white birch over mature condition through time in the management strategy and planned operations run.

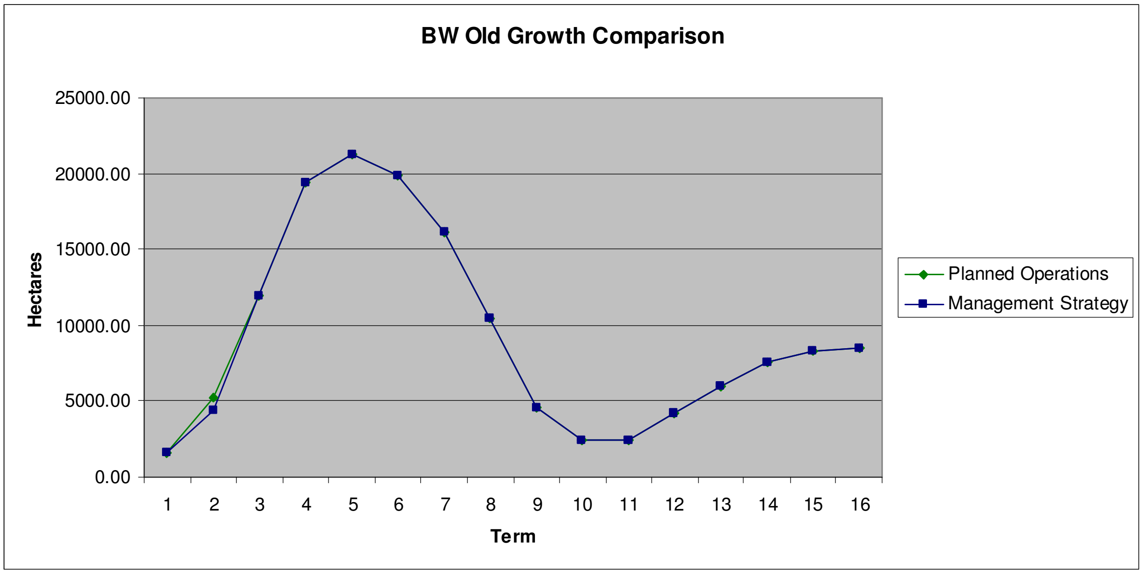


Figure 4.8.39 Comparison of yellow birch over mature condition through time in the management strategy and planned operations run.

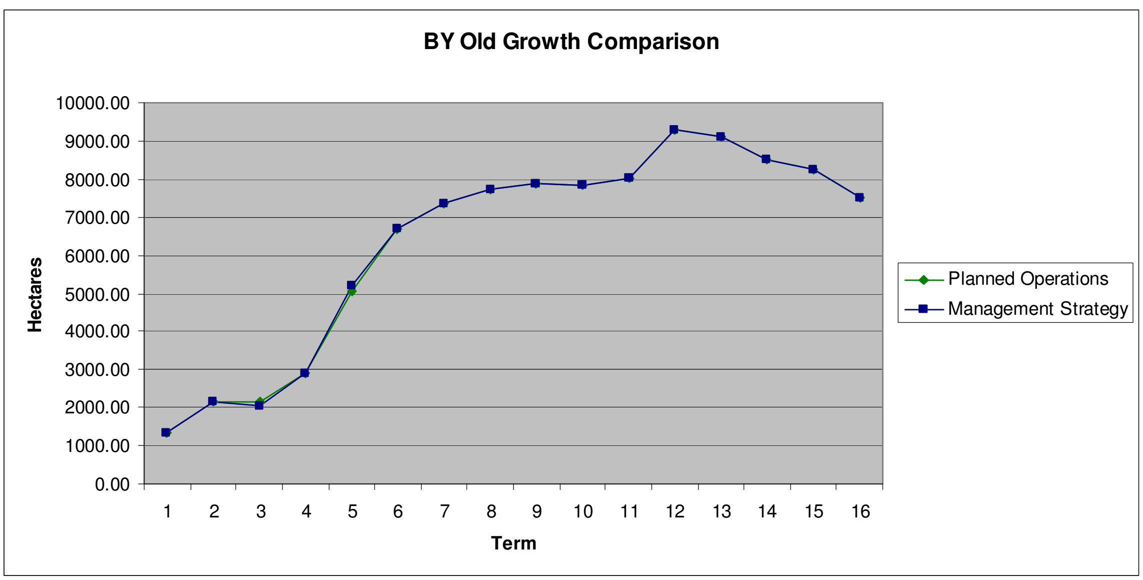


Figure 4.8.40 Comparison of hard maple uniform shelterwood over mature condition through time in the management strategy and planned operations run

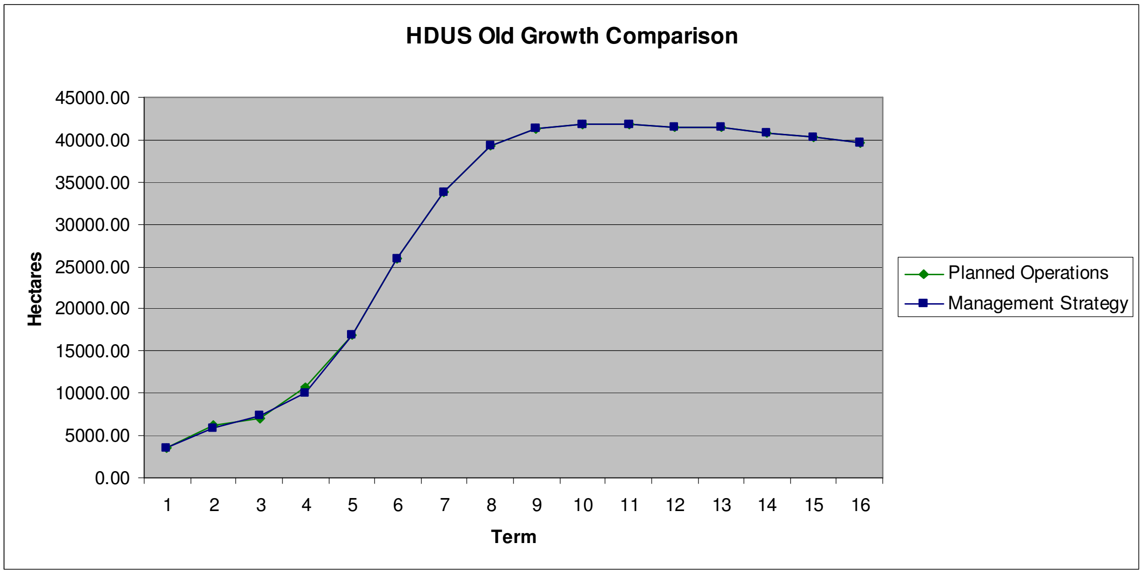


Figure 4.8.41 Comparison of hemlock over mature condition through time in the management strategy and planned operations run

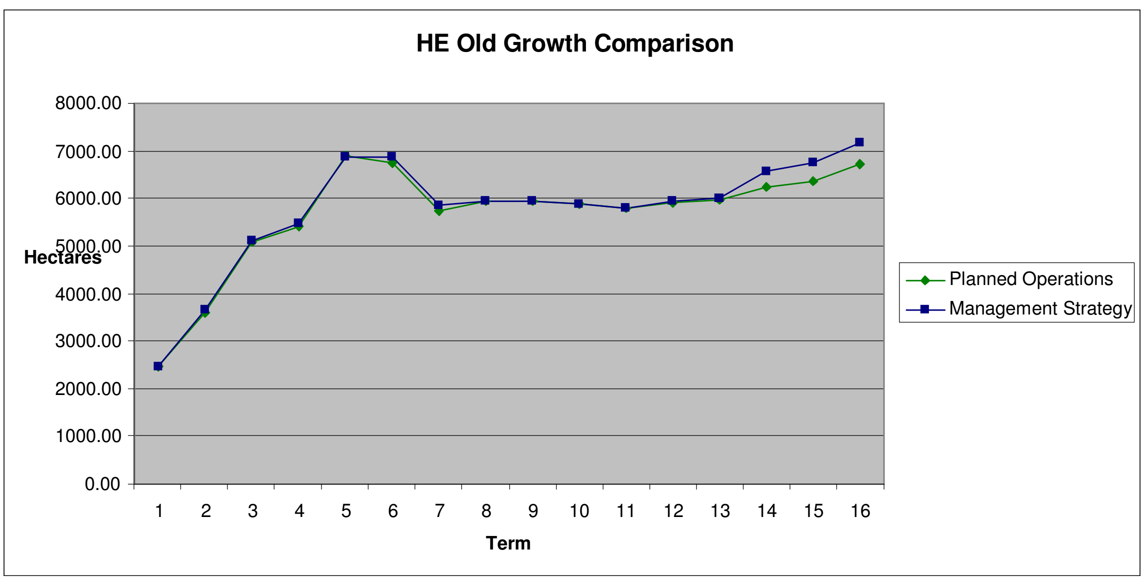


Figure 4.8.42 Comparison of lowland mixedwood over mature condition through time in the management strategy and planned operations run

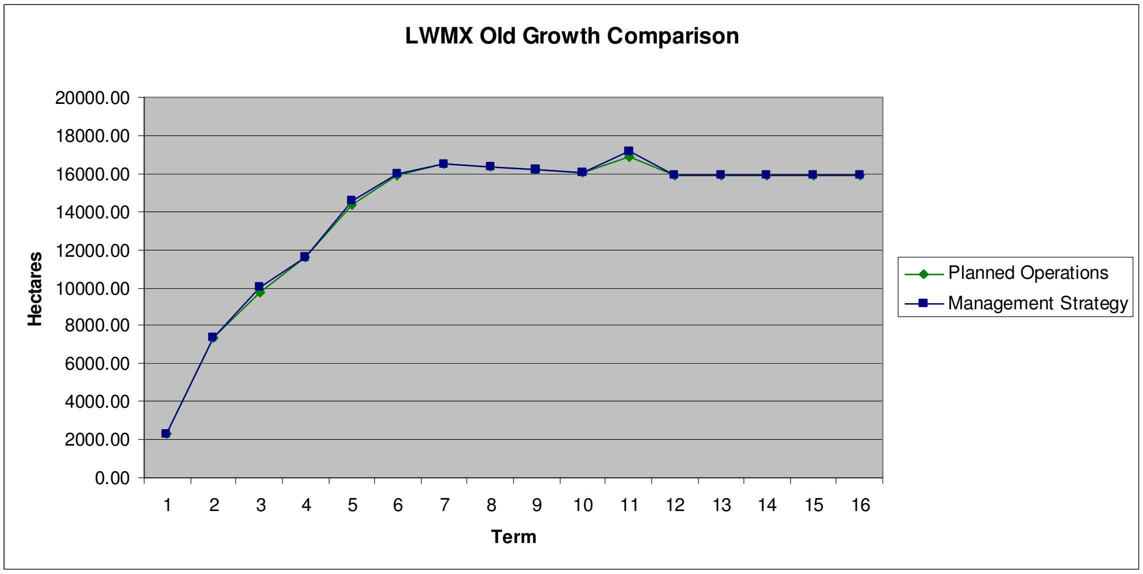


Figure 4.8.43 Comparison of mixed conifer lowland over mature condition through time in the management strategy and planned operations run

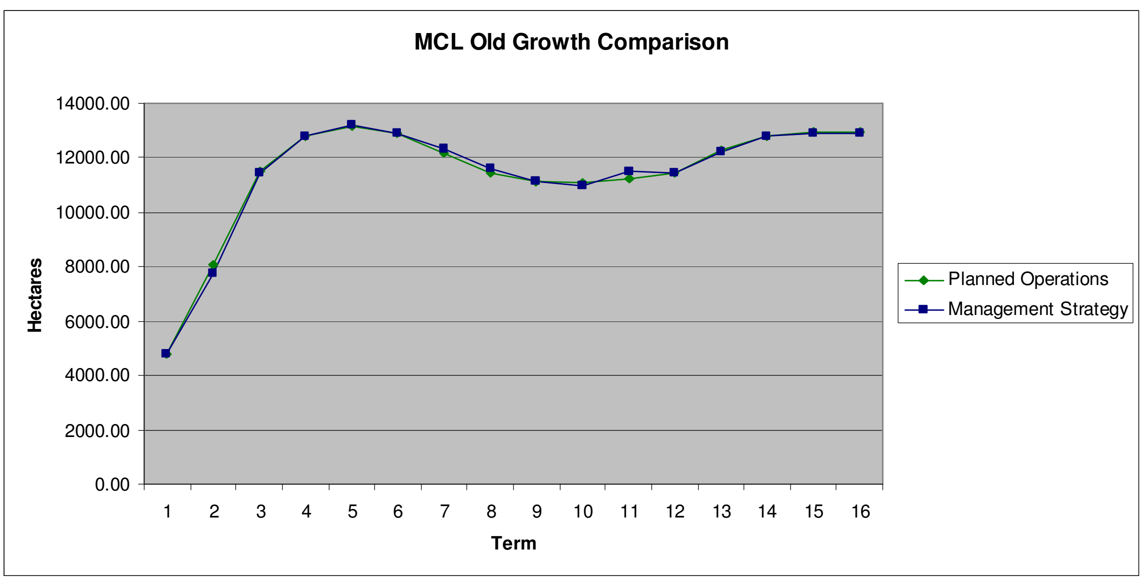


Figure 4.8.44 Comparison of mixedwood over mature condition through time in the management strategy and planned operations run

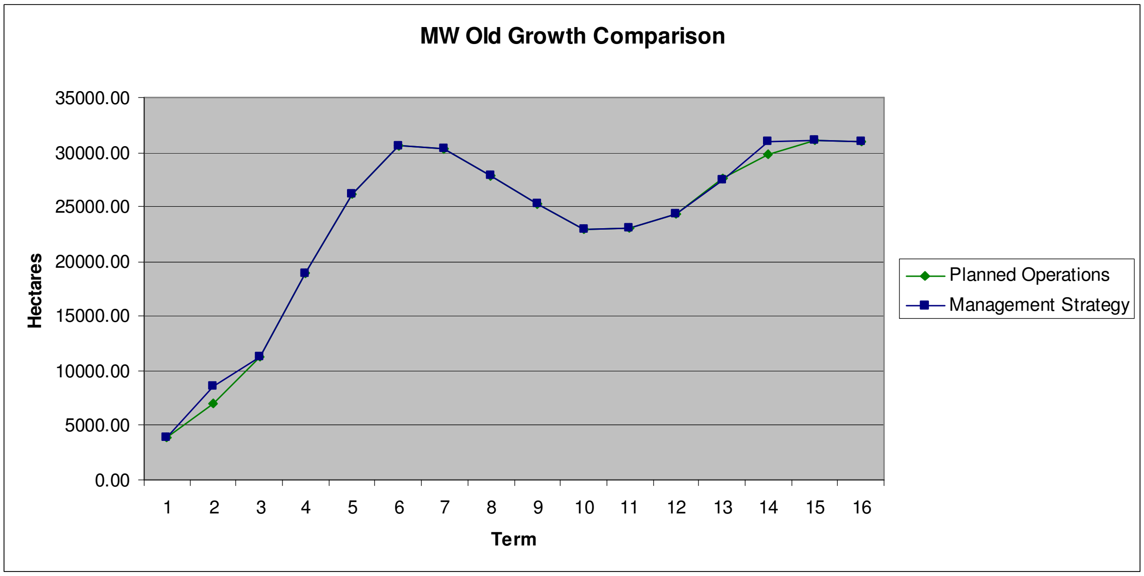


Figure 4.8.45 Comparison of jack pine over mature condition through time in the management strategy and planned operations run

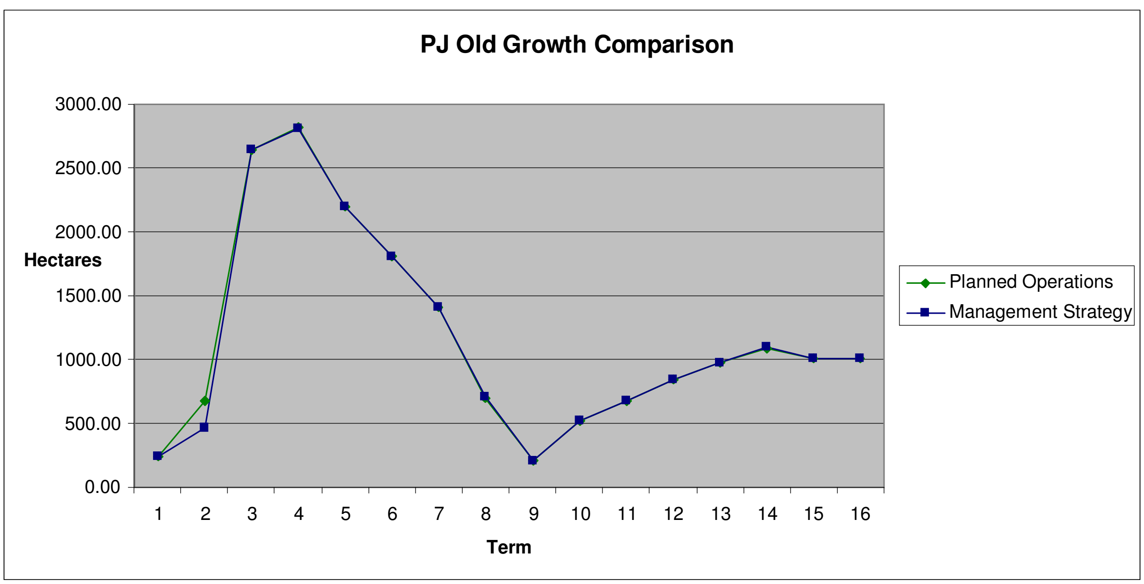


Figure 4.8.46 Comparison of jack pine/black spruce over mature condition through time in the management strategy and planned operations run

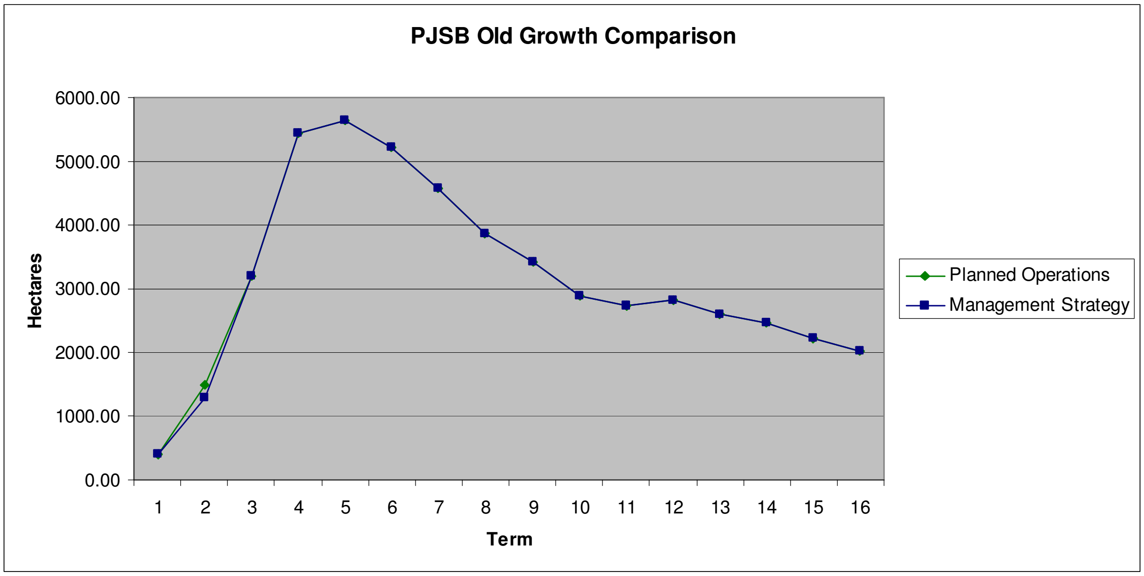


Figure 4.8.47 Comparison of poplar over mature condition through time in the management strategy and planned operations run

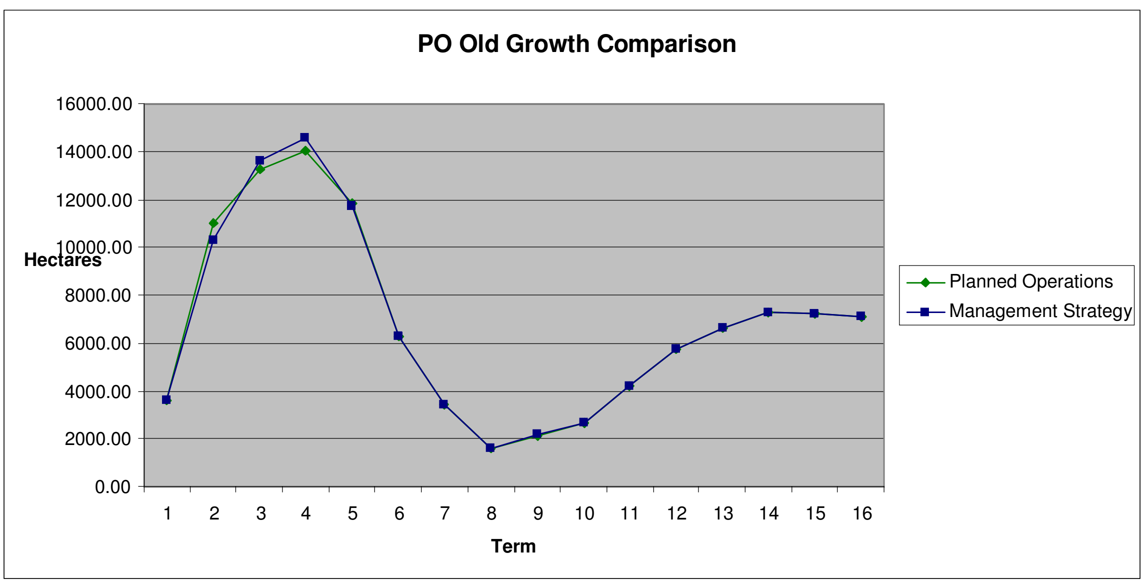


Figure 4.8.48 Comparison of red pine over mature condition through time in the management strategy and planned operations run

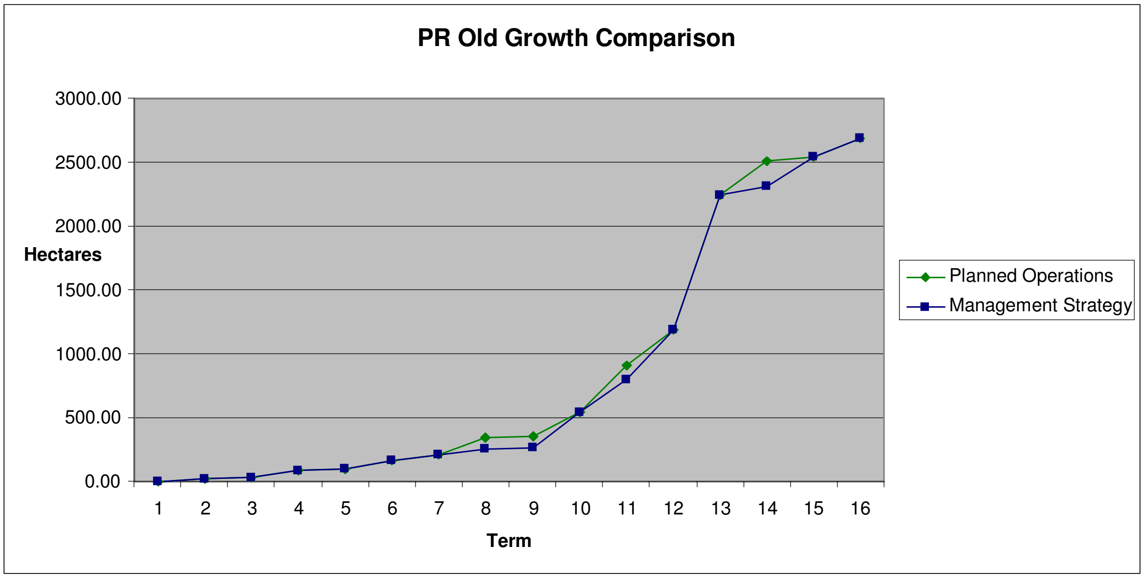


Figure 4.8.49 Comparison of white pine seed tree over mature condition through time in the management strategy and planned operations run

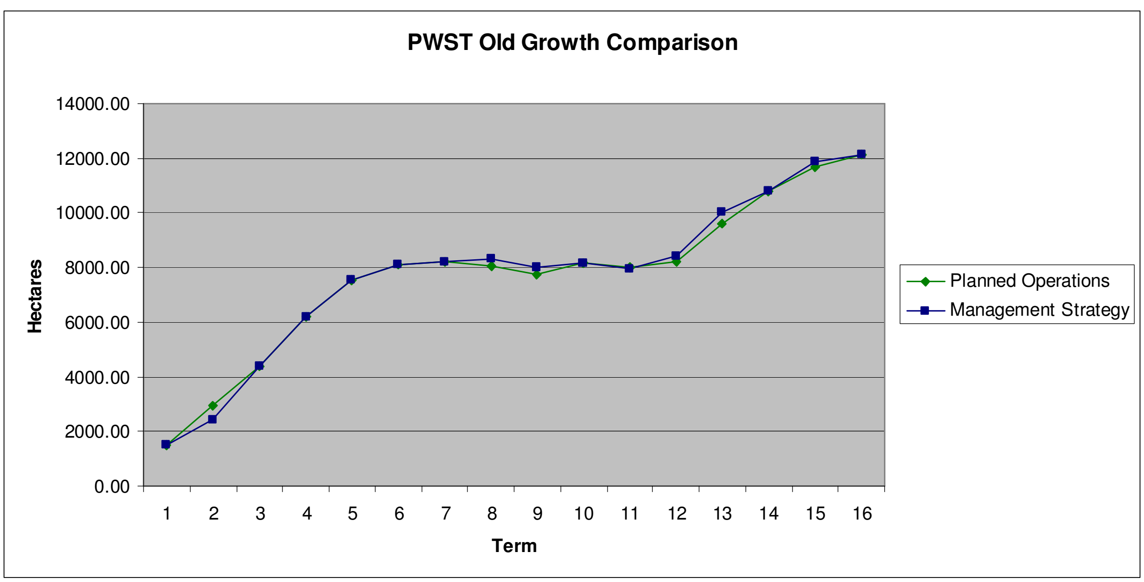


Figure 4.8.50 Comparison white pine uniform shelterwood over mature condition through time in the management strategy and planned operations run

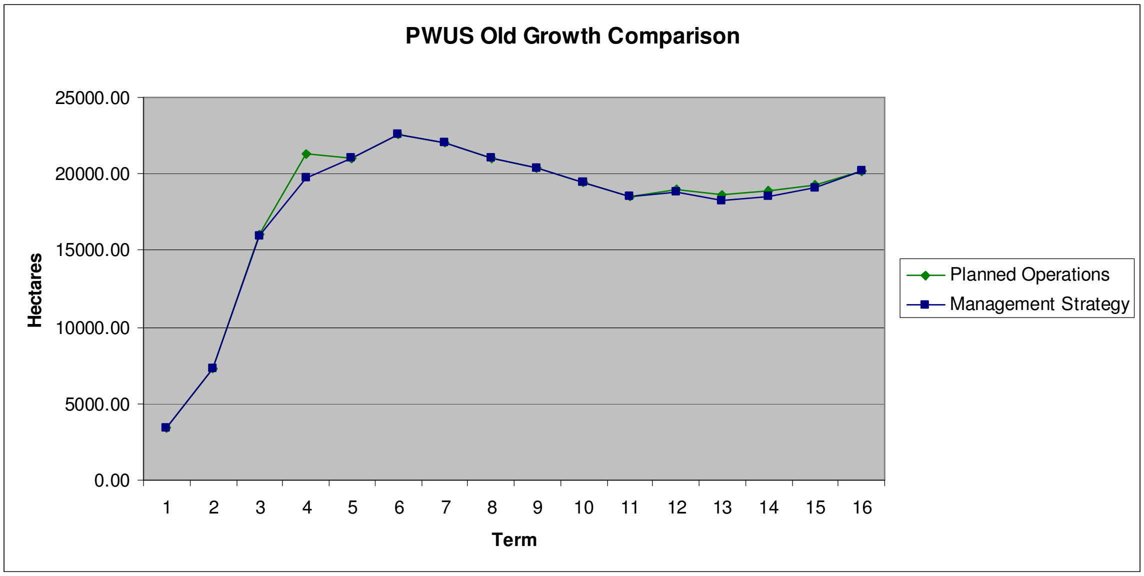
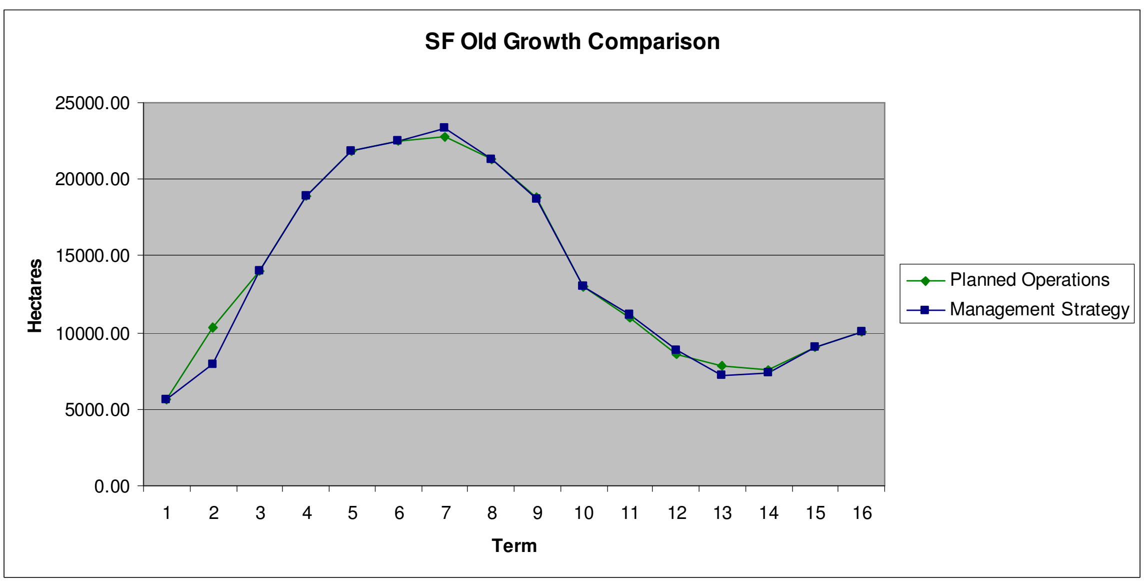


Figure 4.8.51 Comparison of spruce/fir over mature condition through time in the management strategy and planned operations run



The non-binding run did under achieve on the volume targets compared to the management strategy. As illustrated in the following figures, it did not have a significant impact to the target achievement compared to the management strategy. It is clear however, that the planned harvest areas will not achieve exactly the levels that the management strategy intended. Nevertheless, no significant difference is noted in comparison of the planned operations to the management strategy. Figure 4.8.52 illustrates the objective achievement of each species grouping desired level. Figures 4.8.53 through 4.8.60 illustrate the volume achievement of the planned operations (draftplan_1_3_) compared to the management strategy.

Figure 4.8.52 Volume achievement of the Desired Levels

Term	SPF	PO	BW	CeLa	MH	HE	UHLH	PWR	AllProd
2009	102%	108%	82%	125%	86%		130%	128%	107%
2019	87%	100%	67%	124%	89%		117%	123%	98%
2029	74%	89%	56%	126%	77%		102%	157%	93%
2039	74%	84%	65%	122%	66%		100%	151%	92%
2049	74%	82%	58%	108%	66%		95%	134%	86%
2059	79%	82%	57%	89%	64%		95%	136%	87%
2069	83%	89%	51%	81%	71%		95%	170%	94%
2079	86%	89%	46%	79%	73%		95%	158%	92%
2089	86%	89%	46%	85%	71%		95%	169%	94%
2099	86%	77%	37%	98%	63%		95%	196%	94%
2109	86%	89%	38%	135%	69%		95%	212%	100%
2119	86%	89%	38%	135%	70%		95%	206%	99%
2129	86%	89%	37%	113%	72%		97%	192%	97%
2139	86%	89%	36%	110%	73%		96%	173%	94%
2149	86%	104%	45%	97%	69%		95%	211%	101%

Figure 4.8.53 Comparison of projected total available harvest volume between management strategy (PMS.scen33) and planned operations (finalplan_1_3_) model runs

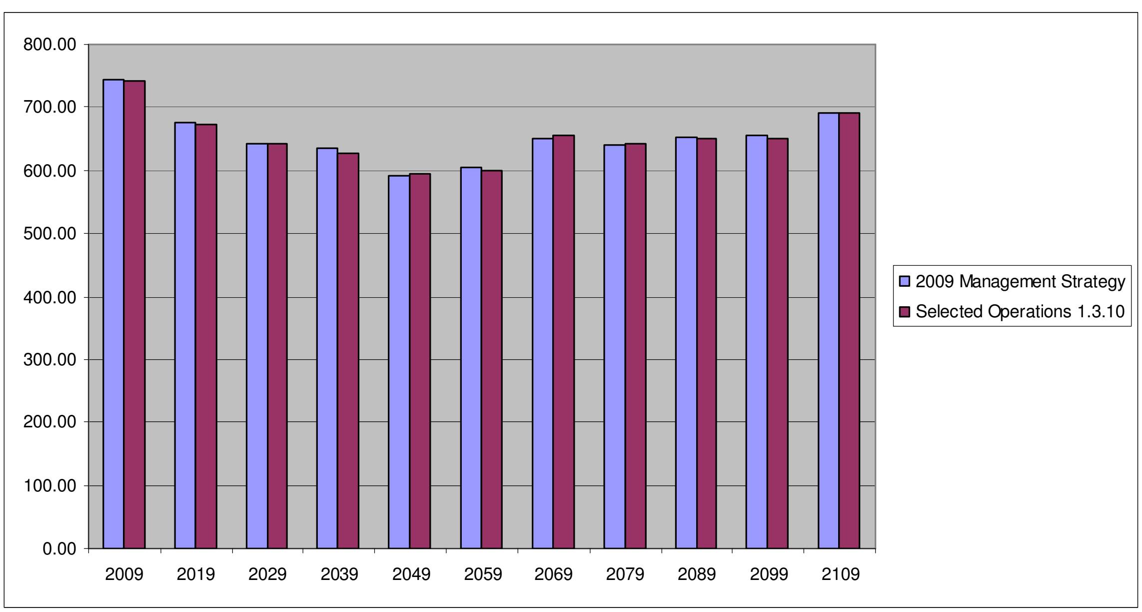


Figure 4.8.54 Comparison of projected SPF available harvest volume between management strategy (PMS.scen33) and planned operations (finalplan_1_3_) model runs

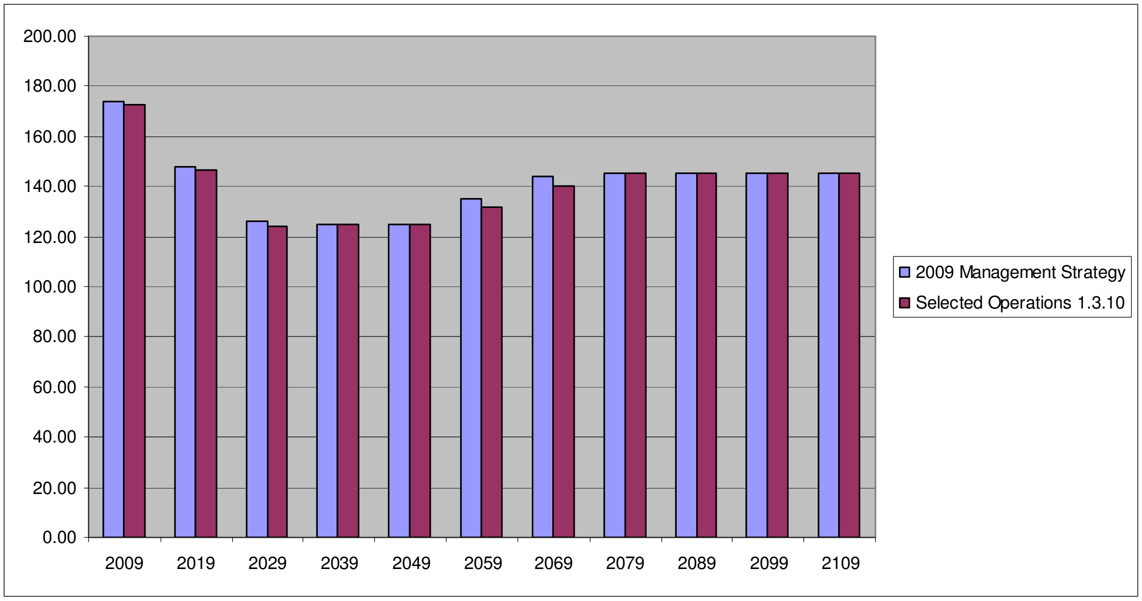


Figure 4.8.55 Comparison of projected PO available harvest volume between management strategy (PMS.scen33) and planned operations (finalplan_1_3_) model runs

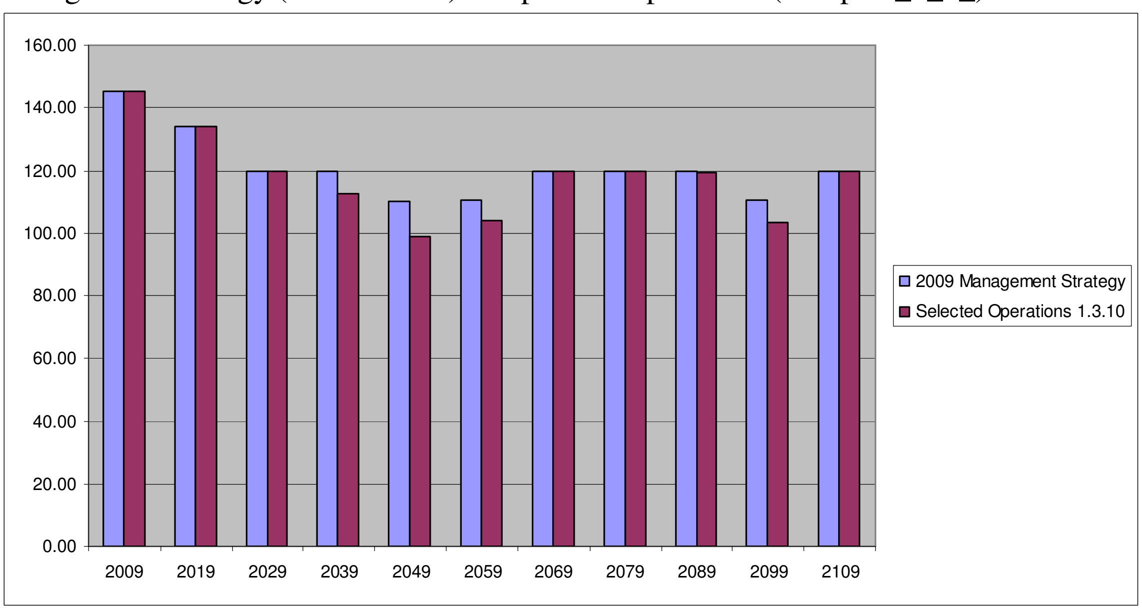


Figure 4.8.56 Comparison of projected BW available harvest volume between management strategy (PMS.scen33) and planned operations (finalplan_1_3_) model runs

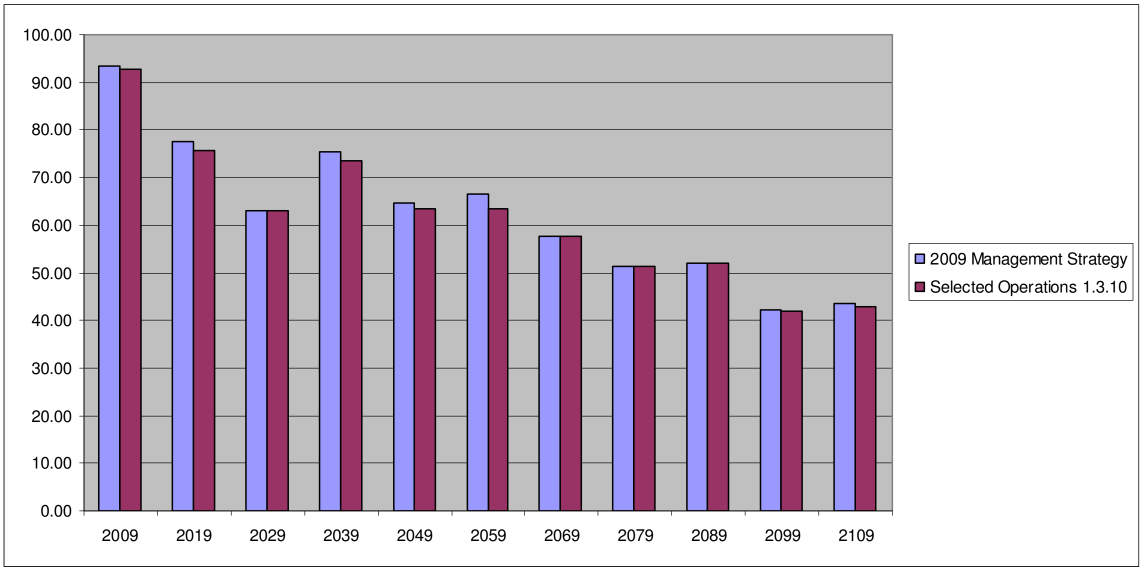


Figure 4.8.57 Comparison of projected PWR available harvest volume between management strategy (PMS.scen33) and planned operations (finalplan_1_3_) model runs

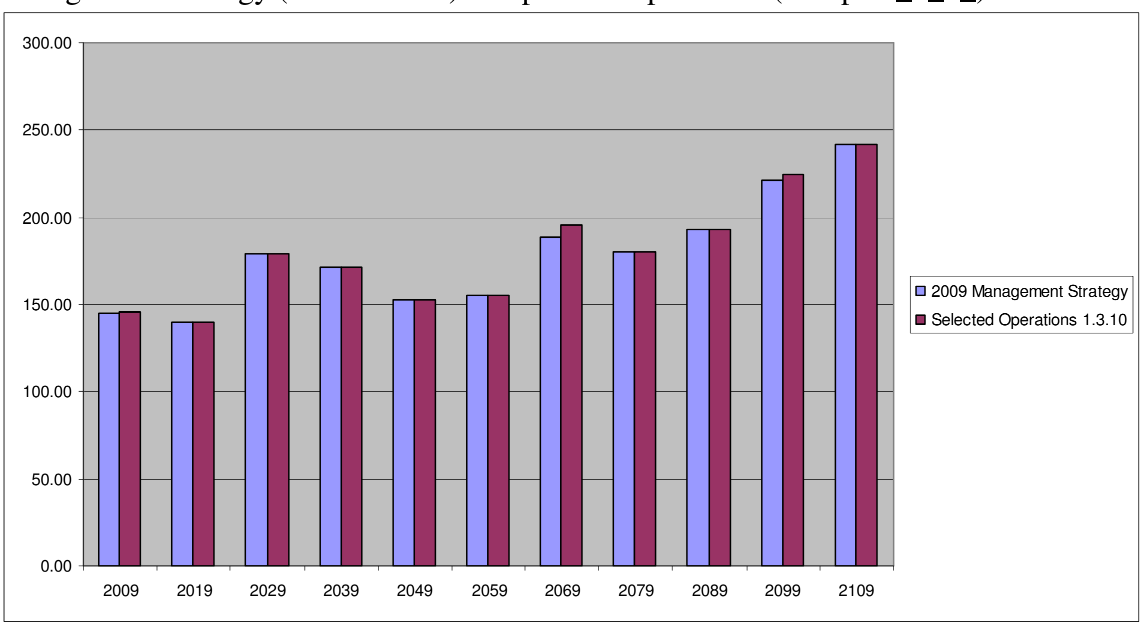


Figure 4.8.58 Comparison of projected MH available harvest volume between management strategy (PMS.scen33) and planned operations (finalplan_1_3_) model runs

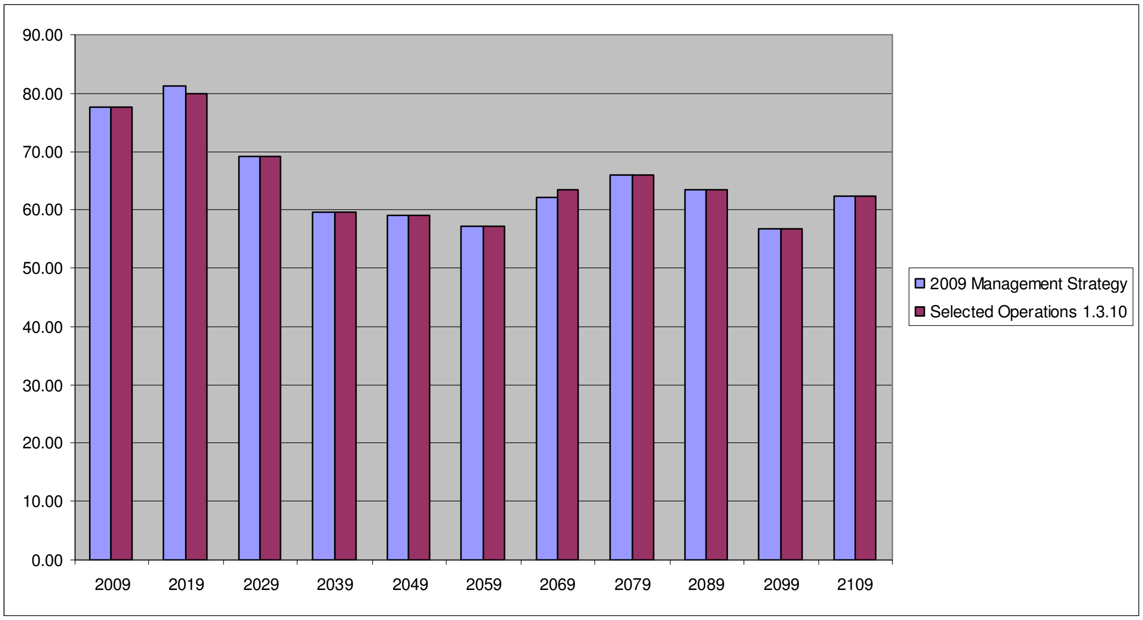


Figure 4.8.59 Comparison of projected UHLH available harvest volume between management strategy (PMS.scen33) and planned operations (finalplan_1_3_) model runs

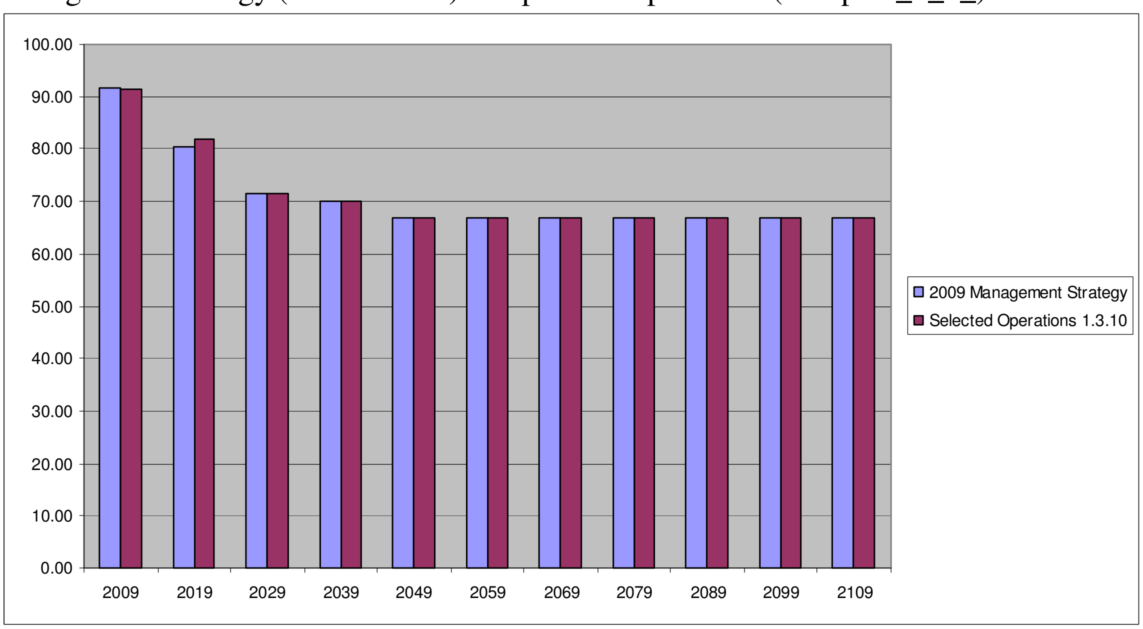
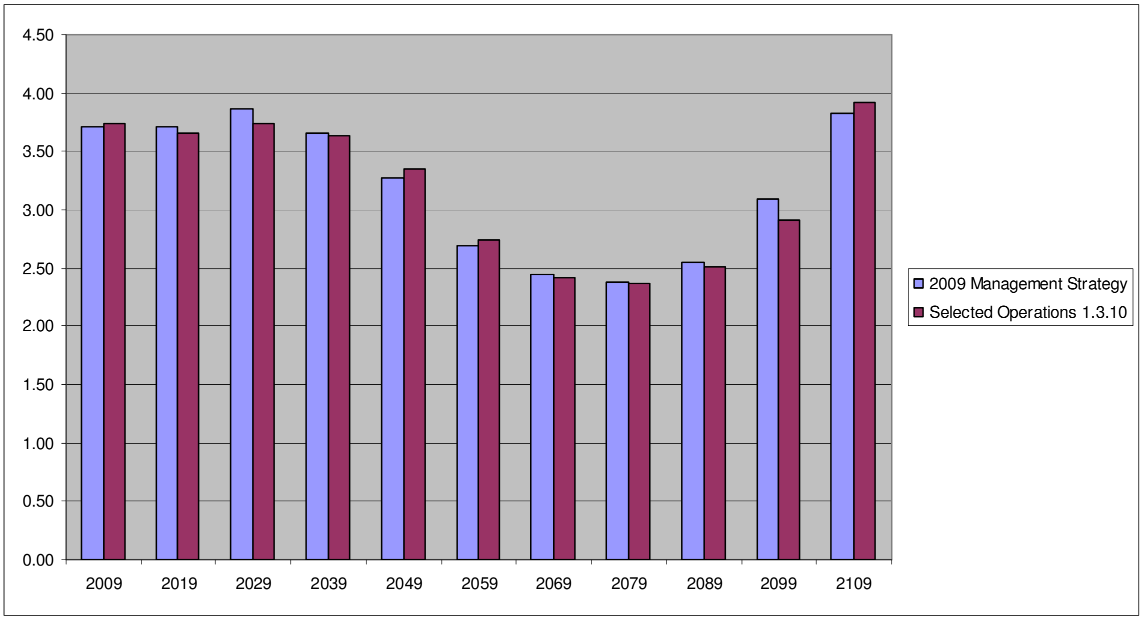


Figure 4.8.60 Comparison of projected CE available harvest volume between management strategy (PMS.scen33) and planned operations (finalplan_1_3_) model runs



5.0 Determination of Sustainability

Based on FMP-13, the vast majority of the 61 indicators of sustainability that were assessed at this stage of the Plan development were within, or moving toward, the desired levels. Rationale for setting targets at different than desired levels has been documented and additional analysis has been conducted to ensure there is no negative impact to the sustainability of the Forest.

In all cases, the indicators that are not within or moving toward the desired level are a result of the current forest condition (ageclass gap, limiting wood supply into the medium terms) or balancing multiple objectives (limiting wood supply vs. certain ecological objectives). In cases where indicators are not moving toward the range for each desirable level, rationale has been provided.

Desired projection of forest cover types were based on a combination of the natural benchmark and the pre-settlement forest condition. The desired level was met for all forest cover types with the exception of the upland jack pine and black spruce and spruce-fir, which both showed a subtle decrease rather than stability.

The total area of upland jack pine and black spruce cover type on the Forest at Plan start was 30,014 hectares. This is projected to change by 4,103 hectares over the course of 100 years. Although the desire to stabilize was not achieved, the proposed management strategy provide greater than 70% of jack pine spruce upland area compared to the natural benchmark by term through this 100 year projection. The natural benchmark projects this forest cover type to loose close to 50% of its area over the course of 100 years.

The total area of spruce-fir cover type at Plan start was 58,607 hectares. This cover type is projected to change by 3,486 hectares over the course of 100 years. Although the desire to stabilize was not achieved, the proposed management strategy provides greater than 70% of spruce-fir area compared to the natural benchmark by term through this 100 year projection. The natural benchmark projects this forest cover type to loose more than 50% of its area over the course of 100 years.

The trend of the natural benchmark makes it difficult to maintain these forest cover types through time since so many other objectives in the Plan are linked to the trends provided for in the natural benchmark run. The desire to stabilize levels is based on working group data supporting historic forest conditions, and may not provide the most accurate comparison to how we classify the forest in forest management plans today. Nevertheless, the planning team felt it was important to consider this background information and allow it to guide the desired levels.

Considering that the reduction is noticeably less than the natural projection, and that the timeframe the loss occurs is extremely long, the conclusion can be made that the result meets the intent of the objective which states, "Maintain the area of forest cover types that would occur naturally on the Nipissing Forest, with consideration of the pre-settlement forest condition". The combination of a natural trend and the desire to consider pre-settlement has lead to the subtle decline of jack pine/ spruce upland on the landscape. Keeping this in mind, the planning team has concluded that the change over time (less than 40 ha/yr for each type) is within the range of the desired level.

Another non-spatial indicator targeted in the management strategy was the abundance of pre-sapling, sapling and two-canopy phase shelterwood condition compared to the natural benchmark. Out of a total of 375 possible measures, when considering 25 Ecosite types by 15 planning terms, all but 9 of the 375 measures met the target. All of the 9 targets that miss the 70% mark achieve at least 95% of the target, with 8 of the 9 being within <3% of achieving the full target.

The creation of this condition is stimulated by harvest activity on the landscape. Failure to meet the target for all terms is brought on by pressure in the medium terms to reduce harvest as a result of a projected shortage in harvest area due to forest ageclass as well as ecological targets in the strategy such as the provision of old growth and other preferred habitat. In addition to these factors, the planning team's objectives to restore white and red pine on the landscape often leads to a reduction in the area found in other Ecosite types when compared to the natural benchmark.

It can be concluded that in light of other objectives on the Forest, as well as the current forest condition, the strategy was not able to meet all targets for this objective. However in each case the condition moves back into the target range in later terms, and eventually begins to move back toward the desired level.

Preliminary spatial assessment of the proposed management strategy has identified excellent movement toward the natural disturbance template; moving closer to the desired level in 7 of 10 possible indicators, with two of these within the range of the desired level. Timing, and spatial factors such as water, private land and provincial parks, explain why the two largest (>10,000 ha) size classes are not being met. In the 201-500 ha size class, movement was away from the desired level. The planning team believes that required standards may conflict with this target. The 90/10 standard requires that clearcuts greater than 260 ha must be less than or equal to 90% in frequency on the landscape. This standard does not always align with the intent to maintain the frequency of this size class in accordance with the natural template pattern. For example, two clearcuts at 252 hectares in size are more effective at meeting the 90/10 standard, rather than one at 504 hectares which is in the next size class in the template, but makes the 90/10 standard more difficult to attain.

The spatial assessments also noted areas where some improvement to the proposed allocation may be considered, focusing mainly on clearcuts greater than 260 hectares, and moose carrying capacity on the Forest.

Wood supply projections have illustrated achievement of the desired levels for many species groupings in many of the future planning terms. Targets were set lower than the desired levels to account for historic utilization trends on the Forest, and were met most terms. Birch volume was projected to move away from the desired level for several past forest management plans and continued to show a similar trend in this strategy. It is clear that the decline is largely due to the ageclass structure of this forest unit, coupled with the desire to reduce the area in this cover type (pre-settlement forest condition). Careful consideration was given to the historic utilization of the species grouping, the even flow projections of the indicator and the possibilities for other species groups to fill in for this species.

Another species grouping that marginally missed the targets in several terms was the hard maple species grouping. The ageclass structure of this forest unit provides a good short term supply, barely missing the 70% target and always balanced with current utilization trends.

Other social economic indicators that fell slightly outside of the planning team's target related to forecast harvest area and volume, as well as planned harvest area. Forecast harvest area targets were met in all but one forest unit, red pine. The red pine forest unit missed the target (905 of available harvest area by forest unit) by 2%. Rationale for this short fall is linked to the small, scattered nature of this forest unit, making it difficult to render operational harvest areas within the forest unit.

Forecast harvest volume targets were missed for the poplar and white and red pine species groupings. Targets set by the planning team required plus or minus 10 percent of the available harvest area, to account for stand level variability in the projections. The poplar species group missed the lower limit by 2% or approximately 2,000 cubic metres per year. The cedar species group missed the upper limit by less than 200 cubic metres per year. Rationale provided in the Plan for these short fall links these issues to the stand selected for operations, and the stand composition characteristic variation from one to the next, compared to the strategic estimation.

The third indicator provided for a balance of harvest area from Phase one to Phase two, with the target allowing a 15% flexibility to allow for the realities of planning operational harvest activities. All forest units fell within the 15% balance, however, some were fairly close to the limit. All forest units that approached the limit are smaller forest units, with less operational flexibility to split equally between the two Phases. The planning team sees this as a necessary short fall to keep the operational layout and access as efficient as possible.

Social and economic analysis for the proposed management strategy evaluated the 9% reduction in timber supply from the past (2004) approved forest management plan. The assessment concluded that no immediate impact to employment would result, as harvest levels have traditionally been lower than planned levels. It is important to note that anticipated reductions of timber supply in the next 4 to 5 planning terms could place strain on employment if resources are fully utilized. Recent trends on the Forest show increased utilization of wood.

The final Plan was presented to the LCC on December 16, 2008.

5.1 Conclusion

The Nipissing Forest planning team concludes, on balance, that plan objectives are being met and progress is being made towards the desired forest and benefits. The determination of sustainability for the forest management plan has been achieved. The Plan continues to have regard for the plant life, animal life, water, soil, air and social and economic values, including recreational and heritage values.

6.0 Documentation

The Nipissing Forest Management Plan includes supplementary documentation, which is a summary of the information used, and the documentation of decisions and analyses made, during the planning process. The supplementary documents listed below outlines the relevant information as per requirements of the Forest Management Planning Manual.

6.1 Outline of Supplementary Documentation

section	document
6.1.1	FMP Guides
6.1.2	A Series of Maps
6.1.3	Information on Other Resources
6.1.4	Table of Residual Stand Structure
6.1.5	Information used to update FRI
6.1.6	Analysis Package (under separate cover)
6.1.7	Aboriginal Background Information
6.1.8	Aboriginal Consultation Approach
6.1.9	Recommendations from year 7 management unit annual report
6.1.10	Addressing audit results
6.1.11	Monitoring for exceptions
6.1.12	Road Documentation
6.1.13	Operational Prescription for AOCs
6.1.14	Stand Listing
6.1.15	Summary of Public Consultation
6.1.16	LCC Report
6.1.17	Summary of Major Issues
6.1.18	Documentation regarding Plan Approval & Review
6.1.19	Terms of Reference
6.1.20	FMP Summary (see section7.0 of the FMP)
6.1.21	Statement of Environmental Values
6.1.22	Socio-economic Report
6.1.23	Desired Forest & Benefits
6.1.24	Ten-year Compliance Plan
6.1.25	Old Growth Strategy
6.1.26	Rationale for Desired Levels and Targets
6.1.27	Representation of Objectives in Forest Modeling
6.1.28	Prescriptions for Harvest, Renewal & Tending
6.1.29	Forest Regeneration Monitoring
6.1.30	Wood Supply Documentation
6.1.31	Forest Unit Statistics
6.1.32	Harvest Net-down Methodology

6.2 Other Documentation

The public correspondence related to the development of this Plan will be retained on file at the North Bay District office of the MNR. The Report for the Protection of Identified Aboriginal Values will also be on file at this location.

7.0 Forest Management Plan Summary

The forest management plan summary is contained in Supplementary Document 6.1.20. The FMP summary is prepared to facilitate public review. It can also be downloaded as a PDF from the NFRM website – **www.nipissingforest.com.**

8.0 Planned Operations for the Second Five-year Term

This section is included to serve as a place holder for the planned operations that will be conducted for the second five year phase of the FMP (i.e. 2014-2019). The following is an outline of the document that will be produced at that time.

8.1 Introduction

8.2 Prescription for Operations

8.3 Harvest Operations

8.4 Renewal and Tending Operations

8.5 Roads

8.6 Revenues and Expenditures

8.7 Monitoring and Assessment

8.8 Supplementary Documentation

8.9 Planned Operations Summary

9.0 Forest Management Plan Tables

FMP-1: Management Unit Land Summary
FMP-2: Summary of Crown Productive Forest by Provincial Forest Type
FMP-3: Description of Forest Units
FMP-4: Summary of Managed Crown Productive Forest by Forest Unit
FMP-5: Silvicultural Ground Rules
FMP-6: Summary of Management Objectives
FMP-7: Projected Forest Condition for the Crown Productive Forest
FMP-8: Projected Habitat for Selected Wildlife Species
FMP-9: Projected Available Harvest Area by Forest Unit
FMP-10: Projected Available Harvest Volume by Species Group
FMP-11: Projected Operations, Revenues and Expenditures
FMP-12: Frequency Distribution of Forest Disturbances
FMP-13: Assessment of Objective Achievement
FMP-14: Operational Prescriptions for Areas of Concern
FMP-15: Forecast (10-year) and Planned (5-year) Harvest Area
FMP-16: Planned Clearcuts (5-year
FMP-17: Forecast of Harvest Volume by Species (10-year)
FMP-18: Planned Harvest Volume and Wood Utilization (5-year
FMP-19: Forecast (10-year) and Planned (5-year) Wood Utilization by Mill
FMP-20: Contingency Area: Harvest Area and Volume
FMP-21: Forecast (10-year) and Planned (5-year) Renewal and Tending Operations
FMP-22: Forecast (10-year) and Planned (5-year) Road Construction and Use Management
FMP-23: Road Crossings of Areas of Concern
FMP-24: Forecast of Revenues and Expenditures (10-year)