

2019-2029 NIPISSING FOREST MANAGEMENT PLAN

January 31, 2019



Forest Management Plan - Title and Certification Page

**FOREST MANAGEMENT PLAN
for the
Nipissing Forest**

Ministry of Natural Resources and Forestry's North Bay District, Northeast Region
Nipissing Forest Resource Management, Inc.
for the 10-year period from April 1, 2019 to March 31, 2029

I hereby certify that I have prepared this forest management plan, including the silvicultural ground rules, to the best of my professional skill and judgement with the assistance of an interdisciplinary planning team in accordance with the requirements of the Forest Management Planning Manual and Forest Information Manual.

[R.P.F. seal] _____ February 8, 2019
Scott McPherson, R.P.F. Date
Plan Author, NFRM Inc.

Submitted by: _____ February 8, 2019
Mark Lockhart, R.P.F. Date
General Manager, NFRM Inc.

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, the Forest Information Manual, and relevant policies and obligations (including any relevant MNRF agreements with Indigenous peoples). I also certify that the forest management plan has been prepared using the applicable forest management guides. In this forest management plan, prescriptions and conditions 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:

Mitch Baldwin Date
District Manager, North Bay District, MNRF

Deb Weedon Date
Regional Resources Manager, Northeast Region, MNRF

Approved by:

Corrinne Nelson Date
Regional Director, Northeast Region, MNRF

Forest Information Portal Submission Identifier: [ID].

Original signed hard copies are filed at the MNRF North Bay District office and the NFRM office.

For Sections of the Forest Management Plan not Prepared by the Plan Author

**FOREST MANAGEMENT PLAN
for the
Nipissing Forest**

Ministry of Natural Resources and Forestry's North Bay District, Northeast Region
Nipissing Forest Resource Management, Inc.
for the 10-year period from April 1, 2019 to March 31, 2029

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

[name]	[position]	[section]	[name]	[date]
Name	Job Title	Sections prepared	Signature	Date

To be completed for the Final Plan

Forest Management Plan - List of Exceptions
FOREST MANAGEMENT PLAN
for the
Nipissing Forest

Ministry of Natural Resources and Forestry's North Bay District, Northeast Region
Nipissing Forest Resource Management, Inc.
for the 10-year period from April 1, 2019 to March 31, 2029

All silvicultural treatments in the silvicultural ground rules that are exceptions to the recommendations in the silvicultural guides, and all operational prescriptions and conditions for areas of concern that 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 Forest Management Plan
No exceptions are planned	Not applicable

Forest Management Plan Contributors

FOREST MANAGEMENT PLAN for the Nipissing Forest

Ministry of Natural Resources and Forestry's North Bay District, Northeast Region
Nipissing Forest Resource Management, Inc.
for the 10-year period from April 1, 2019 to March 31, 2029

PLANNING TEAM MEMBERS

Planning Team Member	Affiliation	Position/Broad Role on Planning Team
Scott McPherson, R.P.F.	NFRM	Plan Author
Mark Lockhart, R.P.F.	NFRM	Chair / NFRM General Manager
Matthew Hollands, R.P.F., Emily Salt, Erin Armstrong, R.P.F.	MNRF Northeast Region	Regional Planning Forester (Project Manager)
Guylaine Thauvette, R.P.F.	MNRF North Bay District	Management Forester
Derrick Romain	MNRF Northeast Region	Regional Planning Biologist
Shamus Snell	MNRF North Bay District	Management Biologist
Norm Dokis	MNRF North Bay District Overlapping Licensee Representative	Resource Liaison Specialist Representative of overlapping licensees and wood supply beneficiaries
John McNutt, R.P.F.		
Tim Toepfner, Fred McNutt alternate	Local Citizens Committee	Nipissing Forest LCC Representative
Dave Joannis	Antoine First Nation Mattawa North Bay	Antoine First Nation Representative Mattawa-North Bay Algonquin Representative
Clifford Bastien, Jr.	Algonquin First Nation	Representative
Clayton Dokis	Dokis First Nation	Dokis First Nation Representative
Joan McLeod, Joanne Gibouleau alternate	Nipissing First Nation	Nipissing First Nation Representative
Robin Koistinen, Michael Paul alternate	Temagami First Nation	Temagami First Nation Representative
Brenda St. Denis, Simon Charest alternate	Wolf Lake First Nation	Wolf Lake First Nation Representative
Marc Laurin, Nelson Montreuil	Métis of Nation of Ontario	Métis of Nation of Ontario Representatives

Forest Management Plan Contributors, Cont.
PLANNING TEAM ADVISORS

Nipissing Forest Resource Management and Mitig Forestry Consultants

Andrée Morneault, R.P.F.	NFRM Silviculture Forester
Andy Straughan, R.P.F.	NFRM Silviculture Forester
Ric Hansel, R.P.F.	NFRM Operations Forester
Daryl Sebesta, R.P.F.	NFRM Operations Forester
Tony Cyr	Senior GIS Analyst, Mitig Forestry Services
Grant Mitchell	Partner, Mitig Forestry Services

Ministry of Natural Resources and Forestry

Robin Hill	Forestry Technical Specialist
Julie Robinson	District Planner
Ed Matthews, James Zacher	Fire Management
Bonnie Kennedy	District GIS Data Technician
Marinus Verwey, Danielle Loranger, George Sanschagrín, Rob Ferrier, Ryan Carr	Resource Management Technicians
Jim Aldridge	Integrated Resource Management Technical Specialist
Mark Austin, R.P.F.	Forest Management Planning Specialist
Todd little, R.P.F.	Regional Analyst, NER
Rob Keron, R.P.F.	Regional Analyst, Southern Region
Karrah Watkins	Regional Analyst, NER
Heather Farrer, R.P.F.	Forest Industry Liaison Officer
Todd Copeland	Species at Risk Specialist
Justin Standeven	Regional Planning Coordinator
Robert Fournier	Regional GIS Officer
Renée Bellini	Cultural Heritage Specialist
Donna Palmero	Regional Aboriginal Advisor
Lindsey Russell, R.P.F.	Regional Forested Ecosystem Science Specialist
Megan Kilgour	Regional Lands Specialist
Derek Seim	Regional Aggregates Specialist
André Joyal	EFR Fire Science Specialist
Jennifer Brown	Forest Information Analyst
Tracy Snarr, Wade Murrant, Kevin Pinkerton, Dave Ward	Parks Superintendents

Ministry of Northern Development and Mines

Catherine Daniels	North East Regional Land Use Geologist
Linda Bouchard-Berzel	Northern Development Officer

Ministry of Environment Parks and Conservation

Madhi Ramadoss	Pesticides Specialist
----------------	-----------------------

Ministry of Tourism, Culture and Sport

James Antler	Policy Advisor, Tourism Policy & Development
--------------	--

Forest Management Plan Contributors, Cont.

LOCAL CITIZENS COMMITTEE MEMBERS

Member	Alternate	Representations
Peter Foy		Anglers and hunters
Dave Minden	Keith Stewart	Cottagers
Chief Dave Joanisse	Clayton Dokis	District Aboriginal Working Group
Lucy Emmott		Environmental Groups
Elwyn Behnke	Blayne Behnke	Independent Loggers
Chris Mayne		Municipalities, chambers of commerce, economic development
Lorie Reed		Naturalists clubs
John McNutt	Mark Lockhart	Sustainable Forest Licensee
Frank Tagliamonte		Prospectors, mining, aggregates
Tim Toepfner	Cassie Bott-Baxter	Public at large
Tom MacLean	Luc Gelinis	Silvicultural contractors
Marvin Geauvreau	Jennifer McCourt	Trails
Joel Larocque	Lyse Laurin	Tourist industry
Ryan Tamlin	George Sanschagrin	Trappers
J. Fred McNutt		Local cultural heritage groups
Cyndy Sutherland-MacPhail	Cliff Moulder	Education

Local citizens committee statement:

“The LCC is in general agreement with the FMP as the best effort with the tools available.

The LCC recognizes that the planning team made it a priority to develop future strategic directions to evaluate how forest management on the Nipissing Forest responds and how it is integrated into its principles and policies, such as those relating to climate change. Direction requires moving the forest towards the natural range of variation, as defined in the Landscape Guide, with respect to forest composition, age classes, and distribution.

The LCC recognizes the efforts made to refine the total number of plan objectives. The available management resources can now be more focused which may facilitate a greater degree of objective achievement. Future FMPs will document this potential direction.”

Forest Management Plan Contributors, Cont.

PLAN REVIEWERS

Plan Reviewer Name and Position	Roles and Responsibilities
Matthew Hollands, R.P.F./ Erin Armstrong, R.P.F. Regional Planning Forester	Operational Review, Preliminary Review
Guylaine Thauvette, R.P.F., Management Forester	Operational Review, Preliminary Review
Derrick Romain, Regional Planning Biologist	Operational/Advisory Review, Preliminary Review
Shamus Snell, Management Biologist	Operational Review, Preliminary Review
Robin Hill, Forestry Technical Specialist	Operational Review
Jim Aldridge, Integrated Resource Management Technical Specialist	Operational Review
Julie Robinson, District Planner	Advisory Review
Ryan Carr, Rob Ferrier, Danielle Loranger, George Sanschagrin, Resource Management Technicians	Operational Review
Justin Standeven, Regional Planner	Operational/Advisory Review
Norm Dokis, District Resource Liaison Specialist	Operational/Advisory Review
Mark Austin, R.P.F., Forest Management Planning Specialist	Advisory Review
Donna Palmero, Regional Aboriginal Advisor	Advisory Review
Rob Keron, R.P.F., Regional Forest Analyst	Operational/Advisory Review, Preliminary Review
Heather Farrer, R.P.F., Forest Industry Liaison Officer	Advisory Review
André Joyal, EFR Fire Science Specialist	Advisory Review
James Zacher, Fire Management Supervisor	Advisory Review
Greg Lloyd, A\Regional Forest Operations Specialist	Advisory Review
Lindsey Russell R.P.F., Forest Science Specialist	Advisory Review

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- 6.1.22 List of Major Changes from the Draft Plan

1 1.0 INTRODUCTION

2 Forest management activities on Crown land in Ontario must be carried out in accordance with a forest
3 management plan that is approved by the Ministry of Natural Resources and Forestry. Forest
4 management plans are a statutory requirement of the *Crown Forest Sustainability Act* and must be
5 prepared by a professional forester registered under the auspices of the *Professional Foresters Act*,
6 2000.

7 The *Crown Forest Sustainability Act (CFSA)* and the decision of the *Environmental Assessment Board on*
8 *MNR's Class Environmental Assessment for Timber Management on Crown Lands in Ontario* provide
9 legal direction for the management of Ontario's Crown forests. Declaration Order MNR-75:
10 Environmental Assessment Requirements for Forest Management on Crown Lands in Ontario provides
11 more direction and clarification for forest management activities. The MNR's *Statement of*
12 *Environmental Values (SEV)* under the *Environmental Bill of Rights, 1993 (EBR)* has also been considered
13 in the development of this FMP to further the objective of managing Ontario's natural resources on a
14 sustainable basis. An updated SEV Consideration document is provided in Supplementary
15 Documentation 6.1.17.

16 The Crown forests of Ontario are divided into management units for the purpose of forest management.
17 The Ministry of Natural Resources and Forestry (MNR) North Bay District contains two management
18 units: the Temagami Management Unit and the Nipissing Forest. This forest management plan is for the
19 Nipissing Forest, which comprises the southern portion of the North Bay District.

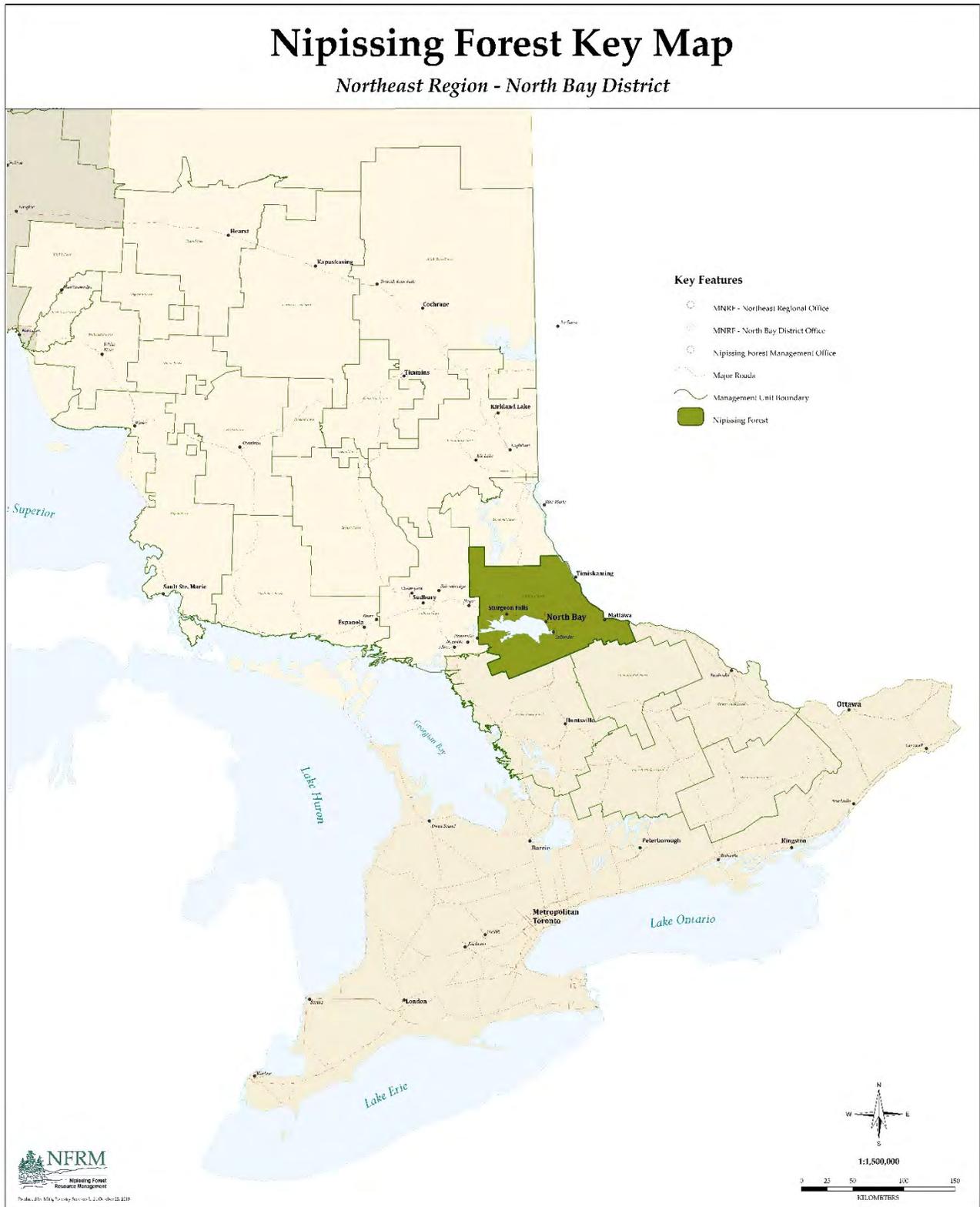
20 The Nipissing 2019-2029 Forest Management Plan (FMP) establishes the long-term direction and
21 shorter-term operational goals for managing Crown forest resources within the management unit. This
22 includes planned harvest areas, access (i.e., road construction and use management strategies), and
23 silviculture (i.e., renewal and tending) that will take place during this period.

24 The Nipissing Forest is administered and managed by Nipissing Forest Resource Management, Inc.
25 (NFRM) under the authority of Sustainable Forest Licence (SFL) No. 542053. The company, NFRM, is
26 owned by its shareholders: R. Fryer Forest Products Limited, Goulard Lumber (1971) Limited, Rayonier
27 A.M. Canada G.P. (formerly Tembec Industries Inc.), Hec Clouthier and Sons Inc., and Georgian-Pacific
28 (formerly Grant Forest Products Inc.). The Sustainable Forest Licence, under the Crown Forest
29 Sustainability Act, is administered by the Ontario Ministry of Natural Resources and Forestry, North Bay
30 district office. North Bay District reports administratively to the Regional Director of the Northeast
31 Region, based in Timmins, Ontario.

32 As the SFL holder, NFRM is responsible for preparing the FMP and Annual Work Schedules (AWS),
33 conducting forest operations in accordance with approved plans, monitoring operations for compliance,
34 collecting and maintaining planning information for the forest according to the current Forest
35 Information Manual and reporting on operations and objective achievements in the Annual Reports.

36 The MNR is responsible for collecting and maintaining values information for the Forest, input, review
37 and approval of planned operations in the FMP and AWS, maintaining communications with the public
38 and Indigenous communities with a known interest in the forest, providing direction on provincial policy,
39 guideline and manual implementation, and auditing of operations to ensure that forest operations are in
40 compliance with the approved plans.

1 **Figure 1.1. Location and extent of the Nipissing Forest.**



2

3

1 The Nipissing Forest (the Forest) covers more than half of North Bay District and comprises the southern
2 portion of that district. The district is located in the south-eastern part of the Northeast Region (refer to
3 Figure 1.1). The Forest extends over 11,469 square kilometres and has a permanent population of
4 approximately 86,000. The city of North Bay has a population of 56,000 and is a supply and
5 communications centre for much of north-eastern Ontario. North Bay is a focal point for a ring of
6 smaller, nearby communities.

7 The largest of the neighbouring centres is Sturgeon Falls (population of about 6,000), which is located 38
8 km west of North Bay. Verner (population of about 1,000), 16 km farther west, is the centre of a large
9 agricultural community. Powassan (population of about 1,200) is 33 km south of North Bay on Highway
10 11, and is the service centre for another agricultural community. The town of Mattawa (population
11 about 2,500) is located 62 km east of North Bay, at the confluence of the Mattawa and Ottawa Rivers.
12 The town of Temiskaming, in Quebec, on the east side of the Ottawa River at the end of Highway 63,
13 also relies to a large extent on the services provided by the community of North Bay.

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

18 There have been many changes in boundaries in the North Bay District in past years, but no significant
19 changes since the last FMP in 2009. The Temagami District was amalgamated with North Bay District in
20 1996 and became the Temagami Area of the North Bay District. From 1980 to 1990 there were four
21 Crown Management Units (CMUs) in the North Bay District: Wasi CMU, Mattawan CMU, Tomiko CMU
22 and Verner CMU. In 1990, the area was reorganized from four to three management units: the Ottawa
23 River CMU, the Sturgeon River CMU, and the Nipissing CMU. In 1994, the entire district became one
24 Crown Management Unit, which became the Nipissing Forest when the sustainable forest licence was
25 signed in 1996. A comprehensive forestry history of the management unit may be obtained by
26 reference to the four timber management plans produced in the 1980s, to the three plans produced
27 during the 1990s, to the North Bay CMU 1994-1999 plan and to the Nipissing Forest 1999 plan. Minor
28 improvements in the accuracy of the management unit boundary were incorporated into the
29 management unit spatial file received in 2016.

30 Private land comprises 23 percent of the total area of the Nipissing Forest and is concentrated in the
31 southern and central regions of the management unit. Its contribution to the overall wood supply in the
32 management unit is minimal.

33 There are 18 provincial parks and 21 conservation reserves in, or partially within the Nipissing Forest.

34 Two First Nation Reserves, Dokis and Nipissing are situated in the western and central parts of the
35 Forest respectively. Two other aboriginal communities, the Mattawa/North Bay Algonquins and the
36 Antoine First Nation, are located in the Mattawa area, but do not have any reserve lands. The
37 Temagami First Nation is located north of the Nipissing Forest, but uses parts of the Nipissing Forest for
38 traditional purposes, and a small portion of the Temagami Lands Set Aside (LSA) extends into the
39 Nipissing Forest. Wolf Lake First Nation is located on the east side of the Ottawa River and also
40 traditionally uses parts of the Nipissing Forest. The Métis Nation of Ontario also has an inherent interest

- 1 in the Nipissing Forest and has recently initiated local involvement in the planning process. Each
 2 Indigenous community has representation on the planning team.
- 3 The provincial government has no land use jurisdiction on the First Nation Reserves, but timber
 4 extraction is an important activity on these lands and many band members are involved in timber
 5 management on the adjacent Crown lands.
- 6 Two major provincial highways, #11 and #17, intersect in the city of North Bay, thus providing excellent
 7 access to the north, south, east and west parts of the district. Numerous secondary highways branch off
 8 from these two creating an elaborate grid of primary access into all corners of the district. Besides
 9 provincial highways, most townships have a network of municipal and local roads. The logging roads,
 10 constructed primarily for wood harvesting, are maintained by logging companies. Recent government
 11 funding has allowed the forest industry to upgrade many of the primary forest access roads within the
 12 Forest.
- 13 A number of mills receive wood fibre from the Nipissing Forest, but not all of them are entirely
 14 dependent on the unit for their timber supplies. The major wood processing facilities that currently
 15 draw their wood supplies from the area are listed in Figure 1.2.

16 **Figure 1.2. A list of mill facilities receiving wood fibre from the Nipissing Forest.**

Mill Name	Location
Pulpwood/OSB	
Domtar	Espanola
GP North Woods LP	Englehart
KD Quality Pellets Ltd.	New Liskeard
Rayonier A.M. Canada G.P. (formerly Tembec)	Temiscaming, Bearn, Quebec
Sawlogs/Poles	
Northern Pallets (2545088 Ontario Ltd.)	North Bay
Almaguin Forest Products	South River
Ben Hokum & Son Ltd.	Killaloe
Dament & Charles Lumber Manufacturing Ltd.	Pembroke
EACOM	Nairn
Goulard Lumber Limited	Sturgeon Falls
H. & R. Chartrand Lumber Ltd.	Noelville
Herb Shaw & Sons Ltd.	Petawawa
Lavern Heideman & Sons Ltd.	Eganville
Northern Pressure Treated Wood Ltd.	Kirkland Lake
Portelance Lumber	Capreol
RYAM division of Rayonier A.M. Canada G.P.	Huntsville
Stella-Jones Inc.	Kirkland Lake
Veneer	
Levesque Plywood Limited (Columbia Forest Products Ltd.)	Hearst
Columbia Forest Products	Rutherglen
Rockshield Engineered Wood Products ULC	Cochrane

17

1 The FMP management strategy and planned operations were prepared in an open consultative fashion
2 by a multi-disciplinary planning team. A team of resource managers, described in the terms of reference,
3 developed this FMP. A Local Citizens Committee (LCC) helped prepare the FMP and will continue to
4 advise the District Manager throughout plan implementation. The primary role of the local citizens
5 committee is to communicate local interests to the planning team and to the District Manager, to
6 discuss management options with the planning team and the District Manager and to advise the District
7 Manager on issue resolution. Refer to Supplementary Documentation 6.1.16 for the updated Terms of
8 Reference for the development of this FMP.

1 2.0 MANAGEMENT UNIT DESCRIPTION

2 2.1 Forest Description

3 2.1.1 Historic Forest Condition

4 Forests are dynamic and in a constant state of change due to natural and human-induced causes,
5 particularly in temperate and boreal regions. The Nipissing Forest is no exception and has undergone
6 significant changes over the last few centuries. The most notable changes occurred since the late 1800s
7 as a result of expanding human settlement, the development of railways, and early logging practices
8 that preceded modern forestry.

9 A summary of the historic forest condition, including shifts in species composition over time, is provided
10 in Section 6.1.1 of the Supplementary Documentation.

11 2.1.2 Current Forest Condition

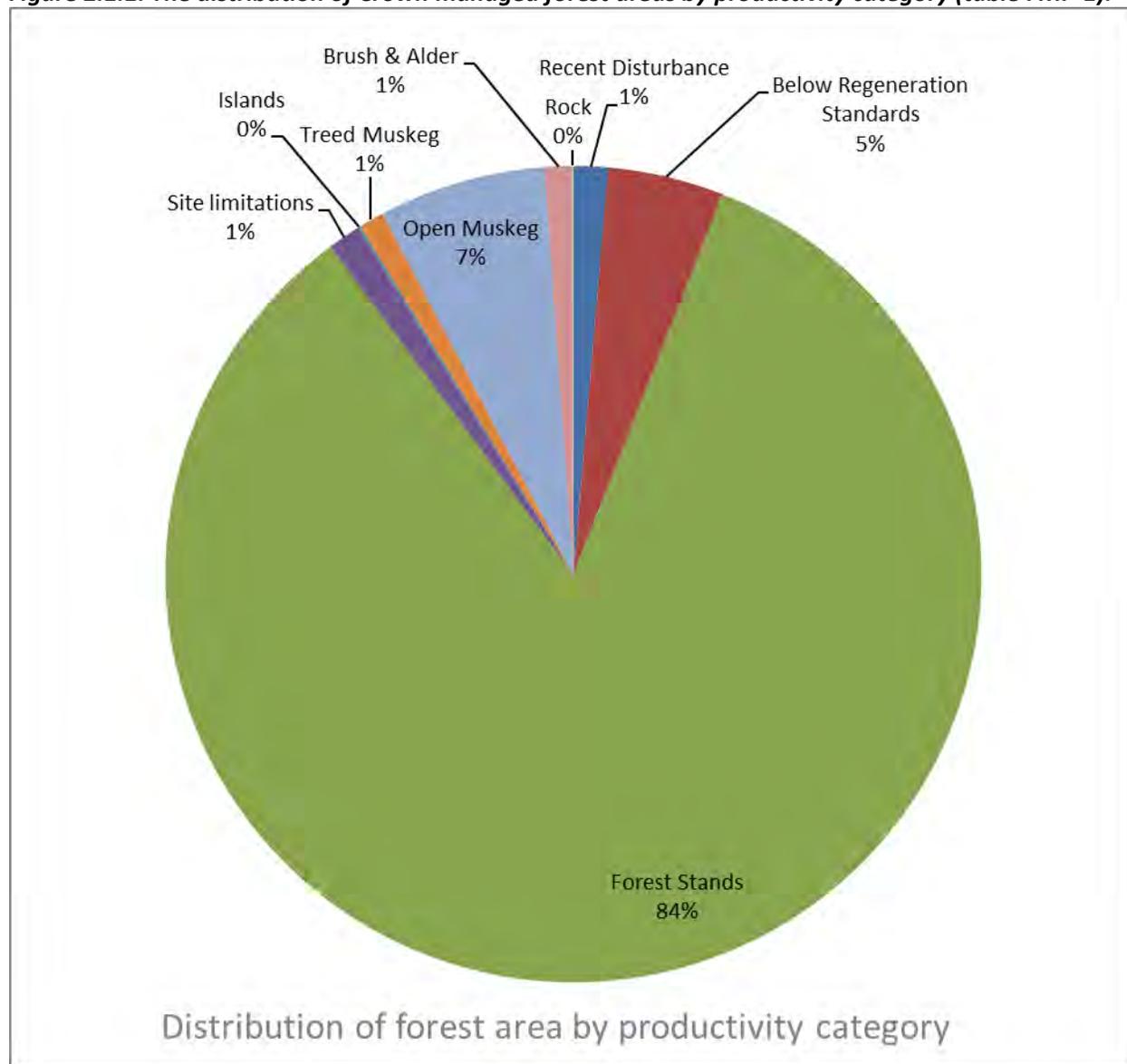
12 The Nipissing Forest covers just over one million hectares including forested area, water and other non-
13 forested areas. Table FMP-1 shows the distribution of lands and water across the various ownerships:
14 74% of the total management unit is Crown (68% in managed plus 6% in provincial parks and protected
15 areas); 23% is patent land; and 3% is other. The Crown lands and waters represent 844,030 ha and of
16 this, 70,001 ha is in parks, protected areas and conservation reserves and 774,029 ha is Crown managed
17 area.

18 The distribution of patent land is concentrated mainly across the central and southern portion of the
19 management unit, largely along the Highway 11 and 17 corridors. Being concentrated along these
20 corridors the management unit is fragmented to an extent, however there is also a benefit to the patent
21 land being relatively contiguous, thus there are few isolated patches of Crown land without potential
22 access routes.

23 Of the 617,818 ha of Crown managed forest 555,051 ha, or 90%, is available production forest. Figure
24 2.1.1 shows the distribution of productive and unproductive forest areas, as well as recent disturbances
25 and regenerating forests.

26

1 **Figure 2.1.1. The distribution of Crown managed forest areas by productivity category (table FMP-1).**



2
3 While there is a relatively large proportion of patent land within the Nipissing Forest, relative to many
4 other forests in the northeast region, overall the land base is fairly productive and capable of supporting
5 a wide diversity of ecological conditions and a relatively diverse forestry sector.

6 The Analysis Package is submitted as a separate file from the FMP (refer to
7 MU754_2019_FMP_TXT_AnPack) and is referenced in the Supplementary Documentation 6.1.2 and
8 provides the description of how the forest inventory products were developed and how the descriptive
9 forest information is updated and projected over the planning horizon.

10 2.1.3 Forest Classification

11 2.1.3.1 Forest Units and Analysis Units

12 **Forest Units**

1 A Forest Unit is a classification system that aggregates forest area for management purposes that will
 2 normally have similar species compositions and develop in a similar manner, and is managed with a
 3 consistent silvicultural system. Forest units used in the plan (PLANFU), described in table FMP-2, are the
 4 primary method of accounting forest composition and provide the basis for harvest allocations. The plan
 5 forest units also link to landscape classes and regional standard forest units in order to develop and
 6 track indicators of biodiversity at the landscape scale in accordance with the Forest Management Guide
 7 for Great Lakes-St. Lawrence Landscapes.

8 Forest unit definitions were, for the most part, unchanged from the 2009 FMP (Figures 2.2.4 and 2.2.5).
 9 This provides an advantage for analysing long-term trends by having the same number and general
 10 definition from one plan to the next. This also maintains reasonable consistency with the 2004 FMP
 11 forest units. As with the previous FMPs, the regionally endorsed standard forest units (SFU) were used
 12 as the foundation for PLANFU (Section 2.1 of the Analysis Package in the Supplementary Documentation
 13 provides details on forest unit definitions).

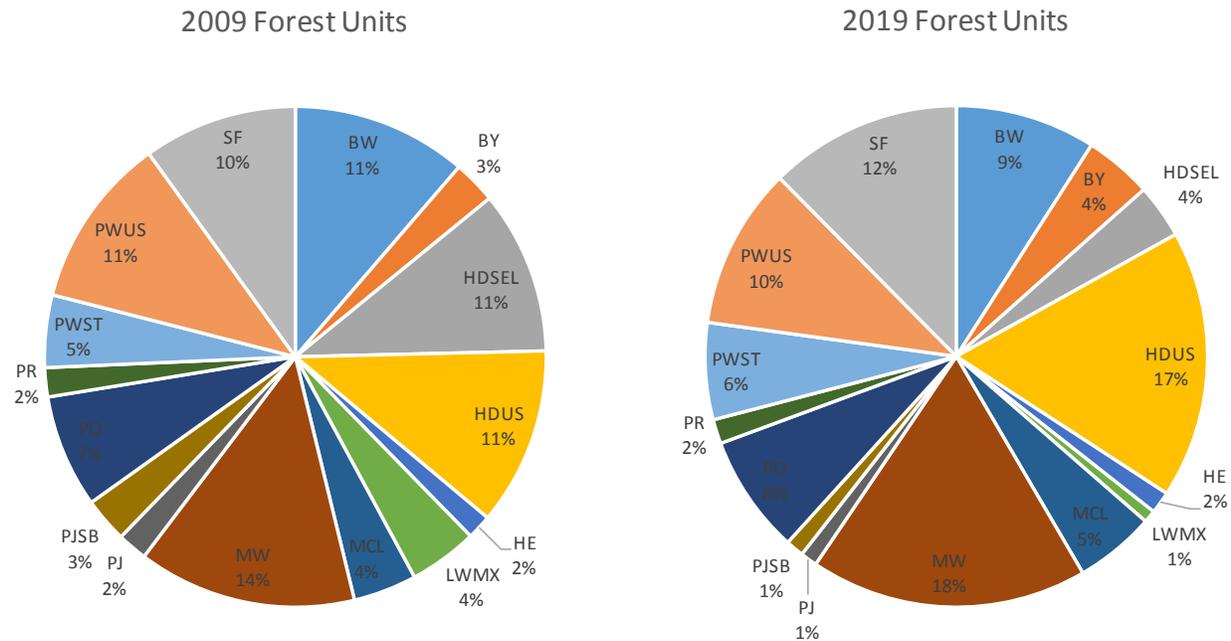
14 **Figure 2.1.2. Forest Classifications table.**

SQL Sort	SFU	2009 PLANFU	2019 PLANFU	Description	Provincial Forest Type	LG Class	Silviculture System
1	PR1	<i>PR</i>	<i>PR</i>	Red Pine	PWR	7 - MP	Clearcut
2	PWUS4	<i>PWUS</i>	<i>PWUS</i>	White Pine Uniform Shelterwood	PWR	5 - WPM	Shelterwood 1R/2R
3	PWOR	<i>PWUS</i>	<i>PWUS</i>	White Pine Uniform Shelterwood	PWR	5 - WPM	Shelterwood 1R/2R
4	PWUSC	<i>PWUS</i>	<i>PWUS</i>	White Pine Uniform Shelterwood	PWR	7 - MP	Shelterwood 1R/2R
5	PWUSH	<i>PWUS</i>	<i>PWUS</i>	White Pine Uniform Shelterwood	PWR	5 - WPM	Shelterwood 1R/2R
6	PWST	<i>PWST</i>	<i>PWST</i>	White Pine Seed Tree	PWR	5 - WPM	Clearcut
7	PJ1	<i>PJ</i>	<i>PJ</i>	Jack Pine	PJK	7 - MP	Clearcut
8	PJ2	<i>PJSB</i>	<i>PJSB</i>	Jack Pine Upland Black Spruce Mix	MCU	7 - MP	Clearcut
9	HE1	<i>HE</i>	<i>HE</i>	Hemlock	MCU	6 - MW	Shelterwood 2R
10	CE1	<i>MCL</i>	<i>MCL</i>	Mixed Conifer Lowland	MCL	8 - SFC	Clearcut
11	SB1	<i>MCL</i>	<i>MCL</i>	Mixed Conifer Lowland	MCL	8 - SFC	Clearcut
12	LC1	<i>MCL</i>	<i>MCL</i>	Mixed Conifer Lowland	MCL	8 - SFC	Clearcut
13	SP1	<i>PJSB</i>	<i>SF</i>	Spruce / Fir	MCU	8 - SFC	Clearcut
14	SF1	<i>SF</i>	<i>SF</i>	Spruce / Fir	MCU	8 - SFC	Clearcut
15	BY1	<i>BY</i>	<i>BY</i>	Yellow Birch	TOL	3 - TH	Shelterwood 1R
16	OAK	<i>HDUS</i>	<i>HDUS</i>	Tolerant Hardwood Uniform Shelterwood	TOL	3 - TH	Shelterwood 1R
17	HDSL2	<i>HDSEL</i>	<i>HDUS</i>	Tolerant Hardwood Uniform Shelterwood	TOL	3 - TH	Shelterwood 1R
18	HDSL1	<i>HDSEL</i>	<i>HDSEL</i>	Tolerant Hardwood Selection	TOL	3 - TH	Selection
19	LWMW	<i>LWMX</i>	<i>LWMX</i>	Lowland Mixedwood	TOL	6 - MW	Shelterwood 1R
20	HDUS	<i>HDUS</i>	<i>HDUS</i>	Tolerant Hardwood Uniform Shelterwood	TOL	3 - TH	Shelterwood 1R
21	PO1	<i>PO</i>	<i>PO</i>	Poplar	POP	4 - IH	Clearcut
22	BW1	<i>BW</i>	<i>BW</i>	White Birch, Poplar Mix	BWT	4 - IH	Clearcut
23	MWUS	<i>MW</i>	<i>MW</i>	Mixedwood	MIX	6 - MW	Clearcut
24	MWD	<i>MW</i>	<i>MW</i>	Mixedwood	MIX	6 - MW	Clearcut
25	MWR	<i>MW</i>	<i>MW</i>	Mixedwood	MIX	6 - MW	Clearcut

16 The most notable differences in distribution of area between the 2009 and 2019 Forest Units is the
 17 reduction in the HDSEL and corresponding increase in HDUS, an increase in the MW and SF, and
 18 decreases in PJ and PJSB (Figure 2.1.3).

19

1 **Figure 2.1.3. Distribution of forest units (PLANFU) in the 2009 and 2019 FMPs (Crown Available area).**



2

3 Table FMP-3 describes the distribution of productive forest area by forest unit, stage of management,
 4 and age class. Productive forest is the area of Crown forest outside provincial parks and protected areas
 5 and is further described by protection forest and production forest. Protection forest is unavailable for
 6 management because of site limitations, i.e., low productivity. A portion of the production forest is also
 7 unavailable (4,575 ha) as it has been withdrawn pending Algonquin First Nation land claim decisions.

8 The forest is also categorized in groupings of provincial forest types (Figure 2.1.4). Provincial forest types
 9 are the broad classification groupings which can be used to describe forests at the provincial scale. Plan
 10 forest units are a refinement of provincial forest types and are specific to the Nipissing Forest.

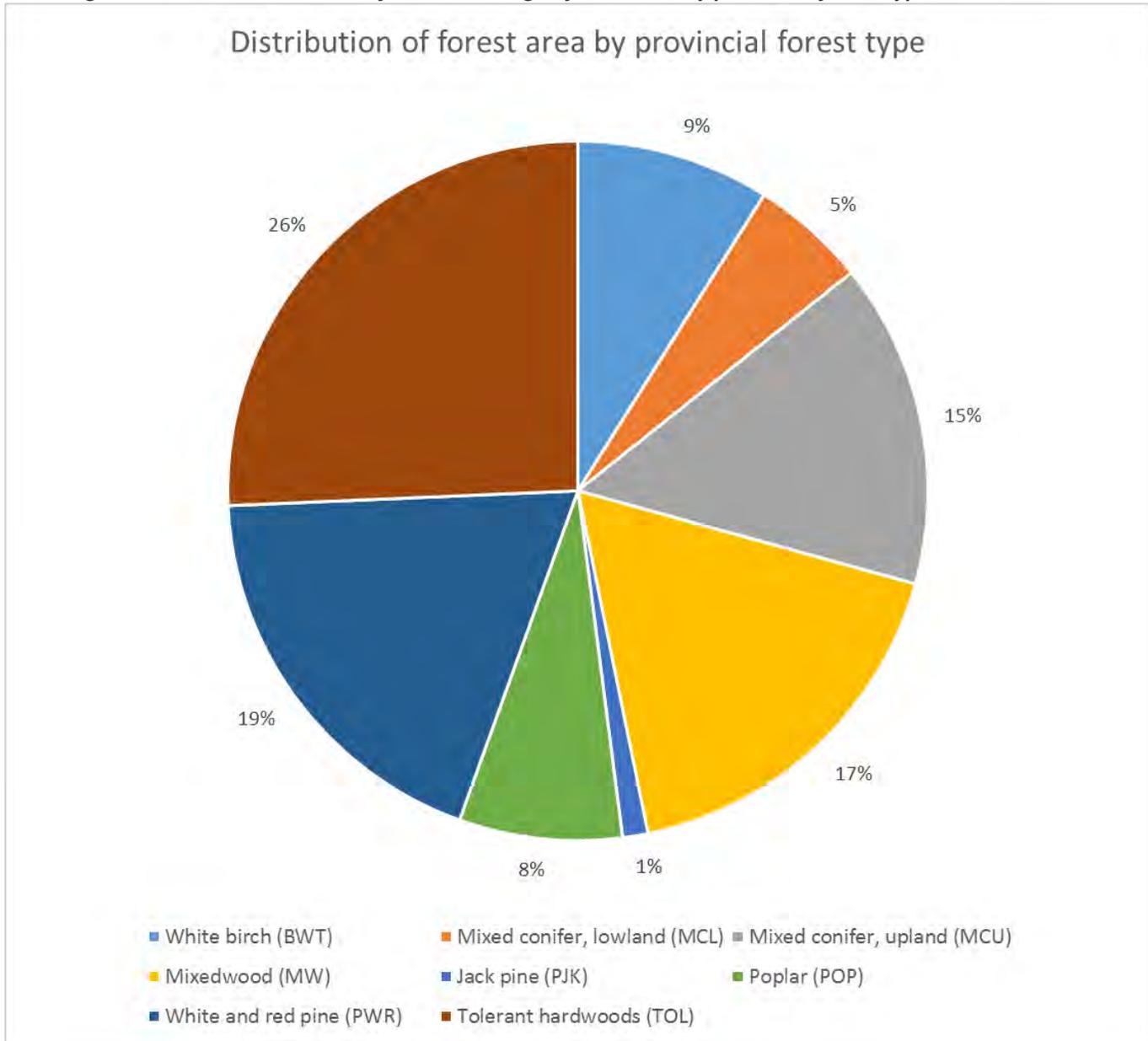
11 The provincial forest types on the managed forest that cover the greatest area are tolerant hardwood
 12 (TOL) at 26% and white and red pine (PWR) at 19%. The mixedwood (MIX) forest type at 17%, mixed
 13 conifer upland (MCU) at 15% and white birch (BWT) at 9% are also significant in size.

14 On the Nipissing Forest, the tolerant hardwood forest type is the most common and is made up
 15 predominantly of hard maple. Hard maple is found throughout the forest, most frequently on fresh to
 16 moist glacial tills. It is most common as relatively pure stands, but is also associated with yellow birch,
 17 hemlock, beech, and oak. Maple stands in the northern portion of the district are generally poorer in
 18 quality than those south of Lake Nipissing due, primarily, to differences in climate. Hard maple is
 19 represented in all age classes with the majority between 60 and 120 years of age.

20 There are 117,624 ha in the PWR forest type, which constitutes 19% of the managed forest. Because of
 21 past heavy logging of white pine and red pine, an objective is to increase the amount of area in this
 22 forest type. This objective has been carried forward from the 1999 and 2004 plans (see Section 3.6,
 23 Objectives). Table FMP-3 shows a reduced number of hectares in the 40-80 age class compared to the

1 other age classes for the white pine forest unit. This is primarily the result of poor historic harvesting
 2 and renewal practices in the 1930's to 1970's. One of the consequences of this is that there is much
 3 more area in the intolerant species, poplar and white birch (See section 2.2.2, Historic Forest). Area has
 4 subsequently been planted for the last 30-40 year with red and white pine as a result of sustainable
 5 forest management practices being introduced to the unit.

6 **Figure 2.1.4. The distribution of Crown managed forest area by provincial forest type.**



8 At about 17% of the managed Crown forest, the MIX forest type is the third most prevalent on the
 9 Nipissing Forest. This forest type is made up of areas with generally no more that 20% of any species
 10 dominating the stand. Almost as common as the MIX grouping, covering 15% of the managed forest is
 11 the forest type MCU, made up of primarily spruce, pine and fir with the presence of some intolerant
 12 hardwoods. Included in the MCU provincial forest type is the area dominated by hemlock on the forest.

1 Although this is a small amount, hemlock is important to several wildlife species. White-tailed deer, for
2 example, make use of stands of hemlock as wintering areas.

3 The BWT forest type covers 55,823 hectares of the managed Crown forest. White birch can be found in
4 relatively pure stands, as well as associated with poplar, balsam fir, white spruce, black spruce, hard
5 maple and white pine on the Forest. White birch can be found on most soil types in the area, however
6 the best growth and quality is found on deep, fresh, loamy tills. BWT stands on dry sands are often the
7 result of wildfires. Many stands that used to be primarily white pine or red pine are now often
8 dominated by white birch because of the removal of pine during historic logging.

9 The POP forest type is found on 47,028 ha throughout the managed Nipissing Forest on a wide range of
10 sites from silty to fine sands and tills. It is more common in the northwest portion of the forest and in
11 the area adjacent to Lake Nipissing. The POP forest type contains mainly trembling aspen and large
12 tooth aspen. Most of the area in the poplar forest type is less than 100 years old.

13 Mixed lowland conifer, MCL, is one of the smaller forest types on the Nipissing Forest, encompassing
14 only 5% of the total Crown forest. These low-lying areas are dominated by black spruce, cedar and larch
15 (tamarack).

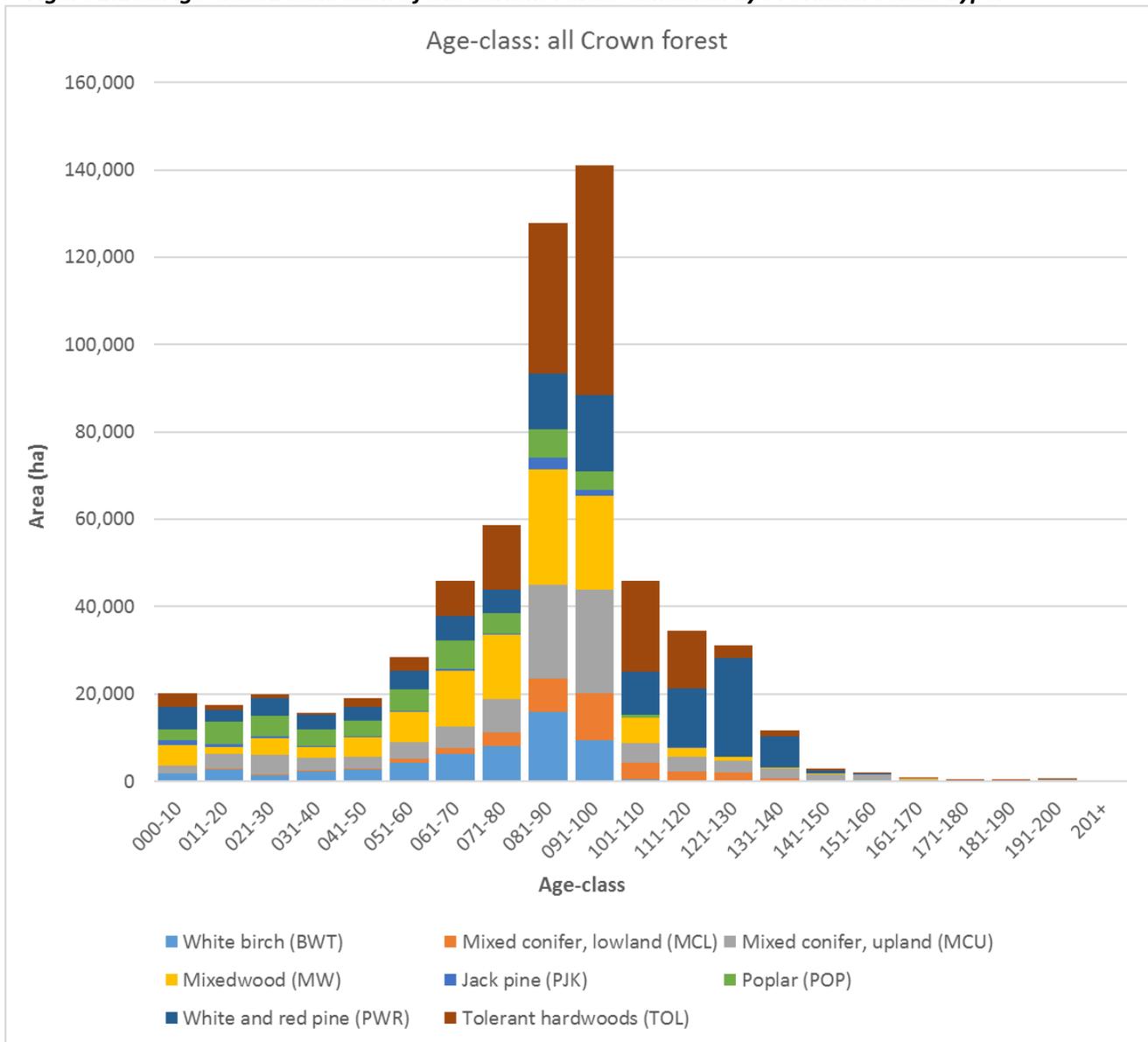
16 The jack pine (PJK) forest type is found on only about 1.2% of the Nipissing Forest. The best jack pine is
17 found in the northeast and northwest corners of the district on coarse sands and gravels. Poor quality
18 stands are found in different parts of the district on dry shallow pockets of soil between exposed
19 bedrock. Stands in the south and west are poor quality due to site conditions and also because of
20 attacks from the jack pine budworm in 1969, 1970, and again in the mid-1990's.

21 Currently, the forest has just under 60% of the total Crown forest area clustered in the 61-100 age
22 classes. Approximately 12% of the area is in the age classes of 0-40 years and 1.0% in the oldest age
23 classes (141 years+). The current distribution of age presents many challenges for wood supply and
24 habitat, especially into the future. In particular, the recruitment of area into mature age-classes is
25 problematic for white pine forest types where the abundance of mature and old forest is much lower
26 than the expected range of natural variation. In this case, there are conflicting objectives of maintaining
27 wood supply and mature forest, both of which depend on forested areas within the same age ranges.

28 The challenges and implications of the age structure of the forest is discussed further in Section 3.2.
29 Objectives and strategies have subsequently been developed so that the future forest composition will
30 be more similar to the way it would occur naturally (see Section 3.6, Objectives). Age-class distribution
31 for each forest type is displayed graphically in Figure 2.1.5.

32

1 **Figure 2.1.5. Age-class Distribution of the Current Forest Condition by Provincial Forest Type.**



2

3

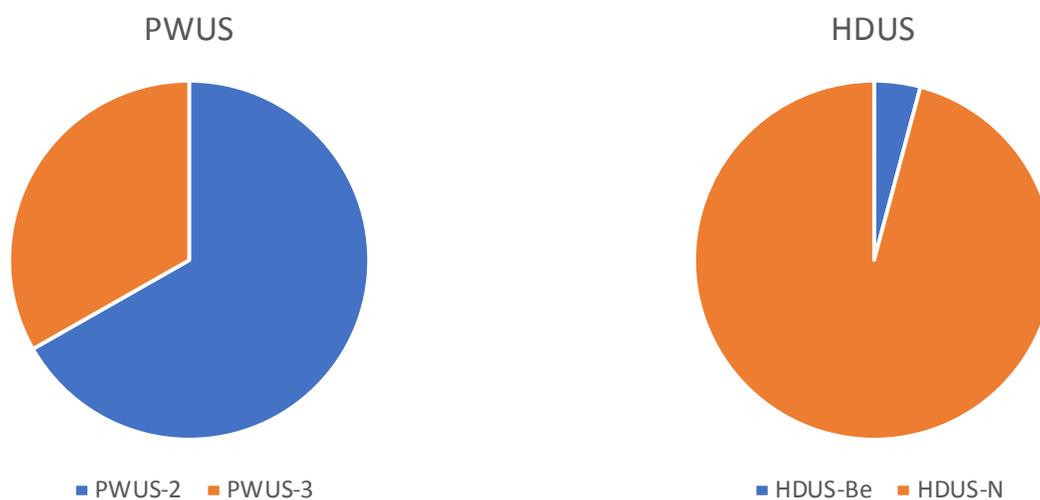
4 **Analysis Units**

5 Forest units were further divided into analysis units for the hardwood and pine shelterwood conditions
 6 (Section 2.1.1 of the Analysis Package in the Supplementary Documentation provides details on analysis
 7 units). The use of analysis units is necessary for two reasons: for division of the HDUS forest unit into
 8 areas where beech bark disease (BBD) is expected to significantly affect forest dynamics, and to
 9 separate the PWUS forest unit into 2- and 3-cut harvest systems.

10 The PWUS-2 analysis unit has a lower stocking of pine, supporting 2-cuts in total with 1 removal cut, and
 11 PWUS-3 has a high component of pine that can reasonably sustain 3 cuts in total with 2 removal cuts.

- 1 The HDUS-N analysis unit has a low level of beech (<20%) and HDUS-Be has a beech component $\geq 20\%$
 2 and is more susceptible to BBD.
- 3 The anticipated infestation of beech bark disease¹ requires an analysis of potential impacts on long-term
 4 wood supply. The advancing front of the disease / insect complex in 2017 was approaching the southern
 5 border of the Nipissing Forest, and initial mortality is expected to occur during the 2019 FMP. It is
 6 therefore necessary to separate stands with a significant ($\geq 20\%$ of the interpreted species
 7 composition) beech component. This division in stand composition will allow for the use of reduced
 8 yield and product recovery in the model inputs (mean DBH is expected to be lower as well as increased
 9 mortality and cull). The HDUS-Be represents approximately 4% of the HDUS forest unit (Figure 2.1.6).

10 **Figure 2.1.6. PWUS and HDUS analysis unit area.**



- 11
- 12 **2.1.3.2 Forest Landscape Classes**
- 13 The forest landscape is classified in many different ways to meet various requirements for analysis,
 14 reporting, and policy implementation. The link between forest classifications is shown in Figure 2.2.4.
 15 Landscapes provide habitat for many wildlife species, each with its own preferences for combinations of
 16 vegetation types, development stages, patch sizes and configurations. As it is difficult if not impossible
 17 to manage wildlife habitat on a species-by-species approach within the context of a forest management
 18 plan, the landscape is divided into classes according to how forests function as habitat. The landscape
 19 classes are the fundamental coarse filter assessment units for the management plan.
- 20 Landscape classes are groupings of forest units by development stage. They were developed based on
 21 cluster analyses of used and preferred habitat types depicted in MNR's habitat matrices.² The habitat

¹ Cale, J.A. et al. 2017. Beech bark disease in North America: Over a century of research revisited. *Forest Ecology and Management*. 394 (86-103).

² Holloway, G., B. Naylor, and W. Watt, Editors. 2004. *Habitat Relationships of wildlife in Ontario – revised habitat suitability models for the Great Lakes-St. Lawrence and Boreal East Forests*. OMNR, Science and Information

1 matrices summarize habitat affinities of selected vertebrate species based on forest type and
2 development stage. As such, the landscape classes express meaningful differences in wildlife use.

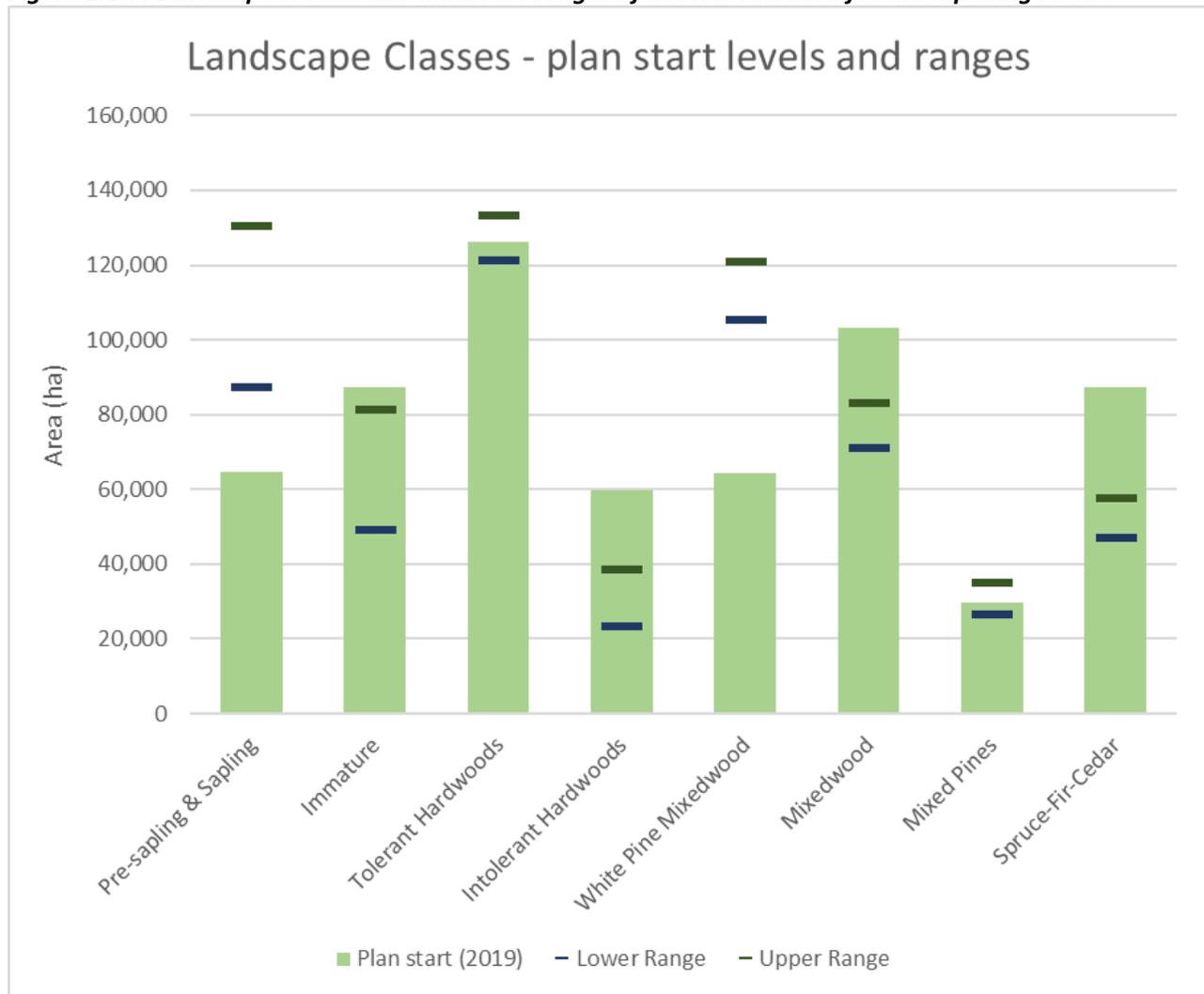
3 Landscape class indicators are developed from direction in the Forest Management Guide for Great
4 Lakes-St. Lawrence Landscapes and the Ontario Landscape Tool (OLT) to provide management direction
5 in relation to the landscape condition at the start of the management plan. Figure 2.1.7 illustrates the
6 initial levels of each of the prescribed indicators for the Nipissing Forest at the start of the plan (i.e., the
7 base model inventory in 2019). The area of each landscape class is shown in relation to the upper and
8 lower simulated ranges of natural variation described within the OLT. The spatial arrangement of the
9 compositional landscape classes is portrayed on the MU754_2019_FMP_MAP_LandPat_00.PDF map
10 series.

11 The initial landscape pattern on the Nipissing Forest presents many challenges for the current and long-
12 term management of the forest. As shown in Figure 2.1.7, some of the indicators start below the range
13 of natural variation, some are above, and only two (Tolerant Hardwoods and Mixed Pines) are initially
14 within the desirable range. Of the eight landscape class indicators, two represent young forest
15 conditions: Pre-sapling and Sapling, and Immature. The other indicators represent mature and old forest
16 conditions, as well as two-staged (2-cohort) conditions, for the six broad classes of habitat type: Tolerant
17 hardwoods (TOL), Intolerant Hardwoods (INTOL), White Pine Mixedwood (PWMIX), Mixedwood
18 (MIXED), Mixed Pines (MXPRJ), and Spruce-Fir-Cedar (SFC).

19 Given the past history of management and disturbance there is a legacy of an un-natural structure and
20 composition on the Forest. This is evident in the age-class distribution shown in Figure 2.1.5, showing a
21 large portion of the forest area within a narrow age range of 80 to 100 years, i.e., much of the forest was
22 disturbed or established in the years during or shortly after the First World War. In more recent
23 decades, the level of disturbance from harvesting and wildfires has been relatively low. Accordingly,
24 there is a low level of Pre-sapling and Sapling forest relative to the expected range of natural variation.
25 The implications for the long-term management direction for the Forest are to increase the level of
26 disturbance and renewal. An increase in the amount of young forest does not, however, correspond
27 evenly across all forest types as there is a surplus of mature and old forest in some conditions and a
28 deficit in others.

29

1 **Figure 2.1.7. Landscape classes and simulated ranges of natural variation for the Nipissing Forest.**



2

3 The Intolerant Hardwoods, dominated by white birch and poplar, Mixedwoods, and Spruce-Fir-Cedar

4 classes have an over-abundance of mature and old conditions relative to a natural landscape

5 composition. Ideally, increases in disturbance and renewal would be concentrated more heavily on

6 these forest types than the Tolerant Hardwoods, White Pine Mixedwoods, and Mixed Pines that are

7 either within or below the natural ranges. Given that the current landscape pattern developed from

8 over a century of un-natural disturbances and renewal, it will be a lengthy process to steer the

9 composition of the forest towards a more natural condition at the current rates of harvest and natural

10 disturbances (namely wildfire). This is further complicated by past and present economic conditions

11 which often do not favour the utilization of many of the INTOL, MIXED, and SFC forest types.

12 These patterns of landscape classes relative to the expected natural ranges of variation were the

13 foundation for the development of the first suite of objectives for the management plan (refer to

14 Section 3.6 and table FMP-10).

1 2.1.3.3 Other Forest Classifications

2 The forested land base is also classified by Central Region Forest Ecosystem Classification (FEC) Ecosite
3 (also used as OWHAM habitat types in the past). The FEC values are assigned by a data conversion from
4 the FRI species composition in the MIST program. The FEC proportions for each Analysis Unit are used in
5 the model's Habitat Matrix to track individual wildlife habitat conditions over time (refer to the
6 Supplementary Documentation 6.1.2, Analysis Package 2.5 and 3.3.4 for further details).

7 Based on input from the Desired Forest and Benefits meeting, indicators were developed for the
8 following species that are accounted for in the Habitat Matrix: Barred owl, Black bear (summer), Black
9 bear (autumn), Marten, Ruffed grouse, Pileated woodpecker, Southern flying squirrel, Snowshoe hare,
10 Red-shouldered hawk. These indicators also provide a comparison to the 2009 management plan which
11 preceded the direction from the Forest Management Guide for Great Lakes-St. Lawrence Landscapes
12 and therefore followed a different approach for developing habitat objectives. The initial habitat
13 conditions and projections over time for these indicators is provided in table FMP-7 and described in
14 Section 3.7.

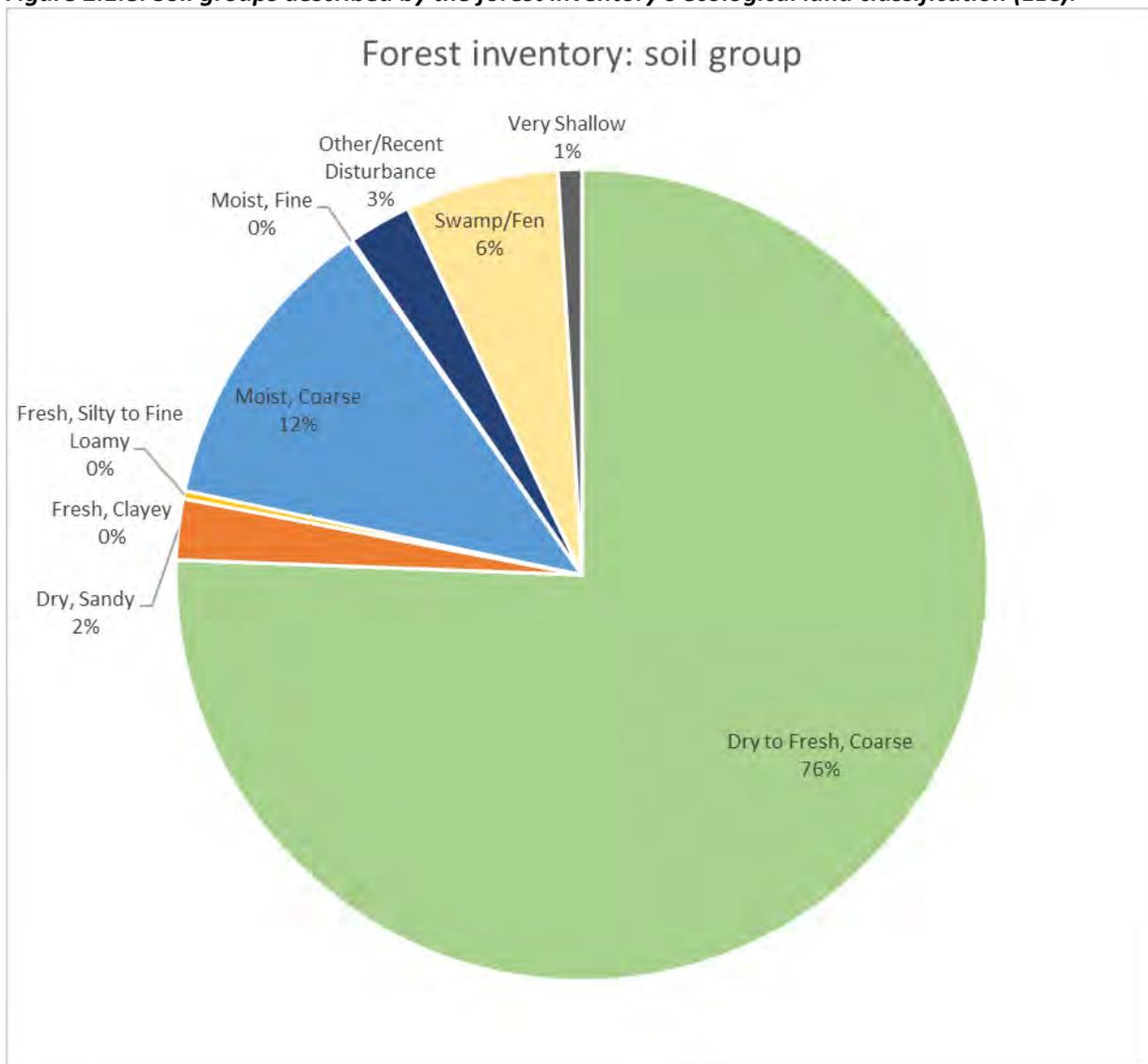
15 The habitat conditions for each of these indicators is closely tied to the landscape classes, hence the
16 maintenance of desirable levels was facilitated by the constraints used to meet the objectives for the
17 landscape class indicators. In other words, it would have been a challenge to meet the indicators for
18 these individual species without the over-arching requirements to move towards the desirable levels for
19 mature and old forest for each landscape class.

20 The use of new, enhanced inventory products also facilitated the classification of the forest into broad
21 soil types based on the ecological land classification (ELC) eco-site typing (Figure 2.1.8). Relative to
22 many other management units in Ontario, the Nipissing Forest has a fairly low component of very
23 shallow and poorly drained (organic) sites, thus limiting the constraints to productivity that are
24 experienced on some other forests³. The ELC soil mapping is done at a much finer resolution than
25 traditional mapping of surface geology and is therefore not conducive to composite scale maps. The ELC
26 information, however, complements the broader-scale mapping of surface geology presented in the
27 MU754_2019_FMP_MAP_LandPat_00.PDF map series.

28 With respect to areas on the forest subject to land claims involving the Algonquins of Ontario, the
29 Nipissing Project Team agreed that a selective approach would be utilized. This approach allowed
30 individual communities to determine if forest management was permitted in specific parcels identified
31 on the land base. Areas agreed to between NFRM and participating communities from the Algonquins of
32 Ontario are classified as available for management in the strategic model. All remaining areas were
33 included in the strategic model for biodiversity and non-timber objectives.

³ McPherson, S. et al. 2008. Applying research for enhanced productivity on the Canadian Ecology Centre – Forestry Research Partnership forests. The Forestry Chronicle. 84(5): 653-665.

1 **Figure 2.1.8. Soil groups described by the forest inventory's ecological land classification (ELC).**



2

3

4 2.1.4 Forest Resources

5 *2.1.4.1 Inventories and Information for Species at Risk*

6 Known sites of occurrence of habitat for flora, fish and wildlife species listed as species at risk under the
 7 Endangered Species Act (ESA) are identified and updated regularly. Land Information Ontario (LIO)
 8 contains information on the location of individual occurrences and habitat of species listed as Species at
 9 Risk (SAR) in Ontario. The MNR has local information on other known occurrences and habitats, as
 10 updated periodically.

11 The occurrence data for endangered and threatened species is considered sensitive data and is not
 12 shown in this FMP. SAR known or suspected to occur in the local district are included in Figure 2.1.9.

1 **Figure 2.1.9. Species at Risk Known or Suspected to Occur in the North Bay District.**

Species At Risk Known or Suspected to Occur in the North Bay District															
Common Name	Scientific Name	Endangered	Threatened	Special Concern	General Habitat Description *	Habitat Regulation **	Government Response Statement *	Provincially Standard Protocol Available	Recovery Strategy *	Fish	Mammal	Bird	Plant	Reptile	Insect
American Eel	<i>Anguilla rostrata</i>	X							X	X					
American Ginseng	<i>Panax quinquefolius</i>	X			X								X		
American White Pelican	<i>Pelecanus erythrorhynchos</i>		X			X	X		X			X			
Bald Eagle	<i>Haliaeetus leucocephalus</i>			X								X			
Bank Swallow	<i>Riparia riparia</i>		X				X		X			X			
Barn Swallow	<i>Hirundo rustica</i>		X		X		X		X			X			
Black Tern	<i>Chlidonias niger</i>			X			X					X			
Blanding's turtle	<i>Emydoidea blandingii</i>		X		X			X						X	
Bobolink	<i>Dolichonyx oryzivorus</i>		X		X		X	X	X			X			
Butternut	<i>Juglans cinerea</i>	X					X		X				X		
Canada Warbler	<i>Cardellina canadensis</i>			X								X			
Chimney Swift	<i>Chaetura pelagica</i>		X		X							X			
Common Five-lined Skink	<i>Plestiodon fasciatus</i>					X	X		X					X	
Common Nighthawk	<i>Chordeiles minor</i>			X								X			
Eastern hog-nosed snake	<i>Heterodon platirhinos</i>		X				X		X					X	
Eastern Meadowlark	<i>Sturnella magna</i>		X		X		X	X	X			X			
Eastern Musk Turtle	<i>Sternotherus odoratus</i>			X										X	
Eastern Ribbonsnake	<i>Thamnophis sauritus</i>			X										X	
Eastern Small-footed Myotis	<i>Myotis leibii</i>	X					x	X	X		X				
Eastern Whip-poor-will	<i>Antrostomus vociferus</i>		X		X			X				X			
Eastern Wood Pewee	<i>Contopus virens</i>			X								X			
Golden-winged Warbler	<i>Vermivora chrysoptera</i>			X								X			
King Rail	<i>Rallus elegans</i>	X					X		X			X			
Kirkland's Warbler	<i>Setophaga kirtlandii</i>	X					X		X			X			
Lake Sturgeon	<i>Acipenser fulvescens</i>	X			X				X	X					
Least Bittern	<i>Ixobrychus exilis</i>		X				X		X			X			
Little Brown Myotis	<i>Myotis lucifugus</i>	X						X			X				
Loggerhead Shrike	<i>Lanius ludovicianus</i>	X			X		X		X			X			
Massasauga Rattlesnake	<i>Sistrurus catenatus</i>		X		X			X	X					X	
Monarch	<i>Danaus plexippus</i>			X											X
Northern Map Turtle	<i>Graptemys geographica</i>			X										X	
Northern Brook Lamprey	<i>Ichthyomyzon fossor</i>			X						X					
Northern Myotis	<i>Myotis septentrionalis</i>	X						X			X				
Olive-sided Flycatcher	<i>Contopus cooperi</i>			X								X			
Peregrine Falcon	<i>Falco peregrinus</i>			X			X		X			X			
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>			X								X			
Short-eared Owl	<i>Asio flammeus</i>			X								X			
Shortjaw Cisco	<i>Coregonus zenithicus</i>		X							X					
Silver Lamprey	<i>Ichthyomyzon unicuspis</i>			X						X					
Snapping turtle	<i>Chelydra serpentina</i>			X										X	
Spotted Turtle	<i>Clemmys guttata</i>	X												X	
Transverse Lady Beetle	<i>Coccinella transversoguttata</i>	X													X
Wolverine	<i>Gulo gulo</i>		X				X		X		X				
Wood Thrush	<i>Hylocichla mustelina</i>			X								X			
Wood Turtle	<i>Glyptemys insculpta</i>		X			X	X	X	X					X	
Yellow -banded Bumblebee	<i>Bombus terricola</i>			X											X
Yellow Rail	<i>Coturnicops noveboracensis</i>			X								X			

2

1 Figure 2.1.9 version: October 30, 2018.

2 *Information is available at the Ministry of Natural Resources and Forestry website at:

3 www.ontario.ca/environment-and-energy/species-risk-ontario-list

4 ** Endangered Species Act, 2007, S.O. 2007, c. 6 O. Reg. 242/08: listed at the time of plan development

5 – updated information is available at the 242/08 website:

6 <https://www.ontario.ca/laws/regulation/080242>

7

8 *2.1.4.2 Fish and Wildlife Inventories*

9 The abundance and distribution of fish and wildlife resources are important factors considered in the
10 development of the forest management plan. As such, this section outlines a summary of occurrences of
11 fish and wildlife species based on inventory and habitat information.

12 **a) Known fish species and habitat on the management unit**

- 13
- 14 • Fish species present and known fish habitats are identified in Land Information Ontario
15 (LIO) data layers which are maintained by the MNRF. LIO data layers that contain
16 thermal regime characteristics of lakes may help determine what fish species are likely
17 to be present in cases where no fish species data are available.
 - 18 • The Nipissing Forest has a mixture of warm, cool and cold-water lakes and streams, and
19 the fish communities within the forest reflect this. Cool water streams/ waterbodies are
20 considered to contain a mixture of both cold and warm water fish species. Common fish
21 species on the forest are as follows:
 - 22 Warm water thermal regime: walleye, northern pike, small and largemouth
23 bass, muskellunge, yellow perch, pumpkinseed, and rock bass.
 - 24 Cold water thermal regime: brook trout, lake trout, lake whitefish, lake herring
25 and burbot.
 - 26 A variety of minnow species are present within lakes and streams in the
27 Nipissing Forest (darters, dace and shiners)
 - 28 • There are 82 lakes within the Nipissing Forest that are stocked. These lakes are stocked
29 with fish such as brook trout, lake trout, rainbow trout and splake.
 - 30 • There are 59 lakes in the Nipissing Forest that are classified as self-sustaining trout lakes.

31 **b) Known wildlife species and habitat on the management unit**

- 32
- 33 • Wildlife species present and known wildlife habitats are identified in LIO data layers for
34 specifically tracked species which are maintained by the MNRF.
 - 35 • The Nipissing Forest is a diverse forest with both the Great Lakes-St. Lawrence and
36 boreal Forest types present.
 - 37 • The landscape provides habitat for a variety of fauna including 51 mammal species, 23
38 reptile and amphibian species and over 200 bird species.

39 **c) Known invasive and native forest pests on the management unit**

- 40
- 41 • A variety of invasive and native forest insects and diseases are known to be on the
42 management unit. They include: white pine blister rust, gypsy moth, European spruce
43 sawfly, white pine weevil, Dutch elm disease, beech bark disease, European pine needle
44 midge, forest tent caterpillar, spruce budworm, spruce and pine sawflies, sugar maple
45 borer, *Nectria* canker and *Armillaria* root rot. Beech bark disease and the scale insect
46 (disease vector) are new to the forest and are anticipated to be particularly problematic,
as progression of the disease complex continues to move north.

1
2 **d) Fish, wildlife, and flora species of local concern**

- 3 • Loring Deer Yard – Wildlife Management Unit (WMU) 47 is home to the largest
4 traditional deer wintering yard in the province, the Loring Deer Yard. Each winter the
5 unit experiences a migration of thousands of deer from surrounding units. This area
6 provides critical habitat for deer in the winter, including refuge from the elements and
7 predators and high energy food sources to help the deer keep their fat reserves up to
8 survive the winter.
- 9 • Red Spruce (*Picea rubens*) – Within the Nipissing Forest is the northern most natural
10 population of red spruce in Ontario. The red spruce, as scattered individuals and in
11 small groups, has been found in a 500-hectare parcel along Hwy 11 north of North Bay.
12 This unique genetic population was studied in the 1970's and 1980's. North Bay District
13 MNR and Nipissing Forest Resource Management staff have and continue to find ways
14 to manage this forest to regenerate red spruce in that area and to collect seed to plant
15 within the surroundings. The population also contains red spruce and black spruce
16 hybrids. Red spruce is shade tolerant and grows on upland and cool moist sites.
- 17 • Bur oak (*Quercus macrocarpa*) – Bur oak is known to grow along the south shore of
18 Lake Nipissing. It is uncommon in other parts of the forest as this is the northern range
19 for the species. Bur oak grows on a variety of soils usually mixed with other species
20 tolerant of shade.
- 21 • Silver maple (*Acer saccharinum*) – Silver maple grows as scattered individuals on the
22 south shore of Lake Nipissing, and is uncommon in other parts of the forest. This
23 maples grows best in rich, moist soils along waterways
- 24 • Eastern Red Cedar (*Juniperus virginiana*) – This cedar is at the most northern edge of its
25 range and has been identified along Red Cedar Lake.
- 26 • Atlantic Coastal Plain – This community of plants has been found on a few lakes within
27 the Nipissing Forest.
- 28 • Pinesap (*Monotropa hypopitys*) – This plant was identified by a tree marker in Cameron
29 Township in 2016. Pinesap does not carry on photosynthesis but obtains its
30 nourishment from fungi associated with roots, often those of oaks and pines.
- 31 • Indian cucumber (*Medeola virginiana*) is occasionally found in the southern portion of
32 the Nipissing Forest. This plant grows in open woods under semi-shade.
- 33 • Other plant species of cultural and medicinal importance: St. John's wort (*Hypericum*
34 *perforatum*), Ladies slipper (*Cypripedioideae* genus), Foxglove (*Digitalis purpurea*),
35 Maidenhair fern (*Adiantum pedatum*), Ostrich fern (*Matteuccia struthiopteris*), Jack-in-
36 the-pulpit (*Arisaema triphyllum*), Wild lettuce (*Lactuca virosa*), Prince's pine
37 (*Chimaphila umbellata* ssp. *Cisatlantica*), White trillium (*Trillium grandiflorum*),
38 Sarsaparilla (*Aralia nudicaulis*), Blue bead lily (*Clintonia borealis*), Solomon's seal
39 (*Malantheum racemosum*).

40
41 **e) Plants Important as construction materials, food and other uses:**

- 42 • Spirit Rope– An extremely rare bush, known as Chibay-Group or "Spirit Rope" (*Dirca*
43 *palustris*) which is the amazingly strong bark of the leather wood bush, used for snares
44 and other purposes
- 45 • Maple sugar bushes
- 46 • Willow bark
- 47 • Canoe quality birches

- 1 • Rose bushes (*Rosa* spp.)
- 2 • Basswood (*Tilia americana*)
- 3 • Dogwood (*Cornus* spp.)
- 4 • Ironwood (*Ostrya virginiana*)
- 5 • Culturally altered (modified) trees
- 6 • Burlwood
- 7 • Eastern red cedar (*Juniperus virginiana*)
- 8 • Red oak (*Quercus rubra*)
- 9

10 The development of the FMP was heavily influenced by the fish and wildlife resources in the
11 management unit area. Many of the resources noted above were identified as requiring special
12 consideration in areas where forest management activities may occur. The quality and quantity of
13 specific resources is, therefore, protected through the development of area of concern (AOC)
14 prescriptions and conditions on regular operations (CRO). For details refer to table FMP-11 and Section
15 6.1.11 of the Supplementary Documentation.

16

17 *2.1.4.3 Values Information*

18 The values maps provide a summary of the geographic locations of known values for the Nipissing
19 Forest, which are considered in forest management planning, and about which further inventory
20 information is available. The maps are prepared in accordance with the Forest Information Manual Base
21 and Values Technical Specifications (2017).

22 The values maps are part of the FMP background information and are available for public viewing.
23 Values data was updated as information was assembled during the preparation of the plan, and the
24 most current and relevant information available on values, including cultural heritage resource values,
25 was available at each stage of public consultation. Where the publication of the location of particular
26 values may be detrimental to their conservation, these values are not to be portrayed on the values
27 maps.

28 The values data are used in developing the long-term management direction, the operational plan and
29 the development of the resource stewardship agreements. The modelling and plan objectives (table
30 FMP-10) are, in part, based on the types and locations of values. The values data are necessary to
31 identify the locations and types of areas of concern (table FMP-11) and conditions on regular operations
32 (Supplementary Document Section 6.1.11).

33 The Nipissing Forest values data are maintained at the MNR North Bay District office and are uploaded
34 to the provincial data sharing site Land Information Ontario (LIO). The data require continual updates
35 during the preparation and implementation of the plan, to ensure the area of concern prescriptions are
36 applied as required, and to reduce operational delays. The values data collected through the forest
37 management planning process is used by many other MNR programs.

38 The values maps are found in Supplementary Document Section 6.1.18 of the forest management plan.
39 The values are portrayed on a series of eight maps, themed as follows: Bear Management Areas,
40 Trapline Areas, Resource Based Tourism Values, Cultural Heritage Values, Fisheries and Wetlands,
41 Wildlife and Forestry, Resource Uses, and Land Values.

1 The Bear Management Areas map illustrates the boundaries of the licenses issued to tourism
2 businesses. The Crown land trapline license boundaries are portrayed on the Trapline Areas map. The
3 data is complete on these maps.

4 Trapline trails will be rehabilitated and cleared of logging debris following timber operations. Trapline
5 trails identified by the trapper will be left in as good as or better condition as prior to the start of
6 operations. Nipissing Forest Resource Management Inc. will contact trappers prior to the harvest to
7 identify trapline trails. Table FMP-11 includes an area of concern prescription for registered trapper
8 cabins.

9 The Resource Based Tourism (RBT) Values maps illustrate values identified in the agreements between
10 Nipissing Forest Resource Management Inc. and RBT businesses. The Resource Based Tourist
11 Agreements are part of Nipissing Forest Resource Management Inc.'s and MNRF's commitment to
12 maintain the viability of the tourism industry by protecting tourism values during the implementation of
13 the FMP. One method of protecting and sustaining these values is the application of the Management
14 Guidelines for Forestry and Resource-Based Tourism (Tourism Guide). The RBT values map is complete
15 as per the agreements.

16 With the help of the Ministry of Tourism, Culture and Sport, NFRM identified resource-based tourism
17 (RBT) businesses on or adjacent to the Nipissing Forest at the invitation to participate stage of planning.
18 Correspondence was sent to all businesses on the identified stakeholder list. Responses from RBT
19 operators were followed up on and values confirmed. Negotiations between NFRM and RBT result in
20 Resource Stewardship Agreements (RSA) where required. Values protected in these RSA documents are
21 incorporated into the area of concern prescriptions or conditions on regular operations of the plan in
22 order to modify forest management activity in order to protect values and interests of these businesses.
23 NFRM has current agreements with approximately 12 different RBT operators on the Nipissing Forest.
24 Maps of agreement areas have been included in the plan.

25 The Cultural Heritage Values map shows the location of the archaeological potential areas (APA). These
26 sites have a high probability of being archaeological sites.

27 The sites are mapped in accordance with the Forest Management Guide for Cultural Heritage Values
28 (Cultural Heritage Values Guide). The APA maps are developed using a variety of geospatial map layers
29 as base data for modelling. Ontario Ministry of Culture Tourism and Sport registered site information,
30 the available cultural heritage landscapes and historical Aboriginal values data are part of the basis for
31 calibrating the model. For this plan, APA was modelled using the updated watercourse and waterbody
32 data. The Nipissing Forest planning team reviewed the model outputs and refined the APAs based on
33 local knowledge and the criteria listed in table FMP-11 - CHPA area of concern prescription. The APA
34 data is complete.

35 The Fisheries and Wetlands values map shows the location of fish habitat and provincially significant
36 wetlands. The fisheries and wetland data are complete at this time. Surveys and evaluations are
37 planned during the implementation of the plan to improve the accuracy of the data.

38 The fish habitat data consist of food supply areas, fish nurseries, fish migration routes, spawning areas,
39 baitfish areas, and cold, cool, and warm waterbodies. The fisheries data is assembled from surveys, fish
40 stocking records, and public knowledge. Data layers that contain thermal regime characteristics of

1 lakes help determine what fish species are likely to be present in cases where no fish species data are
2 available.

3 The classification of waterbodies as warm, cool and cold is on-going. The water temperature
4 classification is used to determine critical habitat periods during which in-water work is restricted.
5 Water is classified based on field surveys; cold water is either assessed as containing trout, or is
6 unsurveyed. The default to cold water classification ensures protection of vulnerable trout species.
7 There are opportunities for the management biologist to review the classification of specific
8 waterbodies during the plan implementation.

9 The Provincial Wetland Conservation Strategy (2017-2030) is a framework to guide the future of
10 wetland conservation across the province. The intent of the Strategy is to establish a common focus to
11 protect wetlands. The designation of provincially significant wetlands is based on the provincial wetland
12 evaluation protocol. In the mid-1990's, MNRF focused wetland evaluations on the largest wetland
13 complexes and those most susceptible to human activities. As a result of this wetland evaluation
14 program, twelve provincially significant wetlands were identified. There are likely more provincially
15 significant wetlands on the Nipissing Forest. Further evaluations are required. Provincially significant
16 wetlands evaluated to date are:

17 Wetland Name	Township(s)
18 Cache Bay	Caldwell, Springer
19 Callander Bay	North Himsworth, West Ferris
20 Chippewa Creek	Widdifield
21 Duchesnay Creek	Merrick, Widdifield
22 Fish Bay	Nipissing
23 Gauthier Creek	West Ferris
24 Jessup's Creek	West Ferris
25 La Vase River / Dreany	East Ferris/West Ferris
26 Loudon Basin Peatland	Loudon
27 Parks Creek	Widdifield
28 Rice Bay	Bonfield/ Phelps
29 Upper Wasi River	Chisholm
30	

31 Wildlife and Forestry values are illustrated on one map. Wildlife data include mineral licks, moose
32 aquatic feeding areas, travel corridors, calving sites, moose and deer wintering areas, deer and
33 waterfowl staging areas, and nesting sites. Forestry values are research and tree improvement areas,
34 significant ecological areas, mast production areas, Areas of Natural and Scientific Interest (ANSI),
35 significant communities of flora and fauna, and white and red pine old growth.

36 The wildlife values data are assembled from surveys, observations, and public knowledge. Regular
37 surveys are completed to locate and update moose aquatic feeding areas and large bird nests. Many
38 nests are identified during the nesting period where there are active forest management operations.
39 Wintering areas are those that have been used by moose and deer for decades.

40 Forest research plot and tree improvement sites data are maintained by the organizations that monitor
41 them, including the MNRF, Natural Resources Canada and the Ministry of the Environment,

- 1 Conservation and Parks. ANSIs and significant ecological areas are derived from land use planning
2 direction. White and red pine old growth sites and mast production areas are mapped using the forest
3 resource inventory.
- 4 The district land use direction also provides for the designation of some old growth sites. White and red
5 pine old growth communities are defined in, and managed consistent with the Forest Management
6 Guide for Great Lakes-St. Lawrence Landscapes (GLSL Landscape Guide). Not all old growth red and
7 white pine forest communities are managed for old growth values. There is also a continual recruitment
8 of old growth, resulting in a net increase from plan start to plan end, and in the long-term. Old growth
9 areas identified in the inventory are illustrated on FMP maps MU754_2019_FMP_MAP_LandPat_03.PDF
10 (Plan start, 2019) and MU754_2019_FMP_MAP_LandPat_04.PDF (Plan end, 2029) for the 10-year plan.
- 11 Eight old growth sites have been identified on the Nipissing Forest. All eight are protected by land use
12 direction as provincial parks or conservation reserves (CR). Seven contain representative old growth red
13 and white pine; one, Widdifield Forest, supports large old growth yellow birch and hard maple. The
14 provincial parks and conservation reserves protecting these stands are follows:
- 15 1. Alexander Lake Forest Provincial Park
 - 16 2. Boom Creek Conservation Reserve
 - 17 3. God's Lake Old Growth White Pine Forest Conservation Reserve
 - 18 4. Gooderham Old Growth White Pine Forest Conservation Reserve
 - 19 5. Mattawa River Provincial Park Additions
 - 20 6. McLaren Forest Conservation Reserve
 - 21 7. Ottetail Creek Conservation Reserve
 - 22 8. Widdifield Forest Provincial Park
- 23 Resource use values include potential tourism areas, trails, waste disposal sites, camps, springs/potable
24 water sources, forest processing facilities, towers, utility sites, peat, wild rice stands, lodges, recreation
25 access points, and designated camping sites. Camps, lodges, towers, utility sites, camp sites, recreation
26 access points, and Crown land waste disposal sites are permitted, licensed or otherwise authorized by
27 the MNRF. Potential tourism areas are identified through the land use planning process. Trails are
28 those maintained by clubs or organizations. Peat and wild rice sites are identified by the public or
29 historically used. The resource use data are complete.
- 30 Consideration of recreation sites in the Nipissing FMP is documented in the prescriptions for operations,
31 table FMP-11 area of concern prescriptions and Supplementary Documentation Section 6.1.11.
- 32 Land Values include aggregate permits, Crown leases, land use permits, municipal boundaries,
33 geographic townships, patent land, enhancement management areas, access-controlled roads, and
34 parks. These data are complete.
- 35 Aggregate, mineral and quarry permits are those issued under the Aggregate Resources Act. Forestry
36 aggregate pits cannot be located within these permitted sites, however some of these sites can be
37 logged in accordance with the permit site plan.
- 38 Crown land leases and land use permits are issued under the Public Lands Act. Municipal boundaries,
39 townships and patent land are part of the provincial base data.

- 1 Private land can be used to meet some of the plan objectives, although the management of that
 2 forested land is not part of the forest management planning process for Crown land.
- 3 Enhanced management areas and parks, including conservation reserves, are established through the
 4 land use planning process. Access controlled roads are the result of following the enhancement
 5 management area direction. The prescriptions for operations within the enhanced management areas
 6 are described in Supplementary Documentation Section 6.1.11.
- 7 There are 18 provincial parks and 21 conservation reserves in, or partially within the Nipissing Forest.
 8 The purpose of protected areas is to permanently protect a system of provincial parks and conservation
 9 reserves that includes ecosystems that are representative of all of Ontario's natural regions, protects
 10 provincially significant elements of Ontario's natural and cultural heritage, maintains biodiversity and
 11 provides opportunities for compatible, ecologically sustainable recreations. Provincial parks and
 12 conservation reserves and their classifications within the Nipissing Forest include:

Provincial Park	Class	Area (ha)
Alexander Lake Forest	Natural Environment	1,934
Kenny Forest Provincial Park	Natural Environment	2,200
Restoule Provincial Park	Natural Environment	2,619
Samuel de Champlain Provincial Park	Natural Environment	2,550
Widdifield Forest Provincial Park	Natural Environment	2,170
Manitou Islands Provincial Nature Reserve	Nature Reserve	1,926
West Sandy Island Provincial Nature Reserve	Nature Reserve	266
Marten River Provincial Park	Recreation	400
Mashkinonje Provincial Park	Recreation	1,101
South Bay Provincial Park	Recreation	1,525
Amable du Fond Provincial Park	Waterway	731
Chiniguchi Park	Waterway	9,417
French River Provincial Park	Waterway	73,530
Jocko Rivers Provincial Park	Waterway	11,299
Mattawa River Provincial Park	Waterway	14,142
Ottawa River Park (Proposed)	Waterway	10,359
Sturgeon River Park	Waterway	4,653
Temagami River Provincial Park	Waterway	3,394
	Total	144,216

13

Conservation Reserve	Area (ha)
Blue Lake End Moraine Conservation Reserve	1,408
Boom Creek Conservation Reserve	590
Boulter-Depot Creek Conservation Reserve	2,348
Bray Lake Conservation Reserve	265
Cache Bay Wetland Conservation Reserve	3,926
Callander Bay Wetland Conservation Reserve	319
Dana Township Jack Pine Forest Conservation Reserve	319

Conservation Reserve	Area (ha)
Field Township Conservation Reserve	399
Fish Bay Conservation Reserve	145
God's Lake Old Growth White Pine Forest Conservation Reserve	354
Gooderham Old Growth White Pine Forest Conservation Reserve	82
Holdridge Creek Conservation Reserve	1,343
McLaren Forest Conservation Reserve	409
Mudcat Lake Forest Conservation Reserve	396
Ottertail Creek Conservation Reserve	1,650
Raganooter Lake Conservation Reserve	311
Sausage Lake Forest Conservation Reserve	664
Smoky River Headwaters Conservation Reserve	928
South River Forest Conservation Reserve	180
Spring/Cut Lake Esker Conservation Reserve	691
Swan Lake Conservation Reserve	256
Total	16,983

1

2 2.2 Social and Economic Description

3 This section relates to the communities that receive substantive amounts of timber, chips, or other
 4 forest products from the Nipissing Forest, or have substantive employment related to the forest industry
 5 or are Indigenous communities in or adjacent to the Nipissing Forest whose interests or traditional uses
 6 may be affected by forest management activities. Community demographic information and information
 7 on the resource sector that utilize various aspects of the Nipissing Forest is presented below. Additional
 8 demographic profiles are found in Supplementary Documentation 6.1.5, Part 1.

9 2.2.1 Overview of Social and Economic Context

10 Determination of the communities that receive substantive volumes of timber or wood fiber, or benefit
 11 from substantive employment related to the Nipissing Forest was obtained from the MNRF Timber
 12 Resource Evaluation System (iTREES). This data management system is used by the MNRF to track and
 13 record Crown wood movement within the province. Reports present the volume of wood delivered to
 14 each mill and a record of provincial stumpage generated by these deliveries. The reports address the
 15 five-year period from April 01, 2011 to March 31, 2016.

16 Demographic profiles of the area of influence of the Nipissing Forest were obtained through statistics
 17 Canada 2011 census data. Information shared by First Nation communities was also obtained to gain an
 18 appreciation of how the Nipissing Forest contributes to these communities.

19 The MNRF Districts and associated communities benefiting from wood sourced from the Nipissing
 20 Forest, that are heavily reliant on the forestry sector, are:

- 21 • Hearst District: Hearst
- 22 • Cochrane District: Cochrane
- 23 • Kirkland Lake District: Kirkland Lake, Gauthier (Dobie), Englehart, Elk Lake (James)
- 24 • North Bay District: Bonfield (Rutherglen), Mattawa, North Bay, West Nipissing (Sturgeon
 25 Falls), Temagami

- 1 • Pembroke District: Bonnechere Valley (Eganville), Killaloe, Pembroke, Petawawa
- 2 • Bancroft District: Madawaska
- 3 • Kemptville District: Clarence-Rockland
- 4 • Sudbury District: Espanola, French River (Alban, Noelville, Monetville), Nairn Centre,
- 5 Sudbury
- 6 • Parry Sound: Huntsville, South River, Kearney

7

8 Ontario Indigenous communities within or adjacent to the Nipissing Forest are:

- 9 • Antoine Algonquin First Nation
- 10 • Dokis First Nation
- 11 • Mattawa/North Bay Algonquin First Nation
- 12 • Nipissing First Nation
- 13 • Temagami First Nation / Teme-Agauma-Anishnabai
- 14 • Wolf Lake First Nation
- 15 • Métis Nation of Ontario, Mattawa Métis Council
- 16 • Métis Nation of Ontario, North Bay Métis Council

17 Wolf Lake First Nation is an Indigenous community located in the province of Québec with interests that
18 extend into the Nipissing Forest. The membership of the community and the First Nation's business and
19 traditional interests straddle the Ontario-Quebec border.

20 A few non-Indigenous Quebec communities also benefit from wood and wood products sourced from
21 the Nipissing Forest. Quebec communities receiving substantive volumes are:

- 22 • Temiscaming
- 23 • Bearn
- 24 • Maniwaki
- 25 • Ste. Pamphile Cte. L'Islet
- 26 • Thurso
- 27 • Ville Marie

28 The scope of contribution of the Nipissing Forest within northern Ontario communities appears to have
29 declined. Permanent closure of a number of northern mills and idling of others in recent years has
30 resulted in a decline of northern wood deliveries. However, the restart of poplar veneer mills in Hearst
31 and Cochrane has seen a small volume of poplar veneer logs flow to the respective mills in these
32 communities in the last two years. Columbia Forest Products is within the forest near the town of
33 Rutherglen and also reopened their facility in 2015 with the restart of deliveries of tolerant hardwood
34 veneer logs.

35 A subtle shift in wood distribution was observed to mills south and east of the Nipissing Forest, thereby
36 a number of smaller proximal communities were added to the social and economic description that
37 were not present in the last plan. It was observed that licensees were successful in diversifying deliveries
38 to small mills located throughout the Ottawa Valley. In addition, the proximity of the Nipissing Forest to
39 the Quebec border and business relationships of some SFL shareholders and some Forest Resource
40 Licensees (FRL) with the Quebec business community may have also facilitated the marketing of
41 available volumes to mills in the noted Quebec communities.

1 2.2.2 Summary of Demographic Profiles

2 The information for non-Indigenous communities was garnered from Statistics Canada Census of
3 Population (2011) data.

4 For data obtained through Statistics Canada, the completeness of the 2011 census data varies for each
5 community. Statistics Canada limits information available for smaller communities due to small sample
6 sizes and privacy concerns. Statistics Canada no longer provides information concerning employment
7 dependency by sector. Thus, these descriptors provided in previous plans are no longer available to
8 planning teams.

9 Data representing total population, gender, primary household language, the number of privately-
10 owned homes and the average persons per household are available for each of the twenty-six (26) non-
11 Indigenous communities and townships within the area of the analysis. Data reflecting labour force,
12 employment rates, type of work, education levels and income and heritage are available for fourteen of
13 the larger communities. This accounts for greater than 86% of the population within the Ontario area of
14 analysis.

15 Statistics Canada data for Quebec non-Indigenous communities was also variable. The majority of the
16 information was available for The Regional Municipality of Témiscaming, including the communities of
17 Ville Marie and Bearn, and The Municipality of Ste. Therese. Incomplete information was available for
18 Thurso and Maniwaki.

19 The data for each community shows a general trend in Ontario of declining population in northern
20 communities as compared to the overall trend of population growth for this province. Clarence-
21 Rockland located east of Ottawa, showed a population increase. The Quebec profiles indicated a general
22 increase in population as well.

23 English is the primary language for all Ontario communities listed except for Clarence-Rockland, French
24 River, West Nipissing and Hearst, where the predominance is bilingual residents who speak both French
25 and English. French was the primary language spoken for the Quebec Communities.

26 Information regarding employment trends is also presented in terms of the total workforce, percent
27 employment and the participation rate. Labour force and income data is available for fifteen (15)
28 Ontario communities and two (2) Quebec communities. Data concerning employment categories and
29 education are also limited.

30 The generalized demographic profile for the collection of communities associated with the Nipissing
31 Forest is presented below.

32 **Nipissing Forest Demographic Profile Summary**

33 The demographic profile for the Nipissing Forest is presented in three components. The component with
34 the most data available from the 2011 Statistics Canada Census is for non-Indigenous Communities
35 located in Ontario.

36 The proximity of the Nipissing Forest to the border of Quebec and the integrated nature of the forest
37 industries resulted in a significant portion of wood sourced from this forest going to facilities in Quebec.
38 The planning team felt it was important to also reflect this benefit from the forest, thus information was
39 sought to describe the community demographics of five communities receiving this benefit.

1 The third demographic component is the Indigenous communities associated with the forest. Limited
 2 Statistics Canada data is available for these communities. Information presented in this document was
 3 provided largely by the respective community.

4 **Ontario non-Indigenous Community Aggregate Profile** for the Nipissing Forest (2011 Census Statistics
 5 Canada)

6 Population and labour force

- 7 • Total population 399,308 (male 49%, female 51%) (26 Community Profiles)
- 8 • Labour force 175,370 (15 Community Profiles)
 - 9 ○ Employed 91.5%, Participation rate ranges 52% to 74% depending on community (15
 10 Community Profiles)
 - 11 ○ Main occupation categories: Sales 25%; Trades 17%; Finance 18%; Management 10% (14
 12 Community Profiles)

13 Community Official Language and Heritage

- 14 • English only 62%; English and French 35% (26 Community Profiles)
- 15 • Canadian 92.8%, Aboriginal 48.7% (14 Community Profiles)

16 Household Characteristics (26 Community Profiles)

- 17 • Number of households 168,826
- 18 • Average number persons per household 2.5

19 Individual income by gender and average household income (14 Community Profiles)

- 20 • Average individual income \$39,260 (male \$44,075; female \$30,437)
- 21 • Average household income \$70,527

22 Education (highest level achieved) (Weighted average 13 Community Profiles)

- 23 • University 15%
- 24 • College 25%
- 25 • Trade 11%
- 26 • Secondary 27%
- 27 • Primary 22%

28

29 The fourteen communities providing full information on their profiles were Hearst, Cochrane, Cochrane
 30 North Unorganized, Temagami, Mattawa, North Bay, West Nipissing, Petawawa, Pembroke, Espanola,
 31 Nairn Centre, Greater Sudbury, Huntsville and Clarence-Rockland. These communities reflect 86.2% of
 32 the total population within the area of analysis.

33 **Quebec non-Indigenous Community Aggregate Profile for the Nipissing Forest**

34 Population and labour force

- 35 • Total population 54,413 (6 Community Profiles)
- 36 • Labour force 9,965 (2 Community Profiles)
 - 37 ○ Employed 81.6%, Participation rate ranges 60% to 61% depending on community (2
 38 Community Profiles)
 - 39 ○ Main occupation categories: Sales 15%; Trades 15%; Finance 10%; Management 10% (1
 40 Community Profile)

41 Community Official Language and Heritage

- 42 • English only 14%; English and French 0.4% (1 Community Profile)

43 Household Characteristics (2 Community Profiles)

- 1 • Number of households 10,250
- 2 • Weighted average number persons per household 2.2
- 3 Individual income by gender and average household income (1 Community Profiles)
- 4 • Average individual income \$33,569 (male \$39,332; female \$27,666)
- 5 Education (highest level achieved) (3 Community Profiles)
- 6 • University 17%
- 7 • College 23%
- 8 • Trade 32%
- 9 • Secondary 27%
- 10 • Primary 1%

11
 12 The Ste. Therese and the Regional Municipality of Témiscaming had the majority of information
 13 available. The regional municipality included the population data for the mill communities of Bearn and
 14 Ville Marie and Témiscaming. Education, total population and number of households were the common
 15 available information items available for five communities assessed. Ste. Pamphile Cte. L'Islet only had
 16 the base population information available from the 2016 census.

17 **Indigenous Community Aggregate Profile**

18 The aboriginal communities' demographic data are presented in Supplementary Documentation 6.1.5,
 19 Appendix 1.

20

21 [2.2.3 Industrial and Non-Industrial Uses of the Forest](#)

22 Section 2.2.3 provides a summary of industrial and non-industrial uses of the forest. Additional
 23 information is found in Supplementary Documentation 6.1.5, Part 2.

24 [Forestry](#)

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

27 [Licensees](#)

28 Nipissing Forest Resource Management Inc. (NFRM) holds the Sustainable Forest License (SFL) for the
 29 Nipissing Forest and is responsible for forest management planning, reporting and the implementation
 30 of the plans. Responsibility for timber harvesting is assigned through the issuance of overlapping Forest
 31 Resource Licences (FRL) under this SFL.

32 The overlapping Licence holder category includes SFL company shareholder Licensees with long-term
 33 harvest rights. Another category is independent operator licensees (non-shareholder indigenous and
 34 non-indigenous operators) who also retain long term harvest rights. The third category is other
 35 operators who may be issued FRLs by the MNR following entering into an overlapping licence
 36 agreement with the SFL, however these operators retain no long-term harvest rights.

37 From April 1, 2011 to March 31, 2016 there were 55 commercial overlapping forest resource licenses
 38 issued to 29 companies and individuals.

39

40 Shareholder Licensees are:

- 41 • Hec Clouthier & Sons Inc.

- 1 • Goulard Lumber (1971) Limited
- 2 • Georgia Pacific (GP) North Woods LP
- 3 • R. Fryer Forest Products Limited
- 4 • Tembec Industries Inc. (currently in the name of Rayonier A.M. Canada G.P.)

5

6 Independent Operator Licensees:

7 *Indigenous*

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

12

13 *Non-Indigenous*

- 14 • Behnke Farms Inc.
- 15 • Bruno Quenneville
- 16 • Scott Gray
- 17 • Emile Janveaux Forest Products Ltd.
- 18 • Frerot Forestier
- 19 • Lucien Groulx & Son Planing and Saw Mill Ltd.

20

21 Other Operators:

- 22 • Gorham Trucking
- 23 • Culin Forestry
- 24 • Jean Brunet Logging Ltd.
- 25 • Sturgeon Falls Brush and Contracting Ltd.
- 26 • Reed Forestry and Fuel Wood
- 27 • Redbridge Forestry
- 28 • Young Forestry Services
- 29 • Silicorp Development
- 30 • CMM Logging
- 31 • Precut Hardwood Inc.
- 32 • Okikendawt Hydro L.P.
- 33 • Tim Bryson Forestry
- 34 • Monterey North Construction Ltd.
- 35 • Teabanly Aggregates Inc.
- 36 • Ron Montreuil, and
- 37 • R.J.M. Garnets Inc.

38 The shareholder licensees employ about 95 people in their woodlands operations. In addition to these
39 employees, shareholders hire contractors and consultants to plan and supervise operations and to
40 harvest the wood in their licensed area. Three shareholder companies are family owned and operated.
41 Each of the Indigenous communities has one full time employee assigned to timber harvesting
42 operations, and they also hire contractors and consultants to carry out forest operations. The
43 independent licensees are family owned and operated businesses, and carry out their own logging

1 operations. One independent licensee is a member of an indigenous community and has indigenous
2 employees. This licensee also is a contractor for a shareholder company and two Indigenous
3 Communities.

4 *Wood Supply Commitment*

5 The following wood supply agreements are active on the Nipissing Forest. This information was sourced
6 through the MNR Available Wood Report-2016-09-12 and the MNR Timber Allocation Licencing
7 Section (TALS) files.

- 8 1. Rayonier A.M. Canada, G.P. (Tembec Industries Inc.) – Temiscaming QC: Supply Agreement
9 536225 White Birch, pulpwood 46,000 m³/year
- 10 2. Rayonier A.M. Canada, G.P. (Tembec Industries Inc.) – Temiscaming QC: Supply Agreement
11 536225 Tolerant Hardwood, pulpwood 41,600 m³/year
- 12 3. GP North Woods LP – Englehart ON: Supply Agreement 536260 Aspen, non-veneer 98,000
13 m³/year
- 14 4. Goulard Lumber (1971) Limited – Sturgeon Falls ON: Conditional Wood Supply Competitive
15 Process Offer White and Red Pine, merchantable 30,000 m³/year
- 16 5. KD Quality Pellets Ltd. – New Liskeard ON: Conditional Wood Supply Competitive Process Offer
17 Tolerant Hardwood, non-veneer, non-sawlog 63,000 m³/year
- 18 6. Cheminis Lumber Inc. – Larder Lake ON: Conditional Wood Supply Competitive Process Offer
19 Spruce, Jack Pine, Balsam Fir, merchantable 21,500 m³/year

20 *Recreation and Tourism*

21 *Provincial Parks and Conservation Reserves*

22 There is a total of 39 protected areas within or partly within the Nipissing Forest that cover
23 approximately 161,154 hectares. The 18 provincial parks reside on 144,216 hectares, and the 21
24 conservation reserves cover the remaining 16,938 hectares. These protected areas are regulated under
25 the Provincial Parks and Conservation Reserves Act.

26 *Recreation*

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

- 33 • Voyageur Multi-Use Trail System (VMUTS)
- 34 • Discovery Routes Trails
- 35 • Near North Trail Association

36 There are two significant cross-country ski facilities:

- 37 • North Bay Nordic Ski Club
- 38 • Wasi Ski Club

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

1 Groomed, managed snowmobile trails are found throughout the Nipissing Forest. The main groups
2 involved with this trail system are:

- 3 • French River Snow Devils Association (241 km)
- 4 • Argyle Riders Snowmobile Club (170 km)
- 5 • South Shore/Restoule Snowmobile Club (254 km)
- 6 • Mattawa and Area Snowmobile Club (150 km)
- 7 • Bonfield Snowmobile Club (150 km)
- 8 • North Bay Snowmobilers Club (139 km)
- 9 • Near North Trail Association
- 10 • West Nipissing Snowmobile Club (330 km)
- 11 • Nipissing/Veuve River Snowmobile Club (167 km)

12 Snowmobile clubs often utilize old or existing logging roads as part of their trail network. Efforts are
13 made by the forest industry and clubs to coordinate activities when use overlaps. Data records within
14 the MNRF District Office identify a total of 1,884 km of snowmobile trails. The above clubs account for
15 approximately 1,600 km of these trails. There are a few other clubs that manage trails that nip through
16 the Nipissing Forest for short stretches that are not noted due to this small distance which can account
17 for a portion of this difference.

18 *Hunting and Fishing*

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

26 The Nipissing Forest overlaps with much of Fisheries Management Zone 11. This area has supported a
27 culturally important fishery for thousands of years, and a significant recreational fishery since at least
28 the early 1900s. This zone consists of diverse fish communities which offer a wide range of angling
29 opportunities. The recreational fishery is an important economic and social driver within FMZ 11
30 contributing to a significant local tourism industry. The most significant individual socio-economic
31 drivers of fisheries within FMZ 11 are lakes Nipissing and Temagami and the French River. Due to their
32 size, the nature of their resources and the level of tourism infrastructure these waters attract visitors
33 from within and outside the country. As well, Lake Nipissing is classified as a provincially Significant
34 Inland Fishery (PSIF) within Fisheries Management Zone 11 which borders on the Nipissing forest.
35 PSIF's are designated to recognize the importance of specific water bodies to the Province of Ontario
36 due to its economic, environmental, and social importance.

37 Review of large game data for the four Wildlife Management Units (41, 42, 47, 48) that overlap the
38 Nipissing Forest was reviewed. Large game is considered black bear, white tailed deer and moose. The
39 wildlife management units extend beyond the forest boundaries and thus represent a slightly larger
40 area; however, the information provides a reasonable estimation of hunter activity associated with the
41 forest.

1 Data suggests that between 1987 and 2015 there are an average of 2,385 hunters in pursuit of bear
2 annually. Approximately 35% of bear hunters are non-residents. It is noted however that while the total
3 number of hunters remains relatively constant from year to year during this period, the number of non-
4 resident hunters active in each management unit has declined significantly since 2011.

5 On average, since 2002, these four Wildlife Management Units generate an average of 15,648 bear
6 hunter days experience. This works out to approximately seven (7) days per hunter based on the
7 average number of hunters in the paragraph above.

8 Deer hunting within these same four Wildlife Management Units demonstrates a significantly higher
9 volume of hunters in pursuit of deer as compared to bear. Between 2000 and 2015 (sixteen years) an
10 annual average of 13,758 deer hunters were issued an average 6400 tags. From this MNRF data an
11 estimated 64,451 hunter days are spent in pursuit of this game annually, averaging 4.7 days per hunter.

12 The Ontario Federation of Anglers and Hunters (OFAH) estimated the number of moose Validation Tags
13 issued within the Nipissing Forest to be 147 tags for 2016. The corresponding annual expenditure on the
14 moose hunting associated with this forest was projected to be \$2,608,515. This is based on hunting and
15 non-travel related hunting expenditures and the corresponding estimated hunter days in relation to the
16 prorated area that the Nipissing Forest overlaps with Wildlife Management Units 40, 41, 41, 47, 48.

17 Mining and Mineral Exploration, Aggregates and Hydro Generation

18 *Mining and Mineral Exploration*

19 Currently in the Nipissing Forest there are active mining and mineral exploration activities which are
20 largely focused on quartz-nuscovite gneiss, mica stone (gneiss), and landscaping stone.

21 *Aggregate Pits*

22 There were 101 aggregate permits issued on Crown land in the Nipissing Forest, under the Aggregate
23 Resources Act, within the District of North Bay for the extraction of sand, gravel, and quarry stone based
24 on returns for the 2015-2016 operating year. Permits administered on the forest but outside the North
25 Bay District (MNRF) are not included in this review. Aggregate pits are administered by the Ontario
26 Aggregate Resource Corporation (TOARC), a private organization based in Burlington Ontario. Royalty
27 rates for unconsolidated sand and gravel is \$0.50 per tonne. The rate for consolidated materials
28 (crushed rock, decorative stone) is \$2.00 per tonne.

29 Revenues to the Crown for aggregate permits within the North Bay District administered portions of the
30 Temagami Management Unit and the Nipissing Forest was over \$300,000 dollars, with Commercial
31 permits reporting 365,470 tonnes of sand and gravel and 66,651 tonnes of crushed rock sourced from
32 Crown land pits. Data to separate records between the two units was not available at the time of FMP
33 development due to the manner the Ontario Aggregate Resource Corporation tracks and records this
34 information. Approximately fifty different companies hold permits on these two management units for
35 the purposes of aggregate extraction.

36 No patent land licence returns are included in this report.

37 *Hydro Generation*

38 Waterpower generation facilities within the Nipissing Forest, with the exception of the Sturgeon Falls
39 dam are administered through waterpower lease agreement with the North Bay District of the Ministry
40 of Natural Resources and Forestry. The Sturgeon Falls generating station is owned by the Municipality of

1 West Nipissing. This facility was established and operated prior to the establishment of waterpower
2 leases by the province.

3 One new facility, the Okikendawt Generating Station has been added to the list since the previous plan.
4 This facility is near Dokis Ontario on the French River.

5 Other

6 *Fur Harvesting*

7 Trapping provides seasonal employment for 107 registered trappers within the Nipissing Forest. The
8 value of the fur harvest is subject to market prices which can vary widely between species and from year
9 to year. During the past four-year period total revenues per year showed a high of \$353,150 in 2013 and
10 a low during 2015 at \$97,069. This trend is reflected in the weighted average price per pelt per year
11 figure. Lower harvest levels were also reported during years where this weighted average price per pelt
12 declined over prior years.

13 *Baitfish Operations*

14 For the year 2015/2016 there were 38 individuals with baitfish licenses, 19 of which were tourism camp
15 operators. North Bay District sells more bait fish licenses than any other district in the province. The bait
16 fish industry supplies the local angling industry and provides supplemental income to individuals
17 involved in baitfish and angling industries.

18 *Bear Management Areas*

19 There are 53 bear management areas in the Nipissing Forest. Bear management areas are licensed to
20 tourist operators to provide bear hunting opportunities.

21 *Ministry of Natural Resources and Forestry Staff*

22 Approximately 28 Employees work out of the MNRF North Bay District office. These employees provide
23 services for both the Nipissing Forest and the Temagami Crown Management Unit.

24 2.3 First Nation and Métis Background Information Report

25 The use of natural resources on the Nipissing Forest by Indigenous communities has been well
26 documented within their First Nation and Métis Background Information Reports (BIR) and Community
27 Demographic Profiles.

28 There are six Indigenous and two Métis communities that have been consulted with during the 2019-
29 2029 Forest Management Plan. These communities are:

- 30 • Antoine Algonquin First Nation
- 31 • Dokis First Nation
- 32 • Mattawa/North Bay Algonquin First Nation
- 33 • Temagami First Nation/Teme-Agauma-Anishnabai
- 34 • Nipissing First Nation
- 35 • Wolf Lake First Nation
- 36 • Métis Nation of Ontario, Mattawa Métis Council
- 37 • Métis Nation of Ontario, North Bay Métis Council.

38 To summarize the extent of natural resource use by these Indigenous communities, the BIR condenses a
39 much wider scope of history such as:

- 1 • Almost 400 years of fur trading with Europeans,
- 2 • 6,000+ years of Indigenous habitation within the Nipissing Forest
- 3 • Evolvement of Indigenous rights and title
- 4 • Evolvement of Indigenous laws
- 5 • Subjection to Treaties or Non-treaties and varied social pressures
- 6 • Early to late lumbering eras.

7 The MNRF has on file the existing reports from each community and works with the communities in
8 order to update the reports on a continuous basis especially at the start of a new FMP. For the 2019-
9 2029 Nipissing FMP, the communities were funded to update their reports during the plan development
10 (2017-2018). One community was to be provided funding but chose not to develop a report or
11 participate in the development of a report as they felt that if they did so, it may impact their ability to
12 seek other funding opportunities from the Province of Ontario.

13 The Métis communities did not respond to earlier invites to participate in the plan development;
14 however, MNRF North Bay has been notified that the Métis are developing a more broad background
15 information report from their Métis Nation of Ontario (MNO) Region and this report will be applicable to
16 the Nipissing Forest when completed.

17 The MNRF and SFL maintain an open-door policy when accepting information from Indigenous and
18 Métis communities, whereas, the information a community wishes to share may not follow the FMP
19 schedule and the consultation with the community may be at the annual work plan stage, prior to
20 harvesting taking place, or working with tree markers and industry to develop pre-harvesting strategies.
21 In short, when working with Indigenous and Métis communities, values information gathering and
22 values information use is non-static and does not fall into a mould like other information and schedules
23 that the FMP Planning Manual offers.

24 The indigenous communities are also careful about sharing their information into a public document for
25 fears that that the value(s) could be vandalized. The indigenous communities and industry have on
26 occasion worked outside of the FMP process to ensure that values are protected and are not part of a
27 public document and this regularly satisfies the fears the community has when releasing sensitive
28 information.

29 Refer to Supplementary Documentation Section 6.1.3 for more specific information related to the First
30 Nation and Métis Background Information Reports.

3.0 DEVELOPMENT OF THE LONG-TERM MANAGEMENT DIRECTION

3.1 Introduction

This section describes the long-term management direction (LTMD) and the development of the management strategy. The long-term management direction for the Nipissing Forest provides direction for road access, harvest, renewal, and tending activities required for a balanced achievement of management objectives. During the development of the LTMD, management objectives were developed and desirable levels and targets identified through analysis, which involved the use of the Strategic Forest Management Model (SFMM). Ontario's Landscape Tool (OLT) was also used to evaluate ecological and habitat indicators of forest composition and landscape pattern. A management strategy was developed based on the evaluation and assessments of objective achievement balanced over a 150-year planning horizon. The management strategy sets the level of harvest for the 10-year period of the forest management plan based on the results of the wood supply analysis and assessment of objective achievement. The wood supply analysis determines the available harvest area (AHA) for each forest unit on the Nipissing Forest.

The LTMD must be consistent with forest legislation and policy and consider the direction in MNRF's forest management guides. The management strategy must also provide for an acceptable balance between social, economic and environmental considerations noted above and provide for the sustainability of the Crown forest.

3.2 Management Considerations

Management considerations are developed from an evaluation of changes to the forest condition (e.g., significant natural disturbance) or social, economic or environmental concerns that affect the development of the long-term management direction. Management considerations were identified by a review of past forest management plans (FMPs), independent forest audits (IFAs), and issues affecting the implementation of the current (2009-2019) FMP. Other sources of information include new science and policy direction, the Aboriginal Background Information Reports and consultation with Indigenous communities, in particular in relation to the negotiations for the Algonquin Land Claim and Temagami Lands Set Aside (LSA), and input from the LCC and the general public.

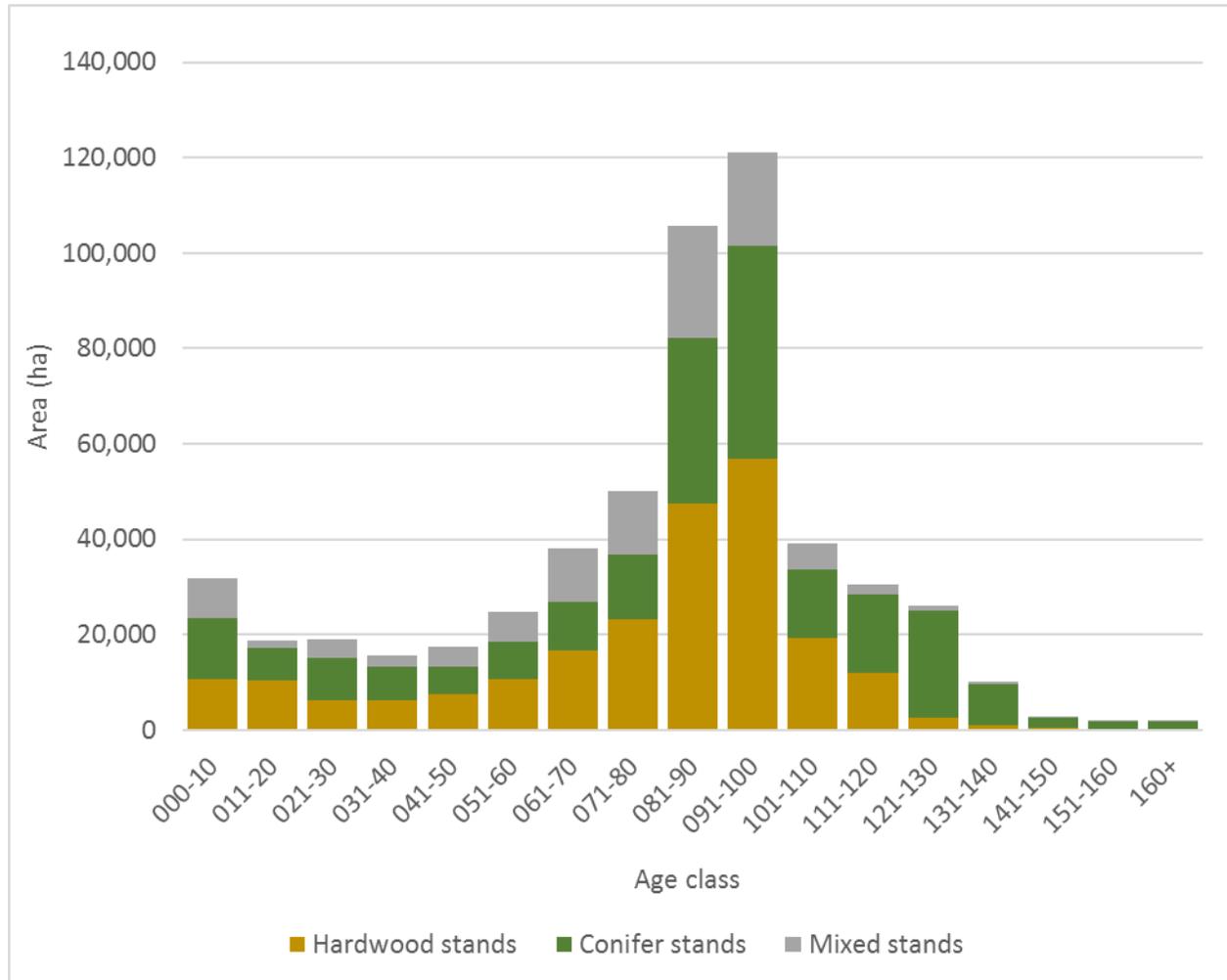
The planning inventory and base model inventory were updated with the most current LSA and land claim parcel areas. The LSA is mapped as a distinct area where specific direction and objectives can be applied, and the area is made available for forest management activities. Algonquin land claim parcels were removed from the available land base. As a result of this exercise approximately 5,000 ha of forest was removed from the managed land base and does not contribute to wood supply. The exception to this were specific parcels where it was requested by participating communities within the AOO to continue forest management within the parcel(s). These areas remain available for forest management, and have been agreed to by the local community members of the Algonquins of Ontario.

Species at risk (SAR) policy is relatively new and is subject to change during the development and implementation of the FMP. During Phase II of the 2009-2019 FMP new direction was implemented, however, it is expected that forest management activities will be further affected with changes to guidelines and occurrences of species. The North Bay District MNRF maintains inventories and information for SAR on the Nipissing Forest. Known sites of occurrence of habitat are documented for flora, fish and wildlife that are listed as endangered, threatened or of special concern. Since this

1 information is considered as sensitive it is not shown on the FMP maps but is available to the planning
 2 team to ensure that known SARs habitat is adequately protected. The Stand and Site Guide provides
 3 forest management direction for forest-dwelling SAR and the MNRF is currently developing a new SAR
 4 guide which may be available to the planning team during the completion of the FMP.

5 The planning team will use the most current MNRF direction to develop updated AOC prescriptions or
 6 conditions on regular operations (CROs) for known SAR occurrences on the forest. New AOC
 7 prescriptions or CROs will be developed and amended to the FMP if new SAR habitat or species
 8 occurrences are identified during plan implementation that will potentially be impacted by planned
 9 forest operations.

10 **Figure 3.2.1. The age class structure of the available forested area, by forest type, at the start of the**
 11 **2019 FMP.**



12
 13 The age structure of the forest is perhaps the most limiting, and challenging aspect of the forest
 14 management plan (Figure 3.2.1). The over-abundance of mature forest, i.e., 80 to 100 years of age, and
 15 relatively low amounts of immature and very old forest limit the long-term availability of harvest area
 16 and old-growth retention areas. The future recruitment of immature forest into older age-classes
 17 presents a challenge in balancing harvest with the new Landscape Guide requirements for retention of

1 mature forest area. This imbalance is not unique to just the available forest area – this pattern is also
2 evident in provincial parks and protected areas, as shown in Figure 2.1.5.

3 The Landscape Guide direction is new to the Nipissing Forest, with the 2019-2029 FMP being the first
4 opportunity to implement this direction. Among the challenges of the required direction is the need to
5 increase the overall area of mature and old white pine mixedwoods and tolerant hardwoods. The long-
6 term retention of mature and old areas conflict with operable harvest areas, due to the limited future
7 recruitment of mature forest from younger ages as shown in Figure 3.2.1, and therefore an analysis of
8 how to balance wood supply and landscape targets was done during scoping exercises. The proposed
9 management strategy has subsequently identified a sustainable harvest, but that shows a downward
10 trend relative to previous plans.

11 The continued re-classification of tolerant hardwoods as selection vs. shelterwood also impacts the
12 achievement of landscape targets for mature and old tolerant hardwoods and wood supply. Managing
13 hardwood areas as even-aged shelterwoods means that a portion of these areas needs to be retained in
14 older age-classes throughout the planning horizon which constrains wood supply. It is, however,
15 necessary to classify a large portion of the Nipissing hardwood areas for shelterwood management due
16 to the limited opportunities for proper selection silviculture. Implementation of the previous two FMPs
17 has shown the challenge of identifying hardwood stands with sufficient stocking, structure, quality, and
18 productivity to be managed with single-tree selection. The majority of sites encountered are not suitable
19 to selection management, and management as even-aged shelterwoods results in longer rotations and
20 retention of mature and old areas with subsequent reductions in harvest area and wood supply.

21 Market trends also continue to affect harvest levels on the Nipissing Forest, and this is expected to be an
22 ongoing issue with the current depressed conifer pulp market. Low utilization of harvest area is a long-
23 standing issue and has therefore been addressed in the scoping exercises for the proposed management
24 strategy.

25 Climate change is also an important consideration in the development of the proposed management
26 strategy. Forest management inherently provides an important role in potential mitigation of climate
27 change through the sequestration of carbon in the accumulation of biomass and wood products. The
28 planning team's approach to addressing climate change, however, was to focus on management
29 activities, above and beyond regular forestry practices that will enhance the resiliency of the forest to a
30 changing climate. Recommendations from the Forest Gene Conservation Association (FGCA) have been
31 considered in the development of an objective to address climate change, as described in Section 3.6.8.

32 3.3 Base Model

33 The strategic analysis for the LTMD was completed using a base model developed in SFMM using new
34 planning inventory for the forest. The inventory was updated to account for stand conditions that would
35 be expected in 2019 (i.e., stand age, and forecast depletions). The base model includes assumptions
36 related to the land base (e.g., management zones and current forest condition), forest dynamics (forest
37 succession, growth and yield), available silvicultural options, biological limits, and other model
38 assumptions identified by the planning team that are documented in the analysis package. Section 3 of
39 the Analysis Package (Supplementary Documentation 6.1.2) provides the details of the development of
40 the base model inventory and the base model.

1 3.3.1 Analysis of Silvicultural Activities

2 Past silvicultural activities were analyzed for the development of the 7-Year Annual Report and trend
3 analysis for the Independent Forest Audit in 2016. Prior to this, the SFL also undertook a review of the
4 silviculture program and made significant changes in the approaches to renewal of conifer forest types.
5 The resultant changes led to a greater emphasis on effective site preparation and tending, including the
6 adoption of new, more effective technologies. In addition, the management of mid-canopy competition,
7 mainly in the form of balsam fir and red maple in white pine shelterwoods was also emphasised.
8 Subsequent success rates for conifer renewal have increased substantially since around 2008.

9 Harvest rates have continued to be significantly lower than planned in the past few decades, resulting in
10 lower than planned renewal activities, as described in Annual Reports. Renewal levels are, however,
11 keeping pace with harvest resulting in a limited silvicultural liability.

12 3.3.2 Analysis of Past Silvicultural Performance

13 An evaluation of monitoring data was used for the development of new, empirically-based post-harvest
14 succession rules for the model, described in table FMP-5. Post-harvest succession describes the
15 predicted yield achievement of each analysis unit and silviculture intensity combination (i.e., silviculture
16 stratum) in clearcut and shelterwood systems. The SFMM model does not include successional changes
17 for uneven-aged systems, therefore there are no successional pathways for the selection forest unit.
18 Regardless, the selection forest unit is a climax forest community and tends to be very stable due to the
19 predominance of shade-tolerant sugar maple; therefore, the succession of managed HDSEL stands is
20 modeled as a static condition.

21 In previous plans, post-harvest succession, also referred to as post-renewal succession (PRS), relied
22 heavily on professional opinion due to a limited supply of empirical data from free-to-grow (FTG)
23 surveys or other sources. A considerable dataset was available for the 2009 FMP, and this has expanded
24 to 21,943 ha of surveys for clearcut forest units to be used for the 2019 FMP, including 8,965 ha added
25 from plot-based surveys (SOI_STARS).

26 The current analysis is based on all of the available data except for conditions represented by less than
27 20 ha. Additional adjustments from the observed results were needed to reflect changes in the
28 effectiveness of silvicultural treatments over time, as many of the survey results stem from past
29 practices that are no longer used.

30 The PRS matrix in table FMP-5 shows intentional site conversions to different forest units (including
31 conversion to shelterwood forest units), as well as renewal success and failure; and was reviewed and
32 revised by the Silviculture Task Team.

33 3.4 Desired Forest and Benefits

34 The Desired Forest and Benefits meeting is the opportunity for the District Manager, Plan Author and
35 the forest management planning team to hear from citizens, and gather information on their vision for
36 the forest, in terms of the composition and the types of benefits to be derived from it.

37 On May 4, 2017, the MNRF North Bay District Manager organized a desired forest and benefits meeting
38 between the planning team, plan advisors, members of the District Indigenous Working Group and
39 members of the Nipissing Forest Local Citizens Committee. The District Manager also invited local

1 trappers' councils and holders of Bear Management Areas/tourism businesses, because these groups
2 were not represented on the Local Citizens Committee at that time.

3 The information gathered at the meeting provided valuable input to the development of the forest
4 management plan (plan) objectives, indicators and desirable levels and targets. Comments can also be
5 used in the development of other sections of the plan or other resource management programs.

6 Meeting participants were given an overview of the Nipissing Forest, and the 2009-2019 plan objectives
7 to set the context for the group discussions. The thirty-six participants, divided in three groups,
8 discussed and gave their opinions during each of three break-out sessions, focusing on Forest Cover &
9 Diversity, Silviculture, and Social & Economic issues. The topics are the broad objective categories from
10 the Crown Forest Sustainability Act and are described in section 1.2.5.1 of the Forest Management for
11 Planning Manual for Ontario's Crown Forests (2009)⁴.

12 A total of 146 comments and recommendations were recorded. The plan author later grouped the
13 comments into similar topics and relevance to various sections of the plan. The comments were
14 presented and discussed at meetings with the Nipissing Forest Management Planning Team and the
15 Local Citizens Committee.

16 The majority of comments (105) contribute to the development of the plan, in the setting of objectives
17 and targets, developing access plans, area of concern prescriptions, conditions on regular operations, or
18 Resource Stewardship Agreements. Figure 3.4.1 below illustrates the number of comments by category.

19 Forty-one comments and suggestions were determined to be suitable for use in processes other than
20 forest management planning (out of scope of the FMP), such as the Crown Land Use Management,
21 wildlife population management, designation of species at risk, private land management, internal
22 processes, wood supply directives, and alternative energy programs.

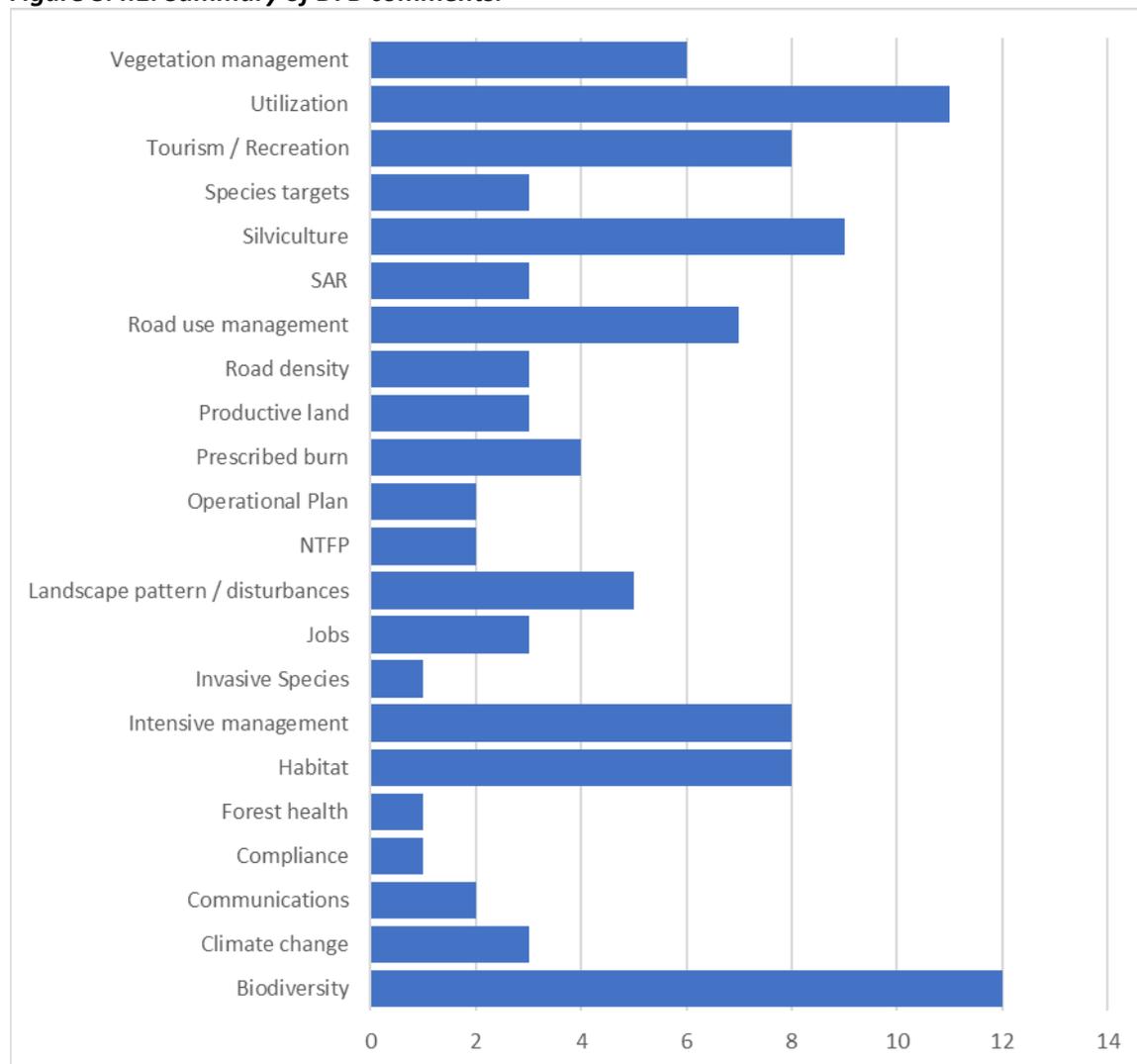
23 Table FMP-10 of the Nipissing Forest 2019-2029 FMP describes twenty-two plan objectives. The
24 comments received at the desired forest and benefits meeting are incorporated within objectives 1, 2, 4,
25 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19 and 22.

26

27

⁴ Development of the LTMD followed the 2009 FMPM and to the extent possible the 2017 FMPM.

1 **Figure 3.4.1. Summary of DFB comments.**



2

3

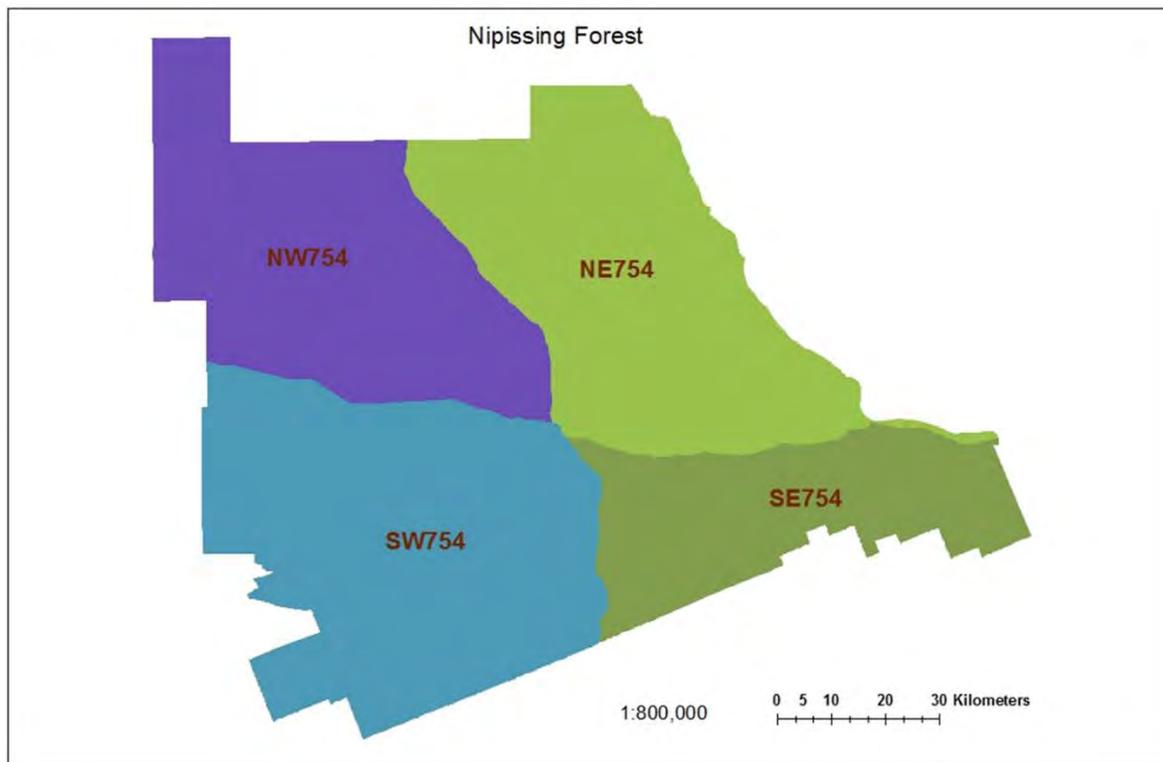
4 **3.5 Strategic Management Zones**

5 The management unit was divided into four zones to provide a spatial representation of harvest over
 6 the first four planning terms (i.e., 40 years of spatial harvest distribution). The management unit was
 7 divided north to south by Hwy 17, and east to west by Hwy 11. The total quadrant area, and the
 8 proportions of the Nipissing Forest that each represents are shown below and illustrated in Figure 3.5.1:

Quadrant	Area (ha)	Proportion
NE	198,573	36%
SE	81,477	15%
SW	98,897	18%
NW	176,103	32%
Total	555,051	100%

9

1 **Figure 3.5.1. Strategic Management Zones for analysis of spatial harvest distribution.**



2
 3 Objective achievement for wood supply was also assessed spatially, in part to phase in direction from
 4 the 2017 FMPM (Part B, Section 3.5), and to provide assurance that harvest area is not
 5 disproportionately allocated across spatial zones over the first 40 years of the planning horizon. Analysis
 6 with and without spatial constraints shows sensitivity in the model to the spatial distribution of harvest
 7 area, but that a constraint can effectively control large fluctuations by zone for the first 4 terms.

8 3.6 Objectives and Indicators

9 The following objectives were developed from input from the Desired Forest and Benefits (DFB) meeting
 10 (refer to FMP Section 3.4), public consultation, and during meetings with the planning team and Local
 11 Citizens Committee. Objectives were also guided by MNRF sources of direction (including Figure A-3)
 12 from the Forest Management Planning Manual for Ontario's Crown Forests (MNRF 2009)⁵ and forest
 13 management guides, particularly the Forest Management Guide for the Great Lakes and St. Lawrence
 14 Landscapes (MNRF 2010), and the Forest Management Guide for Conserving Biodiversity at the Stand
 15 and Site Scales (MNRF 2010), i.e., the Landscape Guide and the Stand and Site Guide, respectively.

16 Objectives are categorized as either quantitative, with specific measurable targets, or qualitative, which
 17 are evaluated by ensuring specific criteria are met, but are not defined by specific amounts or numbers.

⁵ Phase-in provisions for the revised (2017) Forest Management Planning Manual required the LTMD to be developed under the direction of the 2009 manual and implementation of the 2017 direction to the extent reasonably possible.

1 The planning team's review of management objectives from the current (2009) forest management plan
2 was largely influenced by a 2011 Independent Forest Audit Recommendation #3: "The planning team for
3 the Nipissing Forest must ensure objectives in future plans are measurable, predictable, relevant,
4 understandable, valid, and feasible". This, combined with a consolidation of objectives under the
5 direction of the Landscape Guide and Stand & Site Guide, resulted in a rationalization of management
6 direction, with a reduction in the total number of objectives from 42 to 22. Each objective has one or
7 more elements, resulting in 44 indicators and over 400 assessments of sustainability.

8 Also as a result of this rationalization, some of the previous 2009 FMP direction was switched from an
9 objective to AOC prescriptions, or conditions on regular operations. The remaining objectives were then
10 confirmed to be tangible, clear and measurable. A summary of the objectives is provided in table FMP-
11 10.

12 Several objectives have been assessed during the development of the long-term management direction
13 and will be followed-up at each stage of plan production. This subset of objectives and indicators that
14 required measurement through time was assessed using the Strategic Forest Management Model
15 (SFMM), and the Ontario Landscape Tool (OLT), and balanced as part of the requirements of the
16 management strategy. The remaining objectives are assessed through the development of the FMP
17 during Stage 3 and Stage 4 or during implementation of the FMP, in the Year 5 and 10 Annual Reports.

18 Quantitative Objectives

19 3.6.1 CFSA Category - Forest Diversity; structure and composition

20 **#1. Move towards the predicted range of natural variation for landscape structure and composition.**

21 This is a very complex objective and is developed from direction prescribed by the Forest Management
22 Guide for Great Lakes-St. Lawrence Landscapes (the Landscape Guide). The Landscape Guide indicators
23 quantify landscape structure, composition and pattern to provide desirable levels (milestones) to
24 manage towards. Measurable targets are developed from the milestones based on the simulated range
25 of natural variation (SRNV) for each indicator, i.e., the predicted natural level determined during the
26 development of the Landscape Guide and Ontario Landscape Tool (OLT). The applicable geographic area
27 for the Landscape Guide direction used in this objective (milestones from Table A5 of the Landscape
28 Guide) is the Great Lakes-St. Lawrence (GLSL) North⁶.

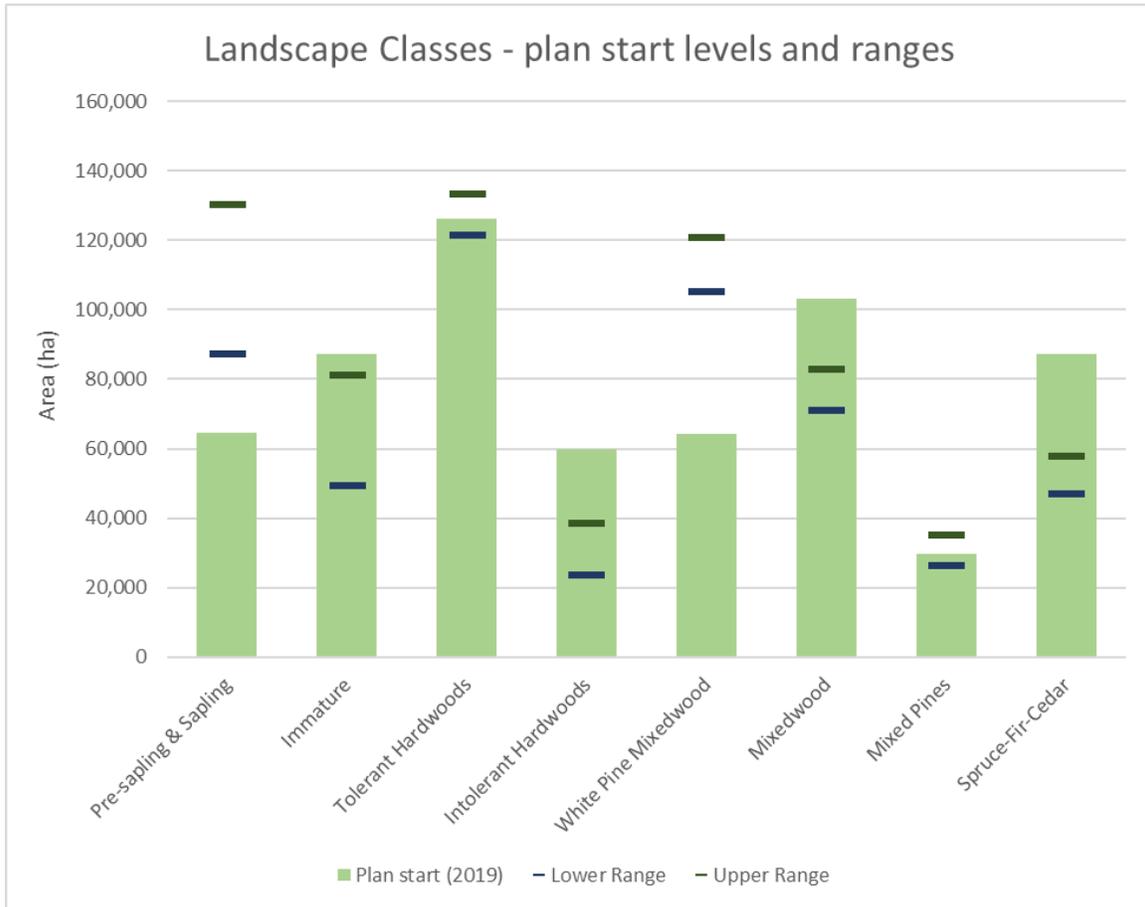
29 Specific indicators for this objective are based on the area (ha) of the following attributes:

30 *A. Landscape Class as defined in the Landscape Guide:*

- 31 i. Tolerant Hardwood (mature, old, two-stage),
- 32 ii. Intolerant Hardwood (mature and old),
- 33 iii. White Pine Mixedwood (mature, old, two-stage),
- 34 iv. Mixedwood (mature and old),
- 35 v. Mixed Pines (mature and old),
- 36 vi. Spruce-Fir-Cedar (mature and old).

⁶ Direction for the GLSL South is used for the Nipissing Forest to assess texture of mature and old forest only in accordance with guideline requirements.

1 **Figure 3.6.1 Landscape guide ranges of natural variation and starting conditions (2019) for landscape**
 2 **class indicators.**



3
 4 The Pre-sapling, Sapling, T-stage (i.e., young forest and two-canopy stands with a young understorey)
 5 class is not included as a specific indicator, in accordance with Landscape Guide Table A5, but was
 6 included in the scoping analysis.

7 Desired levels were set to align with the SRNV relative to the initial conditions: either movement
 8 upwards or downwards to the SRNV, then maintaining within the SRNV. The White Pine Mixedwood was
 9 the only indicator that was not able to reach the SRNV within the planning horizon, therefore a
 10 minimum target of 75% was established during scoping analysis to allow for a balanced increase towards
 11 the SRNV while maintaining sustainable harvest levels.

12 *B. Old-growth forest by Landscape Guide Standard Forest Unit.*

13 Old-growth is defined in the Landscape Guide and OLT. Desirable levels were based on ensuring 100%
 14 of the SRNV was reached or maintained, or if the SRNV could not be reached then follow an increasing
 15 trend. Targets were then set during scoping analysis that ensured consistency with these trends and
 16 compatibility with other model constraints.

17 *C. Area of plan forest units (all ages) on the available, managed land base.*

1 Trends for forest unit area were required to align with corresponding Landscape Class direction and to
2 be compatible with trends established for the 2009 FMP. Desired levels were established accordingly as
3 a percent increase or decrease over the first 100 years of the planning horizon.

4 *D. Area of red and white pine forest (all ages).*

5 The desirable level for red and white pine forest was based on maintaining area above the 1995 level to
6 be consistent with the Conservation Strategy for Old Growth Red and White Pine Forests Ecosystems in
7 Ontario, 1996. The SRNV was also used, and provided a much higher level to reach, therefore the target
8 was based on reaching the SRNV. Scoping analysis showed that red and white area continually
9 increased, therefore the SRNV median was used as a cap to avoid unwarranted conversions from other
10 forest types.

11 The targets for each of these indicators, shown in table FMP-10 were developed and assessed during the
12 development of the long-term management direction, as described in Section 4.3.2 of Supplementary
13 Documentation 6.1.2 Analysis Package.

14 3.6.2 CFSA Category - Forest Diversity; natural landscape patterns

15 **#2. Move towards the predicted range of natural variation for young, mature and old forest landscape**
16 **pattern.**

17 The texture of the mature and old forest and young forest patch size are coarse filter indicators used to
18 characterize landscape pattern. Landscape pattern was assessed with three indicators:

19 *A. Mature and old forest distribution (50 ha texture).*

20 *B. Mature and old forest distribution (500 ha texture).*

21 Desirable levels are expressed as showing movement towards the hexagon histograms (SRNV mean) for
22 the two assessment levels. Two assessment levels for this indicator are used, as described in the
23 Landscape Guide, because it is possible that “the texture measurement at one level, as expressed in a
24 proportional frequency histogram, is exactly the same between two landscapes even though the same
25 texture measurement at a finer or coarser level is significantly different”.

26 It is important to note that the Landscape Guide direction in Table A5, Landscape Guide Region GLSL
27 North – Milestones for Nipissing Forest Management Unit, differs from the other forests in the GLSL
28 North region as it uses 50 and 500 ha hexagon histograms rather than 500 and 5,000 ha. During the
29 development of the Landscape Guide it was determined that landscape pattern emulation on the
30 Nipissing Forest should match that of the GLSL South due to a lesser ‘boreal’ influence than the
31 surrounding GLSL North.

32 *C. Young forest patch size.*

33 Young forest is defined as being less than 36 years of age, as described in the Landscape Guide.
34 Desirable levels were set based on showing movement towards the SRNV mean of patch size.

35 Texture of the mature and old, and young forest is measured at plan start year and year 10 of the forest
36 management plan.

1 3.6.3 CFSA Category - Forest Diversity; distribution and abundance of forest ecosystems

2 **#3. Increase the area of stands that contain red spruce on the Nipissing Forest.**

3 Red spruce is a locally significant species, with natural stands occurring at the northern-most end of its
4 range on the Nipissing Forest. Because of the significance of this species, and because of assumed
5 reductions in abundance in the past, there is interest in regenerating more red spruce on the forest by
6 natural means and supplemented through planting. The desirable level and target for this objective is
7 based on levels of renewal effort that are consistent with recent trends for 100 ha of new planted area
8 over 10 years, amounting to approximately 150,000 seedlings. Achievement of this target will be
9 assessed at the 5th and 10th year of the plan.

10 3.6.4 CFSA Category - Forest Diversity and Provision of Forest Cover; habitat for animal life

11 **#4. To provide habitat for moose populations on the Nipissing Forest.**

12 The objective to provide wildlife habitat for locally featured species evolved from the 2009 FMP to focus
13 specifically on the creation of moose emphasis areas. General wildlife habitat is assessed and tracked
14 through the use of the Landscape Guide Indicators, with the associated milestones that provide
15 direction for achievement through time.

16
17 A specific indicator for this objective is the development of moose emphasis areas (MEAs) dispersed
18 across the forest in areas with moderate to high moose carrying capacity potential. MEAs must cover a
19 minimum of 10-15% of the forest area, and each MEA must be at least 2,000 ha in size. In selecting
20 candidate MEAs, preference was given to areas 10,000 ha in size or greater. The following criteria must
21 also be met, as directed by the Forest Management Guide for Conserving Biodiversity at the Stand and
22 Site Scales (2010).

- 23 • Wetlands: 5 to 10% of each MEA
- 24 • Browse: 5-30% of each MEA
- 25 • Mature conifer: 15-35% of each MEA
- 26 • Hardwood / mixedwood: 20-55% of each MEA

27 Assessment of objective achievement for this indicator is during the development of the operational
28 plan. Refer to Supplementary Documentation 6.1.12 for details.

29 **#5. To maintain habitat for forest-related species at risk.**

30 This objective stems from a FMPM (2017) requirement and is assessed for the year-5 management unit
31 annual report and the management unit annual report for the final year of plan implementation. The
32 indicators are 1) Compliance with species at risk AOC prescriptions, and 2) Provision of training for staff
33 and contractors on the identification and protection of species at risk.

34 3.6.5 CFSA Category - Social and Economic; long-term harvest levels, community well-being

35 **#6. Provide a sustainable, continuous, and predictable wood supply that will meet, as closely as
36 possible, or exceed the current recognized industrial demand of the Forest.**

37 This objective is assessed with several indicators that include harvest area and volume targets:

38 *A. Managed Crown forest available for timber production.*

1 The intent of this indicator is to limit losses of productive forest to permanent access structures (roads,
2 landings) and reserves. The desirable level was set according to estimated losses by forest unit.

3 This indicator is to be measured during the Year 5 management unit annual report and the management
4 unit annual report for the final year of plan implementation.

5 *B. Available long-term projected total annual harvest area (AHA).*

6 Harvest area (ha) is an important indicator of economic potential. Ideally there would be consistent
7 (non-declining) harvest area from plan to plan, and term to term, therefore a 0% decrease was set as a
8 desirable level. This was, however, determined to be infeasible while meeting other plan objectives,
9 hence the targeted level was to ensure reductions in total AHA from term to term did not exceed 10%.
10 This indicator is assessed during the development of the LTMD.

11 *C. Long-term projected available harvest area (AHA) by forest unit.*

12 The desirable level is to maintain a forest unit mix, over time, in order to meet the projected available
13 harvest volume (m³) by species group. Desirable levels cannot be fixed, in order to allow the
14 optimization of the selection of forest units from term to term. Desirable levels are to limit fluctuations
15 from term to term by 20-30% (refer to Table FMP-10 for details). Accordingly, constraints were tested in
16 the SFMM model to prevent changes in harvest area between 10-year periods. Limits less than 20%
17 resulted in infeasible solutions. This indicator is assessed during LTMD development.

18 *D. Long-term projected available harvest volume by species group.*

19 As with harvest area, harvest volume over time is an important indicator of sustainability. The current
20 industrial demand (CID) developed for the 2019 FMP is based on existing wood supply commitments
21 and current mill business plans and was used to set desirable levels for the objective. The following
22 volumes (m³) by species / species group are the desired levels:

- 23 • Spruce-pine-fir (SPF) – 155,000
- 24 • Intolerant hardwood (INT) – 169,200
- 25 • Tolerant hardwood (TOL) – 120,000
- 26 • White and red pine – (PWR) – 118,000
- 27 • Other conifer (OC) – 3,000

28 Scoping analysis showed that meeting these levels during all terms was infeasible, and iterative tests
29 were done to develop the following targets:

- 30 • SPF: 95% in T1, 60% minimum
- 31 • INT (BW+PW): 100% in T1, 70% minimum
- 32 • TOL: 90% in T1, 60% minimum
- 33 • PWR: 100% in T1, 90% minimum
- 34 • OC: 100% in T1, 90% minimum
- 35 • All (total): 90% in all terms

36 This indicator is assessed during the development of the LTMD.

37 *E. Actual harvest area, by forest unit. (% of planned harvest area).*

1 This indicator refers to the amount of harvest area that is actually harvested and reported in annual
2 reports, which may differ from planned areas for a couple of reasons. Conditions on the ground may not
3 match exactly what is described in the inventory, resulting in shifts in forest unit areas; and depressed
4 market conditions may result in continued under-utilization. The target level for the actual harvest area
5 by forest unit is for the depletions to be greater than 75% of the allocations for each FU. The desirable
6 level for this indicator would be 100%, however, due to poor market conditions or poor wood quality,
7 achieving 100% of the available harvest area may not be realistic.

8 This is to be assessed for the Year 5 management unit annual report and the management unit annual
9 report for the final year of plan implementation.

10 *F. Actual harvest volume, by species group. (% of planned harvest volume).*

11 The desirable level for this indicator is for the actual harvest volume to meet 100% of the planned
12 volume for each species group. This level was chosen to meet CID requirements of the identified mills. In
13 reality, there are a variety of possible operational and economic factors which prevent the 100%
14 achievement. The target has, therefore, been set at the actual harvest volume being greater than 75% of
15 the planned volume for each species group. These targets are linked to the AHA indicator targets and
16 will also be tracked through the annual reports and the results will be monitored and reported at years 5
17 and 10.

18 **#7. Indigenous Communities will benefit economically through partnerships, employment
19 opportunities, and business relationships.**

20 This objective, and #8, are developed in consultation with the Indigenous Working Group. Specific
21 details are still to be determined and will be assessed in terms of the documentation of contracts /
22 agreements and economic figures to support objective. The land base is divided into strategic
23 management zones to accommodate objectives for Indigenous communities that may differ from the
24 general area. The Temagami First Nation Lands Set Aside (LSA) are designated as a separate zone that is
25 available for management and is portrayed on FMP maps. Algonquins of Ontario (AOO) zones are
26 partially available for management while other areas are withdrawn from the available land base as
27 determined during consultation with Algonquin representatives. Specific management direction can,
28 therefore, be applied to individual AOO parcels and the Temagami LSA as required and agreed upon
29 with the respective First Nation. A supplementary table to FMP-10 is also provided in Section 6.1.20 to
30 expand on more specific strategies and targets for Indigenous communities.

31 The purpose of objectives #7 and #8 is to ensure that NFRM continues a high level of consultation with
32 the local Indigenous communities. Targets are the same as the desired level.

33 **#8. Indigenous Communities will continue to benefit from forest management through educational
34 and social opportunities.**

35 As with objective #7 there are specific details that still need to be developed. Assessment of this
36 objective will rely on documentation of consultation and meeting minutes.

37 Objectives #7 and #8 will be assessed during preparation of the Year 5 management unit annual report
38 and the management unit annual report for the final year of plan implementation.

1 3.6.6 CFSA Category - Social and Economic; Community well-being

2 **#9. Provide a balance of accessible and remote areas in the Nipissing Forest, within the context of**
3 **land-use plan designations.**

4 *A. Kilometres of primary and secondary SFL roads per square kilometre of managed Crown forest (parks*
5 *and reserves excluded).*

6 Road access to allocated harvest areas, silvicultural treatment areas, and recreational areas is critical to
7 the successful implementation of the FMP. An objective for the provision of a well-maintained road
8 network is, therefore, a useful indicator of success. Road access is, however, contentious as pointed out
9 during the DFB meeting, and a balance of accessible and remote areas is needed, hence the desired
10 level of road density is to maintain density in the short and medium term (10-20 years) at the current
11 level of 0.14 km/km², i.e., as new roads are developed, older roads become impassable resulting in a net
12 change of zero.

13 Desirable level to maintain density in the short and medium term (10-20 years).

14 *B. Kilometres of all SFL forest access roads (primary, secondary, operational) per square kilometre within*
15 *remote access EMAs.*

16 Enhanced management areas (EMAs) for remote access were established in the past during the
17 development of local land use policy. The intent of these areas is to limit access by 2- or 4-wheel drive
18 vehicles to remote areas, therefore the desirable level is to decrease density in the short and medium
19 term (10-20 years) from the current level of 0.18 km/km². This will be achieved as existing roads that are
20 no longer in use grow-over and become impassable, and new roads will be required to have access
21 controls and / or decommissioning plans. Decommissioning may include removal of water crossings, or
22 physical deconstruction. As such, these roads will not contribute to the driveable road network, as
23 outlined in road use management strategies.

24 These indicators are to be assessed for the Year-5 management unit annual report and the management
25 unit annual report for the final year of plan implementation.

26 3.6.7 CFSA Category - Silviculture

27 **#10. Ensure silvicultural activities create the expected future forest conditions on the Nipissing Forest.**

28 The desired level is for 100% silviculture success, based on the premise that investment into any site
29 would provide the anticipated result of a silviculture success all of the time. Targets have been created
30 taking into consideration that forest managers do not always have control over climate and other
31 environmental factors affecting regeneration success, resulting in differences in the intended forest unit.
32 Therefore, the target is to achieve +/-5% of modelled post-renewal succession for intensive treatments,
33 and +/-10% for extensive and basic treatments as described in table FMP-5. Assessment of this indicator
34 provides an important evaluation of the base model assumptions that goes above and beyond the
35 required assessments of renewal for the enhanced 5- and 10-year annual reports (tables AR-12 to 15).

36 This indicator is to be assessed during preparation of the Year 5 management unit annual report and the
37 management unit annual report for the final year of plan implementation.

38 **#11. Manage a balanced silviculture program to sustain a dependable wood supply and promote a**
39 **natural range of habitat conditions.**

1 The purpose of this indicator is to quantify the proportion of available allocated area managed with
2 intensive silviculture treatment packages. Specifically, this pertains to clearcut forest units because the
3 level of intensive management for selection and shelterwood tends to be pre-determined, i.e., tolerant
4 hardwood selection and shelterwood rely on natural regeneration, and pine shelterwood almost always
5 requires a high level of intensive treatment.

6 Scoping runs identified varying feasible levels of intensive management, from 25% to 45% depending on
7 objectives and constraints. The level of intensive management associated with the proposed
8 management strategy is 34%, which aligns closely with the 2009 FMP, and fully supports the wood
9 supply and habitat objectives. Therefore, the desirable level and target for intensive treatment of
10 clearcut forest units was set at a minimum of 30%.

11 This objective will be assessed at the mid-point of the FMP (year 5) and in the final year of plan
12 implementation.

13 **#12. Continue to develop a vegetation management program that judiciously uses herbicides where**
14 **necessary and promotes the use of prescribed fire and other vegetation management alternatives.**

15 The use of herbicides for forest management has been a conflicting issue for several years and continues
16 to be a subject of concern. The judicious, targeted use of herbicides is also deemed to be necessary in
17 certain situations to ensure objectives for renewal and habitat of conifer-dominated forests are met.
18 Discussion at planning team meetings resulted in a decision to carry forward an objective specific to
19 herbicide use from the 2009 FMP. It was also decided that the objective should be revised to focus on
20 ensuring herbicides are used appropriately when required and that alternatives would continue to be
21 evaluated and encouraged.

22 Analysis of herbicide alternatives was also done in conjunction with this objective to examine potential
23 implications of replacing herbicides entirely with alternatives. The approach to scoping endorsed by the
24 planning team was based a paper published from studies originating under Ontario's Vegetation
25 Management Alternative Program (VMAP)⁷. Results from this analysis showed that the sole use of
26 alternatives, with no budget restrictions, would lead to a loss of conifer volume and decline in the area
27 of pine-dominated forests. Details of the analysis are provided in Section 4.3.2 (9) of the FMP Analysis
28 Package. In addition, restricted budgets would result in additional volume and conifer reductions
29 stemming from lower levels of intensive treatment applications. It is therefore suggested that this
30 objective should focus on continuing to judiciously use herbicides where needed while also supporting
31 the use of alternatives.

32 The area of herbicide application and area treated with alternatives, relative to harvest levels is to be
33 assessed as one of the indicators of this objective. The desirable level and target is to maintain or
34 decrease the herbicide treatment area and maintain or increase the area treated with alternatives.

35 A separate indicator is to maintain or decrease the amount of active ingredient (kg a.i./ha) applied to
36 intensive renewal areas.

⁷ Dacosta et al. 2011. Modelling landscape-level effects of reduced herbicide use in two forests in northern Ontario. *Forestry Chronicle*. 87(2): 290-309.

1 The establishment of a demonstration area of herbicide treatments and alternatives is also proposed as
2 a target for this objective. This is to be established within the first 2 years of the FMP with subsequent
3 treatments as required.

4 Prescribed fire is a silvicultural tool that has many advantages, and if applied effectively can provide a
5 means of reducing reliance on herbicides. There are many challenges to using fire as part of a
6 silvicultural program, and costs can be prohibitive, however there are opportunities to pursue
7 prescribed burn proposals through the Forestry Futures Trust. A pilot project has been initiated in the
8 2009 FMP and additional development of high complexity prescribed burn plans is proposed for the
9 2019 FMP, in partnership with the MNRF. The indicator for this part of the objective is the area treated
10 with high complexity prescribed burns (this does not include low complexity slash pile burning).

11 Assessment of this objective will be done for the Year-5 management unit annual report and the
12 management unit annual report for the final year of plan implementation.

13 3.6.8 CFSA Category - Ecological Sustainability; healthy forest ecosystems

14 Several of the FMP objectives use compliance inspections as key indicators, to be measured as the
15 percent of inspections in compliance. The desirable level for the percent of inspections would be 0%
16 non-compliance for inspections related to all of the following objectives. These levels were chosen to
17 ensure that there is no impact of forest activities on the values and other stakeholders on the Forest.
18 However, it is unrealistic to expect that there would never be an incidence of non-compliance. The
19 target (refer to FMP-10) has therefore been set according to a combination of the sensitivity and
20 frequency of the value being protected. These indicators (#13-15) will be tracked and monitored
21 through the annual report and will be assessed at years 5 and 10.

22 **#13. Ensure values are adequately protected on the Nipissing Forest.**

23 A basic compliance monitoring objective is set to encourage continuous improvement in the quality of
24 operations on the Forest. The indicator is the percent of forest operation inspections in non-compliance,
25 by activity and remedy type.

26 **#14. Minimize negative impacts on forest productivity, soil, and water resources.**

27 This indicator is to ensure compliance with management practices that prevent, minimize or mitigate
28 site damage (% of inspections in non-compliance, by remedy type).

29 **#15. Protect water quality and fish habitat within watercourses and water bodies affected by forest 30 management.**

31 Compliance with management practices that protect water quality and fish habitat (% of inspections in
32 non-compliance, by remedy type) is used as the indicator for this objective.

33 **#16. Improve the resilience of the Nipissing Forest to possible effects of climate change.**

34 Climate change is an important issue that garners a significant amount of public interest. Forest
35 management inherently plays an important role in potential mitigation of climate change impacts
36 through the sequestration of carbon in the accumulation of biomass and wood products. The planning
37 team's approach to developing this objective, however, was to focus on management activities, above
38 and beyond regular forestry practices that will enhance the resiliency of the forest to a changing climate.

1 Recommendations from the Forest Gene Conservation Association (FGCA) were used as a basis for the
2 establishment of a white pine seed production area sourced from a climate-appropriate seed zone.

3 In addition, it is recommended to supplement planting programs with tree seedlings from seed zones
4 that are south (within projected climate-appropriate zones) of traditional zones on the Nipissing Forest.
5 The indicator for this target is to supplement seed sources with up to 10% seed from additional
6 recommended climate-appropriate zones.

7 This objective is to be assessed for the Year-5 management unit annual report and the management unit
8 annual report for the final year of plan implementation.

9 **#17. Maintain or increase the abundance of tree species of special interest (at the northern end of**
10 **their natural range).**

11 Conserving genetic diversity is one component of conserving less common tree species on the Forest. To
12 conserve and enhance the genetic diversity, the planning team recognized that sites with rare or less
13 common tree species would be protected and/or managed to enhance or maintain their abundance. The
14 indicator for this objective is the average abundance (% area-weighted composition) of Bd, Be, By, Cb,
15 He, Or as reported in silviculture monitoring surveys, relative to the "Present" averages. The intent is to
16 ensure the composition of these species is maintained or increased.

17 Desirable levels are Bd: 1% in HDSEL; Be: 1% in HDSEL and 2% in HDUS; By: 47% in BY, 16% in HDSEL,
18 11% in HDUS, and 16% in HE; Or: 2% in HDSEL and 11% in HDUS.

19 This objective is to be assessed for the Year-5 management unit annual report and the management unit
20 annual report for the final year of plan implementation.

21 **#18. Promote suitable habitat and browse in and around Stratum 1 Deer Yards.**

22 A significant amount of discussion at the DFB meeting focused on the enhancement of deer yards on the
23 forest, specifically in the Loring area. The areas within and adjacent to deer yards have seen little
24 management activity in the past few FMPs, and as a result there is concern for the lack of browse that is
25 created through logging. Consequently, the indicator to assess this objective is the area managed within
26 and adjacent to (<2 km) deer yards (Stratum 1 mapped area). The desirable level and target is to
27 demonstrate an increase in harvest area reported at Year-5 and 10 of the FMP.

28 **#19. Provide opportunities for personal fuelwood collection that are located in proximity to**
29 **communities on the Nipissing Forest.**

30 In response to public interest, the planning team recognized the importance of the availability of
31 fuelwood from Crown forests that are close to communities. The average volume of wood acquired with
32 Personal Use Fuelwood permits, and / or the number of personal use permits will be used to assess the
33 level of wood made available to the public. The desirable level is to maintain or increase from the
34 currently reported level of 618 m³/year, assessed in the 5th and 10th years of the FMP.

35 **Qualitative Objectives**

36 **3.6.9 CFSA Category - Social and Economic; involvement in forest management planning**

37 **#20. Provide opportunities for First Nation and Métis communities in the development of the Forest**
38 **Management Plan.**

1 The involvement of indigenous communities is critical to developing successful outcomes in the planning
2 process. This objective was developed to ensure there is effective involvement of First Nation and Métis
3 communities in the plan development including, but not limited to, participation on the planning team,
4 Aboriginal Working Group, community meetings, development of the Aboriginal Values Information
5 Report, and development of AOCs for the protection of indigenous values.

6 **#21. Encourage support of the Local Citizens Committee in the development of the FMP for the**
7 **Nipissing Forest.**

8 Involvement of the LCC is a key component to the development of the long-term management direction
9 on the Forest, and recognition of this and other levels of participation is important to the planning team.
10 The LCC's self-evaluation of its effectiveness in plan development and results presented in the Desired
11 Forest and Benefits Meeting Report will provide an indication of the level of support and participation in
12 the planning process.

13 3.6.10 CFSA Category - Ecological sustainability; healthy forest ecosystems

14 **#22. Mitigate the impact of invasive species on the Nipissing Forest.**

15 Invasive species pose a potential threat to the sustainability of forests that must be mitigated through
16 awareness and prevention. Efforts to reduce the spread of invasive species will be monitored through
17 the compliance with quarantine zones as they may become established. Awareness and prevention
18 measures will be promoted during annual spring operations training, focusing on education with
19 contractors, and equipment movement (reducing potential for spreading seeds). Salvage of affected
20 areas will also be promoted and monitored as required.

21 3.7 Long-Term Management Direction

22 The long-term management direction (LTMD) represents a balance in the achievement of management
23 objectives, based on model analysis of what the forested land base is capable of achieving under a
24 variety of constraints (e.g., age structure and composition, habitat requirements, and budget
25 limitations). These outputs are summarized in the tables:

- 26 a) FMP-2: Describes the forest units for the 2019-2029 FMP
27 b) FMP-6: Describes the forest condition for the Crown productive forest
28 c) FMP-7: Describes habitat for selected wildlife species
29 d) FMP-8: Summarizes the available harvest area by forest unit and 20-year projections
30 e) FMP-9: Summarizes the estimated available harvest volume (for 10-year periods) by 20-year
31 projections
32 f) FMP-10: Summarizes management objectives, indicators and targets and includes an
33 assessment of achievement for each objective.

34 The LTMD provides the high-level, strategic direction to guide management activities, based on an
35 analysis of the current forest condition and projections over a 160-year planning horizon. The analysis
36 identifies the levels of road access, harvest, and renewal activities that are required to meet the desired
37 objectives. The development and review of the preliminary LTMD is the second step in a five-step, public
38 consultation process for the plan. Subsequent steps include review of operational aspects of forest
39 management planning including refined harvest allocations, areas selected for silviculture, branch road
40 planning, and the protection of specific values on the forest.

1 Objectives related to forest cover and biodiversity were confirmed and updated according to new policy
2 direction in the Landscape Guide and Stand and Site Guide. The objective for disturbance pattern was
3 changed significantly with the evolution from the Natural Disturbance Pattern Emulation Guide to the
4 new Landscape Guide, although the intent and results are similar, i.e., to move towards the predicted
5 range of natural variation (SRNV) for young, mature and old forest landscape pattern or texture. The
6 development of these objective targets was discussed during the October 3, 2017 planning team
7 meeting. The process that was decided upon was to start scoping with Landscape Classes (as per
8 Landscape Guide direction, recommended order of application, page 22). In cases where reaching an
9 SRNV was infeasible an iterative approach was used to find feasible solutions.

10 Objectives for forest-dependent species, including species at risk, were updated according to the new
11 guidelines and direction. A list of local species of interest was developed from input from the Desired
12 Forest and Benefits Meeting, and preferred habitat conditions were developed from the modelling tools
13 available (SFMM habitat matrix and OLT).

14 The wood supply objective was revised based on updated information on volume commitments and
15 current mill business plans. Targets for the level of achievement were based on the scoping analysis
16 described in Section 4.3.2 of the Analysis Package.

17 Silviculture objectives and post-renewal succession (PRS) pathways were updated based on the
18 recommendations from the year seven management unit annual report. It was decided to specifically
19 link an objective for renewal to the updated PRS analysis to provide an abject measure of regeneration
20 success as described in the strategic model. In particular, the level of successful renewal of white and
21 red pine required updating from the 2009 FMP, in tandem with significant changes in silvicultural
22 practices implemented over the past 10 years. Targets for the level of achievement by forest unit were
23 based on the scoping analysis described in Section 4.3.2 of the Analysis Package.

24 In accordance with the FMPM (2009, 2017), scoping analysis is an iterative process of modeling
25 scenarios to provide insight into what the forest is capable of producing in order to develop realistic and
26 feasible desirable levels for objective indicators. Scoping investigations will consider implications on
27 wood supply, forest conditions, habitat, and other non-timber resources for the short-term, medium-
28 term, and long-term.

29 The following investigations were considered in the development of desirable levels:

- 30 a) An investigation into the ability of the forest to meet forest diversity and forest cover desirable
31 levels (based on current forest condition and forest dynamics); and
- 32 b) An investigation and assessment of the ability of the forest to continue to supply forest benefit
33 levels associated with the current forest management plan.

34 A summary of each of the scoping investigations and significant conclusions or results is provided
35 including:

- 36 i. changes and/or additions that are made to base model inputs and assumptions;
- 37 ii. results and conclusions that provide rationale for specific management objectives, indicators
38 and desired levels.

1 The 'Greatest value of timber harvested over entire planning horizon' objective function in SFMM was
2 used for all tests / runs. This function optimizes value based on volume and price of products for each
3 species group.

4 Management objectives are represented in the analysis as described by the indicators and targets
5 shown in table FMP-10. These represent the desired forest structure and composition as determined by
6 the Landscape Guide in relation to the simulated ranges of natural variation (SRNV). The application of
7 direction presented in Table 2 of the Landscape Guide was followed in the analysis of objective
8 achievement, with indicators represented in the habitat matrix as described in the Section 3.3.4 of
9 Supplementary Documentation 6.1.2 Analysis Package. Old-growth targets were developed for
10 individual Standard Forest Units to provide a higher level of resolution than with groupings, and for a
11 direct link to SRNV values provided in OLT.

12 The Landscape Guide Appendix 1, Table A5 provided general milestones for objective achievement. All
13 Landscape Classes follow the desired trends and reach the SRNV targets within the planning horizon
14 with the exception of White Pine Mixedwood which reaches 75% of the SRNV in 150 years and is
15 expected to reach the SRNV within 250 years. Some indicators also show a departure from the
16 milestones due to different starting points (as determined with the new inventory). Results for the
17 proposed management strategy follow the same direction as the milestones in Table A5 for the White
18 Pine Mixedwood, Spruce-fir-cedar and Intolerant Hardwood classes. The Tolerant Hardwood class shows
19 a decreasing trend before increasing, then reaching the SRNV at Term 16. The Mixedwood class
20 decreases into the SRNV within 5 terms, and the Mixed Pines class decreases then increase to reach the
21 SRNV within 100 years.

22 Wood supply was represented in the analysis of objective achievement as a percent of the targets
23 during each planning term. Initial scoping runs represented volume targets as non-binding constraints to
24 determine general trends and potential for wood supply. Binding targets were then used to ensure
25 minimum levels could be met during the lowest terms where age classes were most limiting.

26 The achievement of objectives was interpreted from the model results based on the ability to meet the
27 targets specified in table FMP-10. Objective achievement for wood supply was also assessed spatially, in
28 part to phase in direction from the 2017 FMPM (Part B, Section 3.5), and to provide assurance that
29 harvest area is not disproportionately allocated across spatial zones over the first 40 years of the
30 planning horizon. Analysis with and without spatial constraints shows sensitivity in the model to the
31 spatial distribution of harvest area, but that a constraint can effectively control large fluctuations by
32 zone for the first 4 terms (refer to Supplementary Documentation 6.1.2 Analysis Package, Section 3.5 for
33 a description of zones).

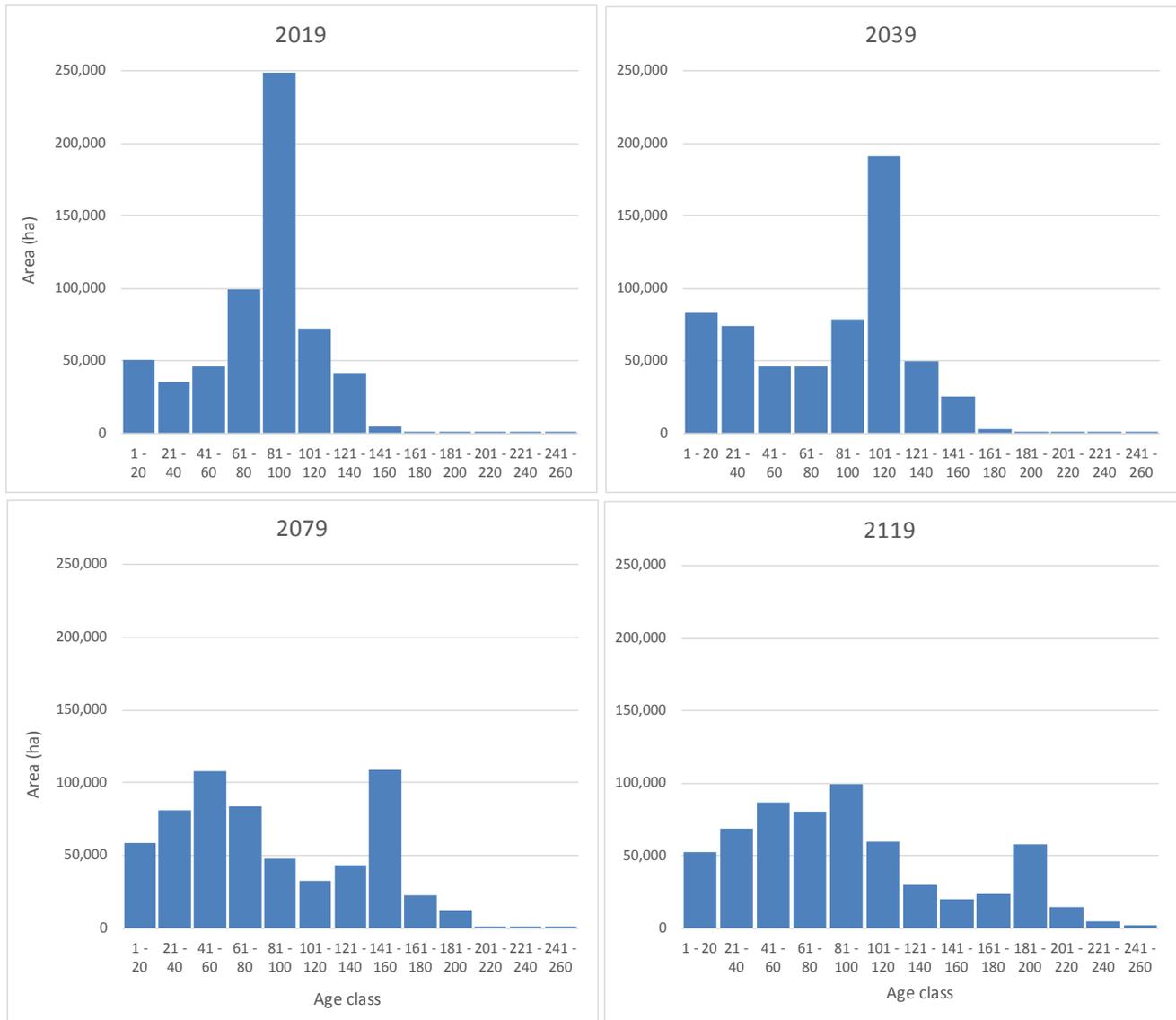
34 Results from the analysis suggest that a balanced, sustainable management strategy can be achieved
35 that meets the direction required by the Landscape Guide while providing a continuous and predictable
36 wood supply. The proposed long-term management direction follows trends that are consistent with
37 previous management plans, without any major changes or fluctuations in habitat or wood supply.
38 Planned harvest volumes gradually decline for several terms, as predicted previously, then recover once
39 the age-class imbalance is overcome.

1 Forest Condition of the Crown Productive Forest

2 Table FMP-6 summarizes projections from SFMM of the area of productive Crown forest by forest unit
 3 and age class, represented in 20-year intervals. There is a 0.7% reduction in total productive area, from
 4 624,506 to 620,330 ha, over the 100-year timespan due to estimated losses from roads and landings.

5 Changes in the projected age-class distributions, resulting from disturbance, renewal, and natural aging
 6 over time, are shown in Figure 3.7.1. It is important to note the drastic imbalance initially (in 2019),
 7 which is described in the Management Considerations of Section 3.2, and the gradual transition to a
 8 more even distribution. There is a dramatic increase in the area represented by old and young forest
 9 resulting from the retention of old-growth, and the harvest and renewal of mature forest.

10 **Figure 3.7.1. The total Crown productive forest area projected by SFMM by age-class over 100 years.**



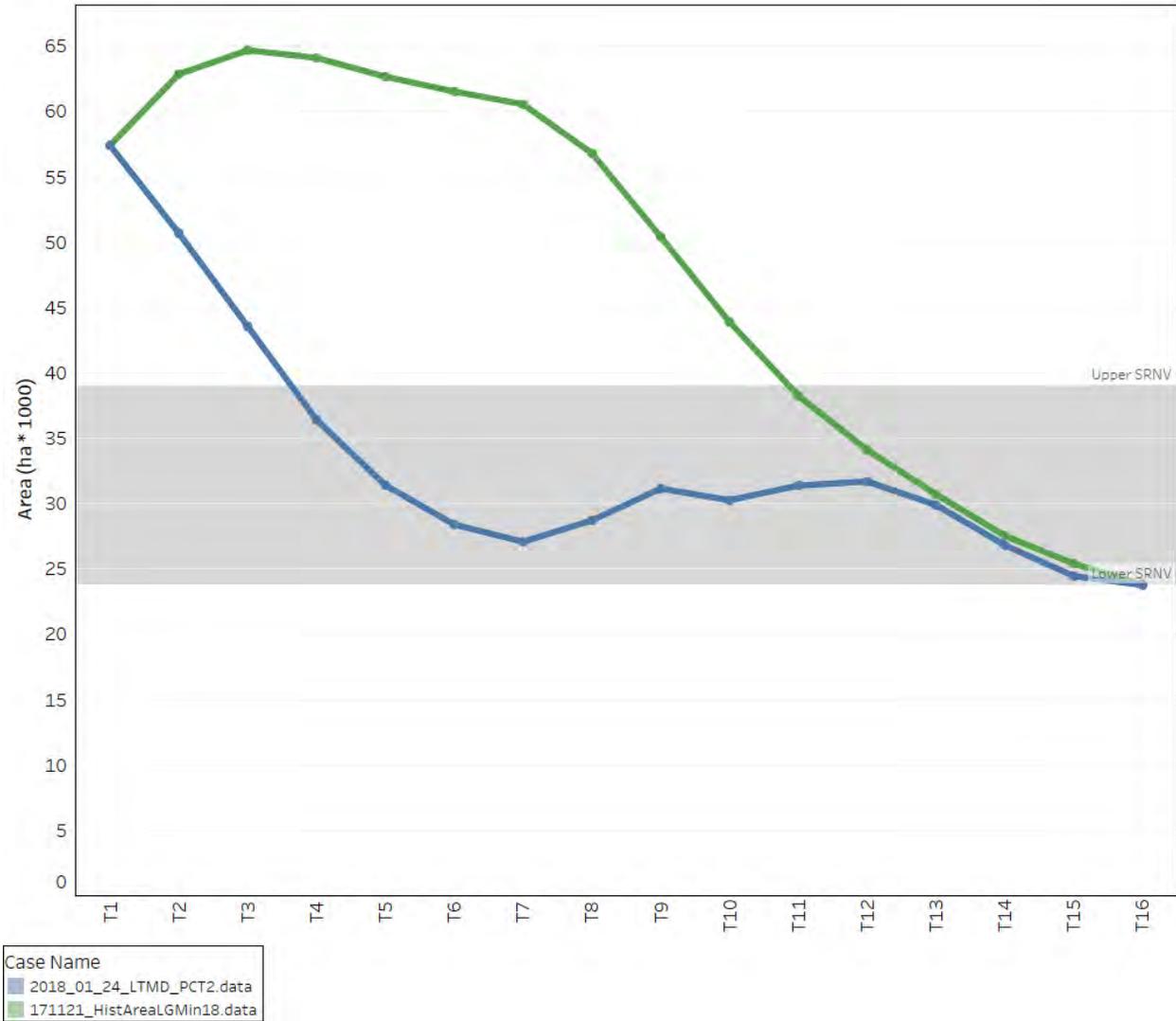
1 One of the main challenges in meeting FMP objective targets over time is the shift in age structure of
2 the forest. In terms T5 to T8 there is a low level of mature and old forest, needed to meet wood supply
3 and landscape class targets, due to the low availability immature forest at the plan start, and
4 subsequent recruitment to mature and old stages as shown in the year 2079 in Figure 3.7.1. This is a
5 common phenomenon for most forest units.

6 *Landscape Classes*

7 The area of mature and old Landscape Classes for the proposed management strategy are portrayed in
8 Figure 3.7.2 for each 10-year model term (x-axis), and contrasted with a historic utilization scenario. This
9 provides context of what may be achieved if the FMP harvest areas are fully utilized in comparison to
10 the level of harvesting that has been typical of the duration of the 2009 FMP. Area projections are also
11 displayed relative to the predicted SRNVs from the Ontario Landscape Tool. Five of the six Landscape
12 Classes reach the SRNV, and are maintained there, during the modeled projections; the exception being
13 the White Pine Mixedwood (PWMIX). The PWMIX class reaches 75% of the SRNV within the planning
14 horizon. The challenges in meeting SRNV targets for PWMIX and other classes that start below the SRNV
15 are related to the age structure of the forest, as described in Figure 3.7.1 above.

1 **Figure 3.7.2. Projected areas for each of the 6 Landscape Classes: Intolerant Hardwoods (INTOL),**
 2 **Mixedwood (MIXED), Mixed Pines (MIXPRJ), Spruce-Fir-Cedar (SFC), White Pine Mixedwood (PWMIX),**
 3 **and Tolerant Hardwood (TOL) by 10-year term (x-axis). The LTMD proposed management strategy**
 4 **(2018_01_24_LTMD_PCT.data) is contrasted with the historic utilization scenario**
 5 **(171121_HistAreaLGMin18.data).**

Comparison of LC 'INTOL'

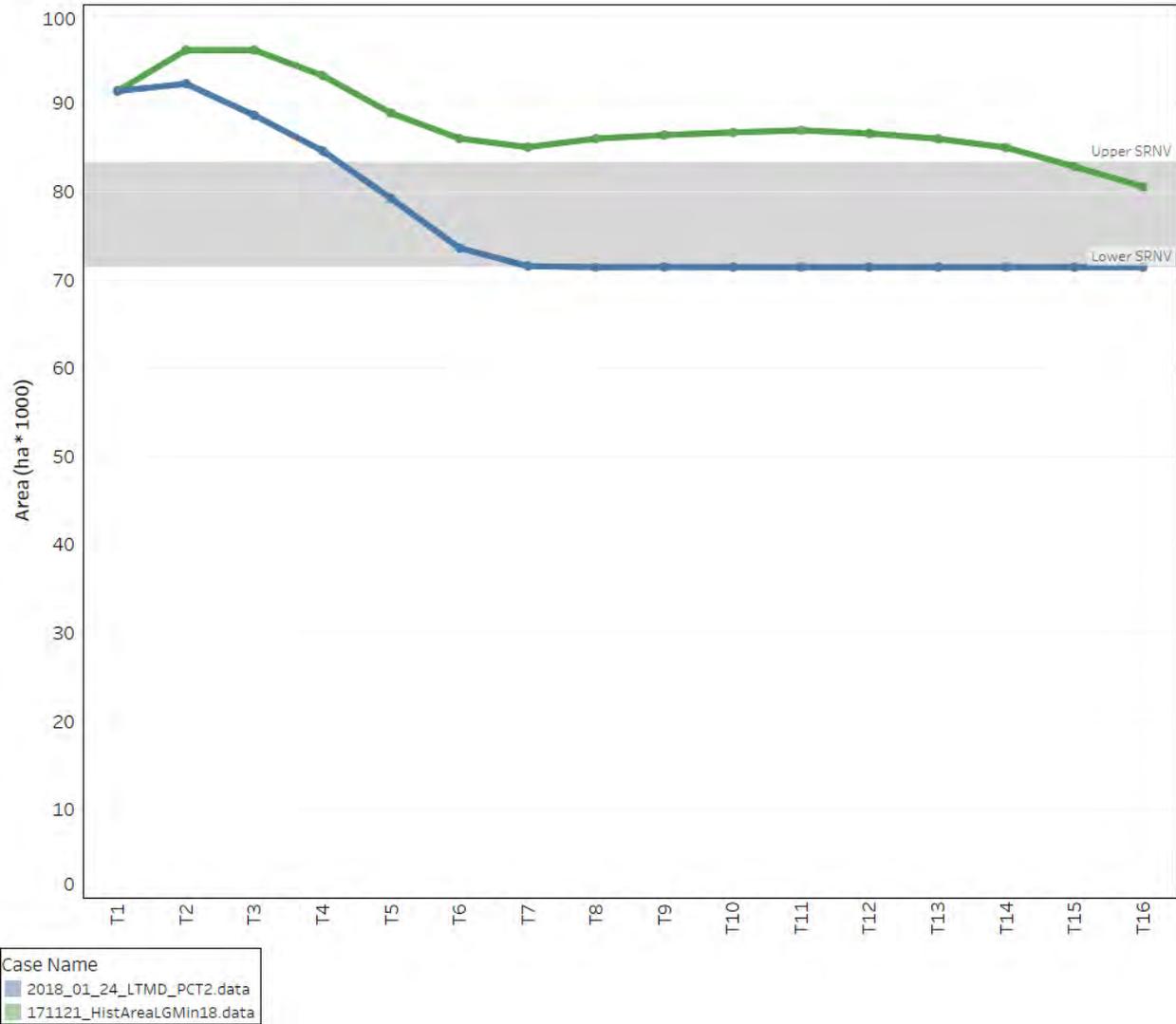


6

7

1 **Figure 3.7.2, Continued.**

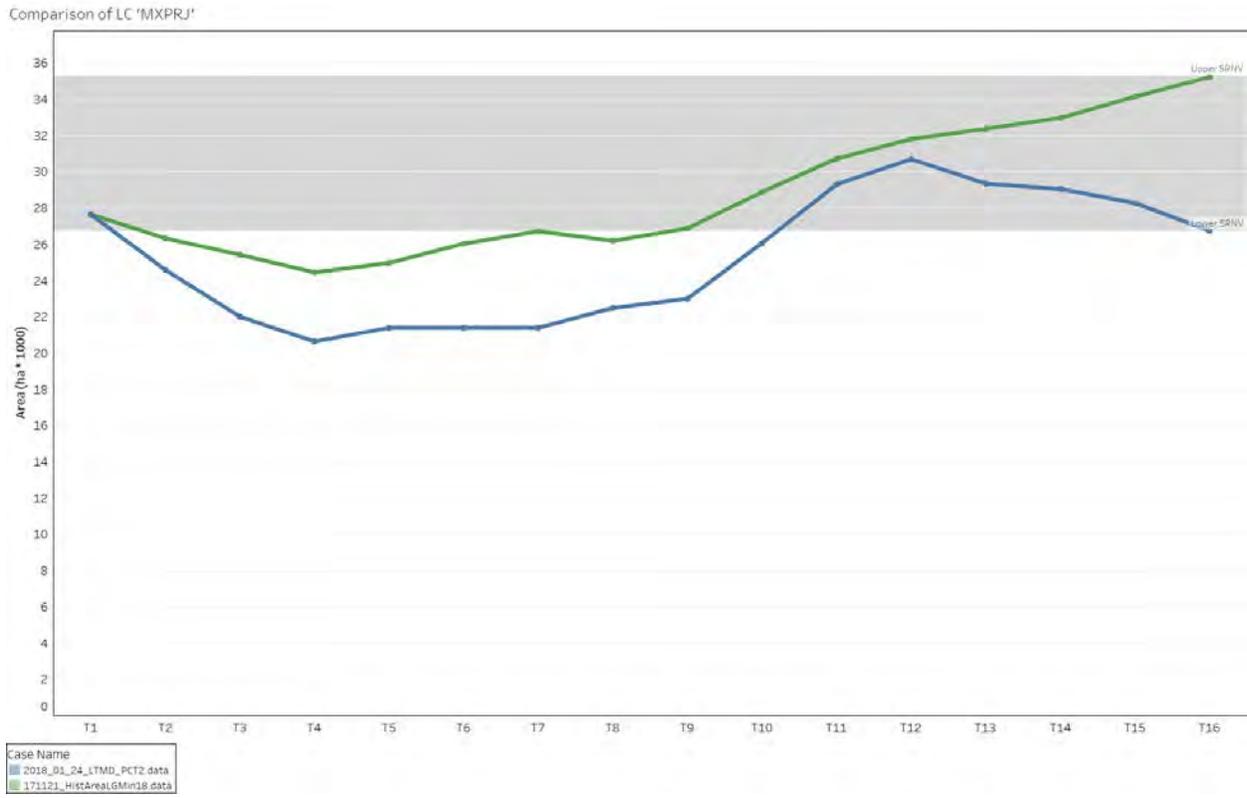
Comparison of LC 'MIXED'



2

3

1 **Figure 3.7.2, Continued.**

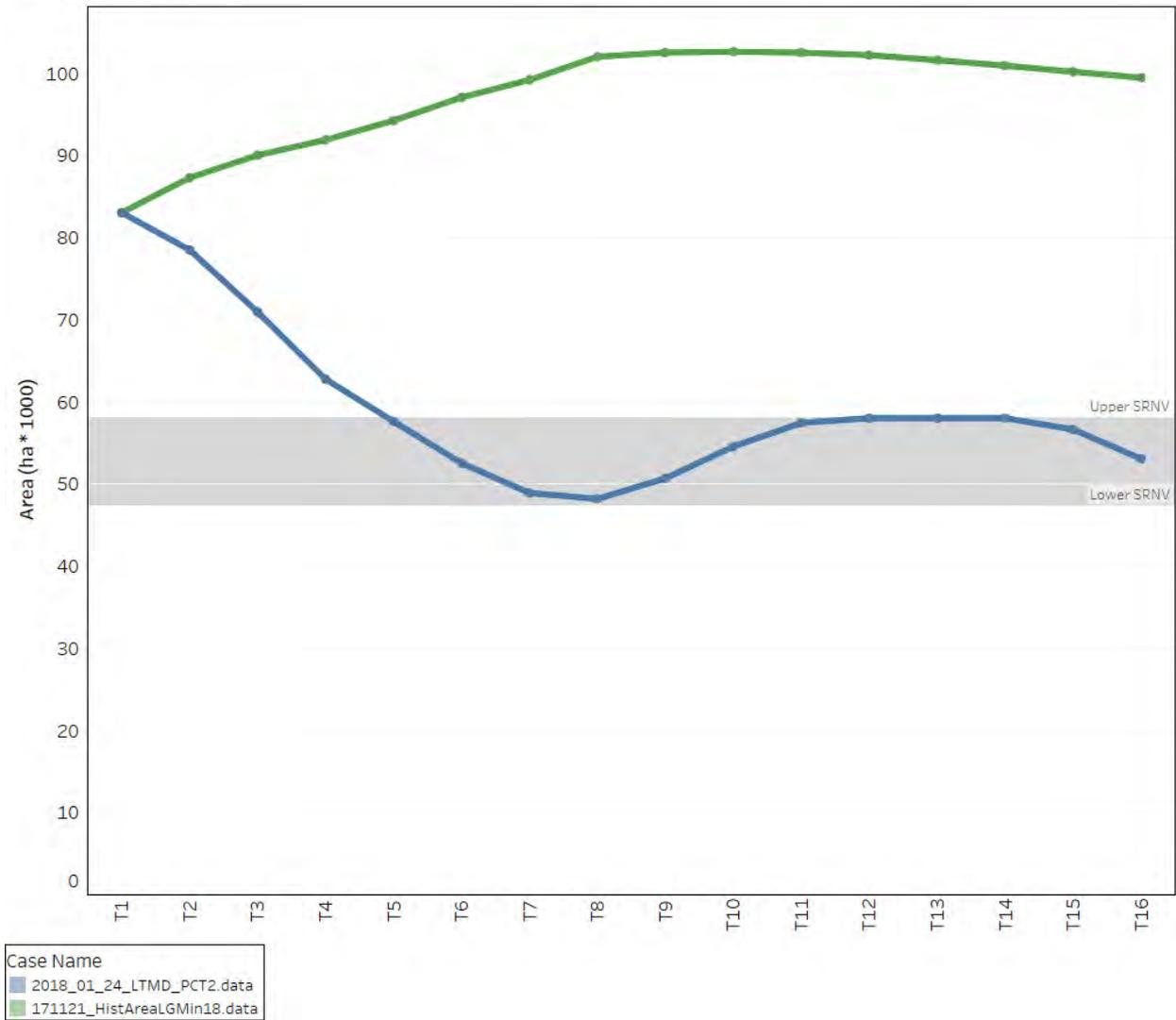


2

3

1 **Figure 3.7.2, Continued.**

Comparison of LC 'SFC'

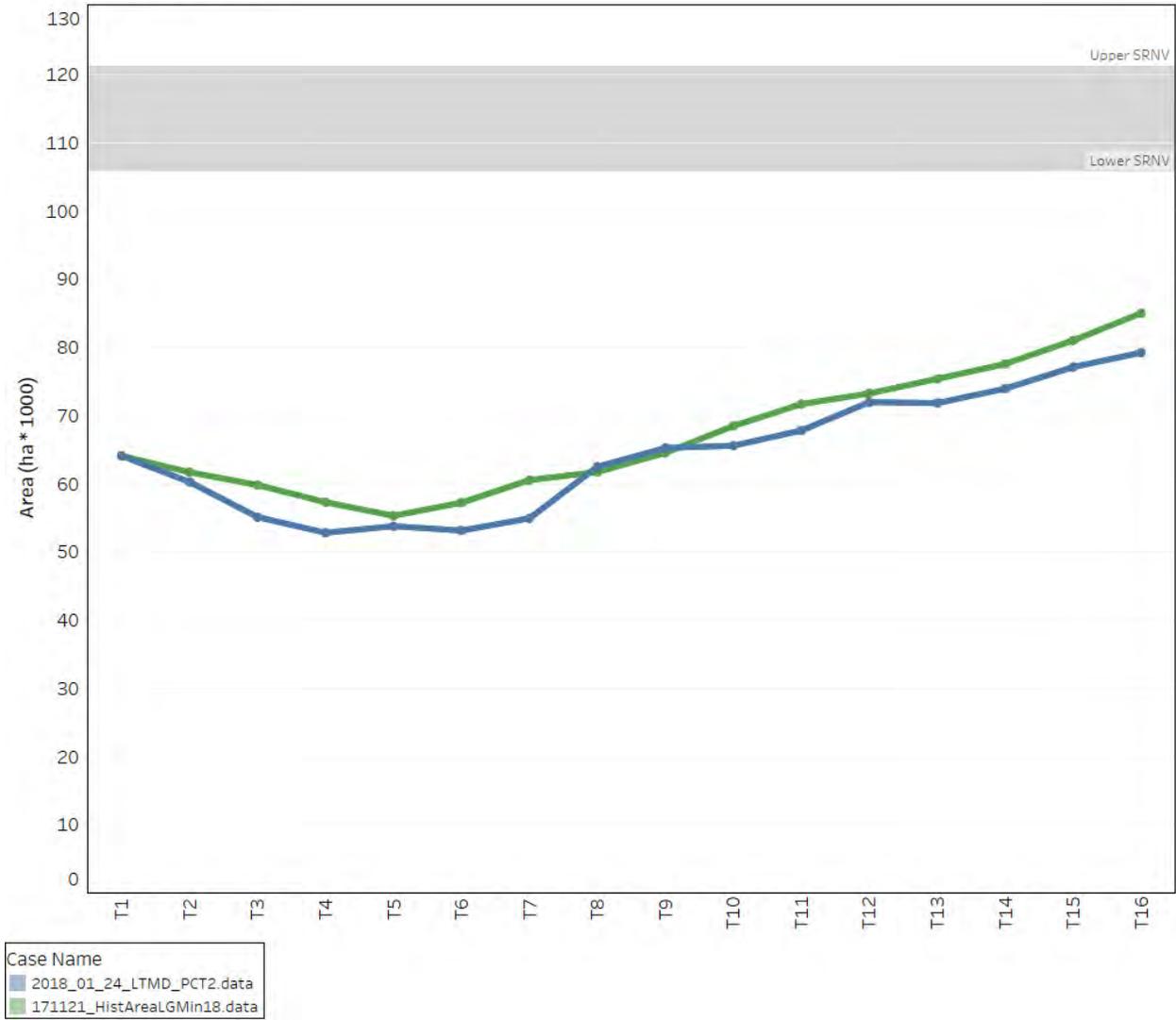


2

3

1 **Figure 3.7.2, Continued.**

Comparison of LC 'PVMIX'

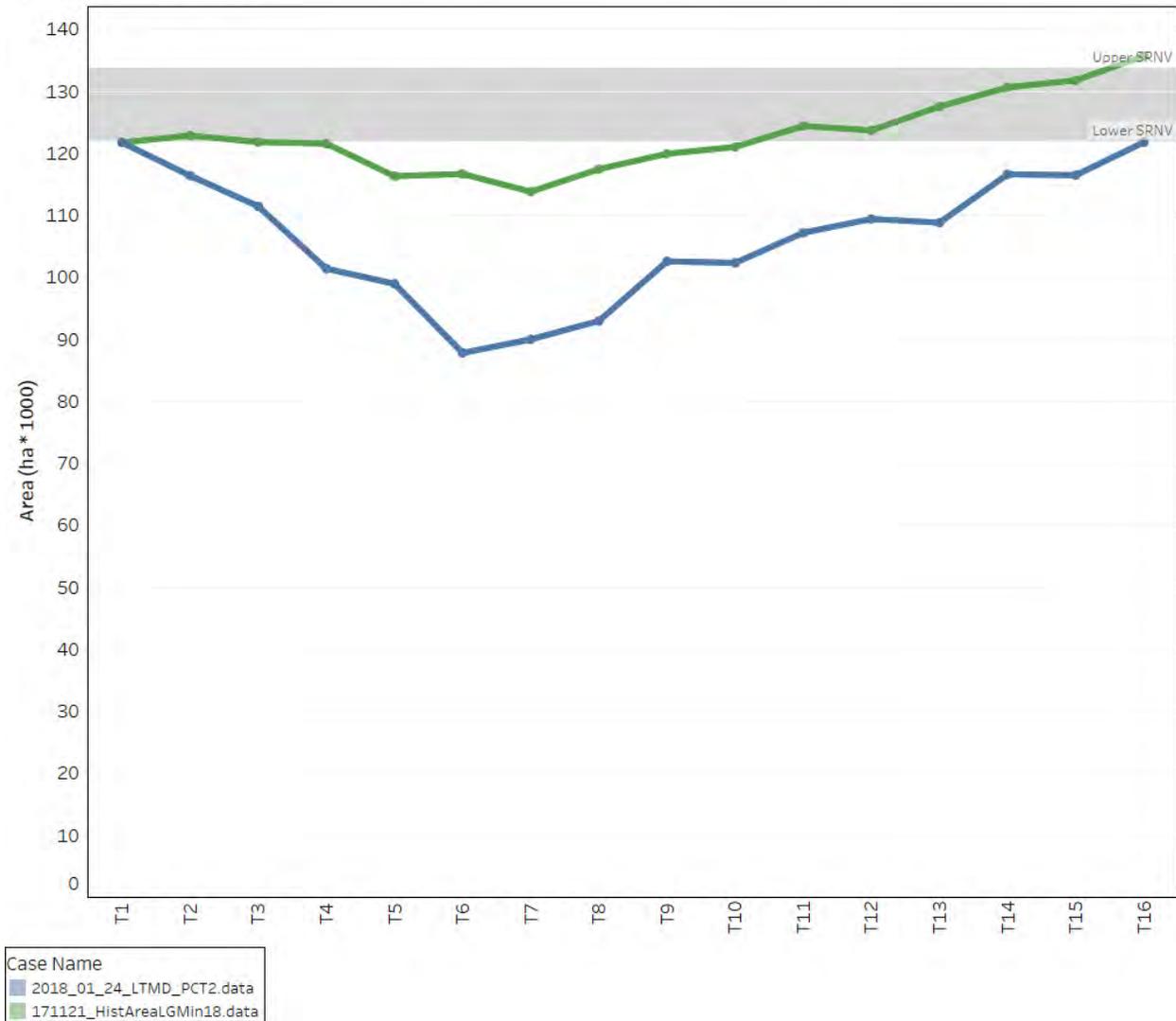


2

3

1 **Figure 3.7.2, Continued.**

Comparison of LC 'TOL'



2



3 Changes in the areas of these landscape classes is a function of disturbance and succession, and are
 4 influenced very heavily by the current forest composition: harvest and renewal activity has a limited
 5 effect over time.

6 The area of mature and old intolerant hardwoods (INTOL) are represented by poplar and white birch
 7 forest units. The initial forest condition shows a significant over-abundance of this class which is the
 8 result of a large portion of the forest originating 80 to 100 years ago. Subsequent disturbance levels
 9 have been relatively low, though natural succession will likely contribute to increasing levels of
 10 conversions. Following the proposed management strategy, INTOL is predicted to reach the SRNV in less
 11 than 30 years and can be maintained within the SRNV for the remainder of the planning horizon. In
 12 contrast, with current harvest levels it would take 100 years to reach the SRNV.

13 The area of mature and old Mixedwood (MIXED) also starts well above the SRNV and following the
 14 proposed strategy will reach the SRNV by Term 4. The challenge with mixedwoods is maintaining levels

1 above the lower SRNV for the duration of the planning horizon. This is a contradiction to the Milestones
2 in the Landscape Guide (Table A-5), as the new inventory shows a much lower level of mature
3 mixedwoods than previous inventories. Hence, harvest levels need to be constrained significantly (i.e.,
4 AHA is reduced) in order to maintain the desired level. Conversely, a lower harvest level, comparable to
5 the levels in the 2009 FMP will result in MIXED area hovering above the SRNV for most of the planning
6 horizon. This is likely a benefit to species such as ruby-crowned kinglet, but would present a challenge in
7 producing increases in browse and early successional habitats. This trend is described at length in the
8 enhanced annual reports for the 2009 FMP.

9 Mature and old jack pine and red pine mixed forests (MXPRJ) are within the SRNV at the start of the
10 planning horizon, but due to the age structure of the forest (Figure 3.7.1) the projected area declines
11 below the SRNV before reaching the SRNV again in Term 10, if the proposed strategy is followed.
12 Thereafter, maintaining this class within the SRNV is possible with the proposed harvest level. This also
13 differs from the Landscape Guide Milestones which suggest levels would be continually increasing, but
14 not reaching the SRNV. A lower harvest level shows a similar pattern but reaching the SRNV 10 years
15 sooner.

16 The Spruce-Fir-Cedar (SFC) class follows the same pattern as INTOL for the proposed management
17 scenario. With the proposed level of harvest, SFC reaches the SRNV within 50 years and can be
18 maintained there, however, this requires a significant level of harvesting. Given the option, the
19 modelled solution harvests a higher level of associated forest units (SF, SBLC) to reach the SRNV, then
20 harvest rates drop precipitously. The model was therefore constrained to reduce the rapid decline in
21 harvest over time as it was not deemed to be necessary to move to the SRNV sooner than 50 years, and
22 to follow the Milestones with decrease in the short and medium terms followed by a maintenance of
23 area within the SRNV. Historic harvest levels will likely result in SFC moving further above the SRNV,
24 perpetuating an over-abundance of mature and old conifer mixes on the landscape.

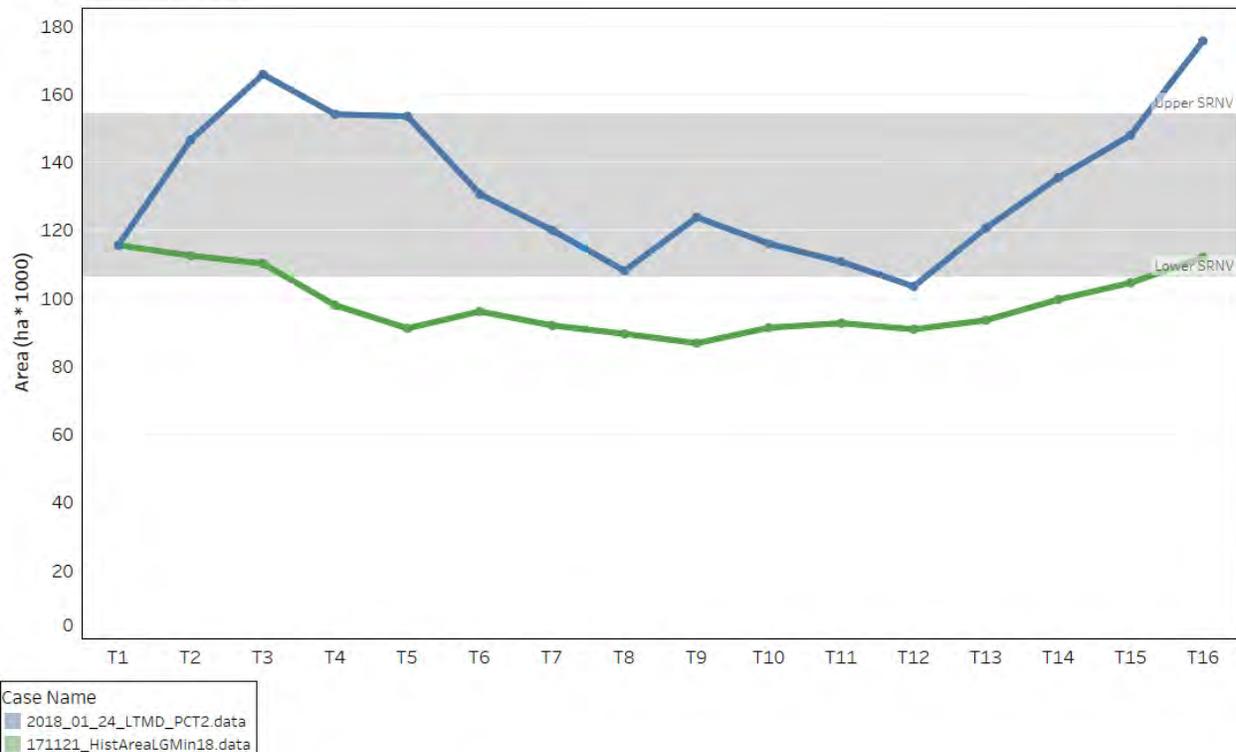
25 Mature and old White Pine Mixedwood follows the Milestone trends, with increasing levels over the
26 planning horizon, except there is a short-term and medium-term reduction before levels are able to
27 increase. It is extremely challenging to meet the Milestones, and impossible without significant declines
28 in harvest area. Scoping runs that achieve a non-declining projection of PWMIX towards the SRNV result
29 in a drop in T1 AHA of 38% to 70% of the proposed strategy, which continues to decline. The proposed
30 strategy provides a balance of moving towards the Milestones, with reduced harvest levels from the
31 2009 and previous FMPs, and gradual progression towards the SRNV. I.e., by reducing harvest of white
32 pine shelterwood and seed-tree to 88% of the 2009 level there is a slight reduction in PWMIX before it
33 climbs towards the SRNV. A drop in PWUS and PWST harvest area to 51% of the 2009 FMP could
34 potentially allow for a non-decline progression to the SRNV but it was felt this was too severe a drop in
35 the AHA for such an important part of the local wood supply.

36 The same challenge in moving towards the SRNV for Tolerant Hardwoods (TOL) is apparent as with
37 PWMIX. This is again the result of the age-class structure of the forest, and exacerbated by the need to
38 manage a large portion of the tolerant hardwoods as even-aged shelterwoods. Milestones for the TOL
39 class are to continually increase, however, this class is at the lower end of the SRNV at the start of the
40 planning horizon. Preventing a decrease in area within this class requires a drop in the HDUS AHA to
41 31% of the 2009 FMP level, and further declines to zero. This is a very important part of the local wood
42 supply, and therefore, it is necessary to allow for a decline in the TOL class, and balance this with a drop

1 in harvest area and wood supply that is not overly drastic. The resulting solution is to stay above 70% of
 2 the SRNV, and allow for a reduction in AHA of tolerant hardwood forest units. This means that harvest
 3 volumes can be maintained at 90% of the desired level in T1, but drop as low as 61% in T10 before rising
 4 again.

5 **Figure 3.7.3. Projected areas for the Pre-sapling, Sapling, and T-Stage Indicator (PSST). The LTMD**
 6 **proposed management strategy (2018_01_24_LTMD_PCT.data) is contrasted with the historic**
 7 **utilization scenario (171121_HistAreaLGMin18.data).**

Comparison of LC 'PSST'



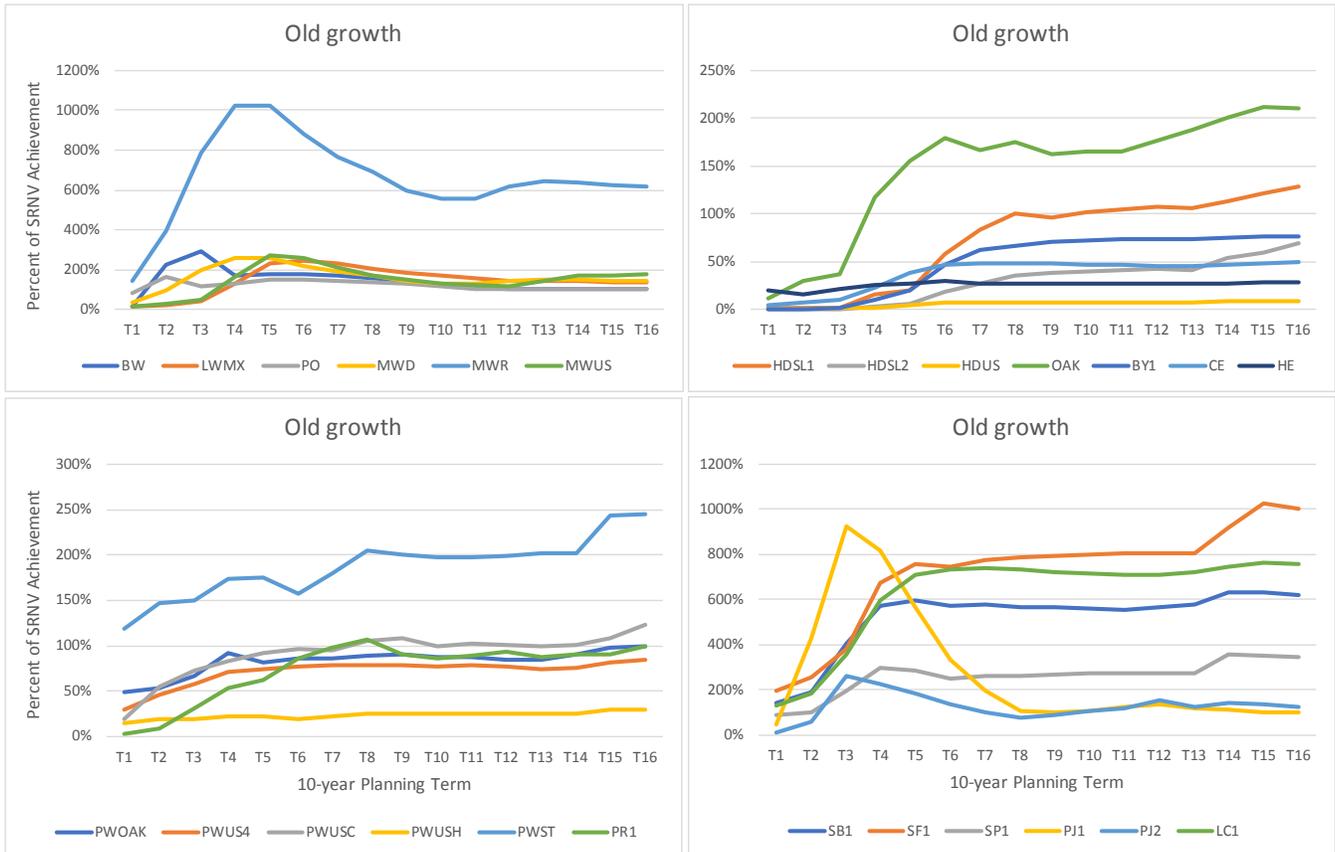
8
 9 The projected areas of Pre-sapling, Sapling, and T-Stage Indicator (PSST) for the proposed management
 10 scenario fluctuate in and around the SRNV over the entire planning horizon. This is a function of young
 11 forest created during periods of harvesting and renewal, assuming full utilization of the AHA. Intuitively,
 12 a lower harvest rate, based on levels observed during the 2009 FMP show PSST levels generally tracking
 13 below the SRNV (Figure 3.7.3 – the x-axis represents each 10-year model term).

14 **Old Growth Forest**

15 The forest inventory shows a significant amount of variation in the amount of old growth forest on the
 16 landscape at the start of the FMP. Old growth is described using the Landscape Guide definitions and
 17 SRNVs for each of the Standard Forest Units (SFUs). This provides a higher level of resolution than Plan
 18 Forest Units (PLANFU), which are aggregations of SFU, e.g., mixedwoods. The approach for the proposed
 19 management strategy was to maintain old growth levels where they occur above the lower SRNV levels,
 20 and increase levels where they are below the lower SRNVs. For some SFUs, starting levels described in
 21 the inventory are very low relative to SRNVs and therefore do not reach the SRNV within the modelling
 22 timeframe. In part, this is a function of uneven-aged forests, which may be very old in terms of the time
 23 since a stand-replacing disturbance, being described by the average age of dominant and co-dominant

- 1 trees, e.g., cedar, hemlock, and tolerant hardwood forests that are uneven-aged have stand ages lower
- 2 than the old growth age of onset even though there is no evidence of disturbance.
- 3 The level of achievement of old growth is shown in Figure 3.7.4 with the percent of the lower SRNV at
- 4 each of the 10-year planning terms.

5 **Figure 3.7.4. Projected areas of old growth for each of the 25 Standard Forest Units.**

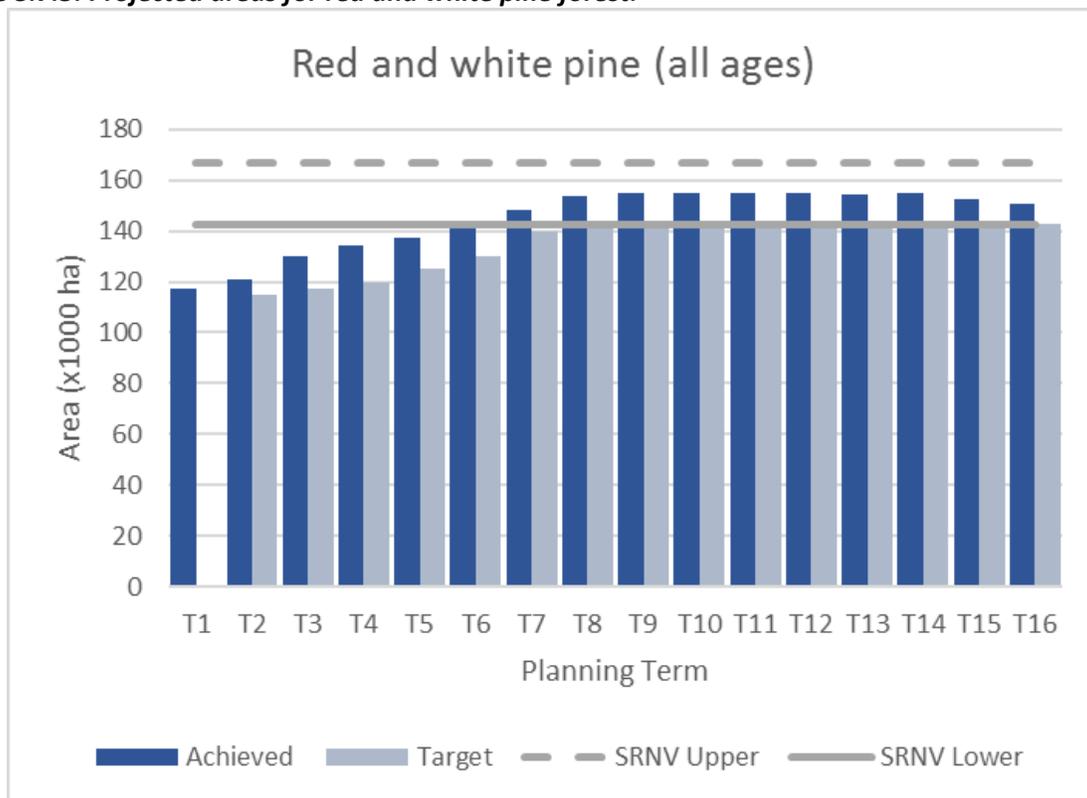


7 Red and White Pine Forest

- 8 The level for red and white pine forest was based on maintaining area above the 1995 level to be
- 9 consistent with the Conservation Strategy for Old Growth Red and White Pine Forests Ecosystems in
- 10 Ontario, 1996, and the predicted SRNV. The SRNV results in a much higher level to reach, therefore the
- 11 target was based on moving towards the SRNV. Scoping analysis showed that red and white area readily
- 12 approaches the SRNV and in fact continually increases above the upper range. To avoid unbalancing the
- 13 landscape composition the SRNV median was used as a cap to avoid unwarranted conversions to red
- 14 and white pine from other forest types and maintain levels within the SRNV (Figure 3.7.5).

15

1 **Figure 3.7.5. Projected areas for red and white pine forest.**



2
3

4 **Mature and Old Texture and Young Forest Patches**

5 The spatial assessment was done in iterative steps with progressively more accurate versions of the Plan
6 End 2029 inventory with updated harvest areas. An assessment was done on an early version of the
7 allocation (Version 1, October 16, 2017) and another version of the preferred harvest area for LTMD
8 (Version 2, December 21, 2017). A subsequent assessment was done during Stage 3 and 4 that excluded
9 contingency areas and reserves to more accurately reflect actual planned harvest area. Details of the
10 spatial assessments for mature and old forest texture and young forest patches are provided in Section
11 5.2.

12 **Habitat for Wildlife**

13 An objective to provide wildlife habitat for locally featured species evolved from the 2009 FMP to focus
14 specifically on the creation of moose emphasis areas. General wildlife habitat is assessed and tracked
15 through the use of the Landscape Guide Indicators, with the associated milestones that provide
16 direction for achievement through time.

17 **Wood supply**

18 The overall projected harvest volume for the 2019-2029 period represents a 5% reduction from the
19 2009 FMP planned volume for the age-related reasons described for the Current Forest Condition (Table
20 FMP-6 and Section 2.1.2). The wood supply objective targets are met, however, for the first 60 years
21 volumes for some species groups are considerably lower than the desirable levels: SPF drops to 64% of
22 the desired level, then increases after 80 years; INT falls to 83% before climbing again in 70 years; TOL

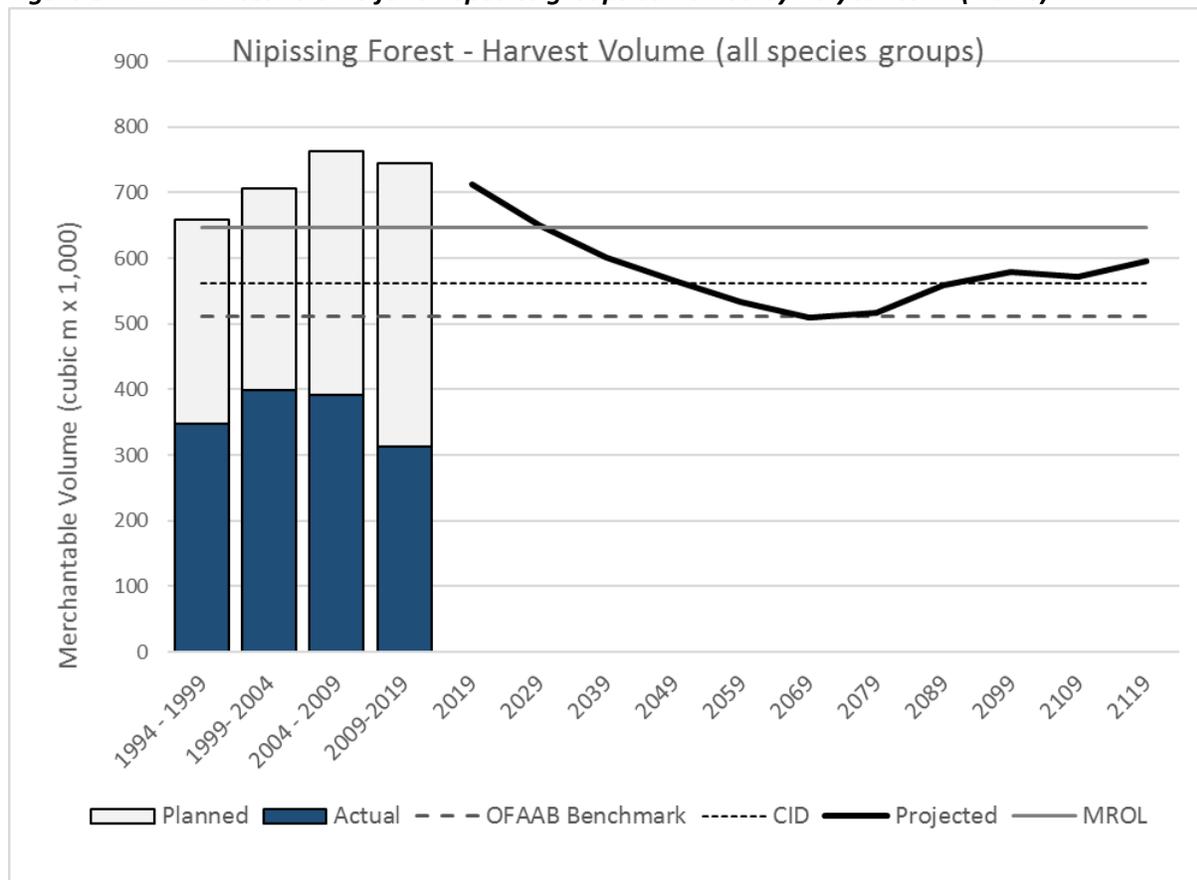
1 declines to 62% and increases in 120 years; and, PWR is maintained above the desirable level due to red
 2 pine volumes (supplemented by commercial thinning). White pine volumes drop to 70% of the desired
 3 level in 70 years then increase consistently. Total volumes, however, remain above 90% of the desired
 4 level for all terms.

5 Volumes are presented in comparison to the Current Industrial Demand (CID) and the Ontario Forest
 6 Accord Advisory Board (OFAAB) Benchmark identified in the Provincial Wood Supply Strategy, and
 7 planned and actual harvest levels from past plans (Figure 3.7.12).

8 Reductions in harvest area are partially offset by volumes obtained through commercial thinning of
 9 planted red pine stands, i.e., the 5% volume reduction from the 2009 FMP is less than the area
 10 reduction of 9%. Red pine stands that were planted several decades ago yield much larger volumes than
 11 other species, and well-stocked stands are eligible to be thinned at regular intervals. Current and future
 12 plantings of red pine contribute to further increases in volume, hence are an important part of the
 13 proposed silviculture program.

14

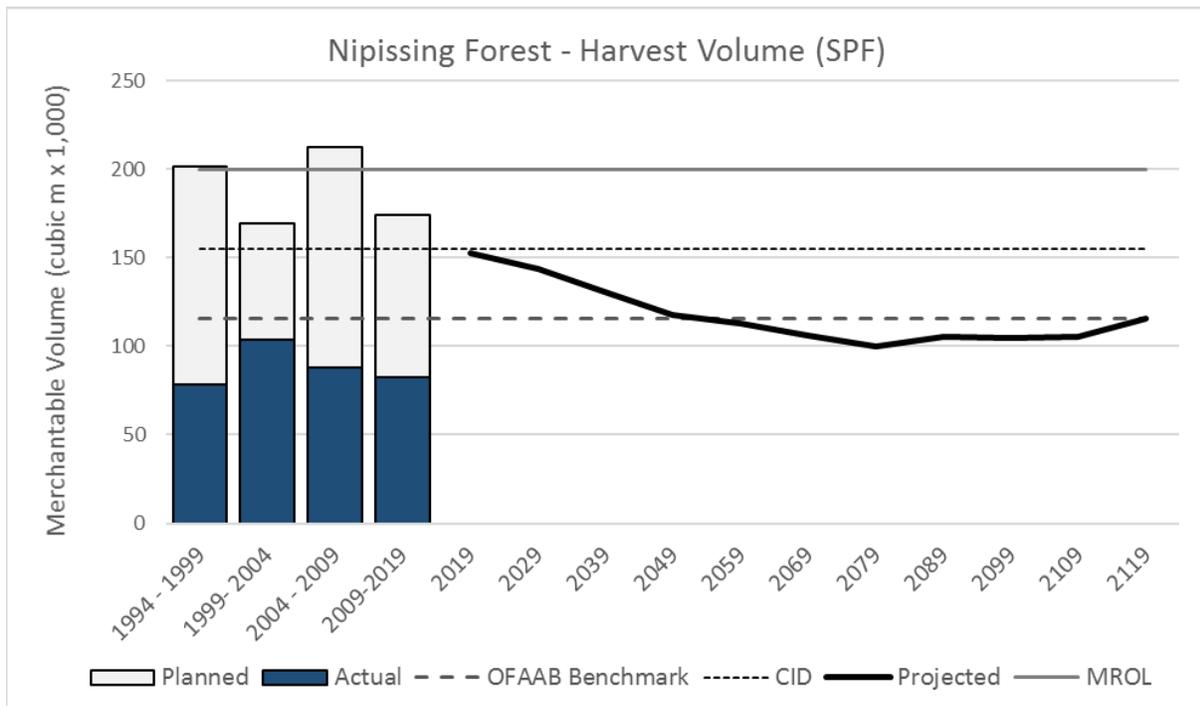
15 **Figure 3.7.12. Harvest volume for all species groups combined by 10-year term (x-axis).**



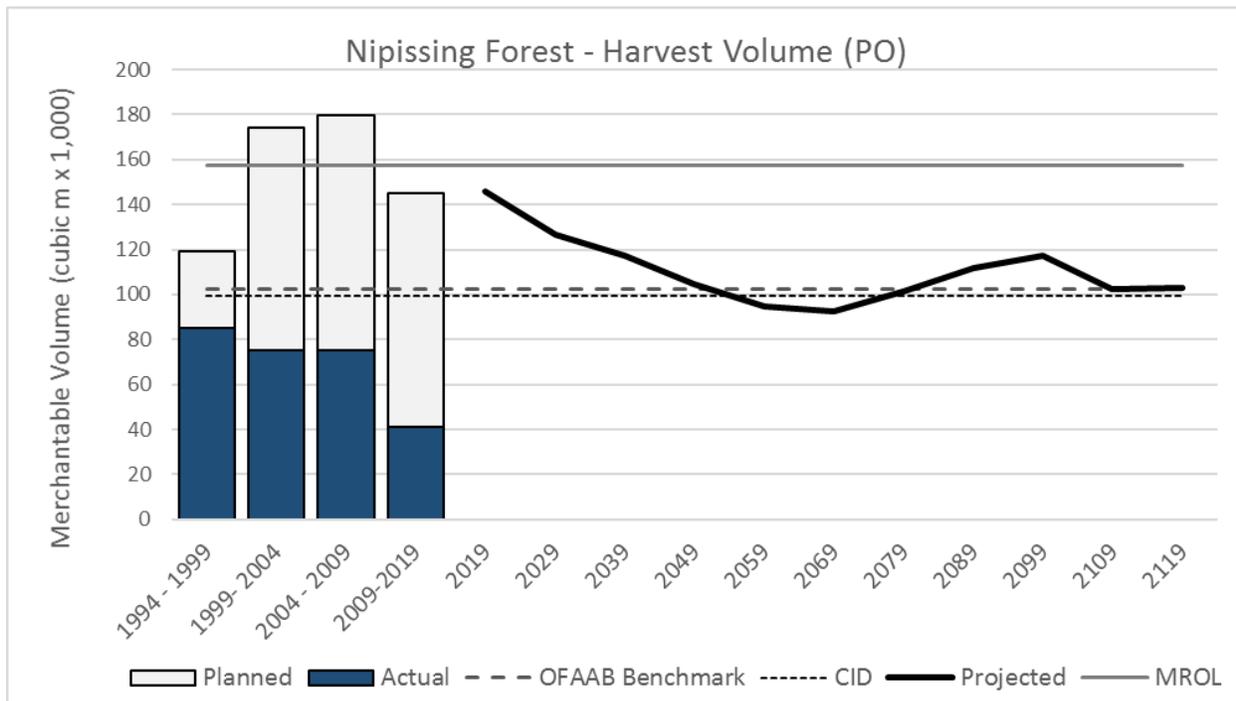
16

17

1 **Figure 3.7.12, Continued.**



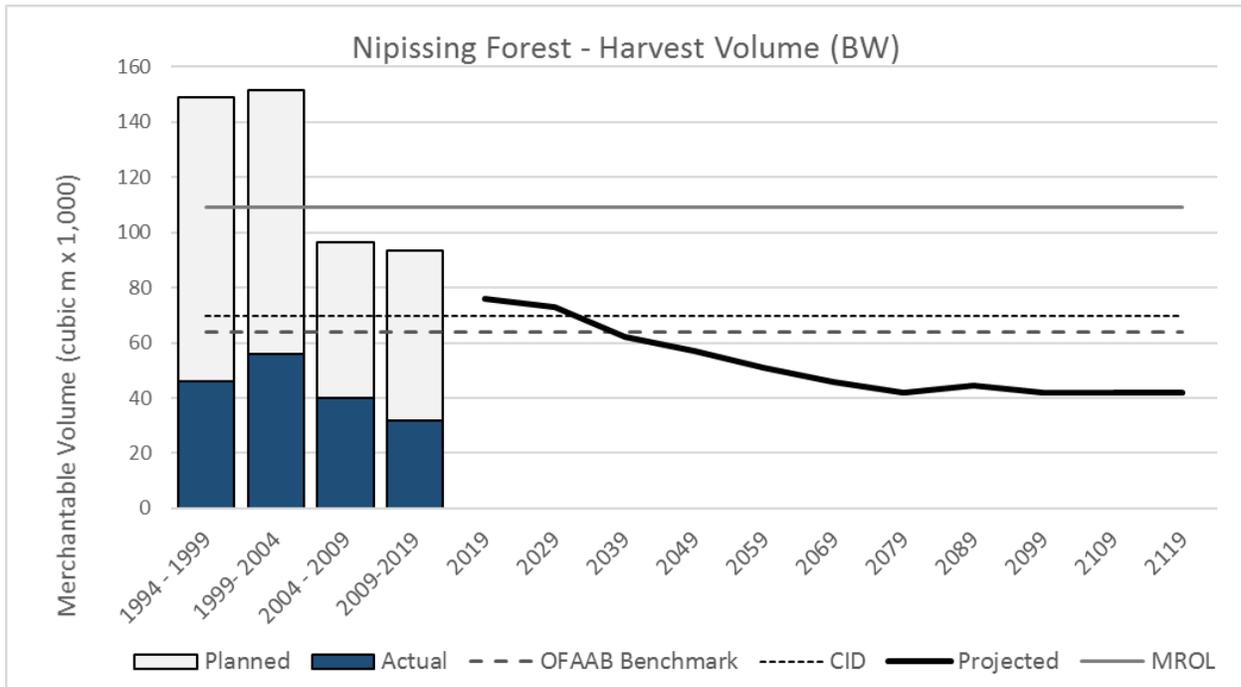
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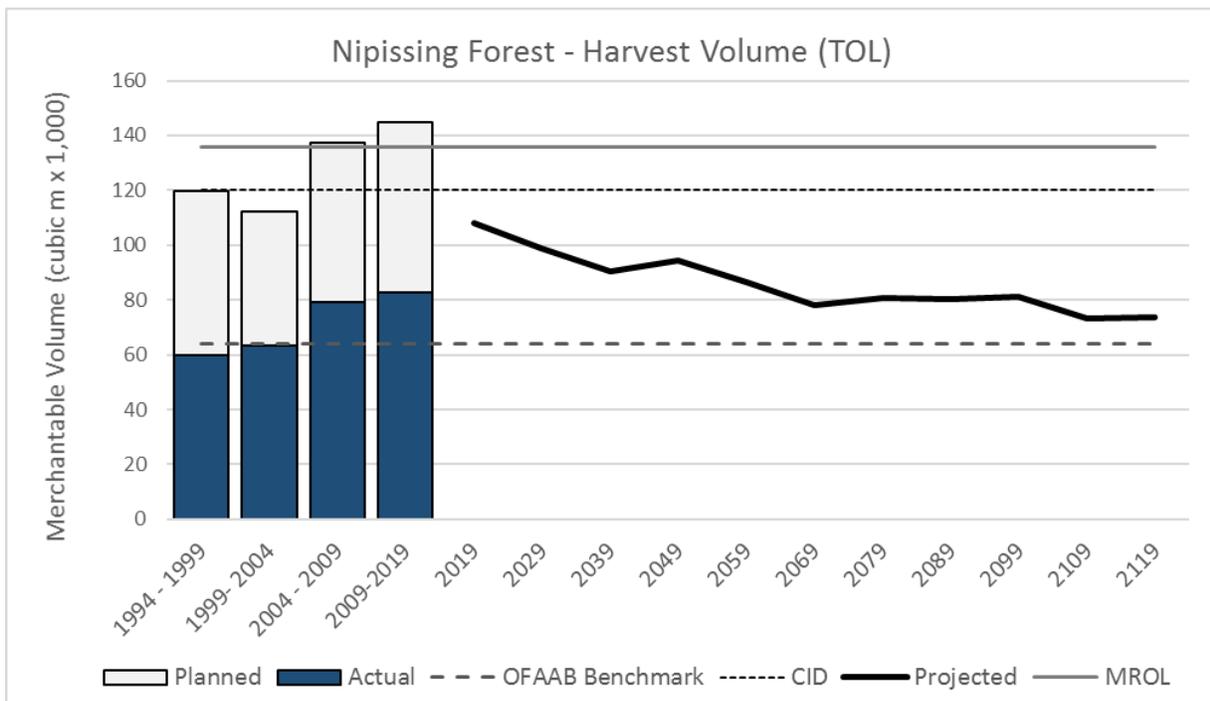
3

4

1 **Figure 3.7.12, Continued.**



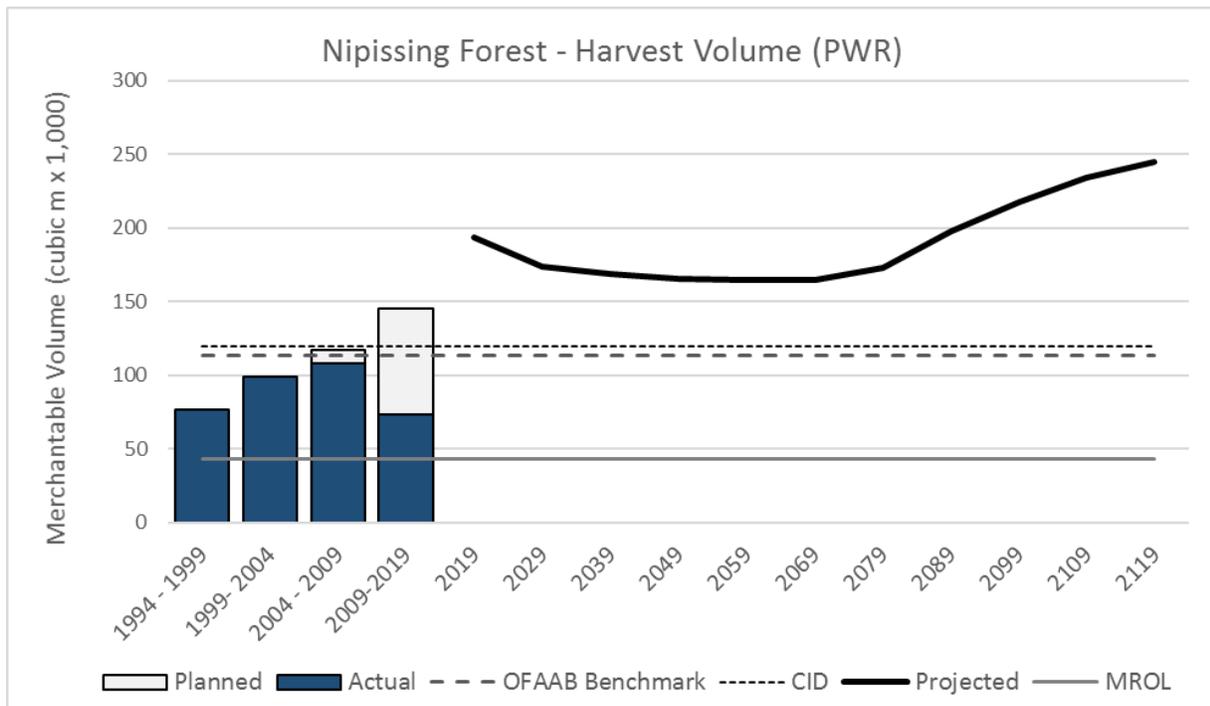
2



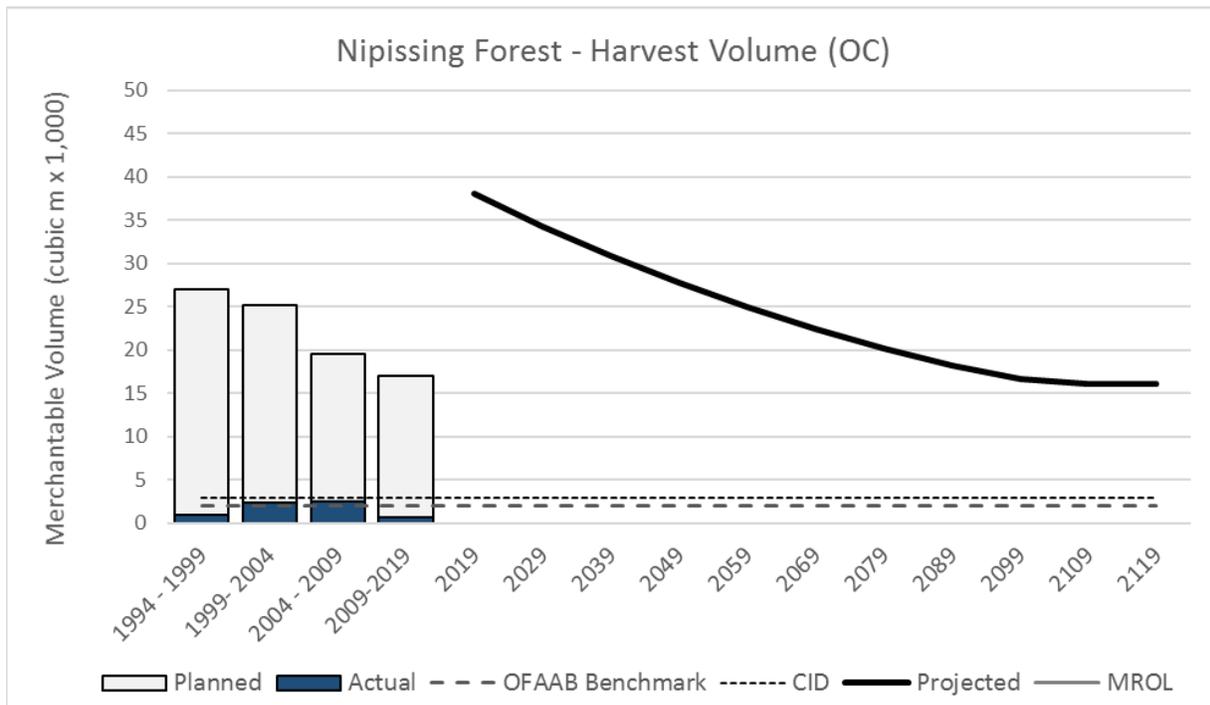
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4

1 **Figure 3.7.12, Continued.**



2

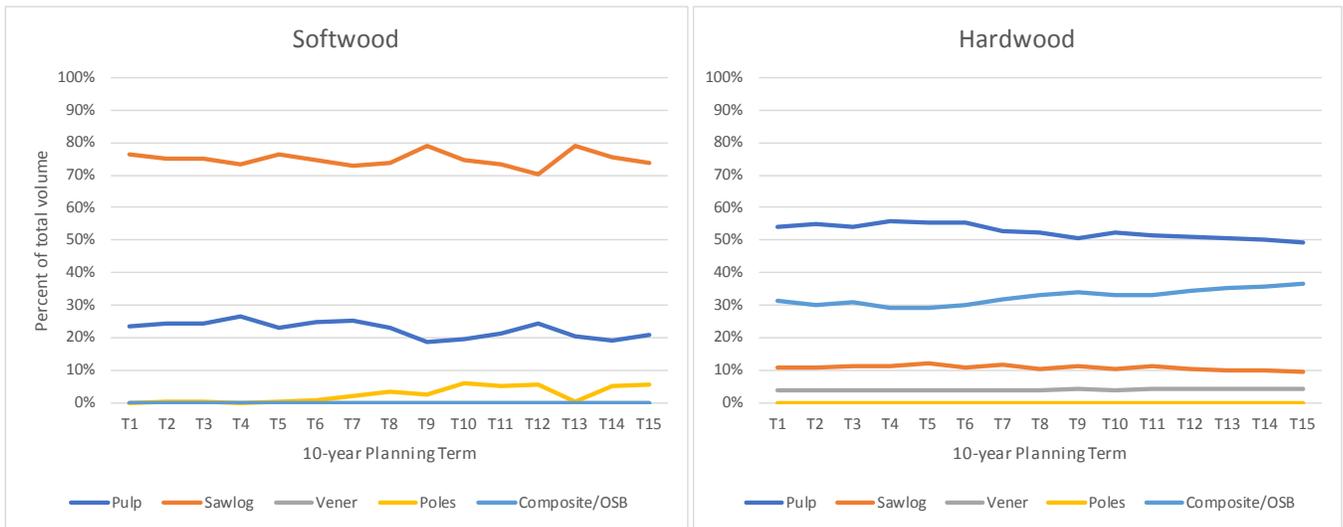


3

4 The OC species group mainly consists of hemlock, followed by cedar, with minor amounts of tamarack.
 5 These species are shown in higher abundance than in previous plans and continue to exceed recognized
 6 levels of market demand.

7

1 **Figure 3.7.13. Projections of product group for the proposed management strategy.**
 2



3
 4 Volume projections also identify product types over time (table FMP-9 and Figure 3.7.13). These
 5 projections show the proportions of products are quite stable over the entire projection period.
 6 Consequently, the value derived from the forest shows a high degree of stability for the next 100 years
 7 or more. Sawlog and veneer proportions in reality should increase with effective tree marking and
 8 careful logging but a limitation of the model is that it does not change product proportions by term.
 9 Proportions do vary by forest unit and stage of management, but these are relatively stable over time.
 10 Consequently, the value derived from the forest shows a high degree of stability for the next 100 years
 11 or more. As red pine plantations mature, however, more poles (hydro / utility) become available. These
 12 are the highest value product produced on the forest.

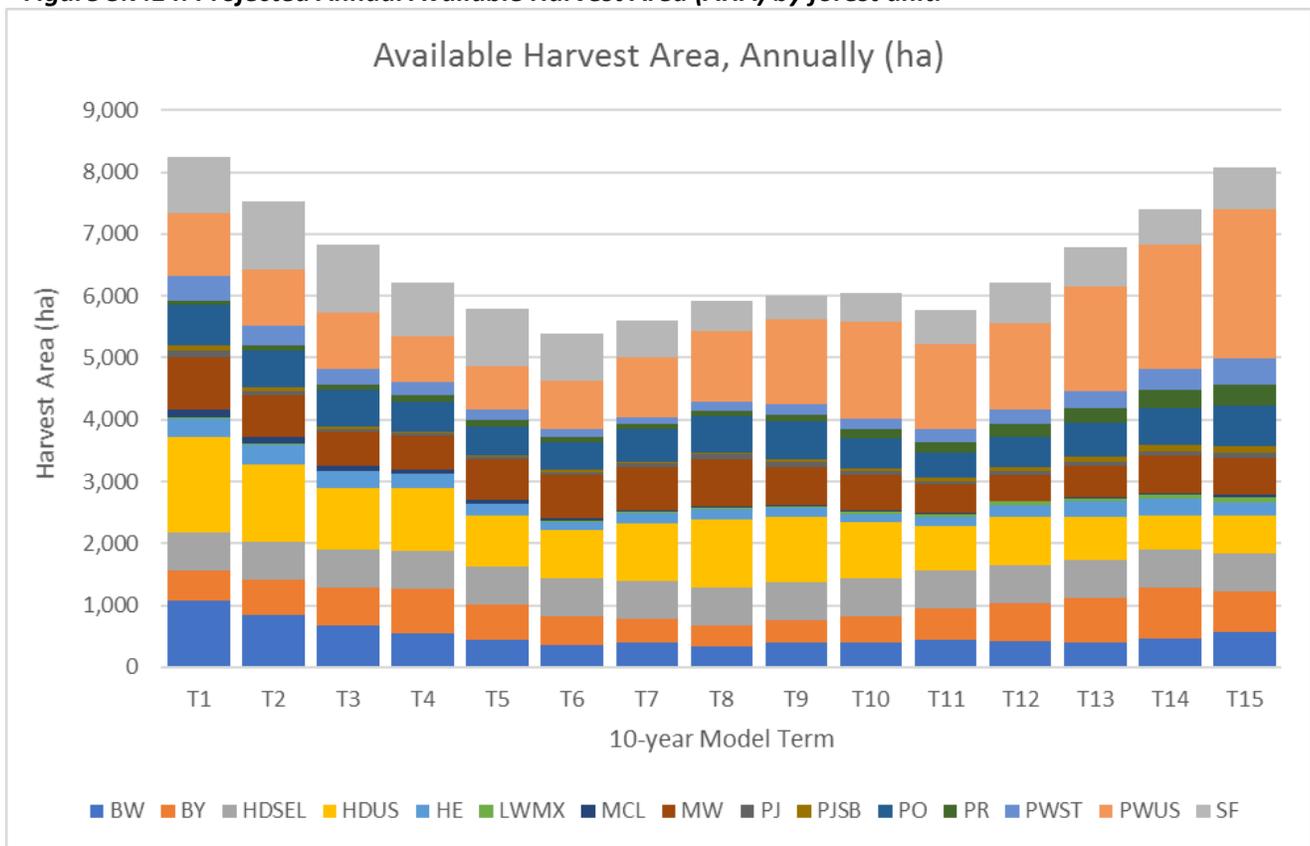
13 **3.7.1 Available Harvest Area**

14 Table FMP-8 summarizes the estimated available harvest area (i.e., for a ten-year period) by twenty-year
 15 projections for the LTMD. Figure 3.7.14 illustrates the projected areas for the full 15 terms of the
 16 planning horizon, by forest unit. As described throughout the text, the age-class structure of the forest,
 17 shown in Figure 3.7.1, has a very strong influence on the availability of harvest areas over time.

18 Some forest units show a greater degree of stability over time, as influenced by the current age
 19 structure. Hardwood selection (HDSEL) of course has the most stable harvest area which is defined by
 20 the cutting cycle and is not constrained by mature and old targets the way the even-aged shelterwood
 21 areas are.

22

1 **Figure 3.7.14. Projected Annual Available Harvest Area (AHA) by forest unit.**



2
3 The distribution of harvest for the first 4 FMP terms, or 40 years is referenced in Section 3.5 and 3.7.4.

4 **3.7.2 Selection of Areas for Harvest**

5 The preferred harvest areas portrayed for the LTMD include eligible areas for the final selection of
6 allocations for the 10-year period of the plan (2019-2029). Preferred areas for harvest were identified by
7 the following criteria:

- 8 a) eligibility of forest stands (forest unit and age),
- 9 b) past management history,
- 10 c) spatial arrangement and distribution (i.e., proximity to existing or proposed road infrastructure),
- 11 and
- 12 d) management considerations, such as steep terrain, or rock.

13 The preferred harvest areas identified were used for the preliminary spatial assessment of texture
14 indicators. Harvest areas identified as optional have also been portrayed on the maps. The optional
15 areas are eligible for harvest and may be substituted for preferred areas during Stage 3 planning for
16 proposed operations if preferred areas are found to be unsuitable.

17 Criteria for eligibility for harvest include:

- 18 1. Areas are reasonably accessible by existing road or with the development of new roads within
- 19 the 10-year period,

- 1 2. Are selected from the available forest land base (excludes islands, non-productive area, non-
- 2 Crown managed, protection forest),
- 3 3. Areas meet the age criteria (table below),
- 4 4. Silviculture history: past shelterwood regeneration cuts are a priority, areas meet the required
- 5 timing since previous entry for selection and shelterwood silviculture systems,
- 6 5. Confirmation from field work (identified in the Planning Composite Inventory) and / or imagery,
- 7 6. Spatially balanced – refer to Section 3.5, Strategic Management Zones in the base model,
- 8 7. Balanced by forest unit area relative to the AHA,
- 9 8. Balanced by licensee share of the AHA,
- 10 9. Planned harvest areas do not exceed available harvest area by forest unit.

11 The following age ranges were applied for stand selection (FTG refers to ‘free-to-grow’ or established
12 stand conditions):

2019 PLANFU	Min Age Suitable	Min Age Preferred	Max Age	Development Stage (DEVSTAGE)
BW	71	81	140	FTG(all)
BY	71	81	190	FTGNAT, SEEDCUT
HDSEL	75	75		FTGNAT, SELECT
HDUS	61	61	190	PREPCUT
HDUS	71	81	190	FTGNAT, SEEDCUT, THINPRE
HE	81	91	190	FTGNAT, SEEDCUT, FIRSTCUT, PREPCUT
LWMX	81	91	140	FTGNAT, SEEDCUT
MCL	91	101	140	FTG(all)
MW	71	81	140	FTG(all)
PJ	61	61	140	FTGPLANT
PJ	71	81	140	FTGNAT
PJSB	71	81	140	FTGNAT, FTGPLANT
PO	70	71	140	FTGNAT
PR	31	31	190	FTGPLANT, THINCOM
PR	71	81	190	FTGNAT
PWST	71	81	140	FTGNAT, FTGPLANT
PWUS	61	71	190	PREPCUT
PWUS	81	91	190	FIRSTCUT
PWUS	71	81	190	FTGNAT, SEEDCUT
SF	40	41	80	FTGPLANT, THINCOM
SF	70	81	140	FTGNAT

13

14 3.7.3 Assessment of Objective Achievement

15 Results from the assessment of objective achievement (summarized in Table FMP-10) show all non-
16 spatial and most of the spatial indicators of sustainability achieved targets, and/or desired levels at the
17 LTMD stage. In those cases where spatial indicators did not achieve targets (4 of 10 hexagon proportions
18 in the texture analysis, and 5 of 9 young patch size indicators), conflicting objectives required trade-offs

1 (i.e., movement towards landscape class targets took precedence over meeting indicators for spatial
2 texture), and supporting rationale is provided.

3 The existing age-class imbalance of the forest had the most significant impact on the achievement of
4 objectives. All targets for landscape classes and wood supply were achieved, but in some instances not
5 the desirable levels due to the lack of immature and young forest available to replace mature and old
6 forest classes in the future (Figure 3.2.1). The distribution of water bodies, roads, patent and Crown
7 land, and the existing configuration of past disturbance patches also limit the ability to meet all of the
8 desirable levels of spatial indicators. The spatial indicators are all very close to the SRNV median values,
9 and these values will be reassessed and adjusted during operational planning.

10 The economic benefits of the proposed supply of wood to mills filter down to businesses offering direct
11 employment in the forestry sector such as tree marking, tree planting, logging, and stand tending.
12 Indirect employment in business areas providing equipment, food services, housing, etc. also benefit
13 from a stable forestry sector supported by the LTMD. Tourism, recreation, and cottaging values are also
14 accommodated during the development of the FMP.

15 3.7.4 Spatial Assessment of Projected Harvest Areas

16 Objective achievement for wood supply was assessed spatially, in part to phase in direction from the
17 2017 FMPM (Part B, Section 3.5), and to provide assurance that harvest area is not disproportionately
18 allocated across spatial zones over the first 40 years of the planning horizon. Analysis with and without
19 spatial constraints shows sensitivity in the model to the spatial distribution of harvest area, but that a
20 constraint can effectively control large fluctuations by zone for the first 4 terms (refer to Analysis
21 Package 3.5 for description of zones).

22 A 20% harvest flow constraint was applied to each zone to prevent excessive spatial fluctuations in
23 harvest, and to limit how much activity can occur in a given portion of the forest.

24 Figure 3.7.15 illustrates the distribution of available harvest area in each zone over a 40-year projection.
25 Fluctuations between zones do occur, but are moderated by the spatial constraint in the model,
26 providing a relatively even distribution over time. This spatial distribution also highlights the importance
27 of the SW zone on the forest to wood supply, which is an area of the forest that has seen limited harvest
28 activity in several decades. The development of long-term road access and allocations in this zone,
29 largely along the Sand Lake primary corridor, is important to achieving a balanced allocation on the
30 forest.

31

1 **Figure 3.7.15. Distribution of harvest area for the first four terms of the planning horizon.**



2
 3 The following tabular summary shows the relationship between the total area of each zone, the LTMD
 4 projected harvest area for each zone, and the proportion of areas allocated. The amount of area
 5 allocated in the NE zone is higher than the modelled level as it will take time to compensate for the long-
 6 standing spatial imbalance by developing access and operational capacity in the less utilized areas of the
 7 forest.

Quadrant	Area	Proportion	Allocated	LTMD T1
NE	198,573	35.8%	46.6%	34%
SE	81,477	14.7%	16.3%	18%
SW	98,897	17.8%	12.3%	16%
NW	176,103	31.7%	24.8%	32%
Total	555,051	100.0%	100.0%	100%

8
 9 **3.7.5 Social and Economic Assessment**

10 Planned harvest and silviculture activities are consistent with the current FMP; hence the evaluation of
 11 social and economic indicators suggests that no significant changes in benefits are projected during the
 12 implementation of the 2019 FMP. Consequently, there are likely no negative impacts to employment
 13 due to harvest and renewal levels projected for the next 10 years. On the contrary, the LTMD provides
 14 for significant increases in direct employment if utilization of available harvest area approaches the
 15 projected levels.

1 Longer-term implications of the LTMD are also similar to previous plans, which have shown a trend of
2 decreasing harvests for several decades followed by consistent increases. The predictable nature of the
3 wood supply, and consistent trends from plan to plan, allow for industries to make gradual adjustments
4 in response to changes in wood availability. Furthermore, the lowest point in projected wood supply
5 remains above the current and historic utilization levels (Figure 3.7.12).

6 The economic benefits of the proposed supply of wood to mills filter down to business offering direct
7 employment in the forestry sector such as tree marking, tree planting, logging, and stand tending.
8 Indirect employment in business areas providing equipment, food services, housing, etc. also benefit
9 from a stable forestry sector supported by the LTMD. Tourism, recreation, and cottaging values are also
10 accommodated during the development of the FMP, although the specific direction is mainly developed
11 during Stage 3 of the planning process.

12 3.7.6 Risk Assessment

13 There are risks that some plan objectives may not be fully achieved during the implementation of the
14 FMP, which can impact the future forest condition and desired benefits. Impacts may affect social,
15 economic or environmental values, alone or in combination.

16 The primary, and perhaps most immediate source of risk is a potential continuation of low market
17 conditions for some wood fibre. During the current and previous planning cycles the level of utilization
18 has been quite low, especially for some forest types and species groups, e.g., pulpwood. This is largely
19 reflective of market conditions and high costs associated with accessing some parts of the forest where
20 volumes are also low. Weather patterns (wet autumn conditions, early winter thaws), policy restrictions
21 (i.e., species at risk and/or timing restrictions), and access constraints may also result in lower utilization
22 of otherwise operational harvest areas.

23 In addition to timing issues, the modelling results highlight the importance of an even spatial
24 distribution of harvest across the forest. The sustainability of wood supply, and the achievement of
25 landscape composition and texture objectives are dependent on the maintenance and development of
26 access to each zone of the forest. The southwest zone of the forest has had little activity in recent
27 decades due to the challenges of existing and future road access that is constrained by patent land, a
28 load restriction on a major bridge to the south of the village of Dokis, and challenging terrain. The
29 distribution of rivers and lakes, and lack of aggregate materials limit the options for road access. Timing
30 restrictions on roads, or other road use constraints pose a risk to achieving harvest and landscape
31 targets if planned activities are limited.

32 A consequence of continued low harvest levels is the inability to reach the full potential of economic
33 opportunities and related social benefits. Employment levels, in terms of both direct and indirect jobs,
34 and revenues associated with historically low harvests are significantly lower than the expectations
35 associated with full utilization of the available harvest.

36 A low-level forest disturbance through harvesting can be favorable to objectives that rely on mature and
37 old forest, however is unfavorable to objectives that rely on the creation of young forest and early
38 successional forest types and species such as jack pine, poplar, and birch. This can also lead to increases
39 in late successional forest types and balsam fir. An increase in balsam fir, which is a less marketable
40 species, would be unfavourable as it would further contribute to the low utilization potential of the
41 forest.

- 1 Reduced harvest levels also pose a risk to achieving the ideal mix of habitat for moose and deer.
2 Harvesting that stimulates the production of deciduous saplings, which is a significant source of browse,
3 is important to the successful maintenance and enhancement of Moose Emphasis Areas and Stratum 1
4 Deer Yards.
- 5 Climate change also poses a potential threat to the health and condition of the forest, and the timing
6 and magnitude of effects are uncertain. Forest management can, however, respond to climate change
7 through an adaptive management process of monitoring and subsequent planning. The potential
8 impacts of invasive species, fire, and blow-down may be exasperated by climate change, and these
9 impacts can be mitigated with a responsive planning process and balanced management strategy. Beech
10 bark disease (BBD) has been considered and planned for accordingly in this plan. The emerald ash borer
11 (EAB) has had a devastating impact to ash trees in parts of southern Ontario and is also anticipated to
12 affect most of the province, however, the amount of ash on the Nipissing Forest is relatively low, and
13 therefore the risk to the plan implementation is minor. The incidence of wildfires has historically been
14 very low on the Nipissing Forest, and climate changes may result in unusual increases in the occurrence
15 and severity of fires. This is mitigated through effective, rapid response of the fire control program.
16 Salvage opportunities also offset the impacts of fire, insect, disease, and weather-related damages
17 through the recovery of damaged trees.
- 18 The overall risks to successfully implementing the LTMD are mitigated with a well-balanced strategy and
19 adaptive management process. A mid-term evaluation of the FMP progress is required to ensure
20 successful implementation, or potentially a need for revised direction. The periodic planning cycle for
21 forest management, requiring a re-evaluation and new plan every 10 years also provides the
22 opportunity to respond to unforeseen challenges or risks.

1 4.0 PLANNED OPERATIONS

2 4.1 Introduction

3 Section 4.0 describes the planned operations for the 10-year forest management plan. The text in the
4 following sub-sections details the prescriptions for operations, harvest areas and volumes, renewal and
5 tending operations, roads planning, expenditures related to operations, monitoring and assessment of
6 operations, and finally compares the proposed operations to the LTMD. Maps of the areas selected for
7 operations and FMP tables 11 to 20 provide more specific details.

8 4.2 Prescriptions for Operations

9 4.2.1 Operational Prescriptions and Conditions for Areas of Concern

10 An area of concern is defined as a “geographic area established for an identified value that may be
11 affected by forest management activities” (FMPM 2017). In order to prevent, minimize or mitigate any
12 potential adverse effects of forest management activities to these values, detailed AOC prescriptions are
13 developed. Specific areas identified as areas of concern contain operational prescriptions that may vary
14 from those identified for normal operations. AOC planning is done on all areas, including those
15 contained within harvest blocks, operational road boundaries and aggregate extraction areas.

16 The prescription includes a description of the area of concern (the specific value(s) to be protected), the
17 operational prescription for harvest, renewal and tending activities and a monitoring program if
18 required. All of this information is presented in Table FMP-11 Operational Prescriptions for Areas of
19 Concern and Conditions on Roads, Landings, and forestry Aggregate Pits (formerly Table FMP-10).

20 Non-timber values (herein referred to as a “values”) to be protected in the Nipissing Forest are
21 identified and shown on a series of values maps. These maps are based on data stored and maintained
22 by the MNRF in Land Information Ontario (LIO). Values data are updated periodically throughout the
23 year to include newly discovered values and to correct any existing inaccurate information.

24 The values and associated AOC prescriptions are summarized in Table FMP-11 and are mapped on
25 1:15,840 scale harvest operations maps. The basic elements of an AOC are made up of a reserve, and up
26 to 3 modified management zones (MMZ1, MMZ2 and MMZ3). A reserve area is considered Crown
27 productive forest in which forest management activities are not permitted in order to protect a certain
28 value on the landscape. Certain prescriptions may allow a controlled crossing of these reserve areas,
29 provided the proper adherence to applicable policy and legislation related to the value under
30 protection. Modified management zones are usually at a greater distance from the value than the
31 reserve area and dictate a modified approach to implementing normal forest management activities. For
32 example, a modification to the level of harvest, timing on operations or conditions on road construction
33 are just three of the types of modifications to forest management activities that could be present in
34 these zones.

35 When sites contain several values in close proximity and mapped modified management zones overlap
36 (e.g., a nest location, other feature and a fisheries value) the most restrictive modified management
37 zone is mapped and applied. Often timing and road restrictions are incorporated into the mapping of
38 modified management zones, and therefore the need to indicate a mapped timing or road restriction is
39 redundant. Timing and road restrictions are mapped independently, with a unique symbol, when no
40 modified management zone exist with a corresponding distance.

1 The planning team, with input from the LCC, developed AOC prescriptions using direction from the
2 Crown Land Use Policy Atlas (CLUPA), approved implementation manuals, on-site information,
3 consultation with First Nations, resource-based tourism operators and public consultation.

4 More detailed information regarding management options, analysis of options, and the selection of the
5 preferred option for each AOC is located in the AOC supplementary documentation Section 6.1.10. It
6 also illustrates how public comments were considered in the determination of the selected alternative.
7 Public comments are located in Supplementary Documentation 6.1.13, Summary of Public Consultation.

8 All previously unknown values identified during operations under this FMP, as encountered in the field,
9 will receive protection as identified in Table FMP-11, even if they have yet to be included in Land
10 Information Ontario (LIO). A stand listing can be derived for forest stands selected for harvest, which
11 includes the reserve, modified management zone prescriptions, by AOC type, with data located in the
12 harvest information products. For stands with overlapping AOCs, the stand is listed with the most
13 restrictive AOC.

14 The information in supplementary document section 6.1.11 is specific to each AOC, and provides a
15 summary of the various types of prescriptions identified in the Plan including the needs of each feature,
16 rationale for protection and potential effects of forest management operations on the value.

17 In addition to these details, supplementary documentation section 6.1.11 is completed if there are any
18 comments or objections (i.e. from the public, Aboriginal communities, stakeholders, etc.) to the
19 proposed prescription, and response to them is documented. If an area of concern prescription for a
20 value differs from the specific direction or recommendation in forest management guides, it is identified
21 as an exception and a monitoring program is required. These are also noted on the MNRF District
22 Manager's certification and recommendation page of the FMP. There are no exceptions to forest
23 management guides in the FMP for AOC prescriptions.

24 It should also be noted that there are several AOCs that indicate a range of potential activity within the
25 modified management zones. These AOCs require additional consultation with the proponent of the
26 value prior to forestry operations. Several values have been addressed in this manner because the level
27 of detail required to determine acceptable levels of activity to properly mitigate the effects of forestry
28 operations on the value cannot be ascertained during the preparation of the FMP. Examples of this
29 approach are the native values and RSA values.

30 *4.2.1.1 Operational Prescriptions and Conditions for Areas of Concern Information Products*

31 The information product associated with operational prescriptions and conditions for areas of concern
32 will identify:

- 33 a) the area of concern identifier; and
- 34 b) the area of concern type.

35 The harvest area information products include:

- 36 • MU754_19AOC01.E00 – AOC composite
- 37 • MU754_19AOC02.E00 – AOC road restrictions (that differ from other modified management
38 zones)

- 1 • MU754_19AOC03.E00 – AOC timing restrictions (that differ from other modified management
- 2 zones)
- 3 • MU754_2019_FMP_MAP_Index_00 – Index Map
- 4 • MU754_2019_FMP_MAP_OPS5405150 to 1 OPS7005120 – Operation Maps.

5 For identified bridging areas (Part A, Section 1.3.4.1), the operational prescriptions and conditions for
6 areas of concern follow the direction in the 2019-2029 FMP documented in FMP-11 and are portrayed
7 accordingly on maps.

8 4.2.2 Prescriptions for Harvest, Renewal and Tending Areas

9 4.2.2.1 Silvicultural Ground Rules

10 Silviculture Ground Rules (SGRs) document all possible silvicultural treatments that can be used to
11 maintain or transform a specific forest unit, through harvest, renewal and tending actions, into the
12 desired future forest unit. The SGRs identify a unique set of treatments (Harvest, Site Preparation,
13 Regeneration, Tending) documented as the “Most Common Treatment Package”. The remaining
14 possible treatments are documented as “Acceptable Alternative Treatments”. Table FMP-4 contains 72
15 SGRs for the Nipissing Forest. The prescriptions for harvest, renewal and tending presented in FMP-4
16 will serve as the prescriptions for operations, including depleted areas that are salvaged, for the 10-year
17 period of the FMP.

18 The information presented in Table FMP-4 is as follows:

- 19 • SGR Code - A label composed of the *current forest unit* followed by the *target forest unit*
20 followed by an indicator of *silviculture intensity*. For example: BW-PWUS-I1 – indicates that a
21 white birch forest unit stand at the time of harvest is planned to be renewed to a white pine
22 uniform shelterwood forest stand. The "I" indicates that an Intensive silviculture
23 effort/investment is to be applied and generally indicates a planting treatment, and the "1"
24 indicates which set of documented intensive silviculture treatments are planned for this stand
25 and generally reflect the number of site preparation treatments that will be implemented. In
26 this case, mechanical site preparation, planting and tending will be implemented with the intent
27 to achieve the desired future forest. Once assigned, the SGR code is used throughout the
28 treatment tracking, reporting, and effectiveness monitoring process.
- 29 • Silviculture System - A silviculture system is “A process whereby forests are tended, harvested
30 and replaced, resulting in a forest of distinctive form. Systems are classified according to the
31 method of carrying out the fellings that remove the mature crop with a view to regeneration
32 and according to the type of forest thereby produced.”⁸ Silviculture systems used in the SGRs
33 are clearcut, shelterwood and selection.
- 34 • Current Condition – A description of the average forest stand at the time of harvest (*current*
35 *forest unit*). It includes the: Forest Unit, and the ecosite. Ecosites are listed in order of the most
36 to the least prevalent for each forest unit; bold values indicate the most representative ecosites.
37 Additional Information includes a description of the expected average stand conditions
38 encountered and any specific conditions under which the SGR can be applied.

⁸ 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.

- 1 • Future Condition – A description of the future conditions of the renewed stand. The Forest Unit
2 identified is the *target forest unit* expected to result from the application of the prescribed
3 treatments. The expected Stand Characteristics of the renewed forest at maturity are
4 documented using the standard forest inventory attributes – site class/stocking/species
5 composition. The Development Information documents the operability age, the expected net
6 merchantable volume at operability age, and Post-Renewal Succession. The Post-Renewal
7 Succession lists all forest units and associated yield curves that may result from the treatments
8 and the proportion of area expected to develop to the given forest units. Effectiveness
9 monitoring data (results from Free Growing Surveys) and professional opinion are used to
10 develop the post-renewal succession rules. These critical forest model inputs are used to predict
11 how the planned silviculture effort and expected successes will affect the future forest
12 composition on a landscape scale.
- 13 • Regeneration Standards- These are used to determine if the renewal effort is progressing
14 towards achievement of the stand conditions described for the *target forest unit*. The Standards
15 describe: Timing of Surveys, Minimum Crop Tree Heights, Target and Minimum levels of stand
16 stocking and density (calculated using site occupancy) for both Acceptable and Crop Tree
17 species, and minimum and maximum relative abundance of different species (species
18 composition limits). For a stand to be declared a success it must meet or exceed the minimum
19 stocking levels for both acceptable and crop species, and be within limits of minimum and
20 maximum species relative abundance limits, and meet the minimum height requirements.
- 21 • Explanatory Notes – These notes provide details about the regeneration survey methodology.
- 22 • Silvicultural Treatments – The type of Harvest Method, Logging Method, Site Preparation,
23 Regeneration, and Tending treatments prescribed to achieve the planned future forest unit are
24 documented. The ‘Most Common Treatment Package’ is described in one row. A second row
25 lists the Acceptable Alternative Treatments that may also be applied to achieve the target future
26 forest unit.
- 27 ○ Harvest Methods (silviculture systems) listed in the SGRs include:
- 28 ■ Seed Tree - clearcut harvest with retained trees distributed to provide for
29 natural regeneration
- 30 ■ Clearcut with Standards - clearcut harvest with retained trees or patches of
31 trees consistent with the Stand and Site Guide - the residual trees are known as
32 the ‘Standards’
- 33 ■ (CLAAG) - clearcut harvest with careful logging around advanced growth
- 34 ■ Commercial Thinning – partial removal of merchantable trees at several times
35 before the final clearcut harvest
- 36 ■ Uniform Shelterwood 2-Cut – combined Preparation/Seeding Cut followed by
37 Final Removal Cut
- 38 ■ Uniform Shelterwood 3-Cut – combined Preparation/Seeding Cut followed by
39 First and Final Removal Cuts
- 40 ■ Uniform Shelterwood 4-Cut – Preparation Cut followed by Seeding Cut followed
41 by First and Final Removal Cuts
- 42 ■ Clearcut-Strip Progressive 3-Cut – narrow strip cutting on 1/3 of stand for 3
43 harvests
- 44 ■ Single Tree Selection – removal of single trees on a 20 to 30 year cycle basis

- 1 ▪ Single Tree Selection with Opportunistic or fully Regulated Groups – same as
- 2 above with openings (1 to 2 X tree height) to encourage regeneration of yellow
- 3 birch, red oak or black cherry
- 4 ○ Logging Methods listed in the SGRs include:
- 5 ▪ Tree Length - removal of tree tops and branches at stump prior to skidding to
- 6 landing
- 7 ▪ Full Tree-skidding of tree to landing without removing the top or branches
- 8 ▪ Cut to Length - removal of tops and branches and cutting tree into log lengths
- 9 (8, 10,12 foot, etc.) at the stump prior to forwarding to landing
- 10 ○ Site Preparation Methods listed in the SGRs include:
- 11 ▪ Mechanical - logging machines (skidders) and attachments (slash piling rakes,
- 12 anchor chains, etc.) modifying onsite vegetation/logging debris/surface organic
- 13 matter to facilitate tree planting
- 14 ▪ Aerial/Ground Chemical - air or ground applied herbicides to reduce competitive
- 15 non-crop vegetation (herbaceous and woody) to facilitate tree planting
- 16 ▪ Prescribed Burning – use of controlled fire to reduce onsite vegetation/logging
- 17 debris/surface organic matter to facilitate tree planting
- 18 ▪ Scarification - logging machines (skidders) and attachments (slash piling rakes,
- 19 anchor chains, etc.) modifying onsite vegetation/logging debris/surface organic
- 20 matter to create favourable seedbeds for the establishment of natural
- 21 regeneration (seed to come from retained trees on site)
- 22 ○ Regeneration Methods listed in the SGRs include:
- 23 ▪ Natural - crop tree seed from retained trees on site to germinate and establish
- 24 on site
- 25 ▪ Fill Plant - low density planting (750-1200 stems per hectare) to augment
- 26 existing regeneration on site
- 27 ▪ Plant - high density planting (1200-2500 stems per hectare) to establish new
- 28 stands
- 29 ▪ Sowing - applying seed actively collected at a separate location and deliberately
- 30 applied to a renewal area (e.g. seeding sites with red oak acorns)
- 31 ▪ Seeding – application of conifer seed (Pj) to a renewal area
- 32 ○ Tending Methods listed in the SGRs include:
- 33 ▪ Aerial/Ground Chemical - air or ground applied herbicides to reduce competitive
- 34 non-crop vegetation (herbaceous and woody) to facilitate crop tree survival and
- 35 growth
- 36 ▪ Manual Cleaning - use of brushsaws or other manual means to reduce
- 37 competitive non-crop vegetation (woody) to facilitate crop tree survival and
- 38 growth
- 39 ▪ Mechanical Cleaning - use of mobile equipment (mulchers, brush clearers) to
- 40 reduce competitive non-crop vegetation (herbaceous and woody) to facilitate
- 41 crop tree survival and growth
- 42 ▪ Pre-commercial thinning - use of brushsaws to space selected crop trees when
- 43 stocking and density are high. This treatment is usually applied after a stand is

- 1 free growing in an effort to increase the quantity and quality of large logs at
2 final harvest
- 3 ■ Tending/Spacing/Improvement Cut-Even-Aged either concurrent with harvest or
4 post-harvest - use of harvesting equipment to remove non-merchantable stems
5 where they are competing with higher value crop trees. Usually prescribed in
6 hardwood uniform shelterwood seeding/regeneration cuts
 - 7 ■ Tending/Spacing/Improvement Cut-Uneven-Aged either concurrent with
8 harvest - use of harvesting equipment to remove non-merchantable stems
9 where they are competing with higher value crop trees. Usually prescribed for
10 stands in the HDSEL forest unit.

11 The development of the Silviculture Ground Rules also considered the results of an Independent Forest
12 Audit that required NFRM to develop a means to better identify those forest units and site conditions
13 where mechanical or chemical site preparation would enhance regeneration effectiveness and direct the
14 appropriate treatments to the sites. A decision support matrix was developed to document
15 thresholds/limits of several site attributes as they relate to the use of mechanical or chemical site
16 preparation. Based on forest unit/ecosite combinations and objectives to either maintain conifer or
17 convert to conifer, thresholds of site attributes were developed. Soil texture, soil moisture, depth of LF
18 (litter, organic or humus form) layer, amount and distribution of logging slash, expected vegetation
19 response, forecasted seed crops, and topography were considered. The results indicated which
20 combination of forest unit/ecosites/objectives would be best bets to target for site preparation. The
21 priority to treat for each of these combinations was prioritized, and the suitability of mechanical vs.
22 chemical methods was determined.

23 The analysis of silvicultural activities (2017 FMPM Part E, Section 3.3) conducted by a registered
24 professional forester also influenced the development of the SGRs. Monitoring data was used to confirm
25 or adjust the effectiveness of the prescriptions. These results were considered in listing the most
26 common and acceptable alternative site preparation treatments in all SGRs.

27 Some changes were made to the 2009-2019 SGRs and some new SGRs are included in this plan. Changes
28 to existing SGRs include:

- 29 • Changed the name of the surveys from “Site occupancy survey” to “Establishment survey” and
30 removed all references to “Free-to-grow” to conform to the Forest Information Manual
31 technical specifications (2017).
- 32 • Merged all red pine commercial thinning SGRs (PR-PR-CT-PSNT-35, PR-PR-CT-PSNT-45, PR-PR-
33 CT-PSNT-65) into one SGR (PRCT)
- 34 • Added red oak, black spruce, and red spruce as target species in the PWUS and PWST
35 regeneration standards. Added He (with a limit that $HE \leq PW$) as a target species in PWUS –
36 PWUS-1R and PWUS-PWUS-2R SGR. These species are often planted or natural regeneration is
37 promoted, and established seedlings are tended when implementing silvicultural activities. They
38 are often priority species to be retained as seed trees/ shelter trees (when PW and PR are not
39 available) when implementing the regeneration cut of PWUS.
- 40 • Removed the requirement for the species composition of white pine to be greater than red pine
41 (PW>PR) in PWUS and PWST regeneration standards, to be more consistent with the range of
42 stand compositions within those forest units, as described in MNRF’s regional forest unit

- 1 definitions (refer to Supplementary Documentation 6.1.2 Section 2.1 of the Analysis Package).
2 Many mature stands that comprise PWUS and PWST forest units contain a higher component of
3 red pine than white pine and this can be reflected in the new forest.
- 4 • Added a minimum white pine component to the regeneration standards for PWUS (PW \geq 20%)
5 and PWST (PW \geq 10%)
 - 6 • Added the option of planting a species mix instead of one species in several SGR's. This allows
7 the planting of sites that have undulating terrain with moister microsites to be planted with
8 species that are suited to the site conditions. This also provides for more resilient plantations in
9 the face of climate change.
 - 10 • Added PR as a target species in the PJSB SGRs. Pr is often a component of mature stands in this
11 forest unit, and regeneration survey data has shown that it is often a component on some of the
12 more variable sites managed under this SGR.

13 Four new SGRs are included in this FMP:

- 14 • HDUS-BW-ST: This SGR is only applied in degraded stands with a hard maple or soft maple (Mh,
15 Mr) component where insufficient stocking and quality is present for a successful shelterwood
16 system, and where a large majority of species are exhibiting severe decline/mortality/poor
17 quality. The objective is to rejuvenate a hardwood mixed stand that is expected to be highly
18 variable in species composition and may therefore be more likely to have a composition of a
19 hardwood-dominated mixedwood (described by the BW forest unit) than HDUS at
20 establishment. This SGR addresses all of the conditions described in the Silvicultural Guide
21 therefore, exceptions monitoring is not required.
- 22 • PJ-PJ-I2: This SGR allows the separation of PJ forest units on shallow soils that are regenerated
23 using aerial seeding (no density regulation) and that will be assigned a basic yield curve (PJ-PJ-I1)
24 from PJ forest units on deeper soils that are regenerated using planting and that will be assigned
25 an intensive yield curve (PJ-PJ-I2). Both require vegetation management, and in some cases,
26 scarification treatments to ensure successful renewal. The 2009-2019 FMP only had one SGR for
27 these two renewal options.
- 28 • PJ-PWST-B: This SGR addresses situations where advanced conifer regeneration composed of
29 mainly PW with some PR, SW, SB exists in the understory/mid-storey and can be released using
30 careful logging with protection of advanced regeneration.
- 31 • PR-PWUS-PRCT75: This SGR is intended for 70 to 80-year-old stands (plantation or natural
32 origin). It permits opportunities to create PWUS. White pine is established in the understory
33 through planting or natural regeneration (often requiring mechanical site preparation and
34 tending) after the final thinning and the final harvest will occur 15-20 years after this
35 commercial thinning when the white pine is established.

36 The strategic silvicultural options documented for the 2009-2019 FMP formed the basis upon which to
37 build and refine those for the 2019-2029 FMP, which reflect the silvicultural options in the base model.
38 The silviculture intensities described in the SGRs of Extensive/Basic/Intensive1 and Intensive2 are
39 reflected in the base model and are comparable to the previous FMP. In a similar manner, the
40 associated species compositions, average stocking, and site class assumptions associated with each
41 yield/intensity curve remained relatively unchanged. The majority of the small differences between
42 those data elements for the 2009 and the 2019 FMP would have been associated with changes in the

1 new Base Model Inventory. Some larger changes were a result of efforts made to provide a higher
2 degree of resolution in Forest Unit descriptions than previous plans. For example, the MCL forest unit
3 was fine-tuned so that it truly represents stands on wetter ecosites (moisture regime ≥ 7) thus
4 providing a better resolution between upland (PJSB, SF) and lowland (MCL) boreal conifer stands.
5 Changes in the HDSEL/HDUS and PWST/PWUS-1R/PWUS-2R forest units were made to better classify
6 stands into these silvicultural units. Several stands in the 2009 FMP were misclassified as HDSEL when
7 they were actually of poor quality and contained high proportions of mid-tolerant hardwood species.
8 They were actually managed as shelterwoods (HDUS). In a similar way, many stands in the 2009 FMP
9 were misclassified as PWUS when they were actually PWST and some were misclassified as PWUS-2R
10 when they were actually PWUS-1R. Survey data, combined with more refined algorithms were used to
11 better classify stands into the appropriate Forest Unit based on stocking, species composition
12 thresholds, and site class (refer to Section 2.1 of Supplementary Documentation 6.1.2, Analysis Package
13 for details).

14 The assumed total cost for each renewal intensity option provided in SFMM is based on specific costs for
15 each individual treatment included in that intensity. The specific costs for silviculture treatments
16 assumed in the 2009 FMP were reviewed for consistency with actual conditions. The assumed costs
17 were consistent with actual costs, however, there was a lack of consideration for situations where
18 multiple site preparation treatments were applied. A revised cost structure was established because of
19 the need for two site preparation treatments to ensure three competition-free growing seasons for
20 planted trees on the more competitive ecosites. The new structure considered that the most common
21 site preparation treatment in Intensive1 SGRs was a mechanical site preparation treatment and in
22 Intensive2 SGRs was a mechanical and chemical site preparation treatment except for the following
23 forest units: MCL, Pj, PJSB, and PR. The latter forest units are often on ecosites that have less red maple
24 and poplar competition immediately after harvest and can often be planted or aerial seeded without
25 site preparation.

26 The structure for tending costs was consistent with the strategy developed for the 2009 FMP. All forms
27 of tending were included and assigned a proportional use and associated cost. This same step was
28 conducted for anticipated second and possibly third tending treatments. This provided an average
29 tending cost that was used in determining the total treatment cost for each renewal option. This
30 exercise was performed for each forest unit.

31 A review was made of the planting densities (trees per hectare) assumed in SFMM for the 2009 FMP and
32 updated for the 2019 model. Establishment densities similar to those levels were being implemented on
33 the ground in the forest. Current effectiveness monitoring surveys conducted three to five years after
34 planting have revealed that establishment densities (average of 1600 stems per hectare) are generally
35 adequate to ensure achievement of regeneration standards.

36 A FMP silviculture task team was struck (composed of MNRF, LCC, SFL members) to develop SGRs,
37 review objectives, and focus review efforts on the post-renewal succession for both clearcuts and
38 shelterwood renewal. The review consisted of an analysis of approximately 21,943 ha of current free
39 growing survey results (14,010 ha more than what was available for the 2009-2019 FMP). Reviews of
40 this nature are critical in determining if adjustments to silvicultural treatments or to expected outcomes
41 are needed.

42 Six general trends were observed when the data was reviewed:

- 1 1. As in 2009, area continues to be created in forest units other than those projected on the more
2 productive sites (i.e., rather than 6 or 7 forest units resulting, as assumed in the 2009 FMP, there
3 were 7-10);
- 4 2. Area in PWST was being created from SF-Int1, SF-Int2, and MW-Basic SGRs that was not
5 forecasted, which is somewhat offset by shortfalls in PO and MW Int1 and Int2;
- 6 3. The degree of success of creating PWUS stands from restoration efforts continues to be lower
7 than predicted. Adjustments were made to silviculture treatments for the 2019 FMP. Higher
8 proportions of red pine seedlings will be planted on clearcut sites because the conditions
9 created are more ecologically appropriate for this intolerant species. White pine is slower
10 growing than red pine in the more open conditions and is damaged by white pine weevil which
11 further reduces its growth rate. This extends the time for the planted trees to reach minimum
12 height requirements and potentially increases the required number of tending treatments.
13 Mortality from white pine blister rust is also higher in more open conditions, leading to lower
14 site occupancy. Red pine will be planted within a mix of white pine and white spruce with
15 increased site preparation costs. These differences were reflected in SFMM both in terms of
16 increased total renewal cost and lower PWUS forest unit renewal proportions for the Int1 and
17 Int2 options.
- 18 4. Area in SF was being created from PJSB-Extensive that was not forecasted which is somewhat
19 offset by shortfalls in SF-Intensive 1 and 2; and
- 20 5. Area in PJ was being created from Basic treatments that was not forecasted and from PJ-
21 extensive that were higher than forecasted.
- 22 6. Limited data was available for renewal results in conifer and hardwood shelterwood due to the
23 lack of planned first and final removal cuts during the 2004-2009 period. It is expected that
24 more data will available for preparation of the next FMP.

25 Development of the rule set for the 2019 post renewal succession included consideration of the trends
26 from the survey results and the 2009 rule set.

27 The results of this work are reflected in both table FMP-4, in terms of treatments and renewal
28 proportions; and, in the Strategic Silviculture Options, Section 3.4 of Supplementary Documentation
29 6.1.2, Analysis Package.

30 Several iterations were made with Strategic Forest Management Model (SFMM) with a focus on
31 silvicultural intensities and reliance of herbicides and alternatives. This was done to investigate the
32 impact on levels of objective achievement when wide ranging levels of silviculture options are
33 implemented. This analysis would also determine if the range of silviculture options is sufficient to
34 enable SFMM to produce realistic results; and, whether the differences between each option enable
35 SFMM to effectively select a variety of options to satisfactorily meet all objectives.

36 Variations of Renewal Stumpage rates were also tested in evaluating herbicide use and options for
37 alternatives. Current renewal stumpage rates/silviculture expenditures enabled the use of a diverse set
38 of silviculture options, while the replacement of herbicides with more expensive alternative treatments
39 required higher stumpage rates for SPF and white and red pine. Results from this analysis also showed
40 unfavorable results for the achievement of conifer wood supply and habitat conditions.

41 The most commonly applied SGR used to regenerate each silvicultural stratum is presented in Figure
42 4.2.1. The most common treatment package in each silvicultural ground rule will be the most likely

1 treatment. This information represents the best estimate of proposed operations at the time of plan
 2 preparation and will not limit the selection of any acceptable alternative silvicultural treatments in the
 3 SGRs at the time of implementation of operations. The preliminary SGR for all proposed areas of
 4 operations are identified on the operational scale maps and in the digital renewal and tending
 5 submission layer (submitted electronically). The information products associated with the harvest,
 6 renewal and tending operations will serve as the stand list.

7 **Figure 4.2.1. Most Common SGRs by Forest Unit on the Nipissing Forest**

Current Forest Unit	Future Forest Unit	Silvicultural Intensity	Description of Most Common Treatment Package
BW	BW	EXTN	Natural regeneration following clearcut w/standards & seed trees
BY	BY	PRSNT	Natural regeneration from Regen & Removal Cut Shelterwood
HDSEL	HDSEL	PRSNT	Natural regeneration from Single Tree Selection harvests at 30 yr. intervals
HDUS	HDUS	PRSNT	Natural regeneration from Regen & Removal Cut Shelterwood
HE	HE	PRSNT	Natural regeneration from Regen & First & Final Removal Cut Shelterwood
LWMX	LWMX	PRSNT	Natural regeneration from Regen & Removal Cut Shelterwood
MCL	MCL	EXTN	Natural regeneration following clearcut w/standards & seed trees
MW	MW	EXTN	Natural regeneration following clearcut w/standards & seed trees
PJ	PJ	INTN1	Aerial seeding and aerial chemical tending following clearcut harvest, basic yield curve
PJSB	PJSB	INTN1	Tree planting and aerial chemical tending following clearcut harvest
PO	PO	EXTN	Natural regeneration following clearcut w/standards
PWST	PWUS	INTN2	Mechanical and aerial chemical site preparation, tree planting and aerial chemical tending following clearcut w/seed trees
PWUS	PWUS-2R	PRSNT	Mechanical and aerial chemical site preparation, natural regeneration, and aerial chemical tending from

Current Forest Unit	Future Forest Unit	Silvicultural Intensity	Description of Most Common Treatment Package
			Regen, First, and Final Removal Cut Shelterwood
PR	PR	INTN1	Tree planting, aerial chemical tending following clearcut w/standards & seed trees
SF	SF	EXTN	Natural regeneration following clearcut w/standards & seed trees

1

2 The use of prescribed burning is an alternative site preparation on several SGRs in clearcut forest units
3 (BW, MW, PJSB, PO, PWST, PR, SF), in PWUS SGRs, in HDUS SGRs where red oak or yellow birch renewal
4 is targeted, and as an alternative tending treatment option in the HDUS-HDUS SGR for the regeneration
5 of red oak. There are currently no areas identified for this treatment on operational maps because the
6 site-specific requirements for this activity are difficult to evaluate without a detailed site analysis by SFL
7 and MNRF staff. Areas identified for prescribed burning will be identified in the proposed Annual Work
8 Schedule and are subject to approval by the MNRF.

9 The aerial application of herbicides is an important treatment option in many SGRs to ensure adequate
10 renewal of desirable species and habitat conditions. Areas identified for aerial chemical tending will be
11 identified annually in the proposed Annual Work Schedule, and are subject to approval by the MNRF. In
12 addition, Ministry of the Environment, Parks and Conservation approvals are required prior to the aerial
13 application of any registered herbicide on the Forest.

14 The elements of Silvicultural Ground Rules as documented in Table FMP-4 ultimately must be
15 transferred to on-the-ground operations. The document titled Prescriptions for Harvest, Renewal and
16 Tending, and Conditions on Regular Operations located in Supplementary Documentation 6.1.11
17 provides very specific direction that is to be followed to facilitate the Forest Operations Prescription
18 process. Of course, the SGRs are one of the very important components of the process.

19 No exceptions to the guides are planned in this forest management plan.

20 *4.2.2.2 Conditions on Regular Operations*

21 Based primarily upon the *Forest Management Guide for Conserving Biodiversity at the Stand and Site*
22 *Scales*, conditions on regular harvest, renewal and tending operations conducted as per the SGRs, have
23 been developed to maintain or protect features that are not addressed by operational prescriptions for
24 areas of concern (e.g. wildlife trees, residual forest, deer wintering, cultural heritage, land use direction),
25 or to implement specific operational standards or guidelines (e.g. site disturbance, residual tree
26 damage). These conditions apply to all of the Nipissing Forest and apply to all harvest, renewal and
27 tending operations. In addition, conditions on roads, landings and aggregate pits have been included for
28 those areas where there are conditions on regular operations. Selected best management practices
29 associated with the conditions on regular operations are also included. Refer to supplementary
30 documentation section 6.1.11 Prescriptions for Harvest, Renewal and Tending, and Conditions on
31 Regular Operations for all the conditions on regular operations.

1 4.3 Harvest Operations

2 4.3.1 Harvest Areas

3 The planned harvest area for the 10-year period of the forest management plan is shown in table FMP-
4 12 by forest unit, age-class and stage of management. The total projected available harvest area plus the
5 mid-rotation tending figure from SFMM (commercial thinning of red pine plantations) and the total
6 regular harvest area for the ten-year period is 84,960 ha and 82,460 ha, respectively.

7 The selected harvest allocations for the 10-year plan do not exceed the available harvest area for any
8 forest unit, and total 82,218 ha of regular harvest and 84,711 including commercial thinning (Figure
9 4.3.1).

10 **Figure 4.3.1. Available and planned harvest area, and volume estimates for the planned allocations.**

Forest Unit	Area (ha)		Volume (m ³)		
	Available Harvest	Planned Harvest	Hardwood	Conifer	All
<i>Regular Harvest</i>					
BW	10,658	10,651	705,770	176,673	882,443
BY	4,970	4,969	175,629	75,090	250,719
HDSEL	6,033	6,023	167,427	16,015	183,442
HDUS	15,604	15,602	542,957	138,245	681,202
HE	2,890	2,889	49,452	109,428	158,880
LWMX	240	240	4,744	5,368	10,112
MCL	1,200	1,200	7,563	80,317	87,879
MW	8,500	8,466	336,482	325,285	661,767
PJ	1,020	1,020	6,588	130,881	137,470
PJSB	810	802	10,599	83,789	94,388
PO	6,674	6,622	677,812	111,452	789,264
PR	680	671	17,986	126,097	144,083
PWST	3,950	3,928	146,049	405,737	551,785
PWUS	10,180	10,144	154,760	848,413	1,003,173
SF	9,050	8,992	121,023	666,140	787,162
Total	82,460	82,218	3,124,841	3,298,930	6,423,771
<i>Commercial Thin</i>					
PR	2,500	2,493	41,051	166,349	207,400
Grand Total	84,960	84,711	3,165,892	3,465,279	6,631,170

11
12 The distribution of planned harvest area for licensee groups is identified in Table FMP-14. Of the total
13 harvest area and mid-rotation tending area 86.6% is allocated to shareholder licensees, 5.3% to
14 independent licensees, and 8.1% to First Nations licensees. The proportional division of harvest area is
15 based on the SFL shareholder agreements and Appendix F of the Sustainable Forest Resource Licence,
16 and approval of the forest management plan does not represent an agreement to make harvest areas
17 available to a particular licensee.

1 The planning of harvest operations is a complicated process of locating feasible harvest areas to meet an
2 available harvest area (AHA) from a non-spatial model (SFMM). The management strategy prescribes
3 the 'optimum' age-class and stage-of-management distribution of the allocation based on non-spatially
4 explicit inputs and constraints. The model is only able to solve the problem as it is framed within its
5 technical capabilities. SFMM has limited capabilities when it comes to considering the numerous spatial
6 constraints that are limited to broad strategic zones developed for the forest.

7 Spatial constraints that drive allocation decisions not considered by the model can include:

- 8 i. economic considerations (e.g. proximity of stands to existing roads and other eligible
9 stands),
- 10 ii. administrative considerations (e.g. traditional operating areas), and
- 11 iii. policy considerations (e.g., Landscape Guide and Stand and Site Guide).

12 Ideally, draft areas selected for harvest operations are chosen consistent with the management strategy
13 and then tested for compliance with spatially constraining policies using the Ontario Landscape Tool
14 (OLT) and the Evaluate Forest Residual Tool (EFRT). If the proposed allocations do not pass the tests, the
15 harvest areas must be adjusted and re-tested. An allocation adjustment may solve one issue but
16 inadvertently create another. The spatial assessment is described in Section 3.7.4.

17 The Evaluate Forest Residual Tool (EFRT) was run on the planned harvest to determine if and where any
18 additional residual patches would be required on the forest. Biologically, the Nipissing Forest is very
19 diverse as it is located in the Great Lakes St. Lawrence Forest Region which is a transitional forest
20 between the Hardwood Forest Region to the south and the Boreal Forest Region to the north. The
21 Nipissing Forest has a wide range of silvicultural treatments coupled with a significant history of
22 disturbances (logging and wildfire) which have created a diverse spatial forest condition.

23 When this tool was run on the planned allocations the results indicated that the current harvest pattern
24 on the landscape did not require additional residual planning to meet spatial and temporal
25 requirements of the Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales,
26 commonly referred to as the Stand and Site Guide (SSG), at the 500 ha scale. Accordingly, there are no
27 mapped residual patches for planned clearcuts. These results were expected for the Nipissing Forest as
28 the diversity within each block with regards to AOC planning and silviculture system tend to favour a
29 harvest pattern that is conducive to the intent of residual planning in the SSG.

30 The EFRT did identify a total of 84 zones within planned clearcuts where additional residual forest
31 patches are required at the 50 ha scale. These areas are portrayed on 11x17" Coarse Filter Pattern
32 Emulation Maps for each harvest block, available at the SFL office. These maps illustrate locations where
33 residual forest must be retained and are used for the Condition on Regular Operations procedure for
34 retention of residual forest (refer to Supplementary Documentation, Section 6.1.18) to locate residual
35 patches in the field. NFRM will re-evaluate stand level residual structure resulting from harvest patterns
36 and report on progress in the 10-year annual report.

37 Mapped allocations portray regular harvest, contingency harvests, and bridging areas (on-going
38 operations from the 2009 FMP). Locations where fuelwood can be obtained will be identified in each
39 annual work schedule.

4.3.2 Completion of On-going Harvest Operations from Previous Plan

The 2019-2029 planning period includes areas carried over from the 2009-2019 forest management plan, within the requirements of the planning manual. These areas are described as bridging areas. Bridging areas are limited to three months of harvest area (Figure 4.3.2), and must be completed by March 31, 2020. The three months of harvest area is approximately 25% of the 2009-2019 FMP total annual available harvest area.

Figure 4.3.2. The area of bridging harvests by forest unit.

Forest Unit	Stage of Management	Area (ha)
BW	Clear-cut	143
BY	Seed-cut	11
BY	Last-cut	96
HDSEL	Selection	155
HDUS	Last-cut	26
HDUS	Seed-cut	476
LWMX	Seed-cut	12
MCL	Clear-cut	15
MW	Clear-cut	254
PO	Clear-cut	121
PR	Clear-cut	84
PR	Commercial thin	29
PWST	Seed-tree	231
PWUS	First-cut	141
PWUS	Last-cut	131
PWUS	Seed-cut	332
SF	Clear-cut	88
Total		2,347

Bridging areas are brought forward from the 2009-2019 FMP and are managed according to the direction in the 2019-2029 FMP, i.e., 2019-2029 FMP AOC prescriptions are applied to bridging areas, as with all regular harvest areas.

4.3.3 Harvest Volume

The planned net merchantable harvest volume for the 10-year period is 6,631,170 m³; 3,165,892 m³ is hardwood and 3,465,279 m³ is conifer (without rounding-off the added decimals carried in the volumes database this sums to 6,631,171 m³). This information is provided in greater detail in table FMP-13.

The available volume projected in the forest management model consisted of 3,288,830 m³ of hardwood representing a 2.9% variance from the planned levels. The 3,808,655 m³ of conifer volume represents an 8.2% variance from planned levels. Overall, the planned volume estimate is 6.2% lower than the modelled volume of 7,097,486 m³. The planned volume is averaged at approximately 81 m³/ha, which is stable from the 2009 FMP illustrating an insignificant 1.5 m³/ha increase.

1 When comparing the available to the forecast, the variance of 6.1% can be explained by a number of
2 different factors. The first is related to the way the model generates an average condition by forest unit.
3 It applies a similar volume recovery to each hectare harvested, depending on its forest unit classification
4 and age. The methodology used to calculate the planned volume involves individual volume estimates
5 on a stand by stand basis, using the stand level volume generator in the Modelling and Inventory
6 Support Tool (MIST). Stocking, site class, age, and species composition are considered on an individual
7 stand basis rather than an average condition. It is easy to see that spread over 7 million m³, some
8 variance is to be expected.

9 Another cause of variation is the more accurate accounting of volumes left unharvested in modified AOC
10 zones. Volumes in modified zones in the planned allocations were netted down according to mapped
11 AOC areas, whereas these estimates were more coarsely estimated in the strategic model. The
12 consideration of operationally modified harvests in a portion of the allocation slightly reduces the
13 expected yield for some stands, and this is accounted for in the planned volumes at an individual stand
14 level.

15 Overall the variance experienced is not considered to be significant, and planned volumes satisfy wood
16 supply commitments in the same manner as the strategic analysis. Further discussion on utilization is
17 presented in section 4.3.6.

18 Planned harvest volumes have been summarized by species and licensee grouping in FMP-14.

19 4.3.4 Wood Utilization

20 FMP-14, located in section 8.0, details the net merchantable wood that is utilized and unutilized by
21 licensee grouping in this Plan and FMP-15, also located in section 8.0, details the wood utilization by mill
22 for the Plan. Table FMP-15 identifies surplus volumes in:

- 23 • pulp material species of white pine, red pine, spruce-pine-fir, cedar, other conifer, hemlock,
24 poplar and white birch.
- 25 • sawlog material species of white pine, red pine, spruce-pine-fir, cedar, other conifer, hemlock
26 and poplar.
- 27 • veneer material species of tolerant hardwoods.

28 While these volumes appear available, they have been identified by the planning team as mixed with
29 other marketable and non-marketable fibre, and must be investigated on a block by block basis at the
30 ground level to determine operational feasibility for harvest.

31 Projected unutilized harvest volumes remain available for utilization to support industrial proposals.

32 The “Commitment Types” shown in Table FMP 15 have changed since the last Plan was approved in
33 2009, with the biggest changes being the inclusion of the mills offered a wood supply from the 2010
34 wood supply competition (WSCP Offer) and the dropping of mills no longer in operation (including
35 Tembec’s saw mill in Mattawa and St. Mary’s Paper Corp.’s pulp mill in Sault Ste. Marie). Tembec
36 Industries Inc. was purchased in 2017 by Rayonier A.M. Canada G.P. The “Nipissing Forest Available
37 Wood Report” was reviewed to assist in the development of FMP-15.

38 The outcome shown in FMP-15 was produced by first fulfilling the supply commitments, shareholder
39 requirements, consideration for the WSCP offers and then expected open market purchases. Specific

- 1 commitments are identified and addressed in Figure 4.3.3 Summary of Wood Supply on the Nipissing
2 Forest

3 **Figure 4.3.3. Summary of Wood Supply on the Nipissing Forest.**

Processing Facility	Commitment Type	Requirement(s) Met?	Comments
Georgia Pacific North Woods LP, Englehart	Wood Supply Agreement for 97,967 m ³ of non-veneer aspen.	Current wood directive met.	Planned allocation will provide 126,368 m ³ /yr of non-veneer aspen if 100% of the allocation is utilized.
Rayonier A.M. Canada G.P. (Tembec Industries Inc.), Temiscaming	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 met, however, material will be supplied by various licensees on the forest to meet these volumes	All white birch and tolerant hardwood pulpwood planned to be harvested on Rayonier A.M. Canada G.P.'s licence is shown as being received by their mill in Temiscaming. (60,515 m ³ /yr of tolerant hardwood and 30,873 m ³ /yr of white birch pulpwood)
Rayonier A.M. Canada G.P. (Tembec Industries Inc.), Temiscaming	Open Market/ Shareholder - for 37,000 m ³ /yr of tolerant hardwood and 18,600 m ³ /yr of white birch (Open Market Purchases)	The total Open Market/Shareholder for hardwood pulp from open market purchases not required due to additional volumes available from Rayonier A.M. Canada G.P. traditional operating area. Additional volumes of white birch added to meet the mill's total requirements.	The total hardwood pulp volume required by the Temiscaming mill met with the additional volumes harvested from their traditional operating area. Additional hardwood pulpwood from other Overlapping Licensees will provide additional volumes higher mill demands are present.
KD Quality Pellets WSCP Conditional	63,000 m ³ /yr of Tolerant Hardwood pulp for pellet market (WSCP Offer)	Not met – 38,000 m ³ /yr identified	All remaining hardwood pulp has been made available to KD Quality Pellets, however it does not meet WSCP offer.

Processing Facility	Commitment Type	Requirement(s) Met?	Comments
Goulard Lumber Limited (1971)	30,000 of PWR (WSCP Offer) Open Market/ Shareholder 31,500 of PWR	Open Market/Shareholder and WSCP met	Requirements met with a heavier reliance on white pine volume (75%) compared to red pine volume (25%).

1

2 All but one commitment type can be met from the forecasted 10-year volumes. The full volumes
3 offered by the Crown to K.D. Quality Pellets are not available in the 2019 FMP. This volume has not been
4 in demand from the facility, and therefore non-achievement is not suspected to limit mill viability.

5 With the exception of Rayonier A.M. Canada G.P.'s mill in Temiscaming, (which is subject to a supply
6 agreement recognizing Ontario Crown wood flow outside the province), wood being shipped to Quebec
7 must first be offered to Ontario mills (as required by the "Northeast Region Procedure for Shipment of
8 Round wood Outside the Province"). The wood going to Quebec does help increase the level of
9 utilization on the Forest and helps maintain current employment levels for the licensees when local
10 markets are unable to utilize this material, i.e., when Ontario-based facilities are unable to
11 accommodate specific volumes then Quebec markets may be considered.

12 In the event of utilization problems during the 2019 Plan, NFRM and North Bay District MNRF will follow
13 the guiding principles outlined in the Northeast Region Operations Guide for Marketability Issues 2013
14 that was developed and endorsed by MNRF's North East Leadership Team. The publication of the
15 "Provincial Wood Report" on MNRF's website is one of the ways the Province is looking to attract new
16 industry to utilize this opportunity.

17 If the underutilization of the available harvest area continues on the Forest, objectives related to
18 economic outlooks, social elements and forest diversity aspects of the forest may not move towards
19 targets at the rate predicted in the LTMD of the 2019 FMP. The effects of underutilization on plan
20 objectives has been analyzed and reviewed by the planning team. The potential effects of
21 underutilization of the available harvest volume are discussed in the analysis package of this FMP, as
22 well as on an annual basis in annual reports.

23 During periods of greatly reduced market demand for conifer pulp a modified utilization strategy will
24 apply. The general direction for this strategy is provided in Supplementary Documentation 6.1.11 -
25 Prescriptions for Harvest, Renewal and Tending and Conditions on Regular Harvest, Roads and
26 Aggregate Pits, Section 6.0. Block-specific direction associated with this strategy will be provided in the
27 applicable Forest Operations Prescriptions. Log specifications will be documented by species and
28 contractor on a Block-by-Block basis and updates will be provided regularly to the MNRF.
29 Implementation of the modified utilization strategy will be confirmed with each Annual Work Schedule,
30 if necessary due to market conditions.

1 The approval of this FMP is not an agreement to make areas available for harvest to a particular
2 licensee, or an agreement to supply wood to a particular mill, but rather an identification of the wood
3 available for market, and the projected demand associated with the Forest.

4 4.3.5 Salvage

5 Currently there are no plans to undertake any salvage operations during the 2019-2029 plan period.
6 However, if a natural disturbance event occurs on the Forest that warrants a salvage harvest operation
7 an amendment may be made to the FMP. FMP-14 will be updated to include the additional natural
8 depleted area and estimated volume by species.

9 4.3.6 Contingency Area and Volume

10 Unforeseen circumstances such as blowdown, wildfire, insect damage or disease may cause some of the
11 planned harvest area to become unavailable for harvest during the ten-year period of the FMP. In order
12 to accommodate such circumstances contingency areas for harvest have been identified. The
13 contingency area is intended as replacement area for lost harvest opportunities. Contingency areas may
14 be later proposed as regular allocation harvest areas in the following FMP. The contingency areas are
15 identified and portrayed on the operations maps of the Plan.

16 Contingency areas were selected spatially across the Forest to support opportunities for all the
17 licensees. In general, contingency areas were located near existing roads or adjacent to proposed
18 allocations to allow for operational feasibility.

19 FMP-16 records the amount of contingency area by forest unit and age class with associated conifer and
20 hardwood volumes. The total contingency harvest volume equals 1,229,118 m³ which is comprised of
21 both conifer and hardwood volumes of 645,574 m³ and 583,544 m³ respectively.

22 There are 16,871 ha of contingency area identified in the plan, including 401 ha of red pine commercial
23 thinning. This total contingency area represents two years (20%) of the available harvest area. In
24 general, on a forest unit basis the intent was also to identify two years' worth of contingency,
25 particularly where disturbances may be more likely. The exceptions were the hemlock (HE) and lowland
26 conifer (MCL) forest units which are relatively small and not typically prone to natural disturbances.

27 4.3.7 Harvest Area Information Products

28 Harvest area information products define the spatial or map information included in the plan.

29 Information products associated with all the harvest areas identify and portray:

- 30 • The harvest block identifier
- 31 • The silvicultural system
- 32 • The harvest category (regular, bridging, second pass, salvage or contingency)
- 33 • The operational prescriptions for areas of concern (AOC)
- 34 • The silvicultural ground rule (SGR)
- 35 • If applicable, stand level residual requirements

36 The harvest area information products include:

- 37 • MU754_19PHR00.E00 – Planned Harvest
- 38 • MU754_19FDP00.E00 – Forecast Depletions
- 39 • MU754_19AOC01.E00 – AOC composite

- 1 • MU754_19AOC02.E00 – AOC road restrictions (that differ from other modified management
- 2 zones)
- 3 • MU754_19AOC03.E00 – AOC timing restrictions (that differ from other modified management
- 4 zones)
- 5 • MU754_2019_FMP_MAP_Index_00 – Index Map
- 6 • MU754_2019_FMP_MAP_OPS5405150 to 1 OPS7005120 – Operation Maps.

7 4.4 Renewal and Tending Operations

8 4.4.1 Renewal and Tending Areas

9 The projected and planned levels of renewal and tending operations associated with harvesting and
10 natural disturbances are summarized by treatment in table FMP-17. The treatments in the table are
11 consistent with the acceptable alternative silvicultural treatments in the silvicultural ground rules in
12 table FMP-4. The planned levels of renewal and tending (FMP-17) and associated expenditures (FMP-
13 19) are required to achieve the objectives described in the FMP.

14 All possible areas that may be eligible for renewal and tending operations for the 10-year term are
15 shown on the summary and composite map for renewal, tending and tree improvement. The areas
16 shown on the maps includes:

- 17 • all areas selected for harvest during the 10-year plan;
- 18 • all areas previously harvested or naturally disturbed during the 2009-2019 or previous FMPs
19 and not yet renewed and/or not yet declared established; and
- 20 • all areas which may require pre-commercial thinning.

21 From FMP-17, the planned regeneration treatments include:

- 22 ○ natural regeneration in clearcut, shelterwood, and selection silviculture systems for a total of
23 53,347 hectares;
- 24 ○ planting and aerial seeding in regular harvest areas for a total of 15,320 and 408 ha respectively;
- 25 ○ planting and aerial seeding in natural disturbance areas for a total of 47 and 11 hectares
26 respectively;
- 27 ○ re-treatments are estimated at 5% of all planted areas to account for the effects of drought for a
28 total of 768 ha;
- 29 ○ supplemental planting treatments within the HDSEL, HDUS, MCL, MW, PWUS, and SF forest
30 units for a total of 1,081 hectares.
- 31 ○ supplemental aerial seeding projects estimated as 1% of planted areas in BW, MW, PJ, PJSB, PO,
32 PR, PWST, SF forest units for a total of 393 ha.

33 The planned site preparation treatments include:

- 34 ○ mechanical treatments for a total of 17,811 hectares;
- 35 ○ aerial chemical treatments for a total of 7,945 hectares;
- 36 ○ ground chemical treatments for a total of 4,446 hectares;
- 37 ○ high complexity prescribed burning for a total of 120 hectares;
- 38 ○ an estimated 1,250 hectares of slash pile burning.

39 The planned tending treatments include:

- 40 ○ manual tending of plantations on harvested sites for a total of 2,172 ha;

- 1 ○ aerial chemical treatments of plantations on harvest and natural disturbance sites for a total of
- 2 20,049 and 47 hectares respectively;
- 3 ○ ground chemical treatments of plantations on harvested sites for a total of 250 hectares;
- 4 ○ high complexity prescribed burn on approximately 28 hectares;
- 5 ○ stand improvement concurrent with harvest operations for even-aged silviculture systems (clear
- 6 cut and shelterwood silvicultural systems) for a total of 4,904 hectares;
- 7 ○ stand improvement concurrent with harvest operations for uneven-aged silviculture systems (
- 8 HDSEL forest unit) for a total of 1,207 hectares.

9 The planned levels in FMP-17 were developed based on analysis of silvicultural activities (e.g., 2016
10 trend analysis that was prepared for the Year-7 annual report and the 2016 Independent Forest Audit)
11 including consideration of: previously harvested/naturally disturbed areas and the associated planned
12 treatments; planned vs actual silvicultural expenditures, planned vs target forest units, and the
13 effectiveness of SGRs, in addition to a review of the proposed harvest areas for the 10-year term of the
14 2019-2029 FMP. Recent effectiveness monitoring surveys are indicating that vegetation management
15 treatments before planting can reduce the number of tending treatments. This important consideration
16 was reflected in the planned levels of site preparation. Reflected in the planned level of mechanical site
17 preparation was the provision for scarification. This treatment is critical to ensure the best chance for
18 natural regeneration of white pine and yellow birch. Finally, the critical importance of tending was
19 demonstrated through the silvicultural effectiveness monitoring (SEM) program (choosing the correct
20 type and timing of tending treatments) and influenced the planned levels of tending.

21 The planned treatments in FMP-17 were used to develop the requirement for seed and planting stock
22 (Renewal Support, Section 4.4.2) and, in association with costs for each treatment, to develop the
23 planned expenditures table (Table FMP-19). The renewal and tending program is based on the full
24 utilization of the planned harvest area. The program will be reduced in accordance with the treatments
25 required to renew the actual harvest area.

26 Information products associated with all areas scheduled for renewal, tending, and protection are
27 submitted with the AWS.

28 4.4.2 Renewal Support

29 Cones will be collected from natural stands in the three seed zones on the Nipissing Forest (Zones 26, 27
30 and 28). Red pine, white spruce, black spruce, and red spruce cones may be collected from the Gurd
31 Tree Improvement Area and white pine and white spruce cones from the Mattawan Seed Orchard.
32 Contracts for cone collecting will include measuring, tagging, storing, and shipping cones to Millson
33 Forestry Service in Timmins, Ontario. All seed processing and seed storage for NFRM is done at Millson's
34 since the anticipated closure of the Ontario Tree Seed Plant in Angus, Ontario.

35 NFRM made a large investment in operational research during the 2009-2019 FMP period to assess and
36 compare the performance of nursery stock from a variety of sources. The results indicated that the best
37 performance, especially in red pine, was from PRT in Dryden, Ontario. Most of the nursery stock planted
38 on the Nipissing Forest is currently purchased from PRT in Dryden. They supply white pine, jack pine, red
39 pine, white spruce, black spruce, and red spruce.

40 Figures 4.4.1 to 4.4.3 provide estimates of seed and stock requirements for the duration of the 2019-
41 2029 plan period based on the assumption of all eligible areas being harvested and renewed.

1 **Figure 4.4.1. Nursery Stock Requirements for Tree Planting for the 2019-2029 period.**

Species	Seed Zone	Stock Type	Number of Trees Required ('000s)
Jack Pine	26	Container	1,094
Red Pine	26	Container	4,652
Red Pine	27	Container	388
Red Pine	28	Container	2,713
White Pine	26	Container	4,389
White Pine	27	Container	366
White Pine	28	Container	2,560
Black Spruce	26	Container	1,960
Black Spruce	28	Container	217
Red Spruce	26	Container	348
White Spruce	26	Container	5,431
White Spruce	28	Container	1,358
Red Oak	26	Container	18
Red Oak	28	Container	18
Eastern Hemlock	26	Container	4
Eastern Hemlock	28	Container	18
Total			25,532

2

3 **Figure 4.4.2. Seeds Required for Aerial Seeding for the 2019-2029 period.**

Species	Seed Zone	Number of Seeds Required ('000s)
Jack Pine	26	2,001
White Pine	26	1,201
White Pine	27	100
White Pine	28	700
White Spruce	26	2,606
White Spruce	28	651
Total		7,259

4

5 In addition, NRFM is targeting to supplement seed sources with up to 10% seed from additional
6 recommended climate-appropriate zones. NFRM is working with the Forest Gene Conservation
7 Association to identify appropriate seed zones and to develop strategies for seedling deployment for
8 jack pine, red pine, white pine, white spruce and red spruce seeds.

9

1

2 **Figure 4.4.3. Forecasted Seed Collection for the 2019 to 2029 period.**

Species	Seed Zone	Source of Seed Collection	Seed or Cones Required (hL)
Jack Pine	26	Bulk Stand	30
Red Pine	26	Bulk Stand	122
Red Pine	27	Bulk Stand	10
Red Pine	28	Bulk Stand	71
White Pine	26	Bulk Stand	312
White Pine	27	Bulk Stand	26
White Pine	28	Bulk Stand	182
Black Spruce	26	Bulk Stand	9
Black Spruce	28	Bulk Stand	1
Red Spruce	26	Bulk Stand	3
White Spruce	26	Bulk Stand	38
White Spruce	28	Bulk Stand	10
Red Oak	26	Bulk Stand	3
Red Oak	28	Bulk Stand	3
Eastern Hemlock	26	Bulk Stand	1
Eastern Hemlock	28	Bulk Stand	1

3

4 Red and white pine cones will preferably be collected during bumper crop years. The white and black
5 spruce targets for seed collection are directly related to supporting the forecasted harvest and renewal
6 levels associated with the SF forest unit. Red oak cannot be stored but will be collected on a periodic
7 basis to meet growing and sowing needs. In general, NFRM intends to have a minimum of five to ten
8 years' worth of available seed for each species.

9 The planting stock forecast includes provision to possibly continue with hemlock and red oak, although
10 natural regeneration appears to be robust and natural regeneration will be the preferred option for
11 regeneration.

12 NFRM manages tree seed consistent with the current policies, directions, and technical requirements for
13 the Province of Ontario. Direction with respect to climate change is expected in the near future which
14 may provide opportunities to plant seedlings from more southern seed zones. In this case, NFRM may
15 purchase seed from other SFL's to be planted in trial areas to support FMP Objective # 16 Improve the
16 resilience of the Nipissing Forest to possible effects of climate change.

17 Tree improvement activities on the Nipissing Forest SFL are primarily conducted at the Gurd Township
18 Research and Demonstration Area located approximately 60 kilometers south of North Bay and at the
19 Mattawan Township Seed Orchard located approximately 30 km northeast of Mattawa. The Gurd
20 Township Research and Demonstration Area is composed of 200 hectares of land that has a long history
21 of forestry research; this history dates back to the mid-1960s. The 6 ha Mattawan Seed Orchard was
22 revived during the last plan period and is now ready for white pine and white spruce cone collection.

1 These sites are identified on the summary and composite maps for renewal, tending and tree
2 improvement.

3 Anticipated tree improvement activities for the Nipissing Forest during the term of this plan are as
4 follows:

5 Gurd Tree Improvement Area

6 White Pine Progeny Test:

- 7 • The last data collection for the progeny test occurred in 2018. The test site is now ready for
8 thinning to create a seed production area. Annual maintenance (tending) for competition
9 control is planned.

10

11 White Spruce Seed Production Area:

- 12 • Possible topping of trees to facilitate cone collection
- 13 • Maintenance (tending) to remove competition
- 14 • Cone collection as required to meet seed demand

15

16 White Pine Seed Production Area:

- 17 • Possible Crown management to facilitate cone collection
- 18 • Maintenance (tending) to remove competition
- 19 • Cone collection as required to meet seed demand

20

21 Red Pine Seed Production Area:

- 22 • Possible Crown management to facilitate cone collection
- 23 • Maintenance (tending) to remove competition
- 24 • Cone collection as required to meet seed demand

25

26 Red Spruce Seed Production Area:

- 27 • Thinning as required promoting retention of lower branches
- 28 • Possible Crown management to facilitate cone collection
- 29 • Maintenance (tending) to remove competition
- 30 • Cone collection as required to meet seed demand

31

32 White Spruce Super Seedling Area:

- 33 • Thinning as required promoting retention of lower branches
- 34 • Possible Crown management to facilitate cone collection
- 35 • Maintenance (tending) to remove competition
- 36 • Cone collection as required to meet seed demand

37

38 White Spruce Natural Seed Collection Area:

- Thinning from below to maintain the seed producing spruce in a competition-free state

Mattawan White Pine Clonal Seed Orchard

- Tending to promote seed production on the surviving representatives

4.5 Roads

4.5.1 Primary and Branch Road Construction

The following is a summary of primary and branch road construction planned for the 2019 FMP. A number of proposed road corridors from the 2009 FMP were not constructed and are being shown again in the 2019 FMP. Supplementary Documentation 6.1.9 contains the rationale and use management strategy for each primary and branch corridor. Table FMP-18 identifies each primary and branch road planned for construction. The table also lists all the existing primary and branch roads proposed for use during the FMP.

Primary and branch road corridors are identified on the operations maps in Supplementary Documentation Section 6.1.18. As per the FMPM, primary and branch road corridors are 1 km in width. Road construction may take place anywhere within the approved corridors, however areas of concern may only be crossed within the specified area of concern crossing areas. Forestry aggregate pits and landing areas for road right-of-way wood may also be developed within the corridors. All road construction in these proposed corridors will follow the direction laid out in Supplementary Documentation Section 6.1.11 of this plan. All roads, sections of roads and networks transferred to the MNRF will be in a decommissioned state, unless otherwise defined in Table FMP-18 and the Road Use Management Strategy.

Primary Roads:

Primary roads provide principal access for the Forest and are constructed, maintained, and used as part of the main road system. The planned primary road corridors will access harvest areas and allow for access to conduct silviculture treatments for the next 10 years. The roads are intended to provide long term access to future harvest areas for the next 20 to 30 years.

Between the 16 primary road corridors there are a total of 170.62 km of primary road corridor proposed to be constructed during this FMP. Most of these roads are pre-existing to some degree as either a branch or operational road. After a review of the Nipissing Forest access plan these roads were classified as primary because of their planned long-term use. The primary road corridors are listed below with their associated proposed construction lengths.

- Bass Lake Road (19.07 km)
- Big Brothers Road (6.75 km)
- Big Jocko River Road (9.29 km)
- Clement Road (7.53 km)
- Crookstick Creek Road (7.45 km)
- Cucumber Lake Road (7.96 km)
- Frances Creek Road (13.5 km)

- 1 • Kearney Lake Road (6.42 km)
- 2 • Odorizzi Road (19.77 km)
- 3 • Red Pine Lake Road (7.71 km)
- 4 • Sag Lake Road (6.77 km)
- 5 • Sand Lake Road (11.48 km)
- 6 • Schell Lake Road (12.05 km)
- 7 • South Boulter Road (13.34 km)
- 8 • Spider Lake Road (4.12 km)
- 9 • Twin Ponds Road (17.4 km)

10 Of these proposed primary roads, three have access restrictions. Big Brothers Road has an existing gate
11 at an MTO aggregate permit towards the beginning of the road. Big Jocko River Road will have a berm
12 installed within five years of the completion of forest management activities (that involve the use of
13 heavy equipment). The South Boulter Road will have a water crossing removed towards the beginning
14 of the road. These access restrictions are a result of Moose Emphasis Areas being established on the
15 forest. Supplementary Documentation Section 6.1.9 contains more information on these specific access
16 restrictions. There are no proposed primary roads being transferred to the Crown.

17 **Branch Roads:**

18 Branch roads are roads that fork off an existing primary or branch road, providing access to, through or
19 between areas of operations on a management unit. The planned branch road corridors are intended to
20 provide long term access to future harvest areas for a period of over 10 years.

21 Between the 27 branch road corridors there are a total of 136.87 km of road corridor proposed to be
22 constructed during this FMP. Many of these roads are pre-existing to some degree as an operational
23 road. After a review of the Nipissing Forest access plan these roads were classified as branch because
24 they extend between operational road boundaries. The branch road corridors are listed below with their
25 associated proposed construction lengths.

- 26 • Afton Township Road (7.56 km)
- 27 • Anderson Lake Road (4.57 km)
- 28 • Bear Lake Road (5.89 km)
- 29 • Big Eagle Road (4.17 km)
- 30 • Coxie Landing Road (2.86 km)
- 31 • Deeryard Road (4.52 km)
- 32 • Field Township Road (5.54 km)
- 33 • Finlayson Lake Road (4.51 km)
- 34 • Fraser Creek Road (8.05 km)
- 35 • Grays Road (4.32 km)
- 36 • Hebert Creek Road (4.91 km)
- 37 • Heronry Road (6.57 km)
- 38 • Kangas Lake Road (3.36 km)
- 39 • Moose Pond Road (3.30 km)
- 40 • Little Rock Lake Road (3.69 km)
- 41 • MacBeth Township Road (8.85 km)

- 1 • Miners Lake Road (3.64 km)
- 2 • Number Two Creek Road (4.32 km)
- 3 • Perch Lake Road (2.11 km)
- 4 • Pinewater Lake Road (3.69 km)
- 5 • Pipeline Road (5.29 km)
- 6 • Poplar Lake Road (5.20km)
- 7 • Sinton Creek Road (7.91 km)
- 8 • Sobie Lake Road (6.82 km)
- 9 • South Cedar Road (4.01 km)
- 10 • South River Road (5.96 km)
- 11 • Veuve River Road (5.23 km)

12 Of these proposed branch roads, eight have access restrictions: Anderson Lake Road, Big Eagle Road,
13 Moose Pond Road, Miners Lake Road, Pinewater Lake Road, and Pipeline Road will all have berms
14 installed within five years of the completion of forest management activities (that involve the use of
15 heavy equipment). The Sobie Lake Road and the Veuve River Road will each have a water crossing
16 removed towards the beginning of the road, within five years of the completion of forest management
17 activities (that involve the use of heavy equipment). These access restrictions are a result of Moose
18 Emphasis Areas being established on the forest. Supplementary Documentation 6.1.9 contains more
19 information on these specific access restrictions. None of the new branch roads or sections of new
20 branch roads are proposed to be transferred to the Crown.

21 4.5.2 Operational Roads

22 Operational roads are contained within a defined operational road boundary and provide short term
23 access for harvest, renewal and tending operations. The FMPM defines an operational road boundary as
24 the perimeter of the planned harvest area plus the area from an existing road or planned road corridor
25 to the harvest area within which an operational road is planned to be constructed. New operational
26 roads planned for construction in this plan period must be within an operational road boundary.

27 Operational roads are not identified during the FMP planning process and are typically located during
28 the Annual Work Schedule stage. Water crossing assessments will be completed as described in section
29 4.5.6 below. The operational road boundaries have been designed to accommodate operational
30 flexibility for road location in consideration of terrain, stream crossings and AOCs. The perimeters of the
31 operational road boundary areas are greater than or equal to 1 km apart. Therefore, a network of
32 operational roads within an operational road boundary area may overlap more than one harvest block.
33 The harvest maps in section 6.1.18 illustrate the operational road boundary perimeters and
34 identification numbers.

35 AOC planning has been completed for all operational road boundary areas and is depicted on the
36 operational harvest maps in section 6.1.8. Operational roads are normally not maintained after they are
37 no longer required for forest management purposes and are often decommissioned. No new
38 operational road required for forest management purposes is planned to traverse a provincial park or
39 conservation reserve. FMP-18 identifies all the operational road boundary areas and the associated use
40 management strategy. The use management strategy for the operational road boundary areas, including
41 transfer and access restrictions, is further described in supplementary documentation section 6.1.9. All

1 road construction in these proposed operational road boundaries will follow the direction laid out in
2 section 6.1.11 of this plan.

3 4.5.3 Area of Concern Crossings - Primary and Branch Roads

4 In order to access the approved harvest allocations, many primary and branch roads need to cross
5 through AOCs due to terrain conditions or when no other reasonable alternative exists for the location.
6 In general, to minimize the impact on the AOC the intent is to cross within the modified portion of the
7 AOC and not the reserve portion, wherever possible or feasible.

8 Road construction through an area of concern must adhere to direction in the Operational Prescriptions
9 for Areas of Concern found in Section 6.1.10 of this FMP. Primary and branch road area of concern
10 crossings within road corridors are given high priority. Area of concern conditions must be followed
11 within the road corridors. The areas of concern prescriptions and the conditions on construction for
12 each individual AOC and road (or landing if applicable) are located in FMP-11.

13 For each new primary or branch road water crossing to be constructed, the location, crossing structure
14 and conditions on construction will be finalized in the applicable annual work schedules in accordance
15 with the Ministry of Natural Resources and Forestry/Fisheries and Oceans Canada Protocol for the
16 Review and Approval of Forestry Water Crossings. When possible, this will be completed a year ahead
17 of time. Public comments on the primary and branch road AOCs are included in the Supplementary
18 Documentation of the plan Section 6.1.9.

19 4.5.4 Area of Concern Crossings - Operational Roads

20 In order to access the approved harvest allocations, many operational roads need to cross through areas
21 of concern (AOCs) due to terrain conditions or when no other reasonable alternative exists for the
22 location. In general, to minimize the impact on the value the intent is to cross within the modified
23 portion of the AOC and not the reserve portion, wherever possible or feasible.

24 Road construction through an area of concern must adhere to the direction in the Operational
25 Prescriptions for Areas of Concern found in Section 6.1.10 of this FMP. Area of concern conditions must
26 be followed within the Operational Road Boundaries (ORBs). The areas of concern prescriptions and the
27 conditions on construction for each individual AOC and road (or landing if applicable) are located in
28 FMP-11.

29 For each new operational road water crossing to be constructed, the location, crossing structure and
30 conditions on construction will be finalized in the applicable annual work schedules in accordance with
31 the Ministry of Natural Resources and Forestry/Fisheries and Oceans Canada Protocol for the Review
32 and Approval of Forestry Water Crossings. When possible, this will be completed a year ahead of time.
33 Public comments on the primary and branch road AOCs are included in the Supplementary
34 Documentation of the plan Section 6.1.9.

35 Except under exceptional circumstances, such as safety, operational road rights-of-way through areas of
36 concern will not exceed 15 m in width.

37 4.5.5 Existing Roads

38 Currently, the Nipissing Forest is generally well accessed by roads. Most of the allocations will use a
39 series of existing roads of all classifications (primary, branch and operational) for access. Table FMP-18
40 lists the existing primary and branch roads, as well as the operational road networks. This table also
41 identifies whether the road is the SFL's responsibility or shared responsibility with the SFL and the
42 MNRF, with MNRF being the lead agency. The responsibility was assigned to either the forest industry

1 or the MNRF. Responsibility includes the monitoring of road conditions, and addressing potential or
2 existing personal and environmental hazards on the roads. This can include the closing of roads where
3 hazards exist. When the forest industry is responsible for a road, ongoing monitoring, maintenance and
4 emergency repair work will be prioritized to meet safety, environmental and industry operational needs.
5 It should be noted that emergency repairs to roads and water crossings might not be restored in a
6 timely manner if they are damaged or destroyed by unplanned events, such as a major storm. Also,
7 there is no obligation, on the part of the Crown or the forest industry, to undertake maintenance or
8 repair work on behalf of other users. These users may not have the resources to replace failed
9 infrastructure and access to businesses or properties could be disrupted at any time.

10 There are no mandatory safety standards with respect to road maintenance, however, the responsible
11 party should correct, when resources to do so are available, any identifiable or known hazardous
12 conditions that could be encountered unexpectedly and have the potential for serious consequences
13 (e.g. washouts or obstructions).

14 Users of all crown forest access road networks on the Nipissing Forest will use roads at their own risk.

15 The existing tertiary road networks identified in this table as being the responsibility of the forest
16 industry are those roads constructed by the forest industry in 2005/2006 or later. The 2005/2006
17 starting point was selected because MNRF began a program of signing Memorandums of Understanding
18 with the forest industry for water crossings in 2005/2006.

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

22 The associated road use management strategies can be found in Supplementary Documentation Section
23 6.1.9.

24 The transfer of road responsibilities between the forest industry and the MNRF will be in accordance
25 with the use management strategy for that particular road/road network. Generally, roads no longer
26 required by the industry for periods of five years or more will be considered by the forest industry for
27 transfer.

28 There is one section of the Porcupine Creek primary road that is proposed to be transferred to MNRF
29 responsibility, and this is reflected in Table 18 and the specific use management strategy.

30 [Conditions on Existing Roads and Landings](#)

31 If an existing road or landing intersects an area of concern, the appropriate conditions will be applied as
32 described in table FMP-11. If there are any additional conditions on roads or landings based on other
33 land use direction, from previous FMP commitments or developed by the planning team these
34 conditions will also be documented in Table FMP-11.

35 If an existing road and or landing is planned to be used for forest management purposes during the
36 period of the forest management plan, and where the road/landing does not intersect an area of
37 concern for a value, existing roads and landings will also follow the conditions in Supplementary
38 Documentation 6.1.11.

1 4.5.5.1 Road Information Products

2 For each existing road or road network that is the responsibility of the sustainable forest licensee and
3 other existing roads that will be used for forest management purposes and which are shared
4 responsibility, information products associated with road construction, maintenance, monitoring, access
5 controls and decommissioning identify:

- 6 a) the corridors for primary roads (20 years);
- 7 b) the corridors for primary and branch roads planned for construction (10 years);
- 8 c) the operational road boundaries (10 years);
- 9 d) the areas of concern within the corridors for primary and branch roads, operational road
10 boundaries, and the areas of concern that intersect existing roads;
- 11 e) the roads that will be maintained;
- 12 f) the roads and associated water crossings that will be monitored;
- 13 g) the segments of roads that currently have access controls and the segments of roads where new
14 access controls are scheduled, and the type of access control activities; and
- 15 h) the segments of roads that will be decommissioned, and the type of decommissioning activities.

16 Information products associated with all areas scheduled for road construction, maintenance,
17 monitoring, access controls and decommissioning portray:

- 18 a) the corridors for primary roads (20 years)
- 19 b) the corridors for primary and branch roads (10 years);
- 20 c) the operational road boundaries (10 years);
- 21 d) the areas of concern within the corridors for primary and branch roads, operational road
22 boundaries, and the areas of concern that intersect existing roads;
- 23 e) the segments of roads that currently have access controls and the segments of roads where new
24 access controls are scheduled; and
- 25 f) the segments of roads that will be decommissioned.

26 The road information products include:

- 27 • MU754_19ORB00.E00 – Operational Road Boundaries
- 28 • MU754_19ERU00.E00 – Existing Road Use Management Strategies
- 29 • MU754_19PRC00.E00 – Planned Road Corridors
- 30 • MU754_19AOC01.E00 – AOC composite
- 31 • MU754_19AOC02.E00 – AOC road restrictions (that differ from other modified management
32 zones)
- 33 • MU754_19AOC03.E00 – AOC timing restrictions (that differ from other modified management
34 zones)
- 35 • MU754_2019_FMP_MAP_Index_00 – Index Map
- 36 • MU754_2019_FMP_MAP_OPS5405150 to 1 OPS7005120 – Operation Maps

37 4.5.6 Road Water Crossings

38 The review and approval of the construction and decommissioning of water crossings will be in
39 accordance with direction in the Ministry of Natural Resources and Forestry/Fisheries and Oceans
40 Canada Protocol for the Review and Approval of Forestry Water Crossings (the Protocol). For each new
41 primary and branch road water crossing to be constructed, the location, crossing structure and

1 conditions on construction will be finalized in the applicable AWS (as per FMPM Part D, Section 3.2.5) in
2 accordance with the Protocol.

3 The decision framework in the Protocol will be used to assist in determining crossings that require an
4 MNRF, and if necessary, a Department of Fisheries and Oceans (DFO) review. Any approved water
5 crossing standards from this Protocol that will be used during forest operations are documented in
6 Supplementary Documentation Section 6.1.11. In addition to the applicable construction conditions, all
7 applicable water crossing standards will be documented in table AWS-1 under *Water Crossing Standard*
8 *Identifier*. In instances where a water crossing standard does not exist, an approved water crossing
9 standard cannot be met in its entirety, or where an operational management zone related to fisheries
10 has identified a need for MNRF review and approval, a MNRF review is required.

11 As per the Protocol, Operational Management Zones for fisheries have been established in the Nipissing
12 Forest. Rationale and documentation for the implementation of the Operational Management Zones, as
13 well as a map, can be found in Supplementary Documentation Sections 6.1.11, and 6.1.18, respectively.
14 Water crossings within the operational management zones require review and approval by the MNRF
15 and DFO (if necessary) and a water crossing standard cannot be applied.

16 The purpose for the Operational Management Zones is to protect specific fisheries habitat associated
17 with brook trout. Brook trout are known to have an affinity for and in many cases rely on small tributary
18 streams for spawning and rearing of early life stages. Water crossings on these streams may not be
19 appropriate, depending on the nature of the stream in question and the location of the crossing relative
20 to site specific habitat features. MNRF review of all crossings is required within the Operational
21 Management Zones identified in the Supplementary Documentation 6.1.18 – Map of Operational
22 Management Zones. The Operational Management Zone map may be updated periodically by the MNRF
23 North Bay District as improved data becomes available, and included with each Annual Work Schedule.

24 The water crossing standards represent additional measures to the specific conditions on the
25 construction, use, and decommissioning of water crossings in table FMP-11 as per the water crossing
26 standards and guidelines in the Forest Management Guide for Conserving Biodiversity at the Stand and
27 Site Scales and MNRF's Crown Land Bridge Manual.

28 4.5.7 Forestry Aggregate Pits

29 Forestry Aggregate Pits are exempt from the requirement for an aggregate permit under the Aggregate
30 Resources Act (ARA) as per the Exemption Criteria identified in Supplemental Documentation Section
31 6.1.11. Forestry Aggregate Pits are typically utilized for a ten-year period starting from the initial
32 aggregate extraction from the pit, however in many cases, partial cutting systems are used on the
33 Nipissing Forest, and as a result forestry aggregate pits are needed for periods of time that exceed 10
34 years. Forestry Aggregate Pits must remain within the road corridor or operational road boundary that
35 was identified in the AWS at the time the site was established. Refer to supplementary documentation
36 section 6.1.11 Prescriptions for Harvest, Renewal and Tending, and Conditions on Regular Operations for
37 Operational Standards for Forestry Aggregate Pits.

38 There are no planned aggregate extraction areas outside of operational road boundaries identified for
39 the term of the 2019-2029 forest management plan.

1 *Conditions on Forestry Aggregate Pits*

2 If a forestry aggregate pit intersects an area of concern, FMP-11 identifies if there are any conditions on
3 operations. Aggregate material must not be removed from an area of concern or within 15 metres of
4 the boundary of an area of concern, except in accordance with the conditions described in FMP-11.

5 If a forestry aggregate pit is planned to be used for forest management purposes during the period of
6 the forest management plan and it does not intersect an area of concern, any conditions on operations
7 are documented in supplemental documentation Section 6.1.11 Prescriptions for Harvest, Renewal and
8 Tending, and Conditions on Regular Operations.

9 *4.5.7.1 Aggregate Extraction Areas Information Products*

10 Information products associated with aggregate extraction areas identify:

- 11 a) the aggregate extraction area identifier; and
12 b) the areas of concern.

13 Information products associated with aggregate extraction areas portray:

- 14 a) the aggregate extraction area identifier; and
15 b) the areas of concern.

16 The aggregate extraction area information products include:

- 17 • MU754_19PAG00.E00 – Aggregate Extraction Areas (no aggregate extraction areas have been
18 identified outside of the ORBs in the FMP submission, therefore this layer is not submitted with
19 the final FMP).
20 • MU754_19AOC02.E00 – AOC road restrictions (that differ from other modified management
21 zones)
22 • MU754_19AOC03.E00 – AOC timing restrictions (that differ from other modified management
23 zones).

24 *4.6 Expenditures*

25 Table FMP-19 summarizes the projected expenditures for renewal and maintenance operations, and
26 renewal support for the Nipissing Forest for the 10-year planning term.

27 The forecast of silviculture expenditures was derived using the planned level of treatments documented
28 in table FMP-17 and the associated renewal support forecasts documented in Section 4.4.2. Those
29 forecasts were then associated with current actual costs to produce the estimated expenditures.
30 Silviculture expenditures are forecasted for both the renewal trust fund and the forestry futures trust
31 fund. This forestry futures trust expenditure relates to the second and third year of a three-year
32 program of Stand improvement in White Pine Shelterwood Stands (\$272,200) and Stand Improvement
33 Concurrent with Harvest in Degraded Hardwood and Conifer Stands (\$57,850).

34 The comparison between forecasted revenues and expenditures appears to confirm that the current
35 renewal stumpage rates when combined with forecasted harvest levels by species results in providing
36 sufficient revenue to implement the planned renewal program. Over the 10-year plan, the forecasted
37 annual revenues and expenditures are relatively close with planned expenditures exceeding projected

1 revenues by only 2% (Figure 4.6.1). The projected expenditures and revenues are an estimate and rely
2 heavily on the model assumptions of the distribution of management intensity across all forest units.

3 **Figure 4.6.1. Projected annual revenues (from the strategic model) and expenditures (from planned**
4 **operations, table FMP-19) for the 10-year plan period (000's).**

Stumpage Revenue	Silviculture Expenditures
\$3,183.72	\$ 3,248.80

6

7 The economic climate and associated market situation for the forest industry requires continuous
8 review of all operating costs. NFRM and the Shareholders review the renewal rates annually as they
9 relate to the renewal program. The review is done to ensure that the current rates for each trees species
10 and product are consistent with renewal expenditures required to maintain them. This process may
11 identify opportunities to possibly adjust and balance rates. The results of the review are shared and
12 discussed with the MNRF.

13 4.7 Monitoring and Assessment

14 4.7.1 Forest Operations Inspections

15 4.7.1.1 NFRM Compliance Plan

16 The Nipissing Forest 10-year strategic compliance plan has been developed in accordance with the
17 requirements of the Forest Compliance Handbook (2014), and MNRF's Forest Compliance Strategy
18 (2007). In general, the compliance plan describes the methods, intensity and frequency of forest
19 operation prescriptions, particular circumstances for which inspections will be conducted, and the
20 submission of inspection reports to the MNRF. The compliance plan provides further information and
21 detail for unique situations, past, present and anticipated compliance problems, compliance goals,
22 objectives strategies and expected results, corrective actions, inspection techniques, and roles and
23 responsibilities. The compliance plan is located in supplemental documentation section 6.1.19. A more
24 detailed compliance plan, which is consistent with the 10-year strategic compliance plan, is developed
25 annually and included as part of the annual work schedule.

26 The Forest Operations Information Program (FOIP), which is a MNRF web-based program, will be used to
27 document inspections, compliance issues and, if required, to track whether remedial actions have been
28 completed.

29 4.7.1.2 MNRF Compliance

30 The North Bay District MNRF will follow provincial direction and audit ten percent of forest operations
31 including harvest, access and renewal and maintenance. The District uses an approach for inspections
32 which considers the specific values and AOC on the individual sites and the compliance history of the
33 licensee to determine which inspections are audited annually.

34 The MNRF forest compliance plans are part of the North Bay District Annual Compliance Operations
35 Plans. The forest compliance plans are prepared in accordance with the Ontario Forest Compliance
36 Handbook. From the analysis, evaluation and approval of the annual Nipissing Forest compliance

1 components and operational activities, and from the review of past operations, MNRF North Bay District
2 plan for the allocation of staff and resources to ensure compliance obligations are met.

3 An integral part of district compliance plans is the application of MNRF's risk analysis and management
4 strategies related to its compliance monitoring of forest operations, as described in the Ontario Forest
5 Compliance Handbook. The focus for forest compliance planning is achieving the best risk management
6 decision in the planning and allocation of forest compliance monitoring resources, given all other
7 mitigating measures in place, so that an appropriate balance is struck among: minimizing the likelihood
8 of non-compliant occurrences; minimizing the probability of the failure of monitoring systems to detect
9 a non-compliance; and minimizing the amount of or adequately mitigating any loss or damage resulting
10 from a non-compliance.

11 All compliance inspections are completed by MNRF certified compliance inspectors.

12 The Forest Operations Information Program (FOIP), a MNRF web-based program, is used to document
13 inspection results, including in compliance operations, operational issues, corrective actions taken, and
14 remedies to address issues.

15 The Nipissing Forest Local Citizens Committee is provided, at each meeting, updates on forest
16 operations, including compliance issues. Semi-yearly field trips often include looking at active and
17 completed forest management projects, and include discussions on forest compliance. NFRM and
18 MNRF North Bay District have an open invitation to LCC members to accompany staff on field
19 inspections. Part of the presentation of the Annual Reports to the committee includes the summary of
20 forest compliance. In addition, LCC members are invited to participate in the Independent Forest Audits,
21 Forest Stewardship Council, and Sustainable Forest Initiative certification audits.

22 4.7.2 Exceptions

23 The FMPM requires an exceptions monitoring program be prepared for any operational prescriptions
24 contained in a FMP for AOCs or SGRs that differ from specific direction provided in a forest management
25 guide. The exceptions monitoring program describes methods that will be used to monitor the
26 effectiveness of the operational prescription.

27 None of the operational prescriptions planned or SGRs for implementation under this FMP are
28 exceptions to the approved forest management guides, therefore an exceptions monitoring program is
29 not required.

30 4.7.3 Assessment of Regeneration

31 4.7.3.1. Establishment Surveys

32 Table FMP-20 summarizes the areas (hectares) that were depleted and assigned to a SGR in all plan
33 periods and the area to be assessed for establishment during 2019-2029 period of the FMP by forest
34 unit and SGR. The planned assessment area is less than the area assigned to SGR because some of the
35 area has been assessed in previous plan periods. The source of the information for this table is a record
36 of applied SGRs, harvest/natural depletions, and silvicultural treatments. SGRs for each recorded
37 depleted polygon (harvest and natural) from the current plan and previous plans that had not been
38 reported as "Free-To-Grow" were updated to the equivalent SGRs in FMP-4 based on silvicultural
39 records. An SGR change layer was produced and will be submitted in the 2018-2019 annual report.
40 Performance surveys will not be conducted as per phase-in provisions of the 2017 FMPM.

1 A total of 46,157 ha of harvest and 1,743 ha of naturally depleted area is expected to be assessed for
2 establishment in the 10-year period of the FMP for an overall total of 47,900 ha (does not include
3 planned harvest areas for the 2017 to 2029 period). Of the total hectares to be assessed for
4 establishment in the 10-year period, 28,659 ha were harvested using the shelterwood silvicultural
5 system (14,479 ha PWUS, 13,851 ha HDUS, and 339 ha of other shelterwood) and require a final
6 removal cut before they can be assessed. It is important to note that over 7,000 ha of the 14,479 ha of
7 PWUS forest unit to be assessed have already received their first establishment survey.

8 Establishment Surveys provide a checkpoint in time where the degree of success of applied silvicultural
9 treatments in achieving the standards contained in the SGRs is measured. Establishment surveys in the
10 clearcut forest units are normally done when all regeneration and tending treatments are completed.
11 Establishment surveys in the shelterwood forest units are normally done when all regeneration and
12 tending treatments are done, including overstory removal treatments. At this point, the stands are
13 expected to meet regeneration standards and grow to a future forest unit as described in the SGR.
14 Sometimes, the survey indicates that another tending treatment is required to meet regeneration
15 standards or that trees have not yet reached the minimum height requirements. In those cases, the
16 appropriate treatment is prescribed and/or more time is allocated and the area is re-surveyed when the
17 stands are expected to meet the regeneration standards. The results of the surveys are reported
18 spatially in GIS coverages and discussed in the text of the annual report.

19 The scheduling of establishment surveys is driven primarily by the timing prescribed in the SGR and
20 partially by a disturbance block reconciliation process. A shapefile is produced annually that depicts all
21 disturbances by silviculture system/development stage/harvest year. It is then overlapped with all areas
22 previously declared free growing. This aids in the planning of efficient survey programs and ensures that
23 all disturbed area is accounted for.

24 A Forest Renewal Monitoring Protocol, Supplemental Documentation Section 6.1.8, identifies the
25 method and timing of surveys at the establishment stage of effectiveness monitoring. Establishment
26 surveys in clearcut and shelterwood forest units will be conducted using a variety of techniques. For
27 homogenous areas of regeneration, a calibrated ocular assessment of the regeneration by a trained and
28 skilled forester or technician will be conducted (usually on the ground, or for large blocks with poor
29 access, from the air). For areas where there is greater variability in species composition and site
30 conditions, a more detailed sampling procedure will be implemented (SOI or site occupancy survey) to
31 ensure that the surveyed area results are an accurate reflection of the state of regeneration for that
32 area. Plot clusters are pre-established using a sampling intensity to adequately capture the variability of
33 the site. Data is collected at each plot and includes: tree species present, height, and competitive status.
34 In the case of shelterwoods, information is also collected on overstory and mid-story tree species. The
35 Site Occupancy survey method provides stocking results and confidence intervals for both crop and
36 acceptable species. For most SGR's, SOI predicts minimum densities based on one well-spaced tree per
37 plot, except for the HDUS-HDUS SGR, where higher densities are normally required for higher quality crop
38 trees. In this case, up to 5 stems per species per plot are tallied. MNRF is in the process of developing
39 new direction with respect to survey methodologies, however, these have not yet been released and
40 phase-in provisions do not require 2019 FMP's to implement them.

41 PWUS forest units receive two formal establishment surveys. The time between the regeneration cut
42 and the final removal cut of the PWUS forest units can be as long as 20-40 years depending on the

1 number of cuts and site conditions, largely because white pine need to remain under shelter until the
2 risk of infection by white pine weevil is reduced (normally when white pine regeneration reaches 5-6 m
3 in height). Frequent monitoring is required to ensure that silvicultural treatments are done at the most
4 appropriate time to ensure success. Several informal surveys are done after the regeneration cut to
5 prescribe silvicultural treatments. A formal site occupancy survey is normally done at year 10-12 and the
6 results are reported in the text of the annual report. A second establishment survey is done when all
7 regeneration and tending treatments are done, including overstory removal treatments. The results of
8 the surveys are reported spatially in GIS coverages and discussed in the text of the annual report.

9 Hardwood stands managed under single tree selection are considered perpetually established as long as
10 the management standards are met. The prescription is developed by a registered professional forester
11 using data collected during a pre-harvest stand assessment, the stands are marked by a certified tree
12 marker, tree marking audits are done to ensure that the prescription was followed, and a compliance
13 survey is done to ensure that harvesting is done following Conditions on Regular Operations described in
14 Supplementary Documentation Section 6.1.11. Sugar maple regeneration is normally abundant under
15 the high shade conditions of stands managed under single tree selection and recruitment generally
16 occurs when tree marking and harvesting are done following guidelines. Any problems can be identified
17 and reported by RPF's, certified tree markers, logging contractors or compliance inspectors during their
18 activities. Increased monitoring can be implemented in problem areas.

19 The results of the surveys are reported annually and summarized in year 5 and year 10 in table AR-14 of
20 the Annual Report. The results are also used to update the Forest Resource Inventory before production
21 of the next forest management plan.

22 Establishment surveys are one component of a balanced effectiveness monitoring system. The NFRM
23 system includes the following components: treatment implementation, operational monitoring, and
24 focused trial monitoring.

25 *4.7.3.2 Treatment Implementation*

26 The silvicultural treatments described in the SGRs are harvest and logging method, site preparation,
27 regeneration, and tending. As these treatments are being implemented on the ground, a variety of
28 quality control or performance measures are being administered and documented. These are described
29 in detail in the Forest Renewal Monitoring Protocol, Supplementary Documentation Section 6.1.8.

30 The harvest and logging methods are continuously monitored for compliance to standards for site
31 damage, residual tree damage, skid trail coverage, area of concern protection, tree or patch retention
32 requirements, etc.

33 Mechanical site preparation is monitored mainly in terms of site coverage and mineral soil exposure.
34 The efficacy of chemical site preparation is closely monitored to ensure judicious and effective use of
35 herbicides. The information is used to refine future treatment prescriptions.

36 Trees being grown by nurseries are subject to quality specifications including foliar nitrogen levels.
37 Mandatory stock testing is being implemented where frozen stored trees are procured.

38 During tree planting projects, quality assessments are conducted continuously and are used to support
39 payment levels to contractors. Tree handling procedures and specific planting methods are also
40 monitored.

1 Manual tending projects are monitored in support of contractor payment. Quality control to ensure
2 that the prescription is properly followed is critical to success of this high cost treatment. The efficacy of
3 chemical tending treatments reparation is closely monitored to ensure judicious and effective use of
4 herbicides. The information is used to refine future treatment prescriptions and provides a base upon
5 which options for application rates/methods and alternatives can be analyzed in a logical manner.

6 Once all the previously described treatments have been implemented, they are reported annually to the
7 MNRF. These activities are documented in GIS coverages and recorded in the Annual Report tables.

8 *4.7.3.3 Operational Monitoring*

9 The operational monitoring program strives to:

- 10 1. ensure the effectiveness of high cost artificial regeneration treatments;
- 11 2. capture as much low-cost natural regeneration as possible in the partial cut systems;
- 12 3. build a robust database of forest unit/ecosite based treatments and their related performance
13 to facilitate analysis that would identify best bet practices or treatment combinations.

14 Once the renewal treatments have been implemented the operational portion of the effectiveness
15 monitoring process begins. The process in place for NFRM (Forest Renewal Monitoring Protocol) is
16 documented in detail in Supplementary Documentation Section 6.1.8.

17 Generally, stands harvested using the clearcut silviculture system can be renewed through natural
18 regeneration (Extensive), CLAGG or seeding (Basic), or planting (Intensive). A temporary sample plot
19 system is described for planting/fill planting/seeding with the intent of: monitoring crop tree
20 performance, determining tending requirements, detecting insect, disease, and wildlife problems; and
21 monitoring ingress of natural regeneration. The process for monitoring natural renewal is focused on
22 verification and reporting natural regeneration prescriptions and occurs within 2-5 years of the
23 completion of harvest activities. Supplemental treatments directed at conifer dominated areas, if
24 required, will be prescribed at that time.

25 PWUS-PWUS-1R and PWUS-PWUS-2R forest units can be renewed using scarification, chemical site
26 preparation, natural regeneration, or planting/fill planting and any combination of the above. They
27 almost always require tending. These areas are frequently assessed (every 2 to 3 years) using ocular
28 surveys until crop tree regeneration is established to detect changes in: light levels, seed crops, mid-
29 storey interference, crop tree ingress and growth, development of competitive vegetation, and the
30 presence of insects or disease. If a regeneration cut or first removal cut requires supplemental planting
31 the process described for planting is initiated. An establishment survey (#1) is conducted at a fixed time
32 from a regeneration cut to document the status of the regeneration. If the regeneration establishes
33 prior to that fixed time, and if specific conditions are met, the first removal cut can occur. In some
34 cases, if the specified time has elapsed and the establishment survey reveals that the regeneration has
35 not fully established then management decisions will intervene to address concerns including but not
36 limited to site preparation, fill planting, tending and/or reinitiating a harvest to create more suitable
37 conditions (both light and ground) for supplemental or retreatment activities. The establishment survey
38 #2 is conducted after the final removal so that the effects of harvesting are accounted for and reported
39 in the Annual Report as a shapefile and discussed in the text.

1 The treatment pathways in the 2-Cut Hardwood Shelterwood system are based on management
2 objectives: choices are managing for hard maple, or, moving towards or maintaining mid-tolerant
3 species (By, Or, Cb) with or without scarification, or, with supplemental planting/sowing. Supplemental
4 planting / sowing is included in some but not all HDUS SGRs, and only where the future forest unit is not
5 HDUS. Where the probability of successfully acquiring hard maple regeneration is quite high, only ocular
6 survey to confirm the presence of crop trees would occur. Where mid-tolerant species management
7 w/without scarification is the focus, frequent (every 2-3 years) ocular surveys will occur until crop tree
8 regeneration is established. The intent is to detect changes in: light levels, seed crops, mid-storey
9 interference, crop tree ingress and growth, development of competitive vegetation, and the presence of
10 insects or disease. If the site requires supplemental planting or sowing the process described for
11 planting is initiated. The establishment survey would then be conducted after the final removal so that
12 the effects of harvesting are accounted for.

13 Under single tree selection, regeneration of the shade-tolerant species occurs naturally, after each
14 periodic partial harvest, and cohorts of many different ages develop, eventually achieving the all-age
15 structure (size classes) prescribed for management. Normally, regeneration recruits in abundance, and
16 is released with each subsequent harvest. Prior to each harvest, the stand condition is surveyed and
17 documented on a pre-harvest assessment compilation sheet (PHACS). That sheet will prescribe to the
18 tree marker the species, size and quality classes to mark for removal. The sheet will document: the
19 residual Basal Area target; movement toward ideal size class structural targets as established in FOP; the
20 desired AGS/UGS ratio target and the resulting percentage AGS improvement to be achieved by the
21 marking. The tree marking audit results will be documented on the same sheet and the resulting
22 percentage AGS improvement will be recorded. Harvest compliance inspections will reveal if logging
23 damage to the site and the residual stand is below the standard. If not, then a formal damage
24 assessment survey will be done and the results recorded and reported in the Annual Report. It is
25 anticipated that the MNRF may soon require additional post-harvest stand attribute data to be
26 submitted as part of the Annual Report. This information would also be used to update the Forest
27 Resource Inventory.

28 Another possible pathway of management for a Selection stand is when Opportunistic Group openings
29 are implemented in an effort to maintain the presence of mid-tolerant species (By, Or, Cb). In these
30 cases, an ocular survey will be conducted every 2 years from harvest or annually from the year of
31 supplemental treatments until the crop trees are established.

32 A database is maintained for each block with the following information: depleted forest unit, silvicultural
33 treatments, and established forest unit. The database is updated each year with establishment survey
34 data and is used to perform the analysis of silvicultural activities. This analysis informs future types and
35 levels of renewal and tending treatments for achieve plan objectives.

36 4.7.4 Roads and Water Crossings

37 The monitoring program for all roads that are the industry's responsibility will include a physical
38 inspection of bridges on an annual basis. Culverts will be inspected every three years (or sooner if there
39 has been a major weather event). Roads will be monitored for proper crowning, ditching, sight lines and
40 other safety and environmental concerns. The monitoring program will be conducted and documented
41 by NFRM on behalf of all of the licensees.

1 MNRF will continue to implement focused monitoring and compliance efforts on water crossing
2 construction and decommissioning projects as per this FMP and associated AWSs, the requirements of
3 the MNRF Forest Compliance Handbook, and the Ministry of Natural Resources and Forestry/Fisheries
4 and Oceans Canada Protocol for the Review and Approval of Forestry Water Crossings.

5 4.7.5 Species at Risk

6 This section applies only when the FMP is proposed to be designated as a Section 18 Overall Benefit
7 Instrument under the Endangered Species Act. The FMP is not designated as an ESA Section 18 Overall
8 Benefit Instrument; therefore, this section does not apply.

9 4.8 Fire Prevention and Preparedness

10 All forest operations on the Nipissing Forest will be carried out with careful consideration to the
11 prevention of forest fires. It is recognized that accidental fires can have a larger impact on annual
12 operations or timber sustainability than many harvest or silvicultural operations. Operators must also
13 be prepared to safely take on initial actions to prevent fire spread, should a fire occur. In addition,
14 operators must be aware of other prevention measures in the Forest Fires Prevention Act and
15 associated regulations.

16 Under the authority of the Forest Management Planning Manual and the Crown Forest Sustainability
17 Act, conditions are placed on forest operations through the Annual Work Schedule to provide for fire
18 prevention and preparedness.

19 4.8.1 Licensee/Contractor - MNRF Fire Contact

20 The principal contact person(s) for each operation is identified in the Annual Fire Plan. This table
21 identifies each Licensee and the contractor that will be involved in harvesting and silvicultural
22 operations during the period of this AWS. It will be the responsibility of NFRM, as the prime licensee, to
23 ensure that any new contractors or Overlapping Licensees are added to this table (and the other tables
24 in this fire plan) and forwarded on to the local MNRF Fire Management Supervisor, prior to the start of
25 operations.

26 Digital files containing composite maps showing areas where all harvesting, road construction/
27 maintenance and silvicultural activities will be occurring during the year can be found in the geo-spatial
28 data layers of each annual work schedule. In addition to this information, a table showing where
29 operations will be during the year and when NFRM will be conducting inspections can be found in the
30 annual compliance plan, which is also part of the AWS submission.

31 4.8.2 Fire Prevention

32 During periods of high fire danger, forest operations will be restricted or suspended according to the
33 guidelines developed by the forest industry and the MNRF called "Modifying Industrial Operations
34 Protocol (2011)". This Protocol was developed to prevent forest fires during high hazard periods by
35 prescribing when, and under what circumstances, operations would be subject to; Short Shift, Restricted
36 Shift, Shutdown, or specific Prevention measures. Forest workers will utilize the MNRF's Forest Users
37 Information phone line or website to find out the fire danger level for their areas and to determine what
38 modifications to make to their operations.

1 The Modifying Industrial Operations Protocol will also provide an incentive for forest operators to
2 become trained and capable with respect to fire suppression, which allows them to operate under
3 slightly higher fire danger conditions.

4 Trained & Capable status will be maintained by meeting each of the following criteria:

- 5 • Prevention: Implementation of an effective prevention program for the type of operation, as
6 outlined in the Fire Prevention and Preparedness Plans.
- 7 • Suppression: Minimum resource and equipment availability as identified in the Modifying
8 Industrial Operations Protocol (Modifying Industrial Operations Protocol Section 1.2 Fire
9 Suppression Equipment).
- 10 • Communication: The ability to communicate and report fires immediately and to receive or
11 obtain updated information on the fire danger.
- 12 • Immediately means – two-way radio or telephone capabilities from the site to the company or
13 MNRF office
- 14 • Training: A minimum of 25% of all staff involved in forest operations on a particular site must be
15 trained to the MNRF SP-102 standard

16 Licensees and their contractors will implement refresher training on a regular basis to ensure that their
17 staff are proficient with the material covered within the SP-102 course at the start of the fire season
18 (usually when operations start back up from the spring break-up). The Modifying Industrial Operations
19 Protocol is also covered during NFRM spring training sessions for Licensees and contractors.

20 A fire preparedness inspection will be completed for all operations by Licensees and contractors prior to
21 the start of operations. Industry FOIP reports will be prepared by NFRM after operations start. The FOIP
22 reports will describe compliance or any incidents of non-compliance with the requirements.

23 A minimum of one inspection will be completed on 50% of the active forest harvest operations during
24 periods of high fire danger and Industry FOIP reports will be submitted.

25 A fire preparedness inspection will also be conducted by NFRM Staff for all renewal operations (tree
26 plants, slash pile burning etc.) prior to start up. Silvicultural contractors will not be allowed to start until
27 all requirements have been met.

28 All industry FOIP reports regarding fire compliance will include details outlining location, type and
29 condition of the fire equipment.

30 All operations will be classified into one of 4 levels of operational risk which are Low, (L) Moderate (M)
31 High (H) or Very High (VH). Local MNRF Fire Management personnel may be called to assist in
32 determining the degree of risk presented by the forest operations and assist in determining the level of
33 fire prevention and suppression preparedness required for the forest operation.

34 One of the keys to any successful fire prevention program is good communications. When resources are
35 available, the spring compliance meeting will provide a start to familiarizing Company and MNRF fire
36 staff with each other and to review how operations will be modified if the fire danger increases.

37 NFRM will work with forest workers to promote fire prevention awareness to other forest users during
38 periods of high fire danger. Company field staff are encouraged to discuss fire prevention with campers,
39 berry pickers, fishermen etc. as they are encountered in the bush. Operations will be encouraged to post

1 signs indicating the fire danger hazard levels on their operations. The company will participate when
2 possible in public notices through different media related to fire bans.

3 Monitoring of activities during the fire season will focus on checking that the required fire suppression
4 equipment is in place and ready to be used. Operators will check their required fire equipment daily
5 prior to starting work. Attention will also be made to the storage of flammable fuels and the parking of
6 equipment on mineral soil. Each operation should be visited once a month during the fire season.

7 The overall success of a fire management program depends on quick response as soon as fire is
8 discovered. Forest workers will be made aware of their responsibilities to prevent fires, to start initial
9 suppression and to report fires to the MNRF Aviation Forest Fires and Emergency Services (AFFES)
10 Headquarters.

11 Fire reporting to the MNRF will occur in a number of ways. A number of licensees have their own
12 internal radio communication system that allows operators to report fires to their office and then the
13 report is phoned into the MNRF. Many contractors and individuals also have cellular phones and can
14 directly report fires to the MNRF. All methods of two-way communication for anyone involved in
15 operations must be immediate.

16 During periods of high fire danger, particularly in periods of modified operations, patrols by contractors
17 and company supervision will be made of the job site after operations have shut down for the day. The
18 level of inspections/patrols will be geared to the requirements for the situation, but all
19 inspections/patrols will continue for at least one hour after work ceases at all locations.

20 If a fire is discovered, Company and/or forest workers will take immediate action to start suppression
21 and to report the fire to the MNRF. The Company and forest workers agree to keep track of the labour
22 and equipment used until the MNRF takes over. The minimum required information to be reported to
23 the MNRF includes: a) discovery time of the fire, b) expected cause of the fire if known, c) location of the
24 fire, d) size of the fire, e) access to control the fire, f) fuel types and g) other values in the area.

25 The annual fire plan will contain detailed operating procedures around normal operations and escalated
26 fire operations. It will outline:

- 27 • Company, contractor and MNRF contact information
- 28 • Fire suppression equipment required
- 29 • Licensee fire training records
- 30 • Company and contractor equipment available for fire suppression activities
- 31 • Fuel keys and definitions related to modification levels to guide operations
- 32 • Standard operating procedures and good management practices related to fire prevention on
33 the management unit.

34 4.9 Comparison of Proposed Operations to the Long-Term Management Direction

35 Upon completion of the proposed management strategy, with consideration for the balance of
36 numerous management objectives, the projection of harvest area by forest unit, age-class and
37 silviculture intensity was identified on the landscape as planned allocations. A preliminary comparison of
38 the operational planned allocations against the strategic direction was performed. Results were

1 summarized as part of the long-term management direction, as well as the proposed operations phases
2 of the plan.

3 Following consultation with the public, proposed harvest areas were revised and another verification
4 run was executed and the results were re-evaluated based on changes to the allocations. This section
5 outlines considerations given to the areas selected for harvest, and how they continue to progress
6 toward achievement of the long-term management direction, and any impact on short, medium and
7 long-term objective achievement.

8 In order to successfully run the model with the selected allocations entered as planned operations, a
9 few small adjustments had to be made to the planned operations input to facilitate a feasible solution as
10 there were two items documented as problematic for the SFMM model (i.e., the 1.3.9 model run, FMPM
11 Section A 1.3.9). The first was a simple decimal problem and was also encountered in development of
12 the 2009 FMP. Several forest unit age-class totals had to be reduced because a decimal place exceeded
13 the operable area in the model, either via GIS processing errors, or operability limitations related to
14 shelterwood forest units, or model order of operation processed. The second issue was related to area
15 in deferrals as a result of the forecast depletion exercise. If an area was forecasted for depletion, and
16 then re-allocated on the basis of new information provided to indicate the area would not be harvested
17 in the current Plan, the result is allocated area that the model believes to already be depleted. These
18 areas would obviously be prime candidates for allocation into the new Plan, and yet, unavailable in the
19 model. This caused complications and was usually related to small areas in a few forest units.

20 Comparisons of projected and planned harvest areas are summarized in FMP-12. The available projected
21 harvest area calculated by SFMM is an optimal allocation which does not take into account spatial
22 constraints or administrative boundaries such as traditional operating areas for licensees. In the
23 management strategy, SFMM allocates age classes to minimize volumes lost to succession and stand
24 decline. The actual planned allocation is subject to many other constraints, including access and block
25 size, which accounts for the variability between the available projected harvest area and the planned
26 harvest area.

27 The management strategy was based on a binding model run, meaning that the volume targets were
28 absolute minimums, just as the ecological and common management assumption targets were in every
29 run completed as part of the plan. In a binding scenario, if the model cannot achieve the volume targets
30 without breaking ecological or silvicultural rule sets, the solution is infeasible. In a non-binding scenario,
31 the model will strive towards volume targets, but will solve on the basis that the volume achieved was
32 the maximum available with consideration of other objectives. Initial assessments of the comparison of
33 planned operations to the management strategy were tested in a binding environment. This was re-
34 evaluated when the solution appeared to harvest more hectares in order to meet the exact volume
35 figures as the management strategy. In reality some acceptable variation could be expected in the
36 volume projection results, depending on specific site and stand conditions of the allocations. What is
37 more important to consider is the ecological targets set in the management strategy and what the
38 impact to harvest on the ground will have on achievement of those targets.

39 The variations between available and planned harvest area are largely seen as age-class variations, i.e.,
40 there are some planned harvest areas that are younger than the preferred minimum harvest age.
41 Overall, the level of substitution of younger stands than the modelled minimum operability range is
42 2.1%, i.e., of the total regular area allocated, less than 1,800 ha is below the minimum operable age for

1 each forest unit, as estimated in the inventory. For the most part, these younger areas are where the
2 interpreted inventory age is younger than actual age, determined from harvest records, field
3 verification, or imagery; or where inventory age is 10 years younger or less than the operable age. For
4 instance, some areas are confirmed to be pockets of red pine that is suitable for commercial thinning
5 but were described as part of a larger stand. Many of these areas also involve small edges of stands that
6 have inclusions of multiple cohorts and have been included within blocks (i.e., slivers that were not
7 netted out during GIS processing). An exception is in the LWMX forest unit where the minimum
8 operable age is quite high at 100 years and there are 157 ha of allocated area that is less than 100 years
9 old. While this is a small area, it is a notable proportion of the LWMX allocation which is very small, and
10 all of the area is at least 70 years old.

11 The average modelled age for all harvest allocations for the management strategy is 101 years, while the
12 average modelled age for planned harvests, in the SFMM A-1.3.9 run is 95 years. A separation of only 6
13 years between planned and strategic ages is an improvement of over results from the previous two
14 forest management plans. The averages for the 2009 plan were 108 years for the management strategy,
15 and 100 for the planned harvest areas.

16 A further comparison is made between all of the eligible stands in the planning inventory, and the sub-
17 set of stands from the planning inventory that are identified for planned allocations. The area-weighted
18 average site class, age, stocking and species composition is presented in Figure 4.9.1, illustrating the
19 relative differences between all of the eligible areas and those selected for harvest. All of the stand
20 attributes are very similar between planned and eligible areas, indicating that allocated stands are highly
21 representative of the average condition available on the forest.

1 **Figure 4.9.1. Comparison of stand attributes by forest unit between all eligible stands and planned**
 2 **harvest areas.**

Eligible - all (planning inventory)

Site																										
PLANFU	Class	Age	Stocking	AB	AW	BD	BE	BF	BW	YB	CB	CE	HE	IW	LA	MH	MR	OC	OR	PJ	PO	PR	PW	SB	SW	
BW	2.1	90	0.73	0.01	0.00	0.00	0.00	0.02	0.46	0.02	0.00	0.01	0.00	0.00	0.00	0.05	0.11	0.00	0.01	0.00	0.17	0.01	0.03	0.07	0.03	
BY	1.8	102	0.75	0.01	0.00	0.00	0.00	0.04	0.04	0.47	0.00	0.04	0.04	0.00	0.00	0.12	0.08	0.00	0.01	0.00	0.02	0.00	0.02	0.04	0.06	
HDSEL	1.5	101	0.81	0.00	0.00	0.00	0.01	0.00	0.02	0.16	0.00	0.00	0.04	0.00	0.00	0.64	0.07	0.00	0.02	0.00	0.01	0.00	0.00	0.00	0.01	
HDUS	1.8	99	0.74	0.01	0.00	0.01	0.02	0.02	0.05	0.13	0.00	0.01	0.04	0.00	0.00	0.32	0.18	0.00	0.10	0.00	0.03	0.00	0.03	0.02	0.02	
HE	1.6	139	0.74	0.01	0.00	0.00	0.00	0.01	0.03	0.16	0.00	0.02	0.51	0.00	0.00	0.08	0.07	0.00	0.01	0.00	0.01	0.00	0.04	0.04	0.01	
LWMX	2.4	97	0.72	0.50	0.00	0.00	0.00	0.02	0.05	0.07	0.00	0.09	0.02	0.00	0.01	0.01	0.06	0.00	0.00	0.00	0.04	0.00	0.01	0.08	0.02	
MCL	2.0	108	0.67	0.02	0.00	0.00	0.00	0.03	0.04	0.02	0.00	0.19	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.51	0.01	
MW	1.9	94	0.71	0.01	0.00	0.00	0.00	0.07	0.20	0.07	0.00	0.05	0.01	0.00	0.00	0.05	0.13	0.00	0.01	0.01	0.11	0.01	0.06	0.16	0.05	
PJ	2.1	93	0.72	0.00	0.00	0.00	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.76	0.02	0.01	0.01	0.10	0.00	
PJSB	2.2	94	0.66	0.00	0.00	0.00	0.00	0.02	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.01	0.53	0.05	0.03	0.05	0.17	0.01	0.01	
PO	2.2	84	0.68	0.01	0.00	0.00	0.00	0.02	0.10	0.01	0.00	0.00	0.00	0.00	0.01	0.10	0.00	0.01	0.00	0.60	0.01	0.02	0.05	0.03	0.03	
PR	1.6	110	0.70	0.00	0.00	0.00	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.01	0.01	0.10	0.63	0.13	0.02	0.01	
PWST	1.9	104	0.69	0.00	0.00	0.00	0.00	0.03	0.13	0.03	0.00	0.02	0.01	0.00	0.00	0.02	0.07	0.00	0.01	0.03	0.11	0.10	0.29	0.13	0.03	
PWUS	1.9	115	0.63	0.00	0.00	0.00	0.00	0.01	0.06	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.04	0.00	0.04	0.01	0.06	0.15	0.52	0.06	0.01	
SF	1.5	97	0.69	0.00	0.00	0.00	0.00	0.10	0.10	0.02	0.00	0.07	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.03	0.04	0.01	0.08	0.45	0.06	

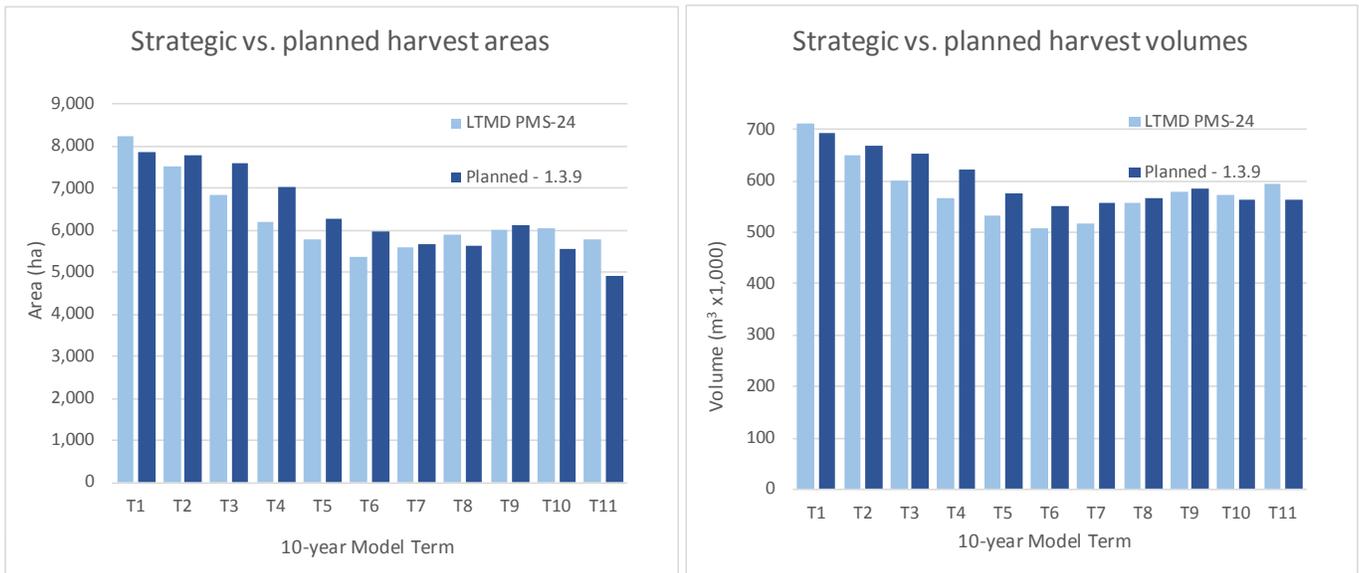
Planned harvest, regular allocations (excluding reserves)

Site																										
PLANFU	Class	Age	Stocking	AB	AW	BD	BE	BF	BW	YB	CB	CE	HE	IW	LA	MH	MR	OC	OR	PJ	PO	PR	PW	SB	SW	
BW	2.0	89	0.76	0.01	0.00	0.00	0.00	0.02	0.50	0.02	0.00	0.01	0.00	0.00	0.00	0.05	0.10	0.00	0.01	0.01	0.15	0.01	0.03	0.06	0.03	
BY	1.8	101	0.78	0.01	0.00	0.00	0.00	0.03	0.04	0.48	0.00	0.03	0.05	0.00	0.00	0.14	0.08	0.00	0.01	0.00	0.02	0.00	0.01	0.04	0.05	
HDSEL	1.4	100	0.82	0.00	0.00	0.00	0.01	0.00	0.02	0.17	0.00	0.00	0.04	0.00	0.00	0.65	0.06	0.00	0.02	0.00	0.01	0.00	0.00	0.00	0.01	
HDUS	1.7	97	0.75	0.00	0.00	0.01	0.03	0.01	0.06	0.15	0.01	0.01	0.04	0.00	0.00	0.38	0.15	0.00	0.08	0.00	0.03	0.00	0.02	0.02	0.02	
HE	1.5	140	0.75	0.01	0.00	0.00	0.00	0.01	0.04	0.16	0.00	0.02	0.52	0.00	0.00	0.08	0.07	0.00	0.01	0.00	0.01	0.00	0.03	0.03	0.01	
LWMX	2.2	93	0.71	0.51	0.00	0.00	0.00	0.03	0.05	0.09	0.00	0.09	0.02	0.00	0.00	0.03	0.00	0.01	0.00	0.03	0.00	0.02	0.10	0.03	0.03	
MCL	1.8	105	0.68	0.04	0.00	0.00	0.00	0.03	0.06	0.01	0.00	0.17	0.00	0.00	0.12	0.00	0.01	0.00	0.01	0.01	0.00	0.05	0.47	0.02	0.02	
MW	1.9	93	0.72	0.01	0.00	0.00	0.00	0.06	0.22	0.06	0.00	0.04	0.01	0.00	0.00	0.05	0.11	0.00	0.01	0.02	0.12	0.01	0.06	0.15	0.05	
PJ	1.8	94	0.80	0.00	0.00	0.00	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.77	0.03	0.01	0.01	0.11	0.00	
PJSB	1.9	95	0.72	0.00	0.00	0.00	0.00	0.03	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.54	0.06	0.02	0.05	0.17	0.00	0.00	
PO	2.2	84	0.70	0.01	0.00	0.00	0.00	0.01	0.11	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.09	0.00	0.01	0.00	0.62	0.01	0.02	0.05	0.03	
PR	1.4	103	0.73	0.00	0.00	0.00	0.00	0.01	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.01	0.11	0.63	0.12	0.02	0.01	0.01	
PWST	1.9	102	0.71	0.01	0.00	0.00	0.00	0.04	0.15	0.03	0.00	0.01	0.00	0.00	0.00	0.02	0.05	0.00	0.01	0.02	0.14	0.09	0.28	0.12	0.03	
PWUS	1.7	115	0.61	0.00	0.00	0.00	0.00	0.01	0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.03	0.00	0.05	0.17	0.55	0.05	0.01	
SF	1.5	94	0.69	0.00	0.00	0.00	0.00	0.08	0.11	0.02	0.00	0.05	0.00	0.00	0.02	0.00	0.01	0.00	0.00	0.04	0.04	0.01	0.08	0.46	0.06	

3
 4 Proposed operations, i.e., planned harvests, are compared to the LTMD in two formats: the actual stand
 5 conditions from the allocated inventory file relative to the strategic model, and the modelled allocations
 6 (A-1.3.9 SFMM run) to the strategic model. The overall area-weighted average age for allocated
 7 inventory stands is 99 years which is slightly different from the modelled average from A-1.3.9 SFMM
 8 run of 95 years due to the aforementioned adjustments in the SFMM model to account for forecast
 9 depletions and different rounding procedures.

10 Results from the comparison of modelled planned operations to the LTMD also show that available
 11 harvest area projection is similar for the planned operations model run (SFMM A-1.3.9). There is a
 12 variation of approximately 4.5% in the first term made up of various forest units. Figure 4.9.2 illustrates
 13 the difference in the long-term projection of annual available harvest area and volume over time. The
 14 differences vary between terms, with the highest degree of variation occurring from Terms 3 to 6.

1 **Figure 4.9.2. Comparison of annual available harvest area and volume between the management**
 2 **strategy (LTMD PMS-24) and planned operations (1.3.9) SFMM model runs.**



4 A spatial comparison by zone has also been done for the first 4 terms, or 40 years, of the model
 5 projections, as part of the Phase-in provisions of the 2017 FMPM (Figure 4.9.3). Section 3.7.4 provides
 6 further discussion on the spatial zones, which are also shown in relative proportions in Figure 4.9.4 and
 7 portrayed on harvest distribution maps MU754_2019_FMP_MAP_DistHarv_01-4. Ideally, the proportion
 8 of harvest areas would mirror the total proportion of area in each zone, i.e., the NE zone makes up 36%
 9 of the forest area, therefore, close to 36% of the harvest area should be allocated to this zone. The NE
 10 zone is, however, traditionally an area of the forest with a higher level of harvest activity and road
 11 access, and it will likely take a few decades to provide a more even distribution of harvest over the
 12 forest as new access is developed, particularly in the SW zone with the development of the primary Bass
 13 Lake Road. Initially in Term 1 there is a higher proportion of area harvested in the NE zone for the
 14 planned harvests (48%) than as suggested in the LTMD (34%), however this is evened out in the
 15 subsequent 3 terms (Figure 4.9.4).

16

17

1 **Figure 4.9.3. Comparison of available harvest area by zone and forest unit between the management**
 2 **strategy (LTMD PMS-24) and planned operations (1.3.9) SFMM model runs.**

LTMD - Strategic Direction (PMS 24)

Zone	Term	BW	BY	HDSEL	HDUS	HE	LWMX	MCL	MW	PJ	PJSB	PO	PR	PWUS	PWST	SF	Total
NE	T1	163	292	361	945	103	6	47	351	61	15	120	2	127	73	159	2,827
	T2	257	209	355	486	114	6	50	8	0	35	55	29	79	147	841	2,668
	T3	626	269	348	284	113	1	20	218	15	0	5	21	212	83	247	2,462
	T4	81	548	354	62	118	0	0	238	17	0	98	39	98	74	498	2,227
SE	T1	144	107	40	211	67	6	9	316	0	0	123	25	333	109	17	1,506
	T2	129	77	51	168	62	5	46	237	0	0	201	7	211	0	30	1,224
	T3	0	92	59	83	44	1	8	12	3	0	228	30	260	0	178	997
	T4	149	61	60	212	7	1	0	57	0	0	110	43	109	1	1	811
SW	T1	102	48	161	280	119	5	24	4	15	1	97	29	247	111	67	1,308
	T2	117	66	158	256	143	5	0	217	71	10	229	29	149	24	61	1,535
	T3	56	62	155	340	110	0	9	66	5	40	157	14	150	94	0	1,257
	T4	64	55	158	524	85	1	0	57	0	0	49	2	325	43	117	1,480
NW	T1	657	50	42	124	0	7	40	179	26	64	327	13	311	102	662	2,605
	T2	350	219	41	337	5	4	0	219	0	12	117	16	472	145	154	2,091
	T3	0	185	40	292	3	13	41	249	27	0	198	33	283	76	669	2,109
	T4	251	66	41	216	5	11	61	203	18	28	216	33	203	84	261	1,696
All	T1	1,066	497	603	1,560	289	24	120	850	102	81	667	68	1,018	395	905	8,246
	T2	853	571	604	1,248	324	19	96	680	71	57	601	82	910	316	1,086	7,519
	T3	682	608	602	999	270	15	77	544	50	40	588	98	905	253	1,095	6,825
	T4	546	730	613	1,014	216	12	61	555	35	28	473	118	735	202	876	6,214

Proposed Operations (A-1.3.9)

Zone	Term	BW	BY	HDSEL	HDUS	HE	LWMX	MCL	MW	PJ	PJSB	PO	PR	PWUS	PWST	SF	Total
NE	T1	556	354	346	909	162	5	68	372	53	36	65	18	271	138	383	3,736
	T2	433	93	355	861	129	7	134	0	32	0	79	17	223	0	176	2,537
	T3	67	572	348	443	152	0	0	141	0	28	35	22	222	0	924	2,954
	T4	76	590	355	299	73	0	0	408	0	0	99	38	185	2	532	2,657
SE	T1	60	68	38	307	46	1	5	117	0	0	134	28	338	72	34	1,248
	T2	87	89	53	350	59	2	79	0	3	0	222	32	394	0	75	1,446
	T3	218	89	59	202	48	0	0	26	0	0	196	54	267	0	0	1,159
	T4	58	81	60	36	14	0	0	60	0	0	90	86	131	1	137	752
SW	T1	67	44	154	217	62	0	5	51	4	5	113	14	141	36	35	946
	T2	159	36	158	265	42	0	53	0	82	0	229	47	334	0	111	1,515
	T3	49	50	155	196	52	0	0	97	0	10	101	14	455	0	0	1,180
	T4	84	130	158	316	35	0	0	154	0	3	90	4	486	0	106	1,566
NW	T1	308	12	40	62	0	0	30	297	56	36	306	4	284	113	368	1,916
	T2	518	9	41	132	0	2	134	0	32	4	192	25	699	0	518	2,304
	T3	213	51	40	57	0	0	0	677	0	41	308	14	512	0	389	2,301
	T4	414	323	41	220	0	0	0	155	0	0	130	56	342	4	354	2,039
All	T1	990	477	577	1,495	270	6	107	838	113	77	618	64	1,034	359	820	7,845
	T2	1,197	227	607	1,608	230	10	399	0	148	4	722	120	1,649	0	881	7,801
	T3	547	762	602	899	253	0	0	941	0	79	641	103	1,456	0	1,313	7,594
	T4	631	1,125	613	871	122	0	0	777	0	3	409	184	1,144	7	1,128	7,015

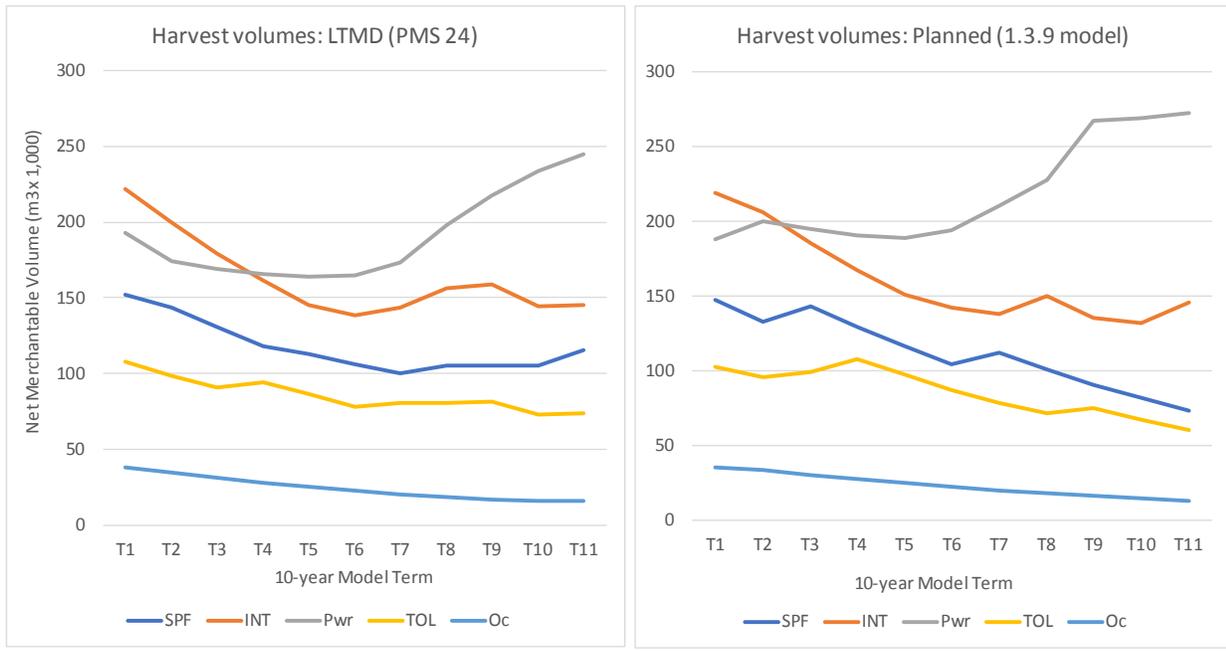
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1 **Figure 4.9.4. Proportions of available harvest area by zone between the management strategy (LTMD**
 2 **PMS-24) and planned operations (1.3.9) SFMM model runs.**
 3

Zone Name	Zone %	LTMD - Strategic Direction (PMS 24)				Proposed Operations (A-1.3.9)			
		T1	T2	T3	T4	T1	T2	T3	T4
NE	36%	34%	35%	36%	36%	48%	33%	39%	38%
SE	15%	18%	16%	15%	13%	16%	19%	15%	11%
SW	18%	16%	20%	18%	24%	12%	19%	16%	22%
NW	32%	32%	28%	31%	27%	24%	30%	30%	29%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

4
 5
 6 Volume projections were also compared between the management strategy and proposed harvest
 7 areas. There are minor differences in the projected volumes, due to the slightly different starting
 8 conditions, however the trends over time are very similar (Figure 4.9.5). This is to be expected given that
 9 the same constraints and objectives were applied in both scenarios.

10 **Figure 4.9.5. Comparison of available harvest volume by species group between the management**
 11 **strategy (LTMD PMS-24) and planned operations (1.3.9) SFMM model runs.**



12
 13 Initially there is a lower volume in the 1.3.9 model and the volume calculated from individual stand
 14 estimates in the allocated stands than in the LTMD strategic direction. The total annual net
 15 merchantable harvest volume for the LTMD model is 713,109 m³, compared to 691,817 m³ in the 1.3.9
 16 model. The 10-year harvest volume estimated from allocated stands is 6,689,415 m³, or 668,942 m³/yr.
 17 The lower volumes in the 1.3.9 model are likely due to the differences in area by zone and age class due
 18 to the forecast depletion issue described above. Differences with the planned harvest volume are likely

1 due to many factors, the most probable being more accurate accounting of volumes unharvested in
2 modified AOC zones. Volumes in modified zones in the planned allocations were netted down according
3 to actual AOC areas, whereas these estimates were more coarsely estimated in the strategic model.

4 Of the 6,689,415 m³ of merchantable volume in the planned allocations, an estimated 1,673,294 m³ is
5 expected to be unutilized (not including undersize and defect). Unutilized volume estimates are shown
6 in tables FMP-14 and FMP-15, based on the available volumes minus commitments. While this does
7 represent a fairly significant amount of uncommitted volume, it is acknowledged in the risk assessment
8 of the strategic direction and is expected to have little negative impact other than a loss of economic
9 opportunities. There is a cascading effect of the low market demand for conifer pulp, which in turn
10 inhibits the utilization of sawlog volumes in stands where conifer pulp is abundant, i.e., sawlogs cannot
11 be harvested from stands that are by-passed due to a lack of pulp markets. The consequence of this is
12 that some allocations may not be harvested and renewed, meaning objective targets for young forest
13 habitats may not be fully met, while targets for mature and old forest may be over-achieved.

14 The ecological targets were also compared between the LTMD and planned allocation model (the 1.3.9
15 run). Given that the starting points were very similar, and the same set of constraints and objectives
16 were applied, the results are intuitively comparable. Each of the Landscape Guide Classes for mature
17 and old forest, total old-growth, and red and white pine follow the same trends over each 10-year
18 model term (x-axis on Figure 4.9.6).

19

1 **Figure 4.9.6. Comparison of Landscape Guide Classes between the management strategy (LTMD PMS-
2 24) and planned operations (1.3.9) SFMM model runs.**



3

1 Renewal and tending limits were also applied with the same constraints between the LTMD and
 2 proposed operations (A-1.3.9) model runs, resulting in the same levels of silvicultural effort. In both
 3 cases the total level of intensive silviculture was determined to be 34% of the overall renewal effort.
 4 Likewise, the level of intensive management by forest unit was the same for both cases.

5 The planned level of treatments, based on all eligible areas for renewal and tending treatments,
 6 compared to the level of treatments by silvicultural intensity described in the proposed management
 7 strategy (PMS-24) are also compared. Figure 4.9.7 provides an overall comparison of the percentage of
 8 area treated extensively versus areas treated under the basic, intensive1, and intensive2 silvicultural
 9 levels for the PMS and the planned area described in Table FMP-17. The result is a 4% shift from
 10 extensive to more intensive silviculture (basic, +int1+int2) between the strategic direction estimate and
 11 planned treatments, i.e., all eligible treatment areas.

12 **Figure 4.9.7. Percentage of harvested area in the clear cut forest units managed under the Extensive**
 13 **versus Basic+Int1+Int2 Silvicultural Intensities in Proposed Management Strategy (PMS-24) Compared**
 14 **to the Planned Levels Reflected in Table FMP-17.**

Intensity Level	PMS-24	PLAN
Extensive	63	59
Basic, Int1 and Int2	37	41

15

16 Figure 4.9.8 summarizes the planned treatment level by forest unit and silviculture intensity to facilitate
 17 comparison with the proposed management strategy.

18 **Figure 4.9.8 Areas Treated for Term 1 in the Proposed Management Strategy (PMS-24) Compared to**
 19 **the Planned Levels Reflected in Table FMP-17.**

FU	PMS-24	Plan-24	PMS-24	Plan-24	PMS-24	Plan-24	PMS-24	Plan-24
	Ext	Ext	Bas	Bas	Int1	Int1	Int2	Int2
BW	9592	9592	0	0	0	1066	1066	0
MCL	0	0	1200	1200	0	0	0	0
MW	5525	4675	0	850	0	298	2975	2678
PJ	153	153	0	0	0	408	867	459
PJSB	162	162	0	0	648	648	0	0
PO	5006	5006	0	0	1669	0	0	1669
PR	0	0	0	0	287	544	393	136
PWST	1975	1975	0	0	0	197	1975	1778
SF	4525	3620	0	905	4525	2262	0	2263
Totals	26938	25183	1200	2955	7129	5422	7276	8982
Plan % of PMS		93%		246%		76%		123%

20

1 The planned level of extensive treatments is less than the PMS levels by 7% or 1,755 hectares. This
2 difference is mainly because of the expectation that 10% of previous and proposed SF and MW harvest
3 areas can receive supplementary planting treatments upon successful implementation of the Careful
4 Logging Around Advanced Growth (CLAAG) harvest method. These hectares are also reflected in the
5 planned level of Basic treatments which exceed the PMS levels by same area (1,755 ha).

6 The planned level of intensive1 (mechanical site preparation, plant and tend) treatments are 24% (or
7 1,707 ha) less than the PMS-24 levels and the planned level of intensive 2 treatments are higher than
8 the PMS by a similar amount (1,706 ha or 23 % more than modelled). Several changes based on
9 operational experience contribute to this overall shift. For example, recent operational experience has
10 indicated that only coarse sandy, well-drained soils are likely to result in successful conifer regeneration
11 when planting on the BW forest unit, thus only requiring one site preparation treatment before planting
12 (Intensive 1 level of silviculture). For a similar reason, 10% of MW forest units were also shifted from
13 intensive 2 to intensive 1. On the other hand, operational experience has also shown that PO forest
14 units on sandy sites tend to have a well-established crop of poplar suckers after depletion and often
15 need two treatments to prepare the site for planting (intensive 2 level of silviculture). Therefore, all PO
16 forest units were shifted from Intensive 1 to Intensive 2 in the planned activities compared to the PMS-
17 24. For the SF forest units, operational experience has also shown that some sites require two site
18 preparation treatments because of the rapid invasion by raspberries after a mechanical site preparation
19 treatment, therefore 50% of the area was shifted to Intensive 2 in the planned activities rather than
20 Intensive 1 as in the PMS. Other minor shifts were done in the PWST and PR forest units. The last shift
21 was to move roughly 50% of the area that was modeled in PMS-24 in the Intensive 2 silvicultural
22 intensity in the PJ forest to Intensive 1 to reflect the area that is managed through aerial seeding
23 because of shallow soils and steep terrain. Tree planting generally only occurs on areas that are
24 trafficable and that have deep enough soils for tree planting.

25 In conclusion, the variances from the strategic model by the planned levels do not appear significant.
26 The operational experience related to the forest units will be enhanced during the 10-year plan and will
27 contribute to limitations on levels of specific renewal intensity for the next time the Strategic Forest
28 Management Model is developed.

29 There are also some notable differences between the LTMD model and the planned allocations with
30 respect to some of the shelterwood stages of management, and the division between beech-dominated
31 stands and regular HDUS stands. This is a larger area allocated in stands heavier to beech than what the
32 SFMM LTMD analysis determined. Allocated stands include 1,140 ha that fall into the beech analysis unit
33 (7.3% of the total HDUS harvest), whereas the SFMM model opted to harvest 658 ha in the first 10-year
34 term (4.2% of the HDUS total harvest). Due to anticipated advance of beech bark disease on the forest it
35 may be advantageous to harvest more than the SFMM-solution area to manage these stands ahead of
36 the killing front.

37 Another difference between the strategic direction and planned harvests is the ratio between
38 shelterwood regeneration cuts (seed-cuts) and removal cuts. In the PWUS forest unit, the allocated
39 stands consist of 50% regeneration cuts and 50% removal cuts while the LTMD determined there to be
40 36% regeneration cuts in the first term and 64% removal cuts. Similarly, HDUS regeneration cuts
41 represented 62% of the harvest in the planned allocations and 26% in the model. The LTMD model
42 opted to do a higher proportion of removal cuts in the first term, while in reality there are many areas

1 where removal cuts need to be deferred to allow regeneration to develop further, or a first removal may
2 not be feasible due to lower than predicted volumes. This is not expected to have an impact on
3 objective achievement as the planned allocation levels are closely mirrored by the 1.3.9 model run
4 which showed comparable results towards volume and ecological targets.

5

1 5.0 DETERMINATION OF SUSTAINABILITY

2 The determination of sustainability is based on the collective assessment of objective achievement, the
3 spatial assessments, the social and economic assessment, the risk assessment, prescriptions and
4 conditions for the protection of values and conditions on regular operations for the protection of
5 important ecological features. The following is a summary of the elements considered for the
6 determination of sustainability with regards to plant and animal life, water, soil and air quality, and
7 social and economic values including recreational values and heritage values.

8 5.1 Assessment of Objective Achievement

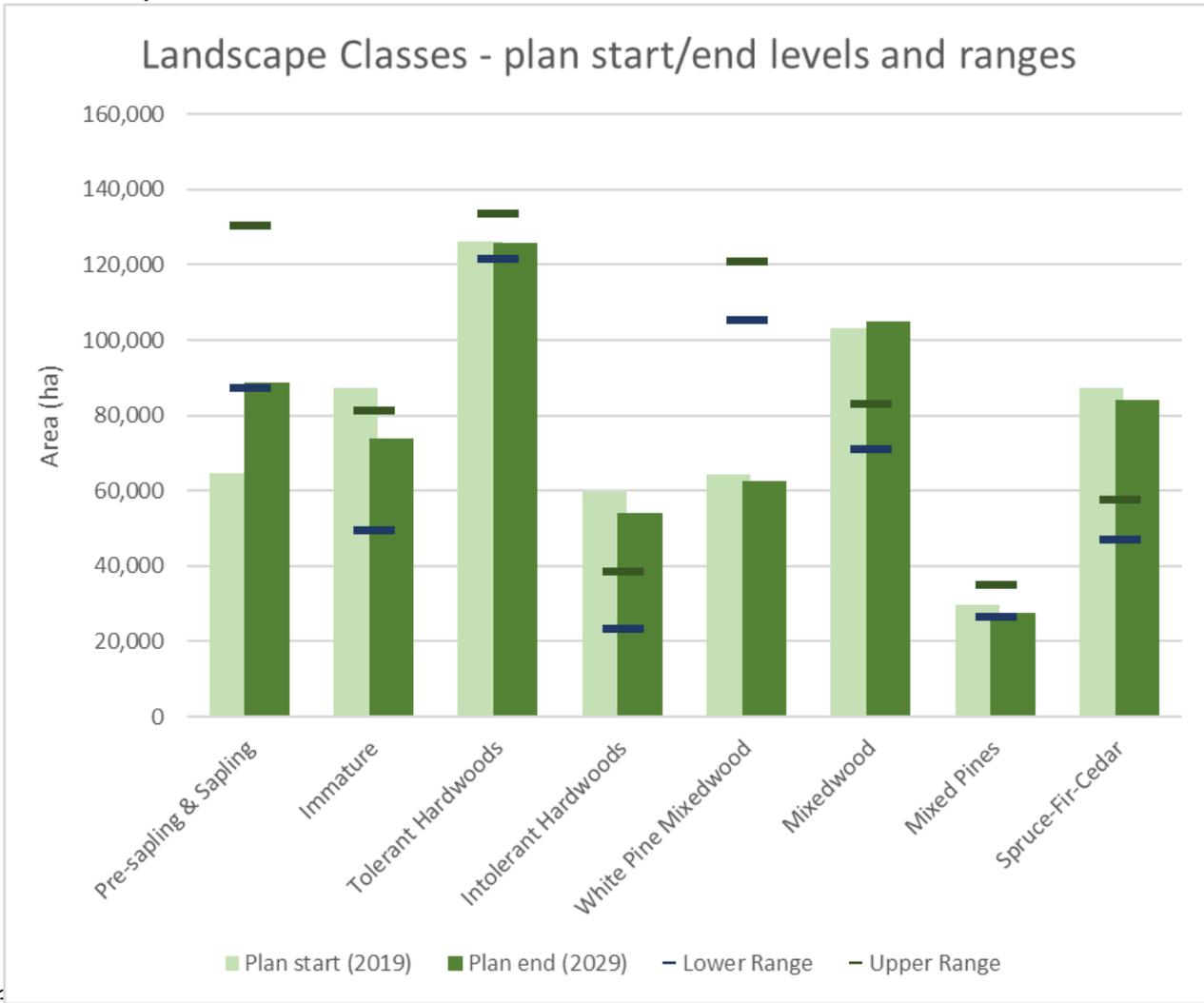
9 The assessment of objective achievement is based on balancing multiple, often conflicting, objectives.
10 The 22 objectives and 44 indicators developed for the Nipissing 2019-2029 FMP address the following
11 CFSA categories:

- 12 • Forest diversity – natural landscape pattern and distribution; forest structure, composition and
13 abundance;
- 14 • Forest diversity and provision of forest cover – habitat for animal life;
- 15 • Social and economic – community well-being; healthy forest ecosystems; long-term harvest
16 levels;
- 17 • Ecological sustainability – healthy forest ecosystems; and,
- 18 • Silviculture.

19 Details on the assessment of objective achievement are documented in table FMP-10 and Section 3.6 of
20 the plan text. The assessment is based on the extent to which the desirable levels and targets are
21 satisfied during the 10-year plan period and over the long-term forecast for those indicators that span
22 multiple 10-year terms. Some objectives cannot be assessed during the production of the plan and are
23 assessed during plan implementation and reported in Annual Reports. Table FMP-10 provides a
24 summary of the timing of assessment for each indicator.

25 Most of the indicators of sustainability assessed during development of the plan were within the
26 desirable levels or are showing movement towards acceptable levels established to balance the
27 achievement of multiple objectives, e.g., wood supply and biodiversity objectives. Section 3.7.3
28 describes the achievement of objectives associated with the strategic direction (LTMD). An additional
29 model run (comparison of proposed operations to the LTMD SFMM run or 1.3.9 run) was also done to
30 evaluate the planned operations to the long-term management strategy. The model results and analysis
31 show that the planned operations meet the intent of the LTMD (Section 4.9).

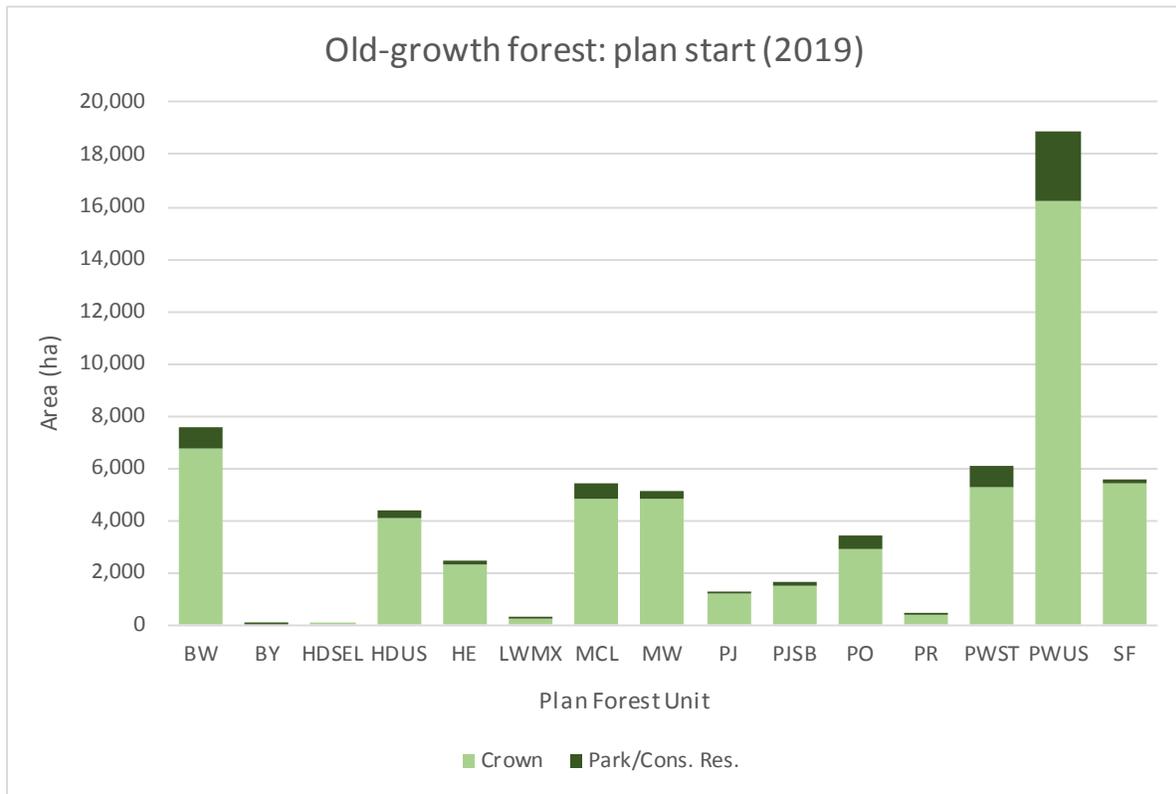
1 **Figure 5.1.1. Ranges of natural variation, and FMP start (2019) and end (2029) conditions for**
 2 **landscape class indicators.**



3
 4
 5 The comparison of landscape class indicators at the start and end of the 10-year planning period is
 6 shown in Figure 5.1.1. The desired levels for each indicator are based on the current forest condition in
 7 relation to the range of natural variation. Each indicator shows a favorable trend, with the exception of
 8 the White Pine Mixedwood indicator which moves very little in the initial planning period. The White
 9 Pine Mixedwood indicator follows a slight decline before steadily increasing towards the desired level
 10 due to limitation in the current age-class distribution as discussed in Section 2.1. The lack of area in
 11 immature age-classes greatly constrains the ability to increase levels of mature and old white pine forest
 12 types while at the same time providing a non-declining wood supply. Consequently, there is a measured
 13 reduction in harvest levels in the white pine shelterwood forest unit, as compared to the 2009 FMP,
 14 along with a gradual recovery towards the desired level for this indicator.

15

1 **Figure 5.1.2. Distribution of old-growth forest across plan forest units and Crown ownership at the**
 2 **start and end of the 10-year plan.**



3

1 The abundance and distribution of old-growth forests has also been assessed at the start (2019 and end
2 (2019) of the 10-year plan, as shown in Figure 5.1.2. For this analysis, old-growth excludes areas with
3 any recorded partial harvesting activity in the inventory. The amount of old-growth increases over the
4 10-year period in both protected areas and regular production forest areas. An increase is seen in old-
5 growth area for all forest units, with the exception of hemlock which is essentially unchanged. Hemlock,
6 however, is rarely harvested due to low market demand, therefore, it is probable that the amount of
7 old-growth hemlock will also increase. This analysis is based on the assumption that all allocated areas
8 will be harvested, which is unlikely given the current and past economic trends. As such, the figures
9 representing both the old-growth areas and mature and old landscape classes are much lower than the
10 expected actual values that will be achieved by the end of the FMP.

11 Objectives for the protection of values and important ecological features are achieved through the
12 implementation of area of concern (AOC) prescriptions and conditions on regular operations (CRO), as
13 described in Section 4.2, Supplementary Documentation 6.1.1, and table FMP-11. Each of these
14 associated indicators is as assessed during implementation of the FMP and evaluated in the Annual
15 Reports.

16 5.2 Spatial Assessments

17 A preliminary spatial assessment was conducted using the Ontario Landscape Tool (OLT) for the spatial
18 objective and associated indicators (desirable and target levels) that are affected by the location and
19 distribution of the planned harvest areas. The indicators used to measure the spatial objective
20 assessment are:

- 21 • Mature and Older Forest at 50 and 500 hectares scales;
- 22 • Young Forest Patch Size (<36 years).

23 The size, shape, and proximity of homogeneous forest types that make up the landscape mosaic can
24 influence the availability of contiguous habitat conditions and the amount and distribution of 'edge'
25 habitat. Refer to Section 3.6.2 for a description of objective indicators for the spatial assessments.

26 Results for the spatial assessments show 11 of 19 spatial targets were achieved (Figure 5.2.1 to 5.2.6). In
27 those cases where spatial indicators did not achieve targets (3 of 10 hexagon proportions in the texture
28 analysis, and 5 of 9 young patch size indicators), conflicting objectives requiring trade-offs were required
29 (i.e., movement towards landscape classes takes precedence over texture). Overall, results show a very
30 similar pattern of texture and young forest patch size to the natural range of variation.

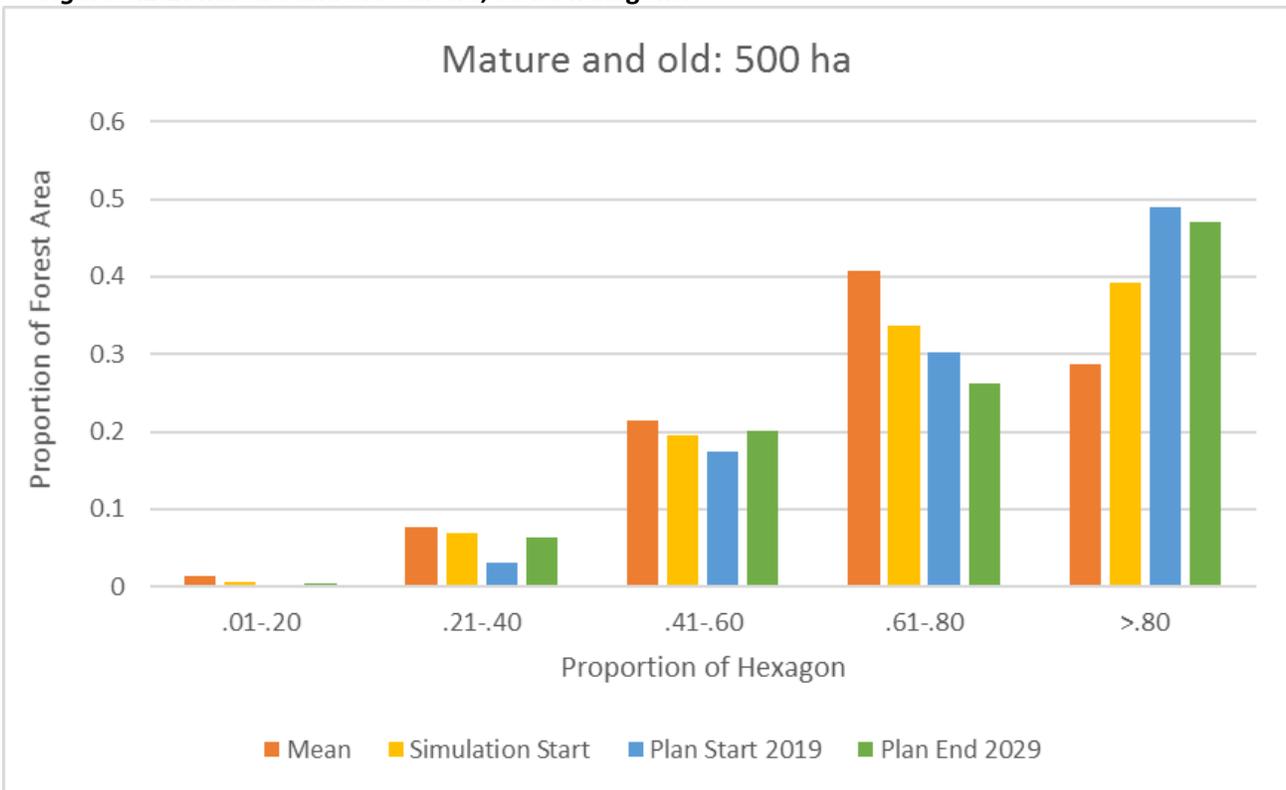
31 5.2.1 Mature and Old Texture

32 Figures 5.2.1 and 5.2.2 illustrate the proportion of the forest that contain hexagons with the given
33 proportion of each forest type. For example, Figure 5.2.2 shows that approximately 0.10 (10%) of the
34 forest is covered by 50 ha hexagons composed of .21-.40 (21%-40%) mature and old forest.

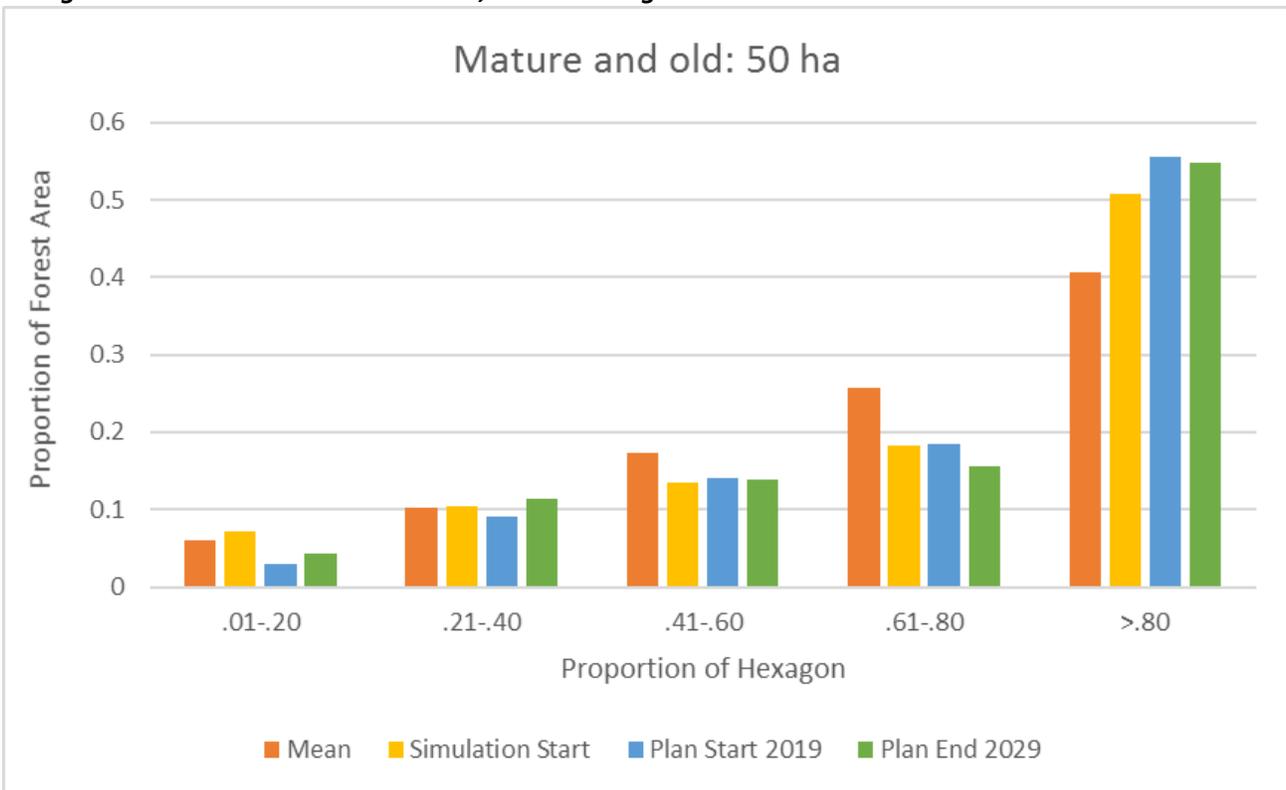
35 Landscape class targets require aggressive harvest of PO, BW, and SF forest units to meet targets.
36 Because of low volumes, poor access, constraints around private land and water bodies, there is often
37 little flexibility for planned block sizes. For feasible operations to occur, many planned harvest patches
38 as a result fall within the 251 to 500 ha size of disturbance size. These areas will be netted down with
39 reserves and contingency areas, and ultimately many may shift to another size range.

40

1 **Figure 5.2.1. Mature and old texture, 50 ha hexagons.**

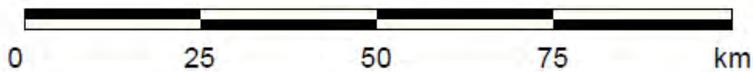
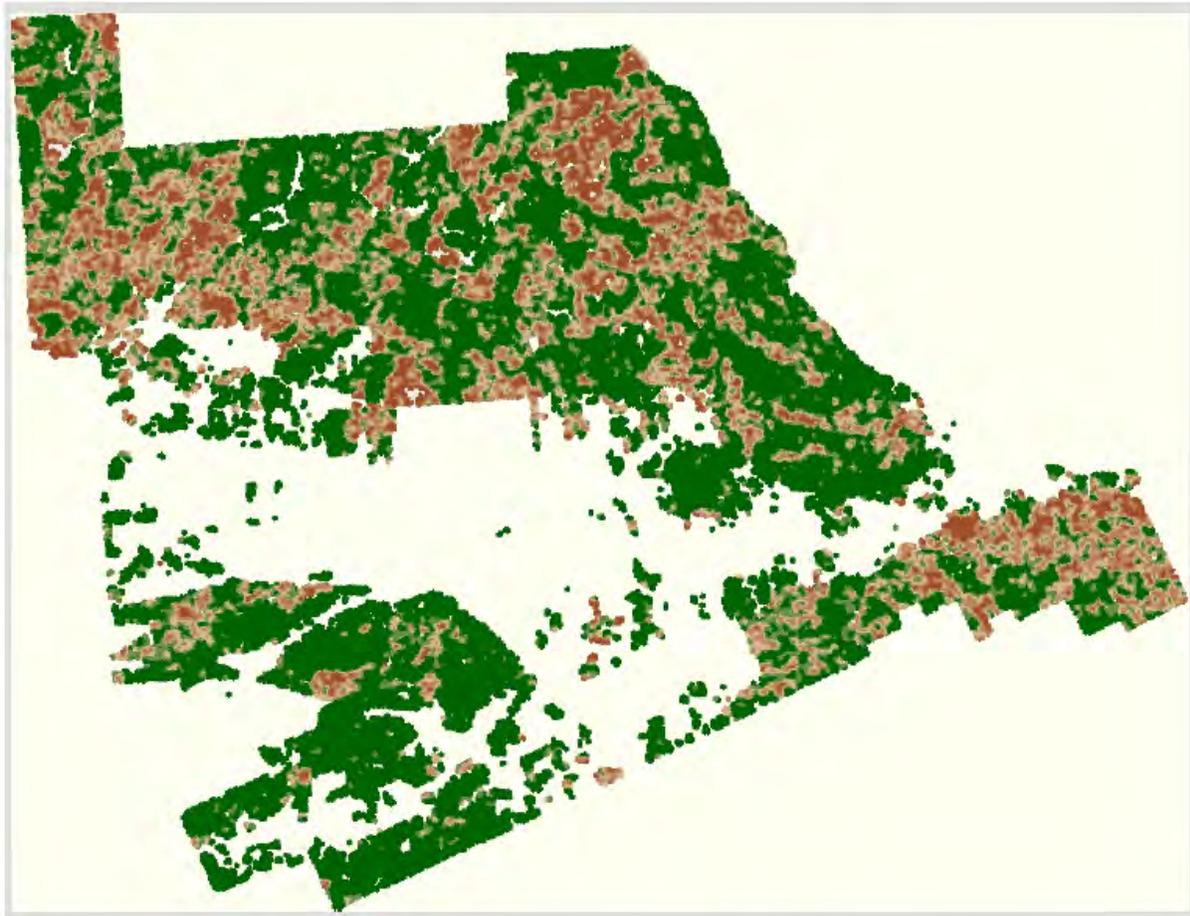


3 **Figure 5.2.2. Mature and old texture, 50 ha hexagons.**

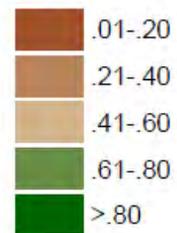


- 1 **Figure 5.2.3. Spatial distribution of the proportion of Mature and Old forest texture at the 50 ha scale at the end of the 10-year planning period (2029).**
- 2

Proportion of Mature and Old Forest (50 ha)



Mean Proportion

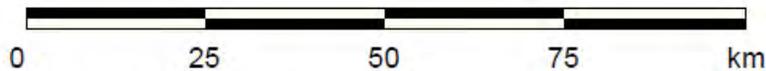


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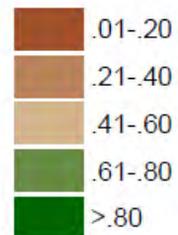
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- 1 **Figure 5.2.4. Spatial distribution of the proportion of Mature and Old forest texture at the 500 ha**
- 2 **scale at the end of the 10-year planning period (2029).**

Proportion of Mature and Old Forest (500 ha)



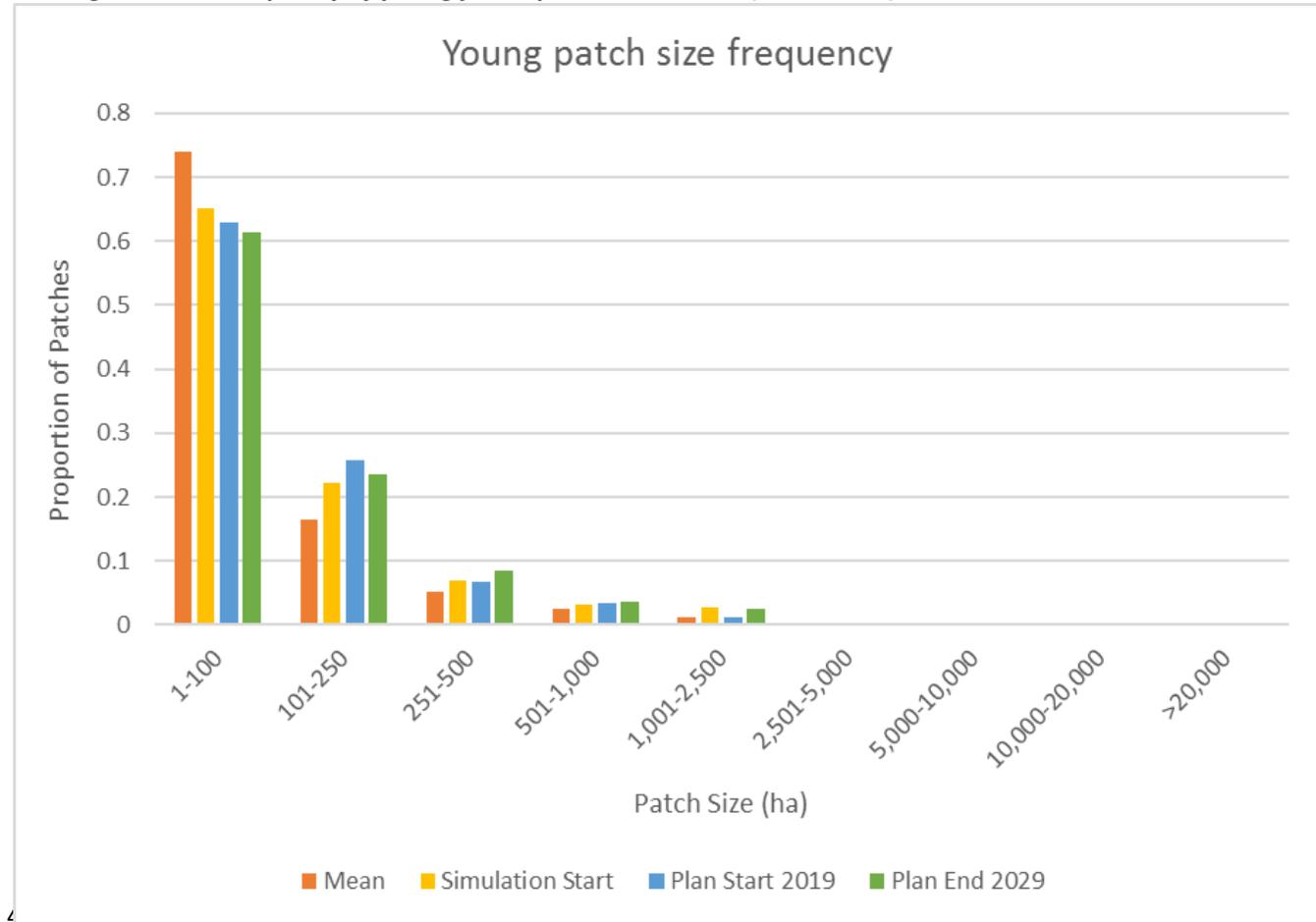
Mean Proportion



- 3
- 4 **5.2.2 Young Forest Patches**
- 5 Patches of young forest are geographically dispersed across the entire management unit, however there
- 6 is a higher proportion of larger patches in the NE and NW zones where there is more of a boreal

- 1 influence on the landscape with less tolerant hardwoods. Consequently, there are more clearcut
- 2 conditions in these zones resulting in a patch mosaic with a higher concentration of young patches.

3 **Figure 5.2.5. Frequency of young forest patch size classes (in hectares).**



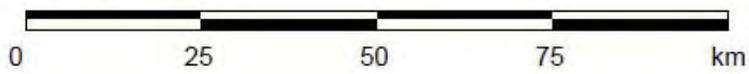
- 5 Overall, the spatial distribution of disturbances closely resembles the desired pattern. The spatial
- 6 indicators are also all very close to the SRNV median values, representing a pattern that emulates a
- 7 natural landscape mosaic.

8

1 **Figure 5.2.6. Spatial distribution of young forest patches.**



Offset 1 of 9



Patch Area
(hectares)



3

1 5.3 Social and Economic Assessment

2 Overall, the social and economic impacts of implementing the 2019 FMP are comparable to the previous
3 2009 FMP. Planned harvest and silviculture activities are consistent between the two plans; hence the
4 evaluation of social and economic indicators suggests that no significant changes in benefits are to be
5 expected. Consequently, there are likely no negative impacts to employment due to harvest and
6 renewal levels projected for the next 10 years. On the contrary, the LTMD provides for significant
7 increases in direct employment if utilization of available harvest area approaches the projected levels.

8 Longer-term implications of the LTMD are also similar to previous plans, which have shown a trend of
9 decreasing harvests for several decades followed by consistent increases. The predictable nature of the
10 wood supply, and consistent trends from plan to plan, allow for industries to make gradual adjustments
11 in response to changes in wood availability. Furthermore, the lowest point in projected wood supply
12 remains above the current and historic utilization levels (Figure 3.7.12).

13 The economic benefits of the proposed supply of wood to mills filter down to businesses offering direct
14 employment in the forestry sector such as tree marking, tree planting, logging, and stand tending.
15 Indirect employment in business areas providing equipment, food services, housing, etc. also benefit
16 from a stable forestry sector supported by the LTMD.

17 Tourism, recreation, and cottaging values are also considered during the development of the FMP.
18 Increased or improved road access will benefit those values that depend on accessibility, while potential
19 negative impacts to values that rely on remoteness are mitigated to the extent possible with specific
20 direction through the implementation of AOC prescriptions, conditions on operations, and resource
21 stewardship agreements (RSAs). Stakeholder involvement and communication during plan
22 implementation will also occur at the Annual Work Schedule stage. This will allow further consideration
23 for values and users to be incorporated in the FMP to minimize potential negative impacts from forest
24 operations.

25 5.4 Risk Assessment

26 Risks that some plan objectives may not be fully achieved during the implementation of the FMP are
27 acknowledged, and this can impact the future forest condition and desired benefits. Impacts may affect
28 social, economic or environmental values, alone or in combination.

29 A primary source of risk is a potential continuation of uncertain market conditions for wood fibre. During
30 the current and previous planning cycles the level of utilization has been quite low, especially for some
31 forest types and species groups, e.g., pulpwood. This is largely reflective of market conditions and high
32 costs associated with accessing some parts of the forest where volumes are also low.

33 Weather patterns (e.g., wet autumn conditions, late freeze-up or early winter thaws), may pose a risk to
34 accessing harvest areas that require the use of winter roads or frozen ground. This may constrain the
35 availability or feasibility of accessing some winter harvest areas. Annual work schedules may, therefore,
36 need to be revised periodically to accommodate changing weather conditions.

37 Policy requirements (i.e., species at risk and / or timing restrictions), and access constraints may also
38 result in lower utilization of otherwise operational harvest areas. Regulations that govern the protection
39 of species and habitats, and land-use policy must be followed, which may reduce the level of flexibility
40 needed to accommodate weather conditions or changes in harvest schedules. The abundance and

1 location of protected habitat varies over relatively short time spans, leading to uncertainty in
2 operational planning.

3 In addition to timing issues, the modelling results highlight the importance of an even spatial
4 distribution of harvest across the forest. The sustainability of wood supply, and the achievement of
5 landscape composition and texture objectives are dependent on the maintenance and development of
6 access to each zone of the forest. The southwest zone of the forest has had little activity in recent
7 decades due to the challenges of existing and future road access that is constrained by patent land, a
8 load restriction on a major to the west (Dokis) and terrain. The distribution of rivers and lakes, and lack
9 of aggregate materials limit the options for road access. Timing restrictions on roads, or other road use
10 constraints pose a risk to achieving harvest and landscape targets if planned activities are limited.

11 A consequence of continued low harvest levels is the inability to reach the full potential of economic
12 opportunities and related social benefits. Employment levels, in terms of both direct and indirect jobs,
13 and revenues associated with historically low harvests are significantly lower than the expectations
14 associated with full utilization of the available harvest.

15 A low-level forest disturbance through harvesting can be favorable to objectives that rely on mature and
16 old forest, however is unfavorable to objectives that rely on the creation of young forest and early
17 successional forest types and species such as jack pine, poplar, and birch. This can also lead to increases
18 in late successional forest types and balsam fir. An increase in balsam fir, which is a less marketable
19 species, is unfavourable as it would further contribute to the low utilization potential of the forest.

20 Reduced harvest levels also pose a risk to achieving the ideal mix of habitat for moose and deer.
21 Harvesting that stimulates the production of deciduous saplings, which is a significant source of browse,
22 is important to the successful maintenance and enhancement of Moose Emphasis Areas and Stratum 1
23 Deer Yards.

24 Climate change also poses a potential threat to the health and condition of the forest, and the timing
25 and magnitude of effects are uncertain. Forest management can, however, respond to climate change
26 through an adaptive management process of monitoring and subsequent planning. The potential
27 impacts of invasive species, fire, and blow-down may be exasperated by climate change, and these
28 impacts can be mitigated with a responsive planning process and balanced management strategy. Beech
29 bark disease (BBD) has been taken into account and planned for accordingly for the 2019 FMP. The
30 emerald ash borer (EAB) has had a devastating impact to ash trees in parts of southern Ontario, and is
31 also anticipated to affect most of the province, however, the amount of ash on the Nipissing Forest is
32 relatively low, and therefore the risk to the plan implementation is minor. The incidence of wildfires has
33 historically been very low on the Nipissing Forest, and climate changes may result in unusual increases in
34 the occurrence and severity of fires. This is mitigated through effective, rapid response of the fire
35 control program. Salvage opportunities also offset the impacts of fire, insect, disease, and weather-
36 related damages through the recovery of damaged trees.

37 The overall risks to successfully implementing the LTMD are mitigated with a well-balanced strategy and
38 adaptive management process. A mid-term evaluation of the FMP progress is required to ensure
39 successful implementation, or potentially a need for revised direction. The periodic planning cycle for
40 forest management, requiring a re-evaluation and new plan every 10 years also provides the
41 opportunity to respond to unforeseen challenges or risks.

1 **5.5 Conclusion**

2 On balance, the 2019-2019 forest management plan objectives are being met and progress is being
3 made towards the desired forest conditions and benefits. The social and economic assessment indicates
4 that current levels of social or economic benefits are projected to be maintained or increased for the
5 2019-2029 period, in comparison with the 2009-2019 FMP. The evaluation of the planned operations
6 also indicates that they are consistent with operations projected in the LTMD.

7 The LTMD and planned operations were developed by the planning team with consideration to plant
8 and animal life, water, soil and air quality, and social and economic values including recreational values
9 and heritage values. The assessment of objective achievement, social and economic assessment, risk
10 assessment, and the LTMD have all demonstrated that the 2019-2029 FMP for the Nipissing Forest
11 provides for the sustainability of the Crown forest.

1 6.0 DOCUMENTATION

2

3 6.1 Supplementary Documentation

4 Refer to the separate file MU754_2019_FMP_TXT_SuppDoc

5 6.2 Other Documentation

6 The public correspondence related to the development of the FMP is retained on file at the North Bay
7 District MNRF office. The Report on the Protection of Identified First Nation and Métis Values will be
8 retained at a location as agreed to in consultation with the First Nation and Métis communities.

9

1 **7.0 FOREST MANAGEMENT PLAN SUMMARY**

- 2 A FMP summary is prepared to facilitate public review of the FMP and public inspection of the approved
3 FMP. The summary will be available for the duration of the public consultation periods. A French
4 language version of the summary is also available.

- 1 **8.0 Forest Management Plan Tables**
- 2 FMP tables have been submitted as a separate file (MU754_2019_FMP_TBL_Tables) in the electronic
- 3 version of this FMP.
- 4 FMP-1: Management Unit Area Summary
- 5 FMP-2: Description of Forest Units
- 6 FMP-3: Summary of Managed Crown Productive Forest by Forest Unit
- 7 FMP-4: Silvicultural Ground Rules
- 8 FMP-5: Post-harvest Renewal Transition Rules
- 9 FMP-6: Projected Forest Condition for the Crown Productive Forest
- 10 FMP-7: Projected Habitat for Selected Wildlife Species
- 11 FMP-8: Projected Available Harvest Area by Forest Unit
- 12 FMP-9: Projected Available Harvest Volume by Species Group and Broad Size or Product Group
- 13 FMP-10: Assessment of Objective Achievement
- 14 FMP-11: Operational Prescriptions for Areas of Concern and Conditions on Roads, Landings, and Forestry
- 15 Aggregate Pits
- 16 FMP-12: Planned Harvest Area
- 17 FMP-13: Planned Harvest Volume by Species
- 18 FMP-14: Planned Harvest Volume and Wood Utilization
- 19 FMP-15: Projected Wood Utilization by Mill
- 20 FMP-16: Contingency Harvest Area and Volume
- 21 FMP-17: Planned Renewal and Tending Operations
- 22 FMP-18: Road Construction and Use Management
- 23 FMP-19: Planned Expenditures
- 24 FMP-20: Planned Assessment of Establishment