SUPPLEMENTARY DOCUMENTATION

B

Analysis Package

TABLE OF CONTENTS

1.0 Introduction

The Analysis Package is used to document the information, assumptions and decisions made during the strategic analysis conducted to support the development of the Long-term Management Direction (LTMD) for the Whiskey Jack Forest 2024-2034 Forest Management Plan (FMP). The Analysis Package consists of text, tables, maps and other information prepared by Miisun Integrated Resource Management Company on behalf of the Ministry of Natural Resources and Forestry, and staff from the Kenora District and the Northwest Region MNRF offices.

2.0 Analytical Tools

The following tools were used during the development of the LTMD for the 2024-2034 Forest Management Plan for the Whiskey Jack Forest:

<u>Water Classification Tool (WCT)</u>
The Water Classification Tool was developed to assist FMP Planning Teams with the implementation of forest operations that aim to maintain ecological functions in aquatic ecosystems (including the protection of fish and fish habitat). The WCT assigns high, moderate or low level of potential sensitivity to forest operations for each water feature. Sensitivity levels are assigned based on either survey information (e.g. fish species presence) or physical attributes (e.g. catchment size). This coverage was manually reviewed by the Planning Team and refined to ensure aquatic values are adequately identified and classified, prior to consideration of water quality areas of concern during Stage Three of FMP production.

<u>Model and Inventory Support Tool (MIST)</u>
This tool configures and classifies the modelling inventory to prepare various modelling inputs. MIST will be used to develop yield curves (based on empirical yields with coefficients built in specific to Northwestern Ontario) for both merchantable and non-merchantable volumes and to create input datasets for the strategic planning model. The June 10, 2019 version of MIST was used.

<u>Strategic Forest Management Model (SFMM)</u>
SFMM is based on linear programming techniques and is used to model timber production capabilities of a forest for various levels of management intensity and objective achievement. The model is designed to be compatible with information currently available in Ontario. The model is used to non-spatially model forest condition and age through time (approximates the amount of habitat for wildlife species through Boreal Landscape Guide indicators), and includes inputs for the geographic location of wildlife management zones (caribou, moose, and deer) and operational management zones (semi-spatial input).

The Strategic Forest Management Model (SFMM) was used as the primary analysis tool for the strategic analysis. SFMM was used to track the entire Whiskey Jack Forest land base through time, and produce projections of changes to the forest structure and composition for 160 years into the future. SFMM was used for the evaluation of forested areas and their contribution to forest diversity, socio-economic benefits including timber production, old growth and wildlife habitat through time. SFMM version 5.1 Build 2019.04.01 was used with AIMMS solver version 4.64.4.21.

Ontario's Landscape Tool (OLT)

Ontario's Landscape Tool is an MNRF-developed stand-alone tool which allows the user to import a digital FRI to perform analyses and comparisons of planned landscapes with simulation results such as the simulated ranges of natural variation (SRNV). It also provides the science and information packages used to develop Ontario's Landscape Guides (e.g. Boreal Landscape Guide). These packages contain summaries of simulation results and decision support tools that can be used in FMP models for testing model inputs, assumptions and results. This tool was used to develop targets and assessment of Boreal Landscape Guide (BLG) indicators for landscape level forest composition and age structure, caribou habitat and landscape texture and pattern. OLT 2020 Version 3.5.7324 was loaded with the updated forest inventory and used for this FMP.

Heritage Assessment Tool (HAT)

The HAT was used to identify high potential Cultural Heritage sites across the forest. Products from the HAT are reviewed by the MNRF provincial archaeologist and Planning Team. The results of this tool were used as the basis of the archaeological potential areas of concern during Stage Three of FMP production.

3.0 Progress Checkpoints

A summary of the key production tasks and responsibilities is found in the Planning Team's Terms of Reference and Project Plan for the 2024-2034 Whiskey Jack Forest Management Plan. The Terms of Reference and Project Plan identify the roles and responsibilities for developing the above-mentioned analytical models, data compilation, update, classification, and conducting the analysis required under the *Forest Management Planning Manual (2020).*

Progress checkpoints are key steps in the development of the Long-Term Management Direction of a forest management plan. The progress checkpoints are:

1. Planning Inventory (approved May 25, 2021);
2. Current Forest Condition (approved April 18, 2023);
3. Base Model Inventory and Base Model (approved May 9, 2023);
4. Management Objectives (May 26, 2023);
5. Proposed Long-term Management Direction (June 13, 2023); and
6. Preliminary Endorsement of Long-term Management Direction (July 18, 2023).

Development and decisions related to the completion of the above progress checkpoints are detailed in the following parts of the Analysis Package.

PART 1: PLANNING INVENTORY

4.0 Development of the Planning Inventory

The planning composite inventory (PCI) for the management unit provides information required for forest management planning, including forest modelling, habitat modelling and forest diversity analyses. The planning inventory contains updated Forest Resource Inventory information as a result of forest management activities and natural disturbances.

The detailed technical requirements, responsibility and timing for production and submission of the planning inventory are described in the Forest Information Manual (July 2020) and FIM Forest Management Planning Technical Specifications (June 2020). Under these specifications, the planning inventory is made up of two different pieces, the planning composite inventory (PCI) and the forecasted depletions layer (FDP). The planning inventory reflects the forest inventory updated with most up to date depletions, silviculture and assessment information, but does not include depleting forecasted depletions from April 1, 2022 to the April 1, 2024 plan start. The forecast depletions layer consists of those depletions not cut in the last actual reported depletions (2022/2023 AR) to the end of the 2012-2024 FMP plus long-term extension, which have not yet been depleted and recorded.

Of Note: The PCI was developed and approved (Progress Checkpoint #1 on May 21, 2021) when the plan was being developed as a 2024-2034 FMP. A delay in planning occurred from Oct. 2021 to Feb.-March, 2023, at which time the PCI was updated as the basis for the 2024-2034 FMP.

The Crown forest portion of the management unit is the land base used for decision-making in the forest management plan. For forest management planning purposes, the Crown forest is categorized as areas managed for timber production and other areas. Other areas include provincial parks and conservation reserves, and areas that have been designated through legal or policy means, or a land use decision, as unavailable for timber production. The areas managed for timber production include all remaining Crown forest lands. The total area of Crown forest on the management unit can contribute to the achievement of non-timber objectives in the forest management plan.

Key Sources of Direction:

- *Forest Management Planning Manual (FMPM 2020)*
- *Forest Management Planning Technical Specifications (FIM Tech. Specs. 2020)*
- *Ontario Forest Resources Inventory*
- *Photo Interpretation Specifications, Revised Specifications March 1, 2012*

The planning composite was developed using GIS datasets approved by MNRF. This section will describe the information used, and the methods employed to produce a planning composite inventory (PCI) that is compliant to the FIM Technical Specifications 2020.

The PCI is based on a group of coverages which are used to create an information product that contains the following information: water, wetlands, ownership and land tenure, parks and reserves, primary and branch road and utility center-line features, and forest polygon coverage.

See Table 1 for a summary of sources of information (datasets) used in development of the Planning Composite Inventory.

Ownership data was delivered in several separate layers and combined as a composite using the process recommended by MNRF Regional staff. Ownership boundaries that shared arcs with water polygons were not adjusted to the new water features from the eFRI.

Table 1 Information Used for Planning Composite Inventory Development

Dataset Name	Description	Feature Type	Use	Vintage
Management unit boundary	Identifies the boundary ofthe Whiskey Jack Forest Management Unit (490) -provided by MNRF	polygon	Identifies area which is within the management unit.	LIO annual update base data delivery from Nov. 09, 2018.
Primary forest inventory coverage (eFRI)	Contains polygons describing the forest at the stand level. Based ondigital imagery acquired in 2009.	polygon	Forms the base of the forest resource inventory. *Not* FIM compliant (based on 2012 OFRI Specifications).	Original inventory 2009 – Updated with harvest, natural depletion, silviculture operations and surveys in from 2008 to 2016 on SFL licensed areas only.
Parks and protected areas	Part of ownership composite, contains polygons that are designated provincialpark or reserves. Provided by the MNRFvia Forest Information Portal request.	polygon	Identifies areas to be removed from the managed land base.	LIO annual update base data delivery from Nov. 09, 2018.

Dataset Name	Description	Feature Type	Use	Vintage
Non- productive forest area and water	Contains polygons that are identified as wetlands, water and other non-productive landtypes. Identified by the eFRI	polygon	Identifies non-forest areas to be removed from productive forest land base.	Updated from the new 2009 imagery
Ownership	Polygons identifying landownership (i.e. crown, patent, federal, crown patent). Base coveragesprovided by the MNRF LIO Warehouse along with Regional Office direction on composite development.	polygon	Identifies areas to be removed or included in the managed land base on ownership.	Data from LIO Annual Delivery from Nov. 09 2018, and direction provided in 2020 by MNRF Regional Office to look at photos to help determine boundaries.
Depletion	Contains polygons that document and track harvest and AOC reserveareas and resulting forest descriptions. Maintained by the FRL Service Provider.	polygon	Used to update forest inventory, stand descriptions and reserve status.	Updated annually - also used in annual reports. Updated to 2021-2022.
Silviculture	Contains polygons that document and track areas where silvicultural operations have occurred. Maintained by the FRL Service Provider.	polygon	Used to update forest inventory, stand descriptions.	Updated annually - also used in annual reports
Assessments (FTG)	Contains polygons thatdocument and track areas where Assessments (FTG) surveys have occurred. Maintained by the FRL Service Provider.	polygon	Used to update forest inventory, stand descriptions.	Updated annually - also used in annual reports

1

Dataset Name	Description	Feature Type	Use	Vintage
Roads	Shows all roads in themanagement unit. Maintained jointly by the MNRF and FRL Service Provider.	line	Major road areas andrecent operational roads were also identified in the eFRI as UCL area. Road centre-line data was therefore not used in the update process other than to review the interpreted UCL.	Updated annually, as recently as October 2016
Utility	Non-productive land associated with utility lines, pipelines, railways,etc. in the management unit.	polygon	Area removed from productive forest land base.	Embedded in eFRI as interpreted from 2009 imagery

The first step in developing the PCI from the eFRI was to create a 2020 FIM-supported format. This involved updating field names and data formats and assigning stand attributes to be compatible with modelling and analysis tools.

The age of a forest stand was calculated on the difference between the plan start year and the YRORG value for the year of the start of the plan (2024).

The new eFRI contains overstory and understorey data to describe some multi-cohort stand conditions. These are identified with a VERT field. In cases where two canopies are described, only one must be identified as the defining canopy for the planning inventory and base model. Most stands have a VERT description of SI (single canopy), however, 1,663 stands have a TU, MU, MO or TO designation that indicates the understorey is the defining stand cohort, i.e., the canopy layer that defines the management regime and DEVSTAGE is the understorey. Therefore, the understorey stand description was copied over to the planning composite and subsequent base model stand attributes.

The 60 character species composition attributes in the eFRI (OSPCOMP and USPCOMP) has 3 characters for the species code and 3 characters for the species percentage, with each coded to the nearest 10%. The eFRI species composition attribute is FIM compliant once copied into a 120-character field.

Harvest depletions that have occurred since eFRI image acquisition began, in 2009, have been updated into the inventory, up to and including depletions from the 2021-2022 annual report. Regeneration (plant, seed) and free-to-grow data was also updated from 2009 onwards to the 2018-2019 fiscal year. Source data used for updating is the same as submitted through the annual reporting process. These polygons are derived from high-resolution digital photography (SAP) that is acquired annually from fixed-wing aircraft. The imagery is ortho-rectified and georeferenced prior to being used for delineating boundaries for harvest and reserve areas.

A process for removing small forested polygons and slivers that are created when overlaying multiple data layers was employed. This process also ensured that eFRI source data for non-forest and non-productive areas were not removed or joined, and all administrative lines (ownership) were preserved. Minimum polygon size, prior to overlaying administrative boundaries was set to 0.5 ha for unmanaged forest polygons using progressive eliminations with fewer and fewer restrictions (remove productive polygons less than 0.25 ha then 0.5 ha).

Center-line features such as roads, rail lines, hydro corridors, and gas pipe lines were buffered in the PCI. Double line features in the eFRI did not require additional buffering as the eFRI provides greater precision and areas are adequately delineated. The introduction of additional buffers would create unnecessary slivers.

The forest was then grown to the start of the planning period (2023) which involved altering the stand age and height information based on accepted regional growth algorithms. (The forest was not further “grown” when the FMP changed from a 2023 FMP to a 2024 FMP).

The forecast depletion (FDP) layer contains remaining harvest areas that are reasonably expected to be harvested during the remaining term of the current forest management plan. This coverage was developed from the planned harvest block layer, minus areas that were already harvested (up until the end of the 2021-2022 fiscal year) and reserves. The forecast depletions were also netted down to exclude areas that are not expected to be harvested by the end of 2023-2024 fiscal year. This was done to avoid having a modelled forecast that is unrealistically high. A FYRDEP of 2023 was used for all the forecast depletion areas as this is the start of the last fiscal year of the plan and it is not known in which year each block will be fully harvested.

4.1 Documentation of the Planning Inventory Checkpoint #1

Progress Checkpoint #1 approval of the Planning Inventory was received on May 25, 2021 via email from Mitchell Legros, R.P.F., Regional Planning Forester to Kurt Pochailo, R.P.F., Plan Author, Service Provider Lead.

PART 2: CURRENT FOREST CONDITION

5.0 Current Forest Condition

The planning inventory products are combined and updated with forest classification information and strategic management decisions to produce the Base Model Inventory (BMI), in accordance with the requirements of the *Forest Information Manual*. The base model inventory and landscape level information are used to describe the current forest condition. The following sub-sections describe the development of the various forest condition classifications.

5.1 Forest Units

The Forest Management Planning Manual (FMPM) defines forest units as: "A classification system that aggregates forest stands for management purposes that will normally have similar species composition; will develop in a similar manner (both naturally and in response to silvicultural treatments); and will be managed under the same silvicultural system."

There are three different types of forest units used in the production of and reporting for the Whiskey Jack Forest Management Plan 2024:

1. Regional Standard Forest Units (NWSFU),
2. Landscape Guide Forest Units (LGFU), and
3. Plan Forest Units (PLANFU).

(Plan forest units may be further subdivided into Analysis Units – See Section 6.1.1).

The three sets of forest units are directly related to each other, and are used or combined to provide required information for strategic planning or reporting. Boreal Landscape Guide Forest Units are the foundation, and are based on Northwest Region standard forest units, and may be rolled up into to planned forest units.

5.1.1 Regional Standard Forest Units (NWSFU)

NWSFUs are management decisions classified in the Planning Inventory and in the Base Model Inventory. The classification script was provided to Planning Team by MNRF Northwest Region (Table 2). See Table 3 for average area-weighted conditions for NWSFUs, and for classification script.

The standard forest units are developed regionally to reflect the different forest conditions and management considerations found across the region and the different forest types. The regional standard forest units are based on a classification system that aggregates forest stands for management purposes, combining those that will normally have similar tree species composition, will develop in a similar manner, and will be managed under the same silviculture system. The Northwest Region is dominated by Boreal Forest with a portion of the southern section of the region has characteristics of Great Lake-St. Lawrence forest types. Therefore, the dominant forest types reflect conifer forest types such as Spruce, Jack Pine and Balsam Fir. Hardwood forests are dominated by Aspen, White Birch and Mixedwood. The Northwest Region standard forest units cover these forest types and include some regional ecosite considerations and management considerations for upland, lowland and shallow sites.

Table 2 Northwest Region Standard Forest Units (NWSFU) Classification

Sort	Code	Name	Criteria
1	PwDom	White Pine Dominant	(Pw >= 40)
2	PrDom	Red Pine Dominant	(Pr >= 70)
3	PrwMx	Red and White Pine Mix	(Pw + Pr >= 40)
4	UplCe	Upland Cedar	(Ecosite = Upland Cedar) Or ((Ce >= 40 And Bf <= 10 And Upland Indicators >= 20 And All Conifers >= 70) And (Ecosites <> All Lowland))
5	OCLow	Other Conifer Lowland	((Ce + La >= 50 Or LeadSp = Ce, La) And (Ecosites = Conifer Lowland))
6	SbLow	Black Spruce Lowland	(Ecosite = Conifer Lowland)
7	SbSha	Black Spruce Shallow	(Sb >= 70 And Po + Bw <= 20 And Ecosite = Shallow)
8	SbDee	Black Spruce Deep	(Sb >= 70 And Po + Bw <= 20)
9	PjSha	Jack Pine Shallow	((Pj >= 70 And Po + Bw <= 20) Or (Pj >= 50 And Po + Bw <= 20 And AGE >= 120)) And (Ecosite = Shallow)
10	PjDee	Jack Pine Deep	(Pj >= 70 And Po + Bw <= 20) Or (Pj >= 50 And Po + Bw <= 20 And AGE >= 120) Or (Pj >= 70 And Ecosite = B034, B035)
11	PoSha	Poplar Shallow	(Po >= 70 And Ecosite = Shallow)
12	PoDee	Poplar Deep	(Po >= 70)
13	BwSha	Birch Shallow	(Bw >= 60 And Po + Bw >= 70 And Ecosite = Shallow)
14	BwDee	Birch Deep	(Bw >= 60 And Po + Bw >= 70)
15	OthHd	Other Hardwood	(Uh + Lh >= 30)
16	SbMx1	Black Spruce Dominant Conifer Mix	(All Conifers >= 70 And Bf <= 10 And Po + Bw <= 20 And Sb + Sw > Pj)
17	PjMx1	Jack Pine Dominant Conifer Mix	(All Conifers >= 70 And Bf <= 10 And Po + Bw <= 20 And Sb + Sw <= Pj)
18	BfPur	Balsam Fir Pure	(Bf >= 70)
19	BfMx1	Balsam Fir Conifer Mix	(All Conifers >= 70 And Bf > 10 And Bf + Sw >= 30)
20	HrDom	Hardwood Dominant	(All Hardwoods >= 70)
21	HrdMw	Hardwood Mix	(All Hardwoods >= 50)
22	ConMx	Conifer Hardwood Mix	(All Conifers >= 50)

- Upland Indicators include (Pr + Pw + Pj + Sw + Bf + Po)
- Upland Cedar ecosites (B013, B036, B051, B066, B084, B100, B115)
- Shallow ecosites (B011, B012, B014, B015, B016, B017, B018, B019, B023, B024, B025, B026, B027, B028)
- Conifer Lowland ecosites (B126, B127, B128, B129, B134, B135, B136, B137, B222, B223, B224)
- Hardwood Lowland ecosites (B130, B131, B132, B133)
- All Lowland = Conifer Lowland + Hardwood Lowland ecosites

Table 3 Area-Weighted Average Condition by NWSFU

SFU	HA	AGE	HT	CCLO	SC	STKG	PW	PR	PJ	SB	SW	BF	CE	LA	PO	BW	UH	LH
BfMx1	25,544	68	11.8	63.6	1.4	0.595	0	0	6	34	7	34	0	0	7	12	0	0
BfPur	1,073	42	8.3	62.7	0.9	0.618	0	0	1	8	3	73	0	0	6	9	0	0
BwDee	11,727	70	16.3	69.1	2.1	0.684	0	0	2	11	4	3	0	0	14	65	0	0
BwSha	104	82	15.3	59.2	2.8	0.6	0	0	17	12	0	0	0	0	12	60	0	0
ConMx	117,199	69	13.3	65.5	1.6	0.631	0	0	22	36	2	7	0	0	17	16	0	0
HrdMw	80,185	68	17.5	64.2	2	0.635	0	0	10	23	4	8	0	0	34	21	0	1
HrDom	69,887	72	20.5	68.2	2.2	0.666	0	0	4	13	3	4	0	0	49	25	0	1
OCLow	3,879	101	13.5	63.8	1.9	0.614	0	0	0	30	0	0	23	40	2	3	0	3
OthHd	4,007.6	87	19.5	65.3	2.1	0.638	0	0	1	14	2	3	2	1	16	9	2	51
PjDee	96,052	51	13.2	73.3	1.9	0.757	0	0	79	12	0	0	0	0	5	4	0	0
PjMx1	70,391	70	14.6	66.8	2.1	0.666	0	0	55	32	0	1	0	0	6	6	0	0
PjSha	24,333	54	13	55.7	2.5	0.561	0	0	80	11	0	0	0	0	4	5	0	0
PoDee	48,606	68	20	69.7	2	0.71	0	0	3	9	2	3	0	0	75	7	0	0
PoSha	36	59	10.8	49.1	3.1	0.701	0	0	5	9	0	0	0	0	83	2	0	0
PrDom	675	80	16.4	66	1.9	0.693	5	79	4	6	0	2	0	0	2	4	0	0
PrwMx	2,125	91	19	71.4	2.1	0.684	10	42	8	14	1	4	0	0	9	13	0	0
PwDom	788	99	21.4	66.3	1.8	0.595	44	11	2	3	1	6	3	0	14	14	1	1
SbDee	86,461	69	11.4	66.8	1.3	0.653	0	0	8	79	2	3	0	0	3	5	0	0
SbLow	55,098	91	11.2	58.5	2.3	0.576	0	0	1	83	0	1	1	11	1	2	0	1
SbMx1	74,058	75	12.2	65.3	1.4	0.617	0	1	26	54	4	3	0	0	5	7	0	0
SbSha	7,956	85	12.9	52.3	1.8	0.503	0	0	13	77	1	2	0	0	1	6	0	0
UplCe	2,154	104	15	73.2	1.8	0.771	2	1	1	12	2	3	54	0	11	13	0	2
	782,337																	

<u>NOTE</u>: Classified forest areas were developed and documented based on approved 2021 PCI. Decisions were still valid therefore areas were not revised for with the 2023 revised PCI.

5.1.2 Boreal Landscape Guide Forest Units (LGFU)

Landscape guide forest units are classifications for broad forest types, and are defined in the *Forest Management Guide for Boreal Landscapes* (Boreal Landscape Guide; BLG) and associated Science Packages. The classification script was provided to Planning Team by MNRF NW Region (see Table 4 for classification script). LGFUs are management decisions applied to the Planning Inventory, in the Operational Planning Inventory and Base Model Inventory.

Landscape Guide forest units are further grouped and stratified by age groupings into Landscape Classes (defined in the BLG). Landscape Classes are considered in the indicators of management objective achievement, in the strategic modelling, and in reporting during and after implementation of the FMP.

Landscape classes are groupings of Boreal Landscape Guide Forest Units by development stage (age groupings), which are meaningful to how forests function as habitat. Forest landscape classes are used to describe the current forest composition, structure and pattern at the landscape level. Landscape classes that are used to describe the current forest condition are defined in MNRF's approved forest management guide(s) relating to landscape pattern and structure. See Section 6.2.2.7 for the classification of Landscape Classes (represented through Generic Yield in Even-Aged Forest).

Table 4 Landscape Guide Forest Units (LGFU)

#	LGFU Code	Name	Included Regional NWSFUs	OWN=1-5-7 Area (ha)
1	**PrwMx**	Red Pine and White Pine Mix	PwDom, PrDom, PrwMx	3,588
2	**OCLow**	Other Conifer Lowland	OCLow	3,879
3	**SbLow**	Black Spruce Lowland	SbLow	55,098
4	**SbDom**	Black Spruce Dominant	SbSha, SbDee	94,417
5	**PjDom**	Jack Pine Dominant	PjSha, PjDee	120,386
6	**PoDom**	Poplar Dominant	PoSha, PoDee	48,642
7	**BwDom**	Birch Dominant	BwSha, BwDee	11,831
8	**OthHd**	Other Hardwood	OthHd	4,008
9	**SbMx1**	Black Spruce Dominant Conifer Mix	SbMx1	74,058
10	**PjMx1**	Jack Pine Dominant Conifer Mix	PjMx1	70,391
11	**BfDom**	Balsam Fir Dominant	BfPur, BfMx1	26,616
12	**HrDom**	Hardwood Dominant	HrDom	69,887
13	**HrdMw**	Hardwood Mix	HrdMw	80,185
14	**ConMx**	Conifer Hardwood Mix	ConMx, UplCe	119,352
	* All 22 Regional NW SFUs each w holey combined into 1 of 14 Landscape Guide Forest Units.			782,337

5.1.3 Plan Forest Units (PLANFU)

The Whiskey Jack Forest is a management unit in Northwest Region that contains a diversity of forest types. All 22 regional standard forest units are represented, though some have minimal area. The development of Plan Forest Units will consider current regional planning requirements, the significance of certain forest types on the Whiskey Jack Forest, as well as amount of SFU areas (rationale to manage separately or in combination with other SFUs).

The 2012-2024 FMP contained 12 PLANFUs. These PLANFUs were reviewed as PLANFU development was considered by the LTMD Task Team. The LTMD Task Team recognized that there were valid reasons to adjust PLANFUs from the 2012 FMP PLANFUs to a revised set for this Whiskey Jack Forest 2024-2034 FMP.

<u>General PLANFU Requirements</u> *(FMPM and FMP training):*

- PLANFUs are to be consistent with the Boreal Landscape Guide Forest Units (LGFU).
- PLANFUs are to be as consistent as feasible with Northwest Region standard forest units (NWSFUs) with roll up (recommended) or splitting (not recommended, rationale required), to facilitate use of regionally available tools and information products.
- PLANFUs represent ecological-based classification of the forest land base (balance of ecology, response to treatment and management considerations.)
- PLANFUs classify stands with similar species composition that are projected to have similar natural forest dynamics.
- Area in a forest unit must be managed under the same silviculture system.
- PLANFU forest units form the basis for the legal harvest area approved in a forest management plan.
- PLANFU forest unit definitions from plan to plan should be as consistent as possible for operational understanding and for accurate reporting and trend analyses.

- PLANFU classification script is determined by the Planning Team (documented in Table FMP-2).
- PLANFUs are management decisions tagged in the Operational Planning Inventory and the Base Model Inventory
- PLANFUs are imported with the land base into strategic modelling, and are the basis for various FMP tables and reporting required by the *Forest Management Planning Manual*.
- If feasible, PLANFUs should match the Kenora Forest 2022 FMP forest units, as both management units are adjacent and being managed and administered by Miisun Integrated Resource Management Company from their Kenora office.

<u>Whiskey Jack Forest 2024 FMP PLANFU Development:</u>

The LTMD Task Team (and advisors) was engaged by the Planning Team for development of proposed PLANFUs.

Whiskey Jack Forest Crown land (ownerships 1 (Crown, Managed), 5 (Conservation Reserves), and 7 (Parks)) by NWSFU was considered for initial analysis of potential PLANFUs (Table 3). The Task Team reviewed area and average species compositions for each NWSFU. The Task Team also reviewed the standard roll up of NWSFUs into Landscape Guide Forest Units (LGFU). The LGFUs were generally the starting point for the 2024 PLANFUs, with some changes as rationalized below:

<u>PLANFU Considerations and Rationale</u>

PRW PLANFU

- Matches Landscape Guide Forest Unit PrwMx.
- contains PwDom (808 ha), PrDom (679 ha) and PrwMx (2,189 ha) and) NWSFUs
- Red Pine and White Pine totals 3,675 ha, so warrants management as a single PLANFU.
- If warranted, variations within the PLANFU yield curves (red pine dominant versus white pine stands) can be reflected in YIELD (analysis units and silvicultural intensities in modelling).
- Very small portion of forest. Could be rolled up with another PLANFU. Keep separate as important Desired Forest & Benefit.
- Will keep 2 analysis units. Matches Kenora Forest.

CMX PLANFU

- Matches Landscape Guide Forest Unit ConMx.
- contains both ConMx (118,598 ha) and upland cedar (UplCe, 2,532 ha) NWSFUs.
- UplCe NWSFU will be identified as an analysis unit in the strategic modelling, separate from the ConMx analysis unit.
- Will have 2 analysis units for wildlife habitat, maybe old growth.
- Matches Kenora Forest.

SBL PLANFU

- Includes two Landscape Guide Forest Units: SbLow and OCLow.
- Contains SbLow (55,461 ha) and OCLow (4,032 ha) NWSFUs.
- Regional support for combining in one forest unit as both are lowland conifer-dominated forest ecosites.
- OCLow and SbLow will be identified with Analysis Units in the modelling, with applicable varied management inputs and constraints. Matches Kenora Forest.

SBD PLANFU

- Matches Landscape Guide Forest Unit SbDom.
- contains SbDee (87,134 ha) and SbSha (7,975 ha) NWSFUs
- No split into analysis units warranted (SbSha not large)
- Will use 1 analysis unit.

PJD PLANFU

- Matches Landscape Guide Forest Unit PjDom.
- contains PjDee (96,551 ha) and PjSha (24,603 ha) NWSFUs
- PjSha NWSFU will be identified as an analysis unit in the strategic modelling, separate from the PjDee analysis unit. Consensus for 2 analysis units.

POD PLANFU

- Matches Landscape Guide Forest Unit PoDom.
- Contains PoDee (50,533 ha) and PoSha (49 ha) NWSFUs
- No split into analysis units warranted. Will have 1 Analysis Unit
- Matches Kenora Forest.

SBM PLANFU

- Matches Landscape Guide Forest Unit SbMx1.
- Contains SbMx1 (74,592 ha) NWSFU
- 1 analysis unit, matches Kenora Forest.

PJM PLANFU

- Matches Landscape Guide Forest Unit PjMx1.
- Contains PjMx1 (70,799 ha) NWSFU
- 1 analysis unit, matches Kenora Forest.

BFM PLANFU

- Matches Landscape Guide Forest Unit BfDom
- contains BfPur (1,075 ha) and BfMx1 (25,975 ha) NWSFUs
- Called BFM (mix, not “Dom”) since greatest area is BfMx1, not BfPur NWSFU
- Discussion: BFM may be grouped with ConMx, but the amount of Balsam Fir on the Whiskey Jack Forest warranted a separate forest unit to allow for specific management strategy and modelling inputs. Also maintains consistency with Kenora Forest FMP (had separate BFM PLANFU). Matches Kenora Forest.

HRD PLANFU

- Includes three Landscape Guide Forest Units: HrDom (71,773 ha), OthHd (4,059 ha), and BwDom (11,956 ha)
- Contains HrDom (71,773 ha), BwSha (104 ha), BwDee (11,853 ha), and OthHd (4,059 ha) NWSFUs
- HrDom is the largest NWSFU in this PLANFU, and the other NWSFUs are smaller and hardwood dominated, and don't warrant separate strategic management. Regionally supported.
- Three separate analysis units will be included in the PLANFU for modelling to distinguish between HRD, BW and OTH (Black Ash).
- Matches Kenora Forest.

HMX PLANFU

- Matches Landscape Guide Forest Unit HrdMx.
- contains HrdMw NWSFU (81,427 ha).
- 1 analysis unit. Matches Kenora Forest.

Decision: With above LTMD Task Team consensus, the Whiskey Jack Forest 2024 FMP will use 11 PLAN Forest Units (decision May 28, 2021) (Table 5). These forest units' definitions and codes (labels) are relatively consistent with the comparable forest units in the 2012 FMP (aids reporting consistency between planning periods).

These forest units have a cleaner use or roll up of regional standard forest units, as compared to the 2012-2024 FMP. These forest units match the Kenora Forest 2012-2022 FMP forest units which is advantageous as both units are adjacent to each other, and bot managed by Miisun Integrated Resource Management Company.

The PLANFUs provided for a strong correlation to Northwest Region Standard Forest Units and the Boreal Landscape Guide Landscape Forest Units (Table 6).

Table 5 Plan Forest Units for the Whiskey Jack Forest 2024 FMP

Whiskey Jack 2024 - PLANFUs Version 1				
PLANFU		**NWSFUs**	**Ha**	
BFM	Balsam Fir Mix	bfpur, bfmx1	26,616	3%
CMX	Conifer Mix	conmx, uplce	119,352	15%
HMX	Hardwood Mix	hrdmw	80,185	10%
HRD	Hardwood Dominant	hrdom, othhd, bwdee, bwsha	85,725	11%
PJD	Jack Pine Dominant	pjdee, pjsha	120,386	15%
PJM	Jack Pine Mix	pjmx1	70,391	9%
POD	Poplar Dominant	podee, posha	48,642	6%
PRW	Red Pine and White Pine Mix	prwmx, prdom, pwdom	3,588	0%
SBD	Spruce Dominant	sbdee, sbsha	94,417	12%
SBL	Spruce Lowland	sblow, oclow	58,977	8%
SBM	Spruce Mix	sbmx1	74,058	9%
		(ownership 1-5-7)	782,337	100%

Table 6 Correlation Between NWSFUs-LGFUs-Whiskey Jack 2024 FMP PLANFUs

1

Whiskey Jack FMP 2024 - Relationship Between Types of Forest Units

Planning Team agreement June 17, 2021

Areas of Crown Forest (OWNER=1-5-7)

Version 1

LTMD Task Team consensus: May 28, 2021

Regional Standard Forest Units (22) (specific sort order)			Landscape Guide FU (14)					2024 Plan Forest Units PLANFU (11)		
SFU	**Name**	**Crown, Forest Area (ha)**	**LGFU**	**(NWSFU)**	**Name**	**Crown, Forest Area (ha)**		**PLANFU**	**Crown, Forest Area (ha)**	
PwDom	White Pine Dominant	788	**PrwMx**	PwDom	Red Pine and White Pine Mix	3,588	→	**PRW**	3,588	0%
PrDom	Red Pine Dominant	675		PrDom						
PrwMx	Red and White Pine Mix	2,125		PrwMx						
ConMx	Conifer Hardwood Mix	117,199	**ConMx**	ConMx	Conifer Hardwood Mix	119,352	→	**CMX**	119,352	15%
UplCe	Upland Cedar	2,154		UplCe						
OCLow	Other Conifer Lowland	3,879	**OCLow**	OCLow	Other Conifer Lowland	3,879	→	**SBL**	58,977	8%
SbLow	Black Spruce Lowland	55,098	**SbLow**	SbLow	Black Spruce Lowland	55,098	→			
SbSha	Black Spruce Shallow	7,956	**SbDom**	SbSha	Black Spruce Dominant	94,417	→	**SBD**	94,417	12%
SbDee	Black Spruce Deep	86,461		SbDee						
PjSha	Jack Pine Shallow	24,333	**PjDom**	PjSha	Jack Pine Dominant	120,386	→	**PJD**	120,386	15%
PjDee	Jack Pine Deep	96,052		PjDee						
PoSha	Poplar Shallow	36	**PoDom**	PoSha	Poplar Dominant	48,642	→	**POD**	48,642	6%
PoDee	Poplar Deep	48,606		PoDee						
SbMx1	Black Spruce Dominant Conifer Mix	74,058	**SbMx1**	SbMx1	Black Spruce Dominant Conifer Mix	74,058	→	**SBM**	74,058	9%
PjMx1	Jack Pine Dominant Conifer Mix	70,391	**PjMx1**	PjMx1	Jack Pine Dominant Conifer Mix	70,391	→	**PJM**	70,391	9%
BfPur	Balsam Fir Pure	1,073	**BfDom**	BfPur	Balsam Fir Dominant	26,616	→	**BFM**	26,616	3%
BfMx1	Balsam Fir Conifer Mix	25,544		BfMx1						
BwSha	Birch Shallow	104	**BwDom**	BwSha	Birch Dominant	11,831	→	**HRD**	85,725	11%
BwDee	Birch Deep	11,727		BwDee						
OthHd	Other Hardwood	4,008	**OthHd**	OthHd	Other Hardwood	4,008	→			
HrDom	Hardwood Dominant	69,887	**HrDom**	HrDom	Hardwood Dominant	69,887	→			
HrdMw	Hardwood Mix	80,185	**HrdMw**	HrdMw	Hardwood Mix	80,185	→	**HMX**	80,185	10%
		782,337				782,337	red matches LGFU		782,337	100%
							blue is clean roll-up			

2

5.2 Management Decision Information

5.2.1 Management Zones (SMZ, OMZ)

In the development of the long-term management direction, the planning team chose to partition the management unit into management zones. A management zone is a geographical area within a management unit that provides spatial context to the long-term management direction, and may influence strategic analysis, and operational planning. Two types of management zones, strategic and operational, can be used to represent spatial considerations.

Strategic Management Zones (SMZ) represent areas with distinct ecological characteristics, landscape biodiversity requirements or forest-level harvest and retention considerations. Strategic management zones are identified in the SMZ field of the spatial Operational Planning Inventory (OPI) and Base Model Inventory (BMI). For this Whiskey Jack Forest 2024-2034 FMP, two management decisions were fundamental to the identification of SMZs. Firstly, the MNRF decision on the area of the WJF that could be planned for forest management activities and the rest of the forest in which no forest management activities were to be planned in this FMP. Secondly, the area of continuous caribou distribution was identified ("the caribou zone"), which included area in both the area that was eligible for forest management activities and the area without activities. These decisions resulted in four (4) SMZs being classified for this 2024-2034 FMP (Figure 1).

Operational Management Zones (OMZ) are subdivisions of the strategic management zones that provide additional delineation of geographic areas which allows for operational variations during strategic LTMD planning, during operational planning and plan implementation. The OMZ field in the BMI contains the unique subunit (which may be letters or a combination of letters and numbers (e.g. "MEA1", "LOTW", "H105", etc.).

Operational management zones were identified for:

- SMZ areas CAR1, CAR2 and SMZA were classified with their same codes for the OMZ field;
- SMZB was further subdivided into OMZs:
  - Moose Emphasis Areas (MEA) – 3 MEAs classified as MEA1, MEA2, MEA3;
  - Deer Emphasis Area (DEA) – 1 DEA classified as DEA1;
  - Large Landscape Patches (LLP) for current or future Mature-Older Forest pattern – 3 LLPs classified as LLP1, LLP2 and LLP3;
  - Remainder of area in geographically separate southern Lake of the Woods section of the WJF, and not in above OMZs – 1 OMZ classified as LOTW;
  - Remainder of northern geographic area in SMZB that was not in above OMZs – 1 OMZ classified as H105.

This OMZ classification resulted in 12 OMZs, covering the entire Whiskey Jack Forest, being classified for this 2024-2034 FMP (Figure 2). See Appendices 2, 3, and 4 in this Analysis Package (Supp. Doc. B) for rationale and description of the development of the Large Landscape Patches for moose habitat, deer habitat and mature-older forest landscape pattern.

Figure 1 Strategic Management Zones (SMZs) on the Whiskey Jack Forest

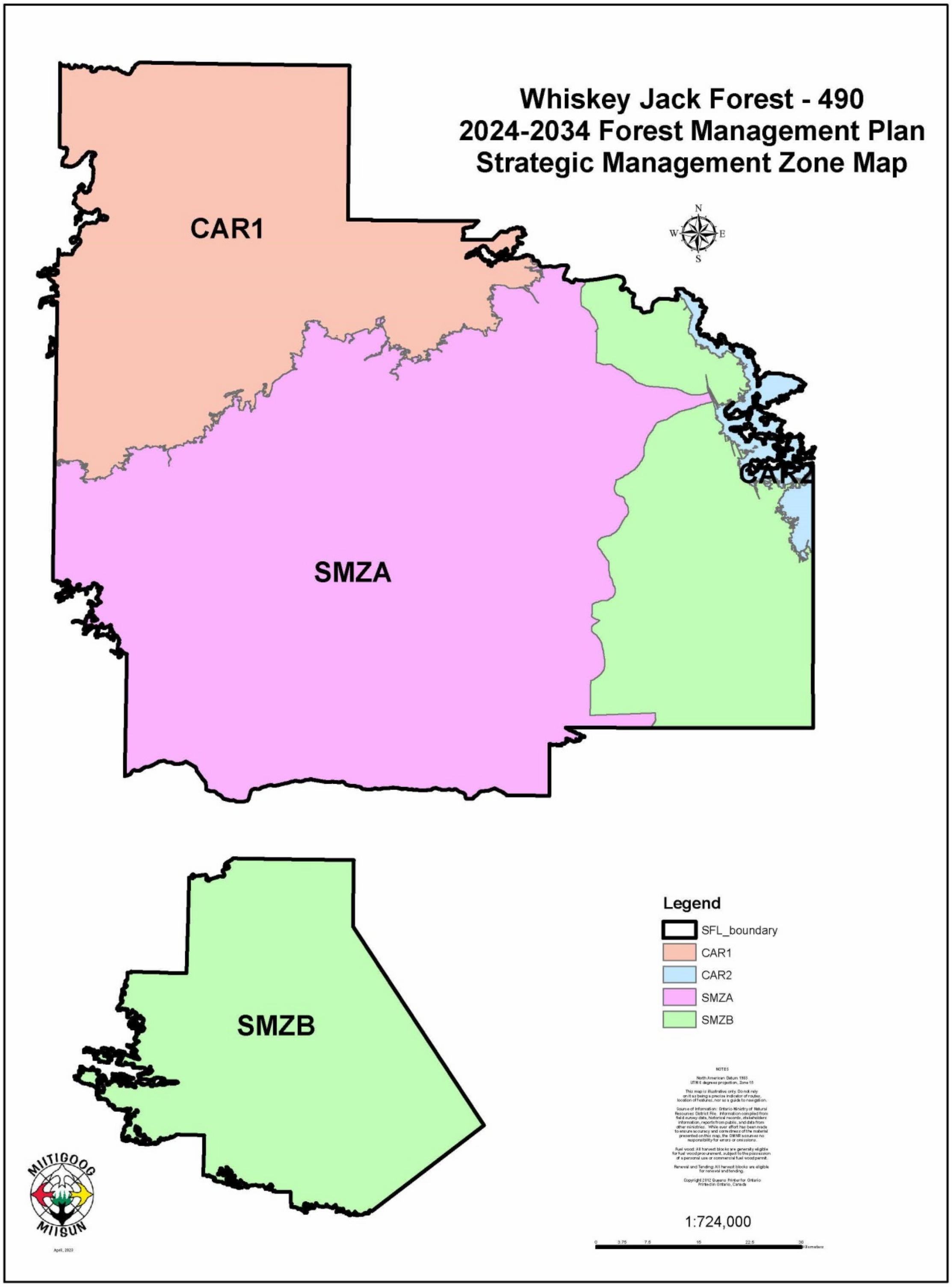
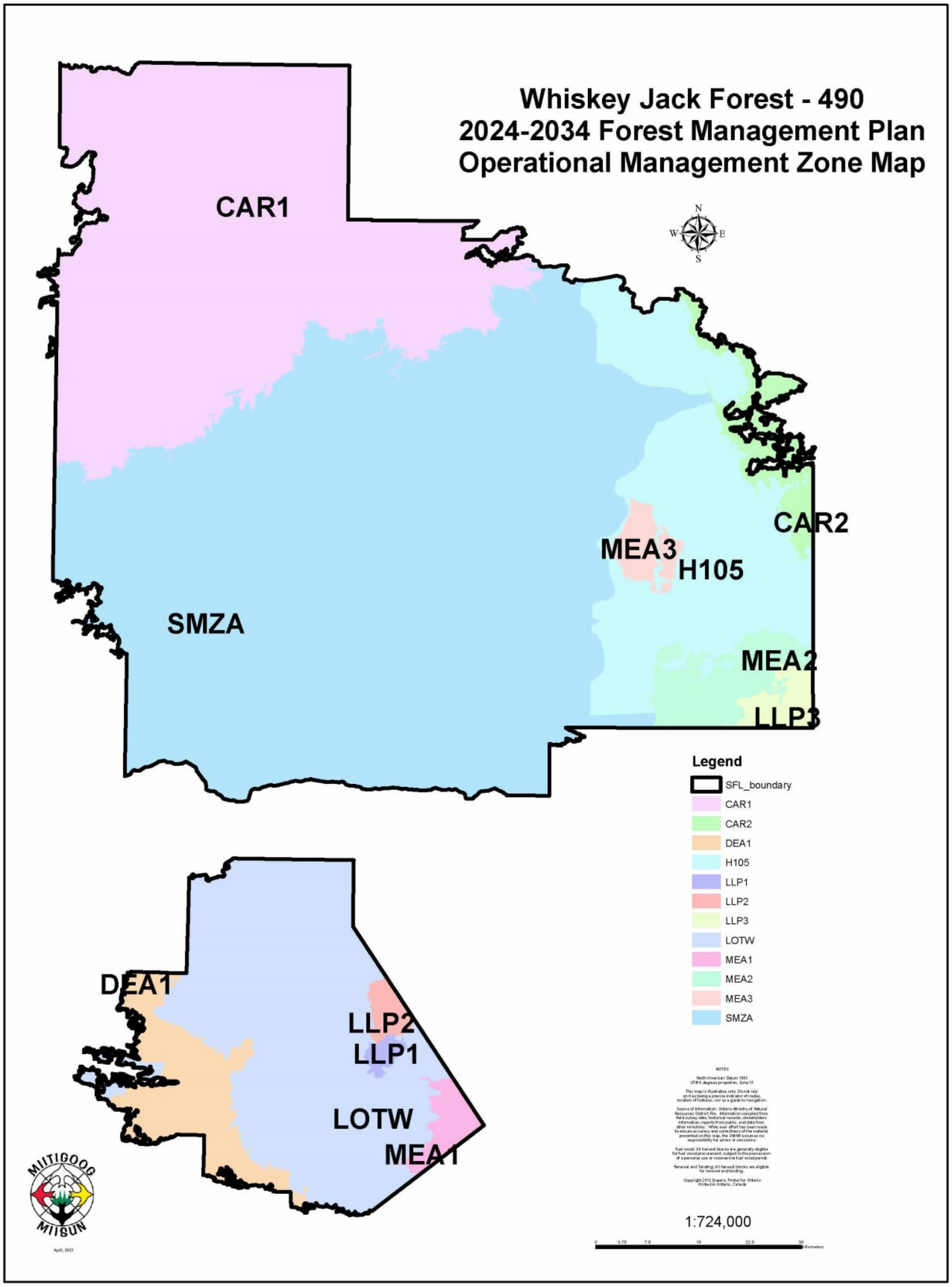


Figure 2 Operational Management Zones (OMZs) on the Whiskey Jack Forest



5.2.2 Forest Productivity (YIELD)

"Yield" in the inventory is used to classify forest conditions within a forest unit. "Yield" generally reflects the productivity or potential of the forested stand to produce wood fibre, and does not reflect the silvicultural treatments (or associated relative cost) to be implemented. “Yield”, called "silvicultural intensity" (SI) in the FMPM 2009 and the 2012-2024 FMP, is referred to as “YIELD” in the BMI (FMPM 2017 and 2020), and throughout this 2024-2034 FMP.

YIELD classification is based on stand origin (natural or managed), forest unit, and ecosite. YIELD classification is only applied to forested stand (POLYTYPE= “FOR”). The LTMD Task Team reviewed the previous plan Silvicultural Intensity to determine if they were consistent with the revised yield classification in the FMPM 2017, or needed to be update based on operations and silvicultural regeneration standards. The team used a new strategy to identify silviculture intensity by defining general site productivity, consistent with the direction 2017 FMPM and consistent with the YIELD definitions in the adjacent Kenora Forest 2022-2032 FMP.

YIELD is identified in Base Model Inventory (BMI) and represents the current and future conditions. YIELD can be classified as NAT – natural productivity (current), LOW – low productivity, MED – medium productivity, and HIGH – high productivity and is included in subsequent SFMM modelling inputs for natural forest succession (old age), yield curves, harvest operability limits, etc. The combination of forest unit and YIELD (i.e. forest productivity) will create a category of forest type called a “silvicultural stratum”. The definition of YIELD was consistently included in the Silvicultural Ground Rules (SGRs) (Table FMP-4).

A future HIGH YIELD in hardwood mix stands (HMX, HRD) and Balsam Fir stands (BFM) was not consistent with successful regeneration after implementing a silvicultural strategy of planting or seeding of conifer. Therefore HIGH is not a valid future YIELD for these four forest units. Likewise in lowland stands (SBL) MED and HIGH YIELDs were recognized to not be viable silviculture options as these stands are low productivity, lowland sites with significant limiting factors that would not result in the achievement of those more productive future YIELDs. Table 7 documents the YIELD definitions with a general description. Table 8 documents the BMI sort criteria and YIELD definitions by PLANFU.

Table 7 Forest Productivity YIELD Definitions

There are four (4) YIELDS used for this 2024 FMP:	
Yield	**General Description of Forest Condition**
NAT: (Present, Natural, Medium	All stands originating from naural disturbances (excludes those stands classified as harvested). All NAT stands were naturally regenerated (no stands received any subsequent renewal treatment).
LOW: (Managed, Low Productivity)	Harvested (managed) forest stands that have lower, minimum site productivity (LOW) for the production of wood fibre. All areas with minimum site qualities that do not have the capability for full stocking due to site limitations. LOW areas are managed stands that are not density-regulated.
MED: (Managed, Medium Productivity)	Harvested (managed) forest stands that have moderate site productivity (MED) for the production of wood fibre. Stands with moderate stocking (less than full stocking or with over stocked conditions). All stands that return to a present-like yield after harvest, with or without subsequent renewal treatments. MED areas are managed stands that are not density-regulated. Also results from natural succession of managed stands.
HIGH: (Managed, High Productivity)	Harvested (managed) forest stands that have better site productivity (HIGH) for the production of wood fibre. After harvest, these areas have generally received one or more renewal treatments to promote prompt regeneration. All stands with close to full stocking. HIGH areas are managed stands that are not density-regulated, however HIGH also includes any density regulated stands that may be established.

Valid YIELDS: Forest Unit / Silvicultural Intensity Combinations for Forest Condition:

- Identifies actual condition of the forest.
- Not all forest units have all YIELD curves.
- Basis for other strategic modelling inputs for natural forest succession (old age), YIELD curves, harvest operability limits, post-harvest renewal transitions, etc.
- Managed YIELDs match 2022 Kenora Forest FMP classifications (WJF average stand conditions vary slightly).

Initial Site productivity limiting ecosites are:
Shallow ecosites = PRIECO equal to B008 to B028 (Note: these were not used in final YIELD sort).
Wet ecosites = PRIECO equal to B126 to B133, or B222 to B224

- YIELD was initially discussed May 28, 2021 (LTMD TT and regional advisor). Yield classification as applied to Operational Planning Inventory on June 1, 2021 (version 1, NAT) to June 15 (managed yields).

General Sort Order: (not all forest units have all yields)
(1) Sort for natural origin stands first.
(2) LOW sort captures all lower Site Class areas, as well as site limiting shallow or wet sites.
(3) HIGH captures stands with better stocking or site class.
(4) MED captures remaining stands without site limitations, and with less than desirable stocking (not already classified as "LOW" or "HIGH").

For reference, the script used to apply YIELD classifications follows:

Whiskey Forest 2024 FMP **Sort for YIELD forest productivity**

<u>YIELD SORT SCRIPT:</u> Ver1 matches Kenora Forest final ver5

```
'YIELD version 5 Some YIELD adjustment or deletions from version 4 (as per Task Team Feb. 12).
DoCmd.RunSQL "update INVENTORY set YIELD = '-' where POLYTYPE = 'FOR' "

DoCmd.RunSQL "update INVENTORY set YIELD = 'NAT' where (DEPTYPE <> 'HARVEST') and YIELD = '-' "

DoCmd.RunSQL "update INVENTORY set YIELD = 'LOW' where PLANFU = 'SBL' and YIELD = '-' "
DoCmd.RunSQL "update INVENTORY set YIELD = 'MED' where (PLANFU = 'BFM' or PLANFU = 'HMX' or PLANFU = 'HRD') and YIELD = '-' "

DoCmd.RunSQL "update INVENTORY set YIELD = 'LOW' where (SFU = 'PjSha') and YIELD = '-' "
DoCmd.RunSQL "update INVENTORY set YIELD = 'LOW' where (PLANFU = 'PJD') and SC>2.5 and YIELD = '-' "
DoCmd.RunSQL "update INVENTORY set YIELD = 'LOW' where (PLANFU = 'PJM') and SC>2.0 and YIELD = '-' "

DoCmd.RunSQL "update INVENTORY set YIELD = 'HIGH' where (PLANFU = 'PJD') and SC <=1.0 and YIELD = '-' "
DoCmd.RunSQL "update INVENTORY set YIELD = 'HIGH' where (PLANFU = 'SBM') and SC <=1.5 and YIELD = '-' "

DoCmd.RunSQL "update INVENTORY set YIELD = 'MED' where PLANFU = 'POD' and SC > 2.5 and YIELD = '-' "
DoCmd.RunSQL "update INVENTORY set YIELD = 'HIGH' where PLANFU = 'POD' and YIELD = '-' "

DoCmd.RunSQL "update INVENTORY set YIELD = 'LOW' where SFU = 'PwDom' and YIELD = '-' "
DoCmd.RunSQL "update INVENTORY set YIELD = 'HIGH' where PLANFU = 'PRW' and SC <=1.0 and YIELD = '-' "
DoCmd.RunSQL "update INVENTORY set YIELD = 'MED' where PLANFU = 'PRW' and YIELD = '-' "

DoCmd.RunSQL "update INVENTORY set YIELD = 'MED' where (PLANFU = 'PJD' or PLANFU = 'PJM' or PLANFU = 'SBD' or PLANFU =
'SBM') and YIELD = '-' "

DoCmd.RunSQL "update INVENTORY set YIELD = 'MED' where PLANFU = 'CMX' and PJ >= (SB + SW) and YIELD = '-' "
DoCmd.RunSQL "update INVENTORY set YIELD = 'LOW' where PLANFU = 'CMX' and PJ < (SB + SW) and YIELD = '-' "

DoCmd.RunSQL "update INVENTORY set YIELD = 'ZZZZ' where YIELD = '-' "
```

POLYTYPE="FOR"

Sort Order:	YIELD	PLANFU	QUERY
1		**all**	Reset all YIELD to "- "
2	NAT	all	DEPTYPE <>"Harvest"
3	LOW	SBL	YIELD="- "
4	MED	BFM or HMX or HRD	YIELD="- "
5	LOW	PJD	(SFU="PjSha") and YIELD="- "
6	LOW	PJD	SC>2.5 and YIELD="- "
7	LOW	PJM	SC>2.0 and YIELD="- "
8	HIGH	PJD	SC<=1.0 and YIELD="- "
9	HIGH	SBM	SC<=1.5 and YIELD="- "
10	MED	POD	SC>2.5 and YIELD=" "
11	HIGH	POD	YIELD=" -"
12	LOW	PRW	SFU="PwDom" and YIELD="- "
13	HIGH	PRW	SC <=1.0 and YIELD="- "
14	MED	PRW	SC>2.5 and YIELD="- "
15	MED	PJD or PJM or SBD or SBM	YIELD=" "
16	MED	CMX	PJ >= (SB + SW) and YIELD = '-' "
17	LOW	CMX	PJ < (SB + SW) and YIELD = '-' "
18	ZZZZ	*Any unclassified*	*YIELD = 'ZZZZ' where YIELD = '-' "*

Table 8 YIELD BMI Sort Criteria and Definitions by PLANFU

FOREST UNIT		YIELD - Forest Productivity				
		Natural	Managed			
		NAT	LOW	MED	HIGH	
		Natural non-density regulated	Low Productivity non-density regulated	Medium Productivity non-density regulated	Higher Productivity majority non-density regulated	
BFM	yield curve name	**BFM-NAT**	**NA**	**BFM-MED**	**NA**	**COMMENTS**
Balsam Fir Mix	Description	Natural origin stands.	not used	All managed stands (on average has moderate stocking)	not used	LOW and HIGH yields not used, as future renewal targets conversion to a different PLANFU.
	FRI Sort Criteria	(sort order 1) NAT = All forest unit stands where DEPTYPE <> HARVEST.		(sort order 2) MED = All forest unit stands where YIELD=" ")		
CMX	yield curve name	**CMX-NAT**	**CMX-LOW**	**CMX-MED**	**NA**	**COMMENTS**
Conifer Mix	Description	Natural origin stands.	Managed stands with more spruce (SB+SW) than Jack Pine (PJ) (non-density regulated)	Managed stands with more Jack Pine (PJ) than spruce (SB+SW) (non-density regulated)	not used	MED and HIGH include the same site classes, but are split by Jack pine or Spruce leading stands to facilitate representative yield curve development.
	FRI Sort Criteria	(sort order 1) NAT = All forest unit stands where DEPTYPE <> HARVEST.	(sort order 2) MED = All forest unit stands where (SB+SW) > PJ and YIELD=" ")	(sort order 3) HIGH = All forest unit stands where YIELD=" ") (are the Jack Pine leading stands)		
HMX	yield curve name	**HMX-NAT**	**NA**	**HMX-MED**	**NA**	**COMMENTS**
Hardwood Mix	Description	Natural origin stands.	not used	All managed stands (on average has moderate or better site class)	not used	LOW and HIGH yield not used, as average stand conditions were productive MED.
	FRI Sort Criteria	(sort order 1) NAT = All forest unit stands where DEPTYPE <> HARVEST.		(sort order 2) MED = All forest unit stands where YIELD=" ")		
HRD	yield curve name	**HRD-NAT**	**NA**	**HRD-MED**	**NA**	**COMMENTS**
Hardwood Dominant	Description	Natural origin stands.	not used	All managed stands (on average has moderate or better site class)	not used	LOW and HIGH yield not used, as average stand conditions were productive MED.
	FRI Sort Criteria	(sort order 1) NAT = All forest unit stands where DEPTYPE <> HARVEST.		(sort order 2) MED = All forest unit stands where YIELD=" ")		
PJD	yield curve name	**PJD-NAT**	**PJD-LOW**	**PJD-MED**	**PJD-HIGH**	**COMMENTS**
Jack Pine Dominant	Description	Natural origin stands.	Harvested stands with site limitations, poor site classes (non-density regulated).	Managed stands with moderate moderate site productivity (non-density regulated)	Managed stands with good site productivity (non-density regulated)	LOW includes all PjSha
	FRI Sort Criteria	(sort order 1) NAT = All forest unit stands where DEPTYPE <> HARVEST.	(sort order 2) LOW = All forest unit stands where SC>2.5 (is poorer) or AU = "PJDS".	(sort order 4) MED = All forest unit stands where YIELD=" ")	(sort order 3) HIGH = All forest unit stands where SC<=1.0 (better)	

FOREST UNIT		YIELD - Forest Productivity				
		Natural	Managed			
PJM	yield curve name	**PJM-NAT**	**PJM-LOW**	**PJM-MED**	**NA**	**COMMENTS**
Jack Pine Mix	Description	Natural origin stands.	Harvested stands with site limitations, poor site classes (non-density regulated).	Managed stands with moderate moderate site productivity (non-density regulated)	not used	
	FRI Sort Criteria	(sort order 1) NAT = All forest unit stands where DEPTYPE <> HARVEST.	(sort order 2) LOW = All forest unit stands where SC>2.0 (is poorer)	(sort order 3) MED = All forest unit stands where YIELD=" ")		
POD	yield curve name	**POD-NAT**	**NA**	**POD-MED**	**POD-HIGH**	**COMMENTS**
Poplar Dominant	Description	Natural origin stands.	not used	Managed stands with moderate moderate site productivity (non-density regulated)	Managed stands with good site productivity (non-density regulated)	LOW yield not used. All hardwood stands are reasonably good productivity, compared to other forest units.
	FRI Sort Criteria	(sort order 1) NAT = All forest unit stands where DEPTYPE <> HARVEST.		(sort order 3) MED = All forest unit stands where YIELD=" ")	(sort order 2) HIGH = All forest unit stands where SC<=1.0 (better)	
PRW	yield curve name	**PRW-NAT**	**PRW-LOW**	**PRW-MED**	**PRW-HIGH**	**COMMENTS**
Red Pine and White Pine Mix	Description	Natural origin stands.	Harvested stands in White Pine SFU (non-density regulated).	Managed stands with poor to moderate site productivity, in the PrwMx or PrDom SFUs (Red Pine)	Managed stands with good site productivity, in the PrwMx or PrDom SFUs (Red Pine)	Sort criteria focused on PW/PR and site cless better represented different PR forest productivity. LOW curve is PW curve, and 2 curves for red pine
	FRI Sort Criteria	(sort order 1) NAT = All forest unit stands where DEPTYPE <> HARVEST.	(sort order 2) LOW = All forest unit stands where AU=PRWW (white pine)	(sort order 4) MED = (AU=PRWR stands) All forest unit stands where YIELD=" "	(sort order 3) HIGH = (AU=PRWR) All forest unit stands where SC <=1.0 (better) and YIELD=" "	
SBD	yield curve name	**SBD-NAT**	**NA**	**SBD-MED**	**NA**	**COMMENTS**
Spruce Dominant	Description	Natural origin stands.	not used	Managed stands with moderate to good site productivity (non-density regulated)	not used	MED and HIGH combined into MED to represent average condition, smaller areas.
	FRI Sort Criteria	(sort order 1) NAT = All forest unit stands where DEPTYPE <> HARVEST.		(sort order 2) MED = All forest unit stands where YIELD=" ")		
SBL	yield curve name	**SBL-NAT**	**SBL-LOW**	**NA**	**NA**	**COMMENTS**
Spruce Lowland	Description	Natural origin stands.	Harvested stands with lowland site limitations (as defined by forest unit), all poor site classes (non-density regulated).	not used	not used	Ecosite defined forest unit with poor productivity, therefore all harvested stands will be LOW.
	FRI Sort Criteria	(sort order 1) NAT = All forest unit stands where DEPTYPE <> HARVEST.	(sort order 2) LOW = All forest unit stands where YIELD=" "			
SBM	yield curve name	**SBM-NAT**	**NA**	**SBM-MED**	**SBM-HIGH**	**COMMENTS**
Spruce Mix	Description	Natural origin stands.	not used	Managed stands with moderate site productivity (non-density regulated)	Managed stands with good site productivity (non-density regulated)	
	FRI Sort Criteria	(sort order 1) NAT = All forest unit stands where DEPTYPE <> HARVEST.		(sort order 3) MED = All forest unit stands where YIELD=" ")	(sort order 2) HIGH = All forest unit stands where SC<=1.5 (better)	

1

5.3 Documentation of the Forest Classification and Current Forest Condition Checkpoint

Progress Checkpoint #2 approval of the Current Forest Condition was received from Mitch Legros, R.P.F., Regional Planning Forester to Kurt Pochailo, R.P.F., Plan Author and Service Provider Lead, on April 18, 2023.

PART 3: BASE MODEL INVENTORY and BASE MODEL

6.0 Base Model Inventory and Base Model

The Strategic Forest Management Model (SFMM) was used as the primary analysis tool for the strategic analysis. This tool is used to track the entire Whiskey Jack Forest land base through time, and produce projections of changes to the forest structure and composition for 160 years into the future. SFMM also allows for the evaluation of forested areas and their contribution to forest diversity, timber production, old growth forest area and wildlife habitat through time. SFMM is a non-spatial linear programming model that also includes area by geographic subunits (semi-spatial component) to allow calculation of certain land base attributes or harvest constrains by general zone of the forest.

The first step in the strategic analysis for the management plan was development of a spatial base model inventory (BMI) used for the initial forest land base (Year 1, Plan Start 2024) within SFMM. Secondly, a suite of modelling inputs for natural forest dynamics, silvicultural options, spatial controls, and management options were developed that would provide structure to the projected natural and human-influenced changes projected within SFMM. The base model serves as the common starting point for development of the long-term management direction.

6.1 Development of the Base Model Inventory

The *Forest Information Manual Forest Management Planning Technical Specifications (2020)* states:

> *"The creation of the BMI requires that forest stand description information from the PCI be updated with information from the forecast depletions to reflect the estimated result of depletions planned for the remainder of the current plan period.*
>
> *This BMI provides the necessary information to generate the inputs for spatial and non-spatial models required for strategic modelling."*

The Base Model Inventory for the Whiskey Jack Forest was created through updating information in the forest classification fields in the approved Planning Inventory (Planning Composite and Forecast Depletion Layer (MU490_23PCM00 & MU490_23FDP00) and then creating a union of these two layers. What follows is a description of how each forest inventory and classification attribute was updated.

- Union of approved Planning Composite Inventory and Forecast Depletions Coverages.
    - Forecast depletions updated HT, AGE to 2024 - forecast year of depletion.
        - No change in species composition, or stocking to maintain original stand characteristics. No assumption of silviculture used to update species composition.

- All forecasted depletions have source = "FORECAST". DEPTYPE updated to HARVEST, DEVSTAGE updated to DEPHARV; and landscape class revised to “presapling-sapling”.
- Add additional attributes to better manage forest information. This includes individual species for species compositions, age classes (AC_10, AC_20, SFMM_10), regional standard forest units (SFU), landscape guide forest units (LGFU), NWR regional analysis units (NWAU).
- Populate management decision information for SMZ, OMZ, SU, PLANFU, YIELD, etc.

Once the Base Model Inventory was created the following modifications were made to enhance the strategic modelling:

6.1.1 Analysis Units

Forest units (Section 5.1.3) were divided, where appropriate, into Analysis Units (AU) for strategic modelling and analysis purposes. Analysis units refine or subdivide forest units to more accurately project forest development and biological considerations such as site limitations or site richness, and differing responses in a post disturbance or successional pathways. Analysis Units also enable a roll-up of area to match Landscape Guide Forest Units, if needed (though LGFUs are not specifically reported in FMPs or required reporting during or after plan implementation).

As described in Section 5.1.3 Forest Units, certain forest units were further subdivided into more than one analysis unit. Forest units that were further subdivided into modelling analysis units are: CMX, HRD, PJD, PRW and SBL.

Forest units and analysis units have been applied, used in various strategic modelling inputs and are being used to support management decisions. Analysis units were specifically used for inputs and analysis in development of natural succession transitions (Section 6.2.2.1) and Post-Harvest Renewal Transitions (Section 6.2.3.3). It is noted that forest units (PLANFUs) are used in plan tables and are the legal basis for the available harvest area (not analysis units).

Individual analysis unit codes were used to reflect the “parent” forest unit and the subcomponent (e.g. A=ash, B=birch, C=cedar, D=deep soiled, S=shallow soiled, R=Red (pine), W=white (pine)). Analysis units and their direct relationship to plan forest units are recorded in Table 9.

For reference, the relationship between 2024-2034 FMP analysis units (AUs) and the NWR analysis units (NWAUs) is recorded in Table 10**.**

Table 9 Relationship of Analysis Units to Plan Forest Units

Whiskey Jack Forest 2024 FMP PLANFUs:			Whiskey Jack Forest 2024 Analysis Units (AUs):		
1	**BFM**	Balsam Fir Mix	1	**BFM_**	(same as PLANFU / SFU sort)
2	**CMX**	Conifer Mix	2	**CMX_**	ConMx component
			3	**CMXC**	Upland Cedar component
3	**HMX**	Hardwood Mix	4	**HMX_**	
4	**HRD**	Hardwood Dominant	5	**HRDA**	OthHd component (Ash)
			6	**HRDB**	Birch component
			7	**HRD_**	Hardwood Dom component
5	**PJD**	Jack Pine Dominant	8	**PJDD**	Jack Pine deep
			9	**PJDS**	Jack Pine shallow
6	**PJM**	Jack Pine Mix	10	**PJM_**	
7	**POD**	**Poplar Dominant**	**11**	**POD_**	
8	**PRW**	Red Pine and White Pine Mix	12	**PRWR**	Red Pine component
			13	**PRWW**	White Pine component
9	**SBD**	Spruce Dominant	14	**SBD_**	
10	**SBL**	Spruce Lowland	15	**SBL_**	Lowland Spruce component
			16	**SBLC**	Lowland Cedar component
11	**SBM**	Spruce Mix	17	**SBM_**	

Table 10 Plan Analysis Unit to NWR Analysis Unit Relationship

FMP Forest Unit	Whiskey Jack FMP Analysis Unit	NW Region Analysis Unit
BFM	BFM_	bfmx1_bf
		bfmx1_dee
		bfmx1-sbdeepmoist
		bfmx1_sha
		bfpur_all
CMX	CMX_	conmx_bfmixdee
		conmx_bfmixsha
		conmx_bfpure
		conmx_mixdee
		conmx_mixsha
		conmx_pjdee
		conmx_pjmixdee
		conmx_pjmixsha
		conmx_pjsha
		conmx_sbdee
		conmx_sbmixdee
		conmx_sbmixsha
		conmx_sbsha
	CMXC	uplce-all
HMX	HMX_	hrdmw_bfdee
		hrdmw-bfsha
		hrdmw_mixdee
		hrdmw_mixsha
		hrdmw_sbdee
		hrdmw-sbsha
HRD	HRD_	hrdom_bfdee
		hrdom-bfsha
		hrdom_hwddee
		hrdom_hwdsha
	HRDA	othhd-ab
		othhd_other
	HRDB	bwdee_bwpure
		bwdee_conif
		bwdee_hwdpure
		bwsha-conif
		bwsha-hwdpure
PJD	PJDD	pjdee_bf
		pjdee_bfmix
		pjdee_hwdlimit
		pjdee-pjlt70
		pjdee-pjlt70sb
		pjdee-pjmix
		pjdee_pure
		pjdee_sbmix
	PJDS	pjsha-bf
		pjsha-bfmix
		pjsha-pjlt70sb
		pjsha-pjmix
		pjsha-pure
		pjsha_sbmix

FMP Forest Unit	Whiskey Jack FMP Analysis Unit	NW Region Analysis Unit
PJM	PJM_	pjmx1_bfdee
		pjmx1_bfsha
		pjmx1_conifmixdee
		pjmx1_conifmixsha
		pjmx1_sbmixdee
		pjmx1_sbmixsha
POD	POD_	podee-abothhd
		podee_conif
		podee_hwd
		podee_purenmst
		posha-hwd
		posha-pure
PRW	PRWR	prdom-all
		prwmx-prw
		prwmx-prwlimitdee
		prwmx-prwlimitsha
	PRWW	pwdom-pw
		pwdom-pwlimitdee
		pwdom-pwlimitsha
SBD	SBD_	sbdee_bf
		sbdee_conif
		sbdee_hwd
		sbdee_pure
		sbsha-bf
		sbsha_conif
		sbsha_hwd
		sbsha_pure
SBL	SBL_	sblow_all
	SBLC	oclow-ab
		oclow-cw
		oclow_misc
		oclow_oclate
		oclow-sb50la50
		oclow-sbla
SBM	SBM_	sbmx1_bfdee
		sbmx1-bfsha
		sbmx1_mixdee
		sbmx1-mixsha
		sbmx1_sbdee
		sbmx1_sbsha

6.1.2 Estimated Reserves

The Stand and Site Guide prescribes slope-based variable width reserve for lakes, rivers and streams. Reserve widths are based on slope calculated through MNRF's digital terrain model.

<u>Methodology Used:</u>

-The Provincial Digital Elevation Model was used which is a combination of Digital Terrain Models (DTM) and Digital Surface Models (DSM) to model the bare earth/surface elevation) available through Ontario GeoHub.

-The Spatial Analyst/Surface/Slope Tool was run on the DEM. The cells/grids are in metres (horizontal ground distance – x and y, vertical distance - z).

- The Output measurement is 'percent rise' (also referred to as the percent slope). Output in Degrees is also an option, but I decided to use percent as the percent intervals for slope are easier to remember (0-15%,15-30%,30-45%, > 45% versus 0 to 8.5 degrees, 8.6 to 16.7 degrees, 16.8 to 24.2 degrees, > 24.2 degrees).
- Z factor is set to 1 (default setting) in the tool (1m of horizontal distance is equal to 1m of vertical elevation).
- Output from the slope tool is a raster file.

-Extract by Mask tool was used to intersect the FMU boundary with the Slope Tool output (Raster file). This cuts down the amount of data to just the FMU boundaries.

-Int Tool used to convert the raster cell values of the raster to an Integer value (rounds it to a whole number). This creates an attribute table where the percent rise in elevation for each grid is quantified.

-Raster to Polygon Tool used to convert raster integer file into a shape file so that you can do definition queries on the various percent elevations.

-Zipfile in the WeTransfer link to Miisun contained the geodatabase (3 shape files – Kenora North, Kenora South (both for the Kenora Forest 2022 FMP), and Whiskey Jack used for this 2024 FMP) and a layer file (symbology based on the stand and site guide quality reserve classifications).

Using the slopes calculated with the digital terrain model, the following reserve widths were applied in the Base Model Inventory for strategic modelling purposes (from SSG):

Slope %	Reserve Width
0-15	30 m reserve
16-30	50 m reserve
31-45	70 m reserve
>45	90 m reserve

Riparian reserve widths are confirmed and applied during operational planning in Stage Three of plan development (after Stage Two: LTMD).

The Stand and Site Guide allows for harvesting of a portion of the shoreline reserves and operationally shoreline reserves along rivers and streams are usually measured from woody shrubs and not from standing timber. Any partial harvesting will be determined and planned during Stage Three of plan productions (operational planning). It was also noted that a majority of bird stick nests, that will require no cut reserve AOC prescriptions, also occur in the shoreline areas of lakes and the majority are accounted for within the estimated strategic modelling riparian reserves.

These estimated reserves were then intersected with the inventory in a separate GIS layer and identified as individual polygons. Reserve widths will be reviewed and adjusted during operational planning to ensure proper reserve widths as measured from the woody shrub line as directed in the Stand and Site Guide.

Additional reserves were added into the BMI where non-riparian zone estimated reserves were expected (typically for consideration of other values). These estimated reserves were added with the estimated riparian reserves in the BMI.

6.1.3 Age Classes

The three age class attributes reflect a 20-year age class, a 10-year age class and a SFMM 10-year model input age class. The two regular 10- and 20-year age class attributes are used in the production of FMP tables and ease of use for operations and summarizing data. The 20-year age classes group stands greater than 140 years old into one class. The SFMM age class was used in the creation of an inventory land base input file for the SFMM model (all 10-year age classes represented up to 260 years old (no stands are older than 260 years.). All the age classes reflect the age at Plan Start (2024).

6.2 Development of the Base Model

The use of SFMM requires that land base, forest dynamics, silvicultural options, wood supply, management objectives and targets be entered into the model. Within these categories, the following items are required:

1. **Land Base Definition (Section 6.2.1)**: ownership, forest unit descriptions, listing of areas available and unavailable for timber production (by forest unit and age class), and non-forested land type descriptions.

2. **Forest Dynamics Information (Section 6.2.2)**: rates of natural succession from one forest type to another, projections for natural disturbance (primarily wildfire), rates of natural succession of non-forested land types to forested, forest development information (yield curves) for natural forest development and various silvicultural treatments.

3. **Silvicultural Options (Section 6.2.3)**: harvest operability ranges, stumpage values, allowances for reserve prescriptions and unharvested volumes within harvest areas, conversion of harvested areas to non-forested land, forest renewal options, post-renewal forest succession rates, commercial thinning and tending treatment options, and active non-forest rehabilitation treatments options.

4. **Wood Supply (Section 6.2.4)**: allows for user control projections of species/products from subunits (sources) to destination mills or markets. Impedance, or the “cost” of getting wood to a mill, may be controlled. This set of inputs was not used for the Whiskey Jack Forest SFMM modelling as the majority of its wood deliveries are to the Kenora area.

5. **Management Objectives and Targets (Section 6.2.5)**: silvicultural budgets, stability of forest units, desired future forest condition, minimum landscape class and old forest area targets, minimum growing stock, species group definitions, harvest flow policies, harvest volume targets, stability and limits of harvest area, forest renewal limits, mid-rotation tending limits, non-forest rehabilitation limits, seedling availability and distribution limits.

6. **Assembly and Calibration of the SFMM Base Model (Section 6.2.6)**: process is described by which the BMI is imported into SFMM, and confirmed through comparison and reconciliation to the Base Model Inventory (Table FMP-1 and FMP-3) and to OLT 2024 areas for BLG indicators.

Land base classifications have already been described in Analysis Package Sections 5.1 to 5.3 and Section 6.1. A summary of other base model inputs, data sources, and other model assumptions developed for the 2024 Whiskey Jack FMP by the planning team follows in Sections 6.2.1 to 6.2.5 of this Analysis Package. Section 6.2.6 summarizes how the land base and base model assumptions were incorporated into SFMM, and confirmed through comparison and calibration as being a reasonable reflection of the Whiskey Jack Forest. This ground work in Base Model development set the platform on which to build strategic modelling of objective achievement for this 2024-2034 FMP (Sections 7 and 8).

6.2.1 Land Base Definition

The Planning Composite Inventory identified most areas that were not available for harvesting due to land ownership, land use decisions, access limitations, etc. and additional estimated slope-based riparian reserve area was also included in the Base Model Inventory (Section 6.1).

Ownership:
Land base data for unmanaged Crown land within the management unit (e.g. parks OWNER=5 and conservation reserves OWNER=7) is entered to facilitate the analysis of productive forest land base for biodiversity and wildlife habitat. Riparian reserves were estimated in the land base for strategic modelling purposes and were included as a "reserve" category.

Non-Crown land (i.e. patent land OWNER=2,3,4, Indian Reserve OWNER=6, and Federal land OWNER=9) is not specifically entered into the SFMM land base as it does not contribute to wildlife habitat or forest diversity indicators because the SFL does not have any control over activities on this patent land. Placeholders for total areas were added as non-productive land, to aid land base reconciliation (Patent and Other).

BMI Classifications:
In order to help with the classification and input of the inventory information into the modelling and for use in analysis, additional inventory attributes were included in the BMI. These attributes include standard regional forest units, analysis units (two types – regional and plan AUs), plan forest units, the subunit field for management zones (included both SMZ strategic zones and OMZ operational zones, see Section 5.2.1).

Wildlife Habitat Types:
For previous forest management plans, strategic modelling included inputs to represent habitat for featured and selected wildlife species. For this plan, in accordance with current provincial direction, a coarse filter approach to forest condition (forest composition, age structure and landscape pattern) was implemented. This approach included the modelling and analysis of a broad range of forest types, which are used by a many species of wildlife. Landscape Guide Forest Units (Section 5.1.2) and BLG direction were used as a basis for the broad forest types in SFMM modelling. Habitat types for caribou and moose (described in Appendices 1 and 2) were represented in SFMM modelling as described in Section 6.2.2.7.

Reserve Forest Types:

Estimated slope-based reserves (Section 6.1) were included in SFMM as identified in the BMI. Since reserves were estimated for the entire Whiskey Jack Forest, minimal additional accumulating reserve inputs were required for SFMM (section 6.2.3.5). Riparian reserves are classified as "unavailable" forest in SFMM for strategic modelling purposes, however they remain as available (AVAIL=A) in the Base Model Inventory. Protection Forest (PF) was also included in SFMM as unavailable (AVAIL=U) forest, as identified in the BMI. Unavailable area in SFMM contributes to achievement of biodiversity objectives, but is not scheduled for forest management activities in the model. Reserve Forest types used are:

AFactr – Area Factor – not used
ProtF – Protection Forest – used (imported from BMI)
Parks – Parks – used (imported from BMI)
EstRes – Estimated Riparian Reserve and other reserves – used (imported from BMI)
IsInd – Forested Islands – none in BMI
MgRes – Management Reserve – used for strategic zones SMZA and CAR1 (no operations).
AcRes – Accumulating Reserves – see Section 6.2.3.5.

Non-forested Land Types: Non-forest land (water, agricultural land, grass & meadow, unclassified land, and other (forested islands) was not used in strategic modelling calculations. Non-productive forested land (treed muskeg, open muskeg, brush & alder, and rock) not used in strategic modelling calculations. Non-forested land and non-productive forest land were entered into SFMM as placeholder total area numbers to aid reconciliation of the initial forest land base to the Base Model Inventory. RdLnd was used as an accumulating non-forest land type for primary and branch roads (see Section 6.2.3.6). Non-forested land types used are:

BSH - Brush	**TMS** – Treed Muskeg
DAL – Agricultural Land	**UCL** – Unclassified Land
GRS – Grass	**WAT** – Water
ISL – Islands	**RdLnd** – Roads and Landings
OMS – Open Muskeg	**PATENT** – Ownership 2, 3, 4
RCK – Rock	**OTHER** – Ownerships 6, 8, 9

Other SFMM Base Model Information:

The fundamental structure of the SFMM Model included certain standard attributes:

- Plan Start year of 2024
- Model set for 16 ten-year planning periods, called "terms" in SFMM. "Term 1" equals the FMP 2024-2034 plan period. Term 17 represents the end of the 151-160 period of the planning horizon (beginning of Term 17).
- The 17 Analysis Units were used as the SFMM "forest units" (Section 5.1.3).
- Renewal treatments included for Natural, Plant and Seed
- YIELD (NAT, LOW, MED, HIGH) was included as "SI" (Silvicultural Intensity) in SFMM

SFMM Land Base Area:

See Section 6.2.6 for the results of the import of the Whiskey Jack Forest land base into SFMM for strategic analysis. The SFMM initial Term 1 (2024) land base land base was confirmed through comparison and reconciliation to the Base Model Inventory.

6.2.2 Forest Dynamics Assumptions

Modelling assumptions pertaining to old-age natural forest succession and Growth & Yield are included in the SFMM Base Model and are summarized in this Analysis Package section.

Certain Forest Dynamics SFMM model inputs were <u>not</u> used for the Whiskey Jack FMP 2024:

- Natural rehabilitation of non-forest to forest (no forecast natural afforestation)
- Wildlife habitat classification, habitat units, habitat seral stages, wildlife habitat suitability matrix, selected wildlife species, the correlation of forest unit area to wildlife habitat units and the non-forest land to wildlife habitat units proportions were not used in SFMM modelling. (no modelling assumptions / inputs for habitat as Landscape Class areas now used as a proxy for various habitat types.).

6.2.2.1 Natural Succession

Natural succession patterns portray how certain forest types tend to succeed to other forest types once they reach a certain age, without intervention from catastrophic natural disturbances or harvesting. These transition rules are portrayed in strategic modelling as succession pathways.

The main assumptions for the development of the natural succession rules is that natural succession occurs at the point where the species composition no longer meets the description of the forest unit or analysis unit. That is the main transition point between one forest unit to another. A second assumption is that the NAT forest productivity class (YIELD) represents naturally disturbed forest area. LOW, MED and HIGH productivity areas reflect silviculturally treated, managed forest conditions. It was decided by the LTMD Task Team and the Planning Team that all forest productivity classes would naturally succeed to a NAT forest condition. The third natural succession assumption within each specific forest unit was based on gap phase and sub-canopy dynamics. Succession to a lower age class occurs where overstory stocking in a forest unit is no longer the dominant forest type. At that point, sub-canopy composition and age class are assigned.

Natural succession development for this FMP was informed by recent regional natural succession research that built upon, and refined, previous natural succession information used for the BFOLDS (Boreal Forest Landscape Dynamics Simulator) inputs. BFOLDS forest dynamics inputs form part of the science package developed to support the Ontario's Landscape Tool (OLT) which is considered the best available science for landscape level forest composition and pattern simulations. Use of the refined BFOLDS natural succession inputs was considered important for this FMP as many of the forest composition targets included in the Long-Term Management Direction were derived from this forest dynamic information in OLT. By using similar forest dynamics assumptions for each forest unit, the strategic LTMD modelling would be using similar underlying natural succession rules.

<u>Methodology</u>

1. Inputs were collaboratively developed by SFL and MNRF regional staff and advisors.
2. "Deterministic" natural succession rules by NWR_AU were provided by region and were based on regional science information.
3. Area of Whiskey Jack Forest Crown land analysis unit (AU) by NWR_AU was calculated (Table 11, left side, same as Table 10).
4. The Whiskey Jack Forest Crown land base by AU was aligned with the NWR_AUs deterministic rule set to inform AU to AU transitions and the estimated age of natural succession (Table 11, right side).
5. Recent Natural Succession information for the Northwest Region (Sept. 2016 draft) was reviewed to inform the relative age of the post-succeeded AU area (same age, or younger than natural succession age).
6. Natural succession rules were checked and refined to ensure that:
    a. Potential succession rules would be applied to all forested area (no area missed);
    b. Any apparent anomalous transitions that may cause concern were identified. Minor adjustments to the deterministic rule set or future AU stand age, where warranted, were undertaken collaboratively with the task team and regional advisor;
    c. Generally, succession rules did not result in a significant increase in stand volume of more than 20 m3/ha (a decrease was considered acceptable as projected stand age was given greater consideration). Most natural succession rules reflected less than a 10 m3/ha increase, or a decrease in volumes before and after the theoretical natural succession transition point;
    d. Succession rules were consistent with refinements in yield curves for older ages ("tails") for successional forest units. Refinement of yield curves is explained in Section 6.2.2.4. See Table 11 for the calculations of stand volumes "before and after" natural succession rules are theoretically applied, and the notation of which succession rules triggered a refinement of the tails of successional yield curves; and
    e. During import into SFMM natural succession rules by analysis unit were double-checked to ensure that natural succession was applied to all areas when expected (no natural succession "leakage").

The resulting natural succession rules (Table 12) were used in the SFMM Base Model and subsequent modelling scenarios. Multiple rules or feathering of transitions was not done, as recent science and research with "deterministic" rules by AU did not require multiple rules.
The natural succession transitions developed for the NAT YIELD forest stands were applied to the future managed YIELDs also.

Natural succession is not activated for Term 1 (2024-2034) in the SFMM modelling (Section 6.2.2.5).

Table 11 Natural Succession Calculations by Analysis Unit

PLANFU		2018 Deterministic Rules				2016 SFU Info (informs future age)			By AU Area	Simple	START			FUTURE			Volume
PLANFU	HA (1-5-7)	Start KF AU	Start nwr_au	Transition Age	Future nwr_au:	Start	End	Future Age	Rule %	Rule %	AU	Age	NAT Vol.	AU	Age	NAT Vol.	Diff.
BFM	5,065	BFM_	bfmx1_bf	130	bfpur-all	125	175	younger (-40)	19%								-
	19,767	BFM_	bfmx1_dee	Long Tail	n/a	end		younger	74%	100%	BFM_	255	65	BFM_	205	73	8
	4	BFM_	bfmx1-sbdeepmoist	130	sbdee-conif	115	135	same	0%								
	708	BFM_	bfmx1_sha	Long Tail	n/a	end		younger	3%								-
	1,073	BFM_	bfpur_all	Long Tail	n/a	end		younger	4%								-
	26,616		BFM AUs transition back to BFM analysis units during natural succession, so simplify with 1 rule.							100%							
			Volume gain is minimal through succession, so acceptable.														
CMX	22,559	CMX_	conmx_bfmixdee	160	bfmx1-dee	95	165	same	19%	21%	CMX_	155	76	BFM_	195	79	3
	1,382	CMX_	conmx_bfmixsha	140	bfmx1-sha	95	165	same	1%								
	816	CMX_	conmx_bfpure	100	bfpur-all	95	165	same	1%								-
	13,179	CMX_	conmx_mixdee	Long Tail	n/a	end		younger	11%	12%	CMX_	255	75	CMX_	195	75	-
	667	CMX_	conmx_mixsha	Long Tail	n/a	end		younger	1%								-
	3,447	CMX_	conmx_pjdee	140	pjmx1-staticdee	95	115	same	3%	3%	CMX_	145	77	PJM_	145	70	- 7
	23,770	CMX_	conmx_pjmixdee	120	pjmx1-sbmixdee	95	115	same	20%	24%	CMX_	115	78	PJM_	115	78	-
	3,639	CMX_	conmx_pjmixsha	110	pjmx1-sbmixsha	95	115	same	3%								-
	789	CMX_	conmx_pjsha	130	pjmx1-staticsha	95	115	same	1%								-
	16,588	CMX_	conmx_sbdee	150	sbdee-pure	75	135	same	14%								-
	28,022	CMX_	conmx_sbmixdee	160	sbdee-conif	65	135	same	24%	40%	CMX_	165	75	SBD_	165	98	23
	1,581	CMX_	conmx_sbmixsha	150	sbsha-conif	65	135	same	1%								-
	759	CMX_	conmx_sbsha	150	sbsha-pure	65	135	same	1%								-
	117,199									100%							-
	2,154	CMXC	uplce-all	Long Tail	n/a	end		younger	100%		CMXC	255	75	CMXC	195	75	-
	2,154									0%							-
			CMX NAT curve has poor volume…A155 has 76 m3. So change future BFM age to 195, where is continues to cycle on BFM tail…														
			CMX to SBD - OK to leave as is with volume gain. There may be a real gain for areas transitioning to productive SBD.														
HMX	22,724	HMX_	hrdmw_bfdee	150	bfmx1-dee	125	195	younger (-30)	28%	28%	HMX_	155	103	BFM_	155	107	4
	90	HMX_	hrdmw-bfsha	120	bfmx1-sha	125	195	younger (-30)	0%								-
	45,308	HMX_	hrdmw_mixdee	200	conmx-mixdee	95	175	same	57%	58%	HMX_	185	84	CMX_	185	75	- 9
	698	HMX_	hrdmw_mixsha	180	conmx-mixsha	95	175	same	1%								-
	11,178	HMX_	hrdmw_sbdee	160	sbdee-conif	95	175	same	14%	14%	HMX_	165	97	SBD_	165	98	1
	187	HMX_	hrdmw-sbsha	160	sbsha-conif				0%								-
	80,185		HMX standard transitions work well (minor volume changes)							100%							

PLANFU		2018 Deterministic Rules				2016 SFU Info (informs future age)			By AU Area	Simple	START			FUTURE			Volume
PLANFU	HA (1-5-7)	Start KF AU	Start nwr_au	Transition Age	Future nwr_au:	Start	End	Future Age	Rule %	Rule %	AU	Age	NAT Vol.	AU	Age	NAT Vol.	Diff.
HRD	3,993	HRD_	hrdom_bfdee	130	bfmx1-dee	115	125	same (-40)	6%	6%	HRD_	135	110	BFM_	135	104	- 6
	18	HRD_	hrdom-bfsha	110	bfmx1-sha	115	125	same (-40)	0%								
	65,625	HRD_	hrdom_hwddee	170	conmx-mixdee	115	125	same (-40)	94%	94%	HRD_	165	89	CMX_	165	75	- 14
	250	HRD_	hrdom_hwdsha	160	conmx-mixsha	115	125	same (-40)	0%								
	69,887									100%							
	2,806	HRDA	othhd-ab	Long Tail	n/a	end		younger	70%	100%	HRDA	255	65	HRDA	205	65	-
	1,202	HRDA	othhd_other	Long Tail	n/a	end		younger	30%								
	4,008									100%							
	5,089	HRDB	bwdee_bwpure	150	hrdmw-mixdee	95	105	same age	43.0%	43%	HRDB	155	96	HMX_	155	103	7
	4,460	HRDB	bwdee_conif	180	bfmx1-dee	95	105	same age	37.7%	38%	HRDB	175	81	BFM_	185	86	5
	2,178	HRDB	bwdee_hwdpure	120	hrdmw-mixdee	95	105	same age	18.4%	19%	HRDB	125	116	HMX_	125	117	1
	88	HRDB	bwsha-conif	180	bfmx1-sha				0.7%								
	16	HRDB	bwsha-hwdpure	100	hrdmw-mixsha	95	105	same age	0.1%								-
	11,831		HRD standard transitions generally work well (minor volume changes)							100%							
			HRD to CMX shows 14 m3 loss, as CMX curve has relatively low volume.														
PJD	160	PJDD	pjdee_bf	110	bfmx1-dee				0.2%	1%	PJDD	115	112	BFM_	115	97	- 15
	737	PJDD	pjdee_bfmix	110	bfmx1-dee			younger?	0.8%								
	12,926	PJDD	pjdee_hwdlimit	170	pjmx1-staticdee	105	185	same?	13.5%	14%	PJDD	175	75	PJM_	175	70	- 5
	87	PJDD	pjdee-pjlt70	180	sbdee-pure				0.1%								-
	321	PJDD	pjdee-pjlt70sb	130	sbdee-conif				0.3%								-
	327	PJDD	pjdee-pjmix	190	pjmx1-staticdee	105	185	same	0.3%								
	57,523	PJDD	pjdee_pure	190	pjmx1-staticdee	105	185	same	59.9%	60%	PJDD	195	75	PJM_	175	70	- 5
	23,972	PJDD	pjdee_sbmix	130	sbmx1-mixdee			same	25.0%	25%	PJDD	135	101	SBM_	135	116	15
	96,052									100%							
	17	PJDS	pjsha-bf	110	bfmx1-sha				0.1%								-
	53	PJDS	pjsha-bfmix	110	bfmx1-sha				0.2%	1%	PJDS	115	74	BFM_	115	97	23
	41	PJDS	pjsha-pjlt70sb	130	sbsha-conif				0.2%								-
	2,921	PJDS	pjsha-pjmix	180	pjmx1-staticsha				12.0%								-
	14,862	PJDS	pjsha-pure	180	pjmx1-staticsha			same?	61.1%	73%	PJDS	175	48	PJM_	175	70	22
	6,439	PJDS	pjsha_sbmix	130	sbmx1-mixsha				26.5%	26%	PJDS	135	67	SBM_	135	116	49
	24,333		Some volume increases with PJDS transitions. PJDS (shallow) is a very low volume curve.							100%							
			OK as is - note that shifting ages was reviewed and not acceptable option, since PJDS curve so low. Likely will be a real volume jump.														
			Future ages adjusted to ensure transition occurs before final PJM natural succesion rule occurs (age 185)														
PJM	3,248	PJM_	pjmx1_bfdee	120	bfmx1-dee				4.6%	5%	PJM_	125	75	BFM_	165	86	11
	350	PJM_	pjmx1_bfsha	120	bfmx1-sha				0.5%								-
	16,319	PJM_	pjmx1_conifmixdee	120	sbmx1-mixdee	105	175	younger (-30)	23.2%	29%	PJM_	125	75	SBM_	95	99	24
	4,237	PJM_	pjmx1_conifmixsha	110	sbmx1-mixsha				6.0%								-
	38,240	PJM_	pjmx1_sbmixdee	180	sbdee-conif				54.3%	55%	PJM_	185	70	SBD_	185	89	19
	7,997	PJM_	pjmx1_sbmixsha	140	sbsha-conif				11.4%	11%	PJM_	145	70	SBD_	145	103	33
	70,391		Transition from PJM curve to SBD and SBM results in volume increase							100%							
			OK to accept since volume increase may be realized / expected. Volume may not affect much area in harvest zone.														

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PLANFU		2018 Deterministic Rules				2016 SFU Info (informs future age)			By AU Area	Simple	START			FUTURE			Volume
PLANFU	HA (1-5-7)	Start KF AU	Start nwr_au	Transition Age	Future nwr_au:	Start	End	Future Age	Rule %	Rule %	AU	Age	NAT Vol.	AU	Age	NAT Vol.	Diff.
POD	6	POD_	podee-abothhd	110	othhd-ab				0.0%								
	8,975	POD_	podee_conif	130	conmx-bfmixdee				18.5%	18%	POD_	135	103	CMX_	135	77	- 26
	20,593	POD_	podee_hwd	140	hrdmw-mixdee	115	145	same	42.3%								-
	19,033	POD_	podee_purenmst	150	hrdmw-mixdee	115	145	same	39.1%	81%	POD_	155	72	CMX_	165	75	3
	10	POD_	posha-hwd	100	hrdmw-mixsha	115	145	same	0.0%								
	26	POD_	posha-pure	100	hrdmw-mixsha	115	145	same	0.1%	1%	POD_	115	122	HMX_	115	120	- 2
	48,642		POD standard transitions generally work well (minor/acceptable volume changes)							100%							
PRW	675	PRWR	prdom-all	Long Tail	n/a	end		younger	24%	100%	PRWR	255	260	PRWR	205	260	-
	1,832	PRWR	prwmx-prw	Long Tail	n/a	end		younger	65%								
	277	PRWR	prwmx-prwlimitdee	Long Tail	n/a	end		younger	10%								
	15	PRWR	prwmx-prwlimitsha	Long Tail	n/a	end		younger	1%								
	2,800									100%							
	743	PRWW	pwdom-pw	Long Tail	n/a	end		younger	94%	100%	PRWW	255	175	PRWW	195	175	-
	33	PRWW	pwdom-pwlimitdee	Long Tail	n/a	end		younger	4%								
	12	PRWW	pwdom-pwlimitsha	Long Tail	n/a	end		younger	1%								
	788		PRWR and PRWW both simply cycle on their own curves.							100%							
SBD	6,345	SBD_	sbdee_bf	150	bfmx1-dee	115	155	same	7%	7%	SBD_	155	104	BFM_	155	107	3
	20,382	SBD_	sbdee_conif	Long Tail	n/a	end		younger	22%	93%	SBD_	255	85	SBD_	195	86	1
	11,652	SBD_	sbdee_hwd	Long Tail	n/a	end		younger	12%								-
	48,082	SBD_	sbdee_pure	Long Tail	n/a	end		younger	51%								-
	248	SBD_	sbsha-bf	150	bfmx1-sha	95	125	same	0%								
	2,962	SBD_	sbsha_conif	Long Tail	n/a	end		younger	3%								-
	912	SBD_	sbsha_hwd	Long Tail	n/a	end		younger	1%								
	3,833	SBD_	sbsha_pure	Long Tail	n/a	end		younger	4%								-
	94,417		SBD mostly cycles on its own curve. Minor area transitions to BFM.							100%							
SBL	55,098	SBL_	sblow_all	Long Tail	n/a	end		younger	100%	100%	SBL_	255	75	SBL_	205	76	1
	55,098									100%							
	3	SBLC	oclow-ab	Long Tail	n/a	end		younger	0%								
	1,023	SBLC	oclow-cw	Long Tail	n/a	end		younger	26%	100%	SBLC	255	75	SBLC	205	76	1
	34	SBLC	oclow_misc	Long Tail	n/a	end		younger	1%								
	137	SBLC	oclow_oclate	Long Tail	n/a	end		younger	4%								-
	292	SBLC	oclow-sb50la50	150	sblow-all	75	95	same	8%								
	2,391	SBLC	oclow-sbla	160	sblow-all	75	95	same	62%	0%							-
	3,879			delete rule as per regional direction (Rob)						100%							
			SBL_ and SBLC (lowland cedar) both simply cycle on the NAT curve (remain in own AU).														
SBM	6,689	SBM_	sbmx1_bfdee	150	bfmx1-dee	95	125	same	9.0%	9%	SBM_	155	116	BFM_	155	107	- 9
	92	SBM_	sbmx1-bfsha	150	bfmx1-sha	95	125	same	0.1%								
	33,163	SBM_	sbmx1_mixdee	160	sbdee-conif	75	135	same	44.8%	91%	SBM_	165	111	SBD_	165	98	- 13
	4,017	SBM_	sbmx1-mixsha	150	sbsha-conif	75	135	same	5.4%								-
	26,162	SBM_	sbmx1_sbdee	160	sbdee-pure	75	135	same	35.3%								-
	3,935	SBM_	sbmx1_sbsha	150	sbsha-pure	75	135	same	5.3%								-
	74,058		SBM standard transitions work well (minor volume changes)							100%							
	782,337																

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Table 12 SFMM Natural Succession Rules by Analysis Unit

(Rule references proportion of area natural succeeding, based on area remaining in the forest unit. “SetUp” is placeholder for data to be duplicated for all subunits.)

PRSNT YIELD uses all NAT inputs.

SU	AU1	Age1	YIELD1	AU2	Age2	YIELD2	% Rule
SetUp	BFM_	255	NAT	BFM_	205	NAT	1.00
SetUp	CMX_	115	NAT	PJM_	115	NAT	0.24
SetUp	CMX_	145	NAT	PJM_	145	NAT	0.04
SetUp	CMX_	155	NAT	BFM_	195	NAT	0.29
SetUp	CMX_	165	NAT	SBD_	165	NAT	0.77
SetUp	CMX_	255	NAT	CMX_	195	NAT	1.00
SetUp	CMXC	255	NAT	CMXC	195	NAT	1.00
SetUp	HMX_	155	NAT	BFM_	155	NAT	0.28
SetUp	HMX_	165	NAT	SBD_	165	NAT	0.19
SetUp	HMX_	185	NAT	CMX_	185	NAT	1.00
SetUp	HRD_	135	NAT	BFM_	135	NAT	0.26
SetUp	HRD_	165	NAT	CMX_	165	NAT	1.00
SetUp	HRDA	255	NAT	HRDA	205	NAT	1.00
SetUp	HRDB	125	NAT	HMX_	125	NAT	0.30
SetUp	HRDB	155	NAT	HMX_	155	NAT	0.53
SetUp	HRDB	175	NAT	BFM_	185	NAT	1.00
SetUp	PJDD	115	NAT	BFM_	115	NAT	0.01
SetUp	PJDD	135	NAT	SBM_	135	NAT	0.25
SetUp	PJDD	175	NAT	PJM_	175	NAT	0.19
SetUp	PJDD	195	NAT	PJM_	175	NAT	1.00
SetUp	PJDS	115	NAT	BFM_	115	NAT	0.01
SetUp	PJDS	135	NAT	SBM_	135	NAT	0.26
SetUp	PJDS	175	NAT	PJM_	175	NAT	1.00
SetUp	PJM_	125	NAT	BFM_	165	NAT	0.05
SetUp	PJM_	125	NAT	SBM_	95	NAT	0.29
SetUp	PJM_	145	NAT	SBD_	145	NAT	0.17
SetUp	PJM_	185	NAT	SBD_	185	NAT	1.00
SetUp	POD_	115	NAT	HMX_	115	NAT	0.01
SetUp	POD_	135	NAT	CMX_	135	NAT	0.18
SetUp	POD_	155	NAT	HMX_	165	NAT	1.00
SetUp	PRWR	255	NAT	PRWR	205	NAT	1.00
SetUp	PRWW	255	NAT	PRWW	195	NAT	1.00
SetUp	SBD_	155	NAT	BFM_	155	NAT	0.07
SetUp	SBD_	255	NAT	SBD_	195	NAT	1.00
SetUp	SBL_	255	NAT	SBL_	205	NAT	1.00
SetUp	SBLC	255	NAT	SBLC	205	NAT	1.00
SetUp	SBM_	155	NAT	BFM_	155	NAT	0.09
SetUp	SBM_	165	NAT	SBD_	165	NAT	1.00

6.2.2.2 Natural Rehabilitation of Non-forest to Forest

Not Used - Natural rehabilitation of roads and landing was accounted for in the proportions of area converted to non-forest (Silvicultural Option - accumulating roads and landings). Operational roads and landings would in most cases be actively rehabilitated after harvesting. For the most part, primary and branch roads would not be abandoned during this FMP. Therefore, no natural rehabilitation of roads and landing were included in the model.

6.2.2.3 Natural Disturbances

Resource managers need to understand the implication of forest disturbance specifically fire, windthrow and insect damage so they can gain insight into natural forest development. Natural events such as forest fires and insect infestations are important elements of forest dynamics and are an important consideration to enable the accurate prediction of the future forest condition. Fire regimes vary across regions and climates and greatly affect forest stand composition and structure.

Modelling natural disturbances is very challenging due to the unpredictability of timing and geographic locations of natural disturbances. In past FMPs, modelling inputs were used that assumed that a specified proportion of a forest unit area would be naturally disturbed each 10-year period, applied to every 10 year age class equally. This approach was reasonable and consistent with regional direction for strategic planning for the 2012-2024 FMP. This application of a set of proportional disturbance factor does not reflect how natural disturbances actually occur; however was still considered by the LTMD Task Team and Planning Team to be the most reasonable approach to include in the strategic modelling for this 2024 FMP.

The SFMM Natural Disturbance Cycles and Succession screen allows you to specify an average natural disturbance cycle for each forest unit, and the succession rules that describe how disturbed areas succeed to new forest types. SFMM assigns areas naturally disturbed to the youngest age class of the future (post-disturbance) forest units with a silvicultural intensity of “Present”.

<u>Fire Cycles</u>

Natural disturbance rates portray expected annual rates of catastrophic disturbances such as fire, blow down, and lethal insect infestations based on MNRF historical records of natural disturbance under fire suppression strategy (called "Suppression"). These suppression fire cycles for various management units were summarized by the Ministry. The Fresch Report and NW Forestry Forum bulletin entitled *Forest Fire Disturbance: Factors for Modelling and Mapping Procedures (2001)* were used to determine the suppression fire cycle.

The fire cycle analysis estimated a natural pre-suppression fire cycle for the Whiskey Jack Forest of 60 to 200 years depending on the forest unit for the natural scenario calibration run (average of 81 years) – data from MNRF information (regional estimates).

Suppression fire cycle from Forestry Forum technical paper with 299 years for the Whiskey Jack Forest (used 299 years, same as 2004 and 2012 FMPs).

Post Natural Disturbance Forest Unit Transitions

Forest unit transitions after natural disturbance were primarily based on natural disturbance inputs to the BFOLDs model as used in the OLT Model, based on the area weighted average of standard forest units and eco-districts located on the forest. This information was considered the best available information. Natural disturbance assumptions are reasonably consistent with the inputs used for the 2004 and 2012 FMPs' strategic modelling.

For the 2012 FMP, forest unit transitions based on Northwest Region Bounds of Natural Variation science data and forest unit definitions were developed and analyzed. For the 2012 FMP, the impacts of disturbance rates and resulting forest unit transitions were tested on their own and in combination with other natural succession rules. The 2012 FMP planning team evaluated the future forest condition in all scenarios and made refinements where necessary to ensure reasonable calibration with the OLT model. Since the detailed analysis of natural disturbance was undertaken and reviewed for the 2012 FMP, this 2024 FMP utilizes the same natural disturbance suppression fire cycle and forest unit transitions as the 2012. While forest units between this 2024 FMP and the 2012 FMP are very similar, the transitions of HRD forest unit area were approximated for this FMP as there was not a HRD forest unit for the 2012 FMP (was included in the HMX forest unit)

Forest unit transitions resulting from fire disturbance were consistent for all of the investigations. Natural disturbance inputs are summarized in Table 13 below.

Table 13 Natural Disturbance Cycles and Succession

Forest Unit	Suppression Fire Cycle (yrs)		Proportion Succeeding to Forest Unit after Disturbance: BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBM	SBL	SBM
BFM		299		0.20	0.15	0.05		0.35	0.05				0.20
CMX		299		0.17	0.16	0.05		0.35	0.03		0.05		0.19
HMX		299		0.07	0.52			0.03	0.38				
HRD		299		0.02	0.20	0.28			0.50				
PJD		299					1.00						
PJM		299		0.03	0.02		0.60	0.35					
POD		299							1.00				
PRW		299								1.00			
SBD		299		0.15	0.05		0.10	0.25			0.25		0.20
SBL		299										1.00	
SBM		299		0.10	0.01		0.25	0.40			0.04		0.20

1 Development Calculations:

2012-2024 FMP Natural Disturbance Fire Cycles and Forest Unit Transitions

Natural Disturbance Cycles and Succession Revised July 26, 2010: NatDist5

Forest Unit	e-Suppressi ire Cycle (y	Suppressio ire Cycle (y	Proportion Succeeding to Forest Unit after Disturbance: BFM	CMX	HMX	OCL	OTH	PJD	PJM	POD	PRW	SBL	SPD	SPM	
BFM	75	299		0.20	0.20				0.35	0.05				0.20	
CMX	90	299		0.17	0.21				0.35	0.03			0.05	0.19	
HMX	95	299		0.07	0.52				0.03	0.38					
OCL	300	299				1.00									
OTH	150	299					1.00								
PJD	60	299						1.00							
PJM	60	299		0.03	0.02			0.60	0.35						revert to BFOLDS to reduce PJD.
POD	100	299								1.00					
PRW	200	299									1.00				
SBL	250	299										1.00			
SPD	85	299		0.15	0.05			0.10	0.25				0.25	0.20	revert to BFOLDS to reduce SPM and incr
SPM	80	299		0.10	0.01			0.25	0.40				0.04	0.20	CMX, PJM.

2024-2034 FMP Natural Disturbance Fire Cycles and Forest Unit Transitions

(adjusted for revised forest units)

Forest Unit	Suppression Fire Cycle (yrs)		Proportion Succeeding to Forest Unit after Disturbance: BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBM	SBL	SBM		
BFM		299		0.20	0.20	-		0.35	0.05				0.20	reduce HMX 5%, move to HRD?	1.00
CMX		299		0.17	0.21	-		0.35	0.03		0.05		0.19	reduce HMX 5%, move to HRD?	1.00
HMX		299		0.07	0.52	-	-	0.03	0.38						1.00
HRD		299		0.02	0.20	0.28			0.50						1.00
PJD		299					1.00								1.00
PJM		299		0.03	0.02		0.60	0.35							1.00
POD		299		-	-	-	-	-	1.00						1.00
PRW		299								1.00					1.00
SBD		299		0.15	0.05		0.10	0.25			0.25		0.20		1.00
SBL		299										1.00			1.00
SBM		299		0.10	0.01		0.25	0.40			0.04		0.20		1.00

Revised (with above changes):

Forest Unit	Suppression Fire Cycle (yrs)		Proportion Succeeding to Forest Unit after Disturbance: BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBM	SBL	SBM	(AUs in PLANFU:)	
BFM		299		0.20	0.15	0.05		0.35	0.05				0.20		1.00
CMX		299		0.17	0.16	0.05		0.35	0.03		0.05		0.19	(CMX_, CMXC)	1.00
HMX		299		0.07	0.52			0.03	0.38						1.00
HRD		299		0.02	0.20	0.28			0.50					(HRD_, HRDA, HRDB)	1.00
PJD		299					1.00							(PJDD, PJDS)	1.00
PJM		299		0.03	0.02		0.60	0.35							1.00
POD		299							1.00						1.00
PRW		299								1.00				(PRWR, PRWW)	1.00
SBD		299		0.15	0.05		0.10	0.25			0.25		0.20		1.00
SBL		299										1.00		(SBL_, SBLC)	1.00
2 SBM		299		0.10	0.01		0.25	0.40			0.04		0.20		1.00

NOTE: With SFMM inputs by analysis units, above transitions will be used for all components of all forest units. Components of a forest unit will transition to the same analysis unit within the forest unit (e.g. HRDA to HRDA; SBLC to SBLC).

Sorted for Analysis Units: **SFMM NatDist Input (duplicated for all subunits)**

Forest Unit	Suppression Fire Cycle (yrs)		Proportion Succeeding to Forest Unit after Disturbance: BFM_	CMX_	CMXC	HMX_	HRDA	HRDB	HRD_	PJDD	PJDS	PJM_	POD_	PRWR	PRWW	SBM_	SBL_	SBLC	SBM_
BFM_		299		0.20		0.15			0.05			0.35	0.05						0.20
CMX_		299		0.17		0.16			0.05			0.35	0.03			0.05			0.19
CMXC		299			0.17	0.16			0.05			0.35	0.03			0.05			0.19
HMX_		299		0.07		0.52						0.03	0.38						
HRDA		299		0.02		0.20	0.28						0.50						
HRDB		299		0.02		0.20		0.28					0.50						
HRD_		299		0.02		0.20			0.28				0.50						
PJDD		299								1.00									
PJDS		299									1.00								
PJM_		299		0.03		0.02				0.60		0.35							
POD_		299											1.00						
PRWR		299												1.00					
PRWW		299													1.00				
SBD_		299		0.15		0.05				0.10		0.25				0.25			0.20
SBL_		299															1.00		
SBLC		299																1.00	
3 SBM_		299		0.10		0.01				0.25		0.40				0.04			0.20

Additional Natural Disturbance Input Development Information

While strategic analysis did specifically include modelling inputs to simulate fire disturbances, the impacts of recent fire are also considered in FMPs in two additional ways:

Natural Fire-Derived Desirable Levels (Simulated Range of Natural Variation)

Boreal Forest Landscape Dynamics Simulation Model (BFOLDS), a fire-based model of natural forest condition, calculated the Simulated Range of Natural Variation (SRNV) for the Whiskey Jack Forest. The BFOLDs SRNVs for BLG indicators were used as the desired levels for these indicators. By having an LTMD based on fire-derived targets, the Planning Team is planning for forest management activities that incorporate the effect of natural disturbance. Planning for fire-derived BLG indicator targets provided some consideration for large, wildland fire in the strategic modelling (as did the natural disturbance suppression fore cycle and forest unit transitions).

Re-plan Every 10 Years and Reset the Forest Land Base

Over successive FMPs with planning conducted every 10 years with updated forest inventories, plan implementation should continue to move the forest condition towards the desirable (fire-derived) natural condition. Wildland fire disturbances up to 2021 were included in the planning composite inventory (PCI) used as an inventory starting point for this FMP. Any stand replacing natural disturbance occurring during the 10-year period of the plan will be accounted for in the planning inventory for the next FMP (2034-2044). Any actual natural disturbance would be accounted for through adaptive management with the frequent 10-year planning cycle being implemented.

Natural disturbance is not activated for Term 1 (2024-2034) in the SFMM modelling (Section 6.2.2.5).

6.2.2.4 Growth and Yield in Even-age Forest

This section of the Analysis Package described the development of yield information:

A. Tree Species Definitions
B. Yield Curve Development – General
C. Natural Productivity Yield Curves (NAT)
D. Managed Yield Curves (LOW, MED, HIGH)

Note: MIST = Modelling and Inventory Support Tool
Other timber yield-related information is contained in:
Section 6.2.2.5 Timber Product Proportions (net merchantable volumes), and
Section 6.2.2.6 Undersized and Defect Biomass Volumes

A. <u>Tree Species Definitions</u>:

Prior to documenting the development of growth and yield information used in the strategic modelling, one needs to document the tree species used in the forest resources inventories (PCI, OPI, BMI) and SFMM.

Tree species in the planning composite inventory are listed in Table 14. These tree species were standardized for use in net merchantable and biomass volumes (MIST, SFMM) and for FMP tables for the plan (Table 16).

Table 14 Tree Species in Planning Inventory

CODE	COMMON NAME	SCIENTIFIC NAME
PW	Pine, White *[eastern white]*	Pinus strobus
PR	Pine, Red	Pinus resinosa
PJ	Pine, Jack	Pinus banksiana
SB	Spruce, Black	Picea mariana
SW	Spruce, White	Picea glauca
BF	Fir, Balsam	Abies balsamea
CE	Cedar, all	Thuja spp.
LA	Larch, Eastern (also called Tamarack or American Larch)	Larix laricina
PO	Aspen, Trembling Incudes: Poplar, any / mix	Populus tremuloides, Populus spp.
BW	Birch, White (or paper)	Betula papyrifera
AB **MS**	Black Ash Maple, Soft	Fraxinus nigra Acer spp.

Table 15 Tree Species Used in Modelling and FMP Documentation

CODE	COMMON NAME
PW	White Pine
PR	Red Pine
PJ	Jack Pine
SB	Black Spruce
SW	White Spruce
BF	Balsam Fir
CE	Cedar, all
LA	Eastern Larch (also called Tamarack or American Larch)
PO	Poplar, any / mix
BW	White Birch (or paper)
UH	Upland Hardwood (includes Red Oak, Soft Maple)
LH	Lowland Hardwoods (includes Black Ash)

The following tree volume codes from MIST do not occur on the Whiskey Jack Forest: Hemlock, Balsam Poplar, Hard Maple, and Yellow Birch (zero occurrence and zero volumes)

In FMP tables, total volume will be reported with conifer and hardwood subtotals. Tree volumes are reported in all tables and documents consistently in the order above in Table 15.

B. Yield Curve Development - General

Each forest unit has a distinct yield curve for the "Natural" forest condition (i.e. NAT, natural origin), and additional yield curves to reflect managed, post-harvest stand development based on varying levels of site productivity (LOW, MED, HIGH). The main assumption used in the development of the curves, is that all points in time, the curve's species composition is consistent with the forest unit definition.

Note: The "NAT" yield referenced throughout the FMP is the same as the "PRSNT" yield/intensity labelled in MIST.

Yield curves were derived collaboratively with the LTMD Task Team, the MNRF Regional Forest Analyst and MNRF science Plan Advisors using the best available science, planning inventory information, operational timber volume data, and comparisons to the Whiskey Jack Forest 2012 FMP volume data and adjacent Kenora Forest 2022 FMP volume data.

Base Whiskey Jack Forest data MIST curves, or adjusted regional data MIST base yield curves, were created then imported and adjusted in MS Excel (as warranted). In excel, yield curve data was sorted into the applicable tree species consistent with FMP table tree species listings and consistent with SFMM strategic model tree species inputs. Also in MS Excel, additonal adjustments to certain yield curves were made, specifically to the older "tail ends" of the curves for successional forest units. This was necessary to ensure the interaction of SFMM strategic modelling inputs between yield curves and “old age” natural succession rules. After initial development in MIST and subsequent adjustment in MS Excel, the yield curves are ready for input into the strategic model.

Yield curves for each forest unit and yield are documented in Appendix 6 of this Analysis Package. This yield curve appendix also includes a comparison of the base yield curves as derived in MIST and, if applicable, the revised yield curves if an adjustment outside of MIST (MS Excel) was done to successional forest units (as referenced below in Natural Productivity and Managed yield curve development subsections). Also see the SFMM model input file for detailed volumes per species per hectare used for this 2024 FMP.

C. <u>Natural Productivity Yield Curves (NAT)</u>

The general process for development of NAT yield curves by forest unit is discussed first, followed by specific information and rationale for each forest unit.

NAT YIELD includes areas that were depleted by natural means (where DEPTYPE <> HARVEST). The NAT (PRSNT) area-weighted average stand conditions were calculated in MIST from the initial inventory import (using a sample age range) with PLANFUs and YIELD (NAT) applied (Table 16).

Table 16 Inventory Average Stand Conditions for Each PLANFU NAT Yield Area

PLANFU	YIELD	lead species	Average Species Composition	avg Stocking	avg Site Class
BFM	NAT	Bf	Bf37 Sb33 Bw13 Po 6 Sw 6 Pj 5	0.59	1.5
CMX	NAT	Sb			
CMX-spruce	NAT	Sb	Sb47 Bw17 Po14 Bf 9 Pj 7 Sw 4 Cw 1 Pr 1	0.60	2.0
CMX-jackpine	NAT	Pj	Pj50 Po19 Sb14 Bw13 Bf 3 Ct 1	0.67	1.5
HMX	NAT	Po	Po34 Sb23 Bw2 2Pj 9 Bf 8 Sw 4	0.62	2.0
HRD	NAT	Po	Po44 Bw30 Sb13 Bf 4 Oh 3 Pj 3 Sw 3	0.67	2.0
PJD	NAT	Pj			
PJDD (Deep)	NAT	Pj	Pj79 Sb12 Po 5 Bw 4	0.76	2.0
PJDS (Shallow)	NAT	Pj	Pj80 Sb11 Bw 5 Po 4	0.56	2.5
PJM	NAT	Pj	Pj54 Sb31 Bw 6 Po 6 Bf 2	0.66	2.5
POD	NAT	Po	Po76 Sb 9 Bw 8 Pj 3 Bf 2 Sw 2	0.70	2.0
PRW	NAT	Pr			
PRWR (PR)	NAT	Pr	Pr54 Sb13 Bw10 Pw8 Po7 Pj5 Bf2 Sw1	0.68	2.0
PRWW (PW)	NAT	Pw	Pw38 Bw14 Po14 Pr14 Sb8 Bf7 Pj2 Ce1 Ms1 Sw1	0.63	2.0
SBD	NAT	Sb	Sb78 Pj 8 Bw 6 Bf 3 Po 3 Sw 2	0.62	1.5
SBL	NAT	Sb	Sb79 Oc13 Bw 2 Ct 2 Bf 1 Oh 1 Pj 1 Po 1	0.58	2.5
SBM	NAT	Sb	Sb54 Pj24 Bw 8 Po 5 Bf 4 Sw 4 Pr 1	0.60	1.5

avg = area-weighted average stand condition

Yield curves for this FMP were derived using the MIST program (Modelling and Inventory Support Tool, version Jan. 14, 2020). The methodology for MIST yield curve development is described below. Based on the forest unit and MIST projections, three slightly different processes resulted in the final NAT yield curves for the FMP. Table 17 identifies which forest units utilized:

1. “Whiskey Jack Forest Dataset” steps (WhkJk1),
2. “WhkJk1 dataset” but blended two different subsets of data (Blend), and
3. “NW Region Datasets” (NWR_prw or NWR_pod).

Table 17 MIST Datasets and Age Ranges Used for Each PLANFU NAT Yield

		Sample Age Range					Inventory Age Range				
PLANFU	**MIST**	**minage**	**maxage**	**K0**	**K1**	**K2**	**minage**	**maxage**	**STKG Profile**	**Data Used**	**Curve Used**
BFM	BfMx1	25	125	107.33	183.59	282.15	28	144	vstkg	WhkJk1	Prsnt
CMX	Blend								vstkg	WhkJk1	Blend
CMX-spruce	CM_Sb	35	125	84.67	154.01	232.28	40	155	vstkg	WhkJk1	Prsnt
CMX-jack pine	CM_Pj	25	125	3.64	172.69	316.18	28	125	vstkg	WhkJk1	Prsnt
HMX	HrdMw	25	125	23.56	171.18	281.52	29	124	vstkg	WhkJk1	Prsnt
HRD	HrDom	25	125	26.08	139.86	252.36	28	128	vstkg	WhkJk1	Prsnt
PJD											
PJDD (Deep)	PjDee	25	125	52.63	139.15	267.42	28	124	vstkg	WhkJk1	Prsnt
PJDS (Shallow)	PjSha	25	125	4.41	185.02	268.65	28	113	vstkg	WhkJk1	Prsnt
PJM	PjMx1	25	125	34.41	172.17	298.68	40	124	vstkg	WhkJk1	Prsnt
POD	PoDom	25	125	-63.00	194.00	439.50	27	155	vstkg	NWR_pod	Aa
PRW											
PRWR (PR)	PrwAl (Bb)	25	125	103.16	116.80	215.34	28	158	vstkg	NWR_prw	Aa
PRWW (PW)	PrwAl (Cc)	25	125	103.16	116.80	215.34	28	158	vstkg	NWR_prw	Cc
SBD	SbDom	25	125	101.55	113.12	179.39	35	144	vstkg	WhkJk1	Prsnt
SBL	SbLow	25	125	151.17	237.47	354.20	40	154	vstkg	WhkJk1	Prsnt
SBM	SbMx1	25	125	125.70	179.74	274.27	28	124	vstkg	WhkJk1	Prsnt
MIST files:	WhkJk1	is	whkjk yc1		Used for all forest units, except PRW and POD.						
	NWR_prw	is	nwe regions grp prw		Used for PRW.						
	NWR_pod	is	nwr po dominant		Used for POD.						

Method 1: Yield Curve Development with the Whiskey Jack Forest Dataset:

1. The Whiskey Jack Forest dataset for MIST file was generated using an SQL script run by the NWR Regional Forest Analyst on the inventory. The inventory stand attributes were checked/manipulated to ensure that they would be compatible with MIST structures (vertical structures considered, for example).
2. The resulting Whiskey Jack Forest MIST dataset was imported by the MNRF advisor, plan analysis units mapped to the primary corresponding regional standard forest unit (SFU), and the imported inventory was used for the management unit specific MIST dataset (WhkJk1 MIST data file).
3. The MIST default sample age range of 25 – 125 years was selected for all forest units (analysis units) (except CM_sp where 35-125 years produced a better variable stocking profile, see Method 2 below). The Task Team decided to generally use the default age ranges as 1) the default rages 25 to 125 represented the Whiskey Jack Forest structure sufficiently as a whole.
4. MIST calculated the average stand condition for the sample age range for each forest unit. The resulting average species composition, stocking and site class for the MIST sample range by PLANFU using Whiskey Jack Forest data was recorded (Table 16).
5. “Variable” stocking profile was used to generate NAT yield curves for all forest units (Table 17). The MIST coefficients for the NAT curves are also documented in the table.
6. The projected MIST PRSNT yield curves (called “NAT” YIELD in FMP) for the Whiskey Jack Forest, where applicable, were compared to:

- nm volumes from the 2012-2024 Whiskey Jack Forest FMP Prsnt yield curves (note there is some variation in forest units between plans).
- nm volumes from the adjacent Kenora Forest 2022 FMP by forest unit (same definitions as WJF 2024) (some average stand attributes differ from the Whiskey Jack Forest). These MIST curves for the Kenora 2022 FMP were generated with the same current version of MIST, including some updated embedded growth and yield data, and are considered the most reliable comparison for development of the WJF 2024 curves.
- IFA report noted a broad consistency between planned and actual volumes indicating that timber projections in the 2012 FMP were generally accurate.

Implementation of seven years of the 2012 FMP has resulted in harvested volumes by block that generally approximated the projected volumes. Overall average harvest volumes per hectare were approximately 111 m3/ha which is similar (slightly higher) than the total volume of 107 m3/ha predicted in the 2012 FMP (2018-2019 enhanced Annual Report). Detailed analysis of volumes by planned forest unit were very limited since most harvest blocks contain multiple forest units, and harvest area approvals for the 2012 FMP period covered multiple blocks under one approval. There is overall satisfaction with yield curves developed for the 2012 FMP (local expert opinion), however there was some noted variation by forest unit.

The resulting comparison to the 2012 FMP yield curves, and the adjacent Kenora Forest 2022 yields confirmed that yields developed for NAT with Kenora Forest data with Method 1 were reasonable and comparable to actual yields and those used in the 2012 FMP for all forest units except **CMX, POD, PRW forest units**.

- **CMX forest unit** contained 2 distinct forest types – mixed conifer with Spruce being predominant, and mixed conifer with jack pine being predominant. See **Method 2** for a summary of development of the CMX NAT yield curve.
- **POD and PRW** forest units had either limited sample sizes or significant variability of these forest unit areas on the Whiskey Jack Forest, so the variable stocking calculation for the management unit did not provide statistically good curves for these forest units. See **Method 3** for development of the yield curves for POD and PRW forest units.

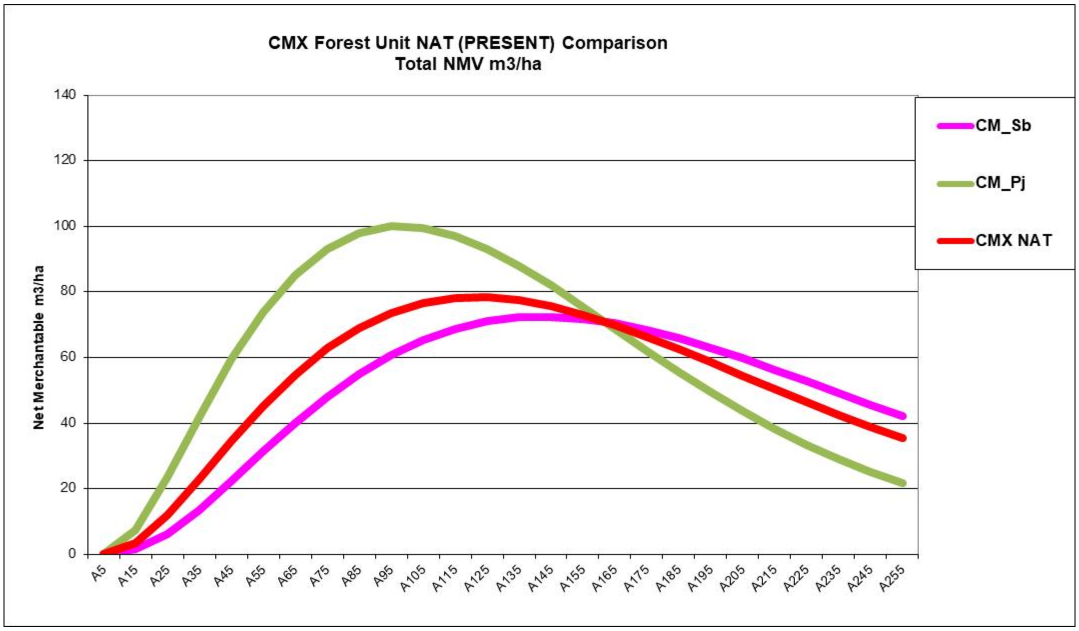
7. NAT (base present) yield curves were documented in tables and graphs with comparisons provided.

Method 2: CMX Yield Curve Development with the Whiskey Jack Forest Dataset

The same steps for Method 1 were followed, however the CMX forest unit area was split into those inventory stands that are spruce-leading (CM_sb, where (Sb+Sw)>Pj in species composition), and the remaining stands that are jack pine-leading (CM_pj, where Pj>=(Sb+Sw).

1. Base present NAT curves were generated in MIST for CM_sb and CM_pj using Whiskey Jack Forest average stand parameters.
2. The two resulting NAT curves were used to generate a “Blended” NAT curve based on the area-based occurrence of spruce leading (67%) or jack pine leading (33%) stands.
3. The resulting calculated (blended) CMX NAT yield curve was used for the CMX NAT yield curves (Figure 3).
4. The CMX NAT (base present) yield curve was documented in tables and graphs with comparisons provided.

Figure 3 CM_Sb and CM_Pj NAT curves and resulting in prorated CMX NAT curve



Method 3: POD and PRW Yield Curve Development with the Northwest Region Dataset:

During yield curve development, small sample areas, or samples with skewed data, can significantly affect the appropriateness of the base yield curve inputs, yield curve parameters as well as the variable stocking profile. An inappropriate stocking profile will result in inappropriate volume projections in MIST. For forest units with small or skewed samples, NWR-ROD recommends the use of the Northwest Region (NWR) based data variable stocking profile as a surrogate for the management unit.

1. For the remaining PRW and POD forest units, the Whiskey Jack Forest initial NAT yield calculations were limited by small area sample sizes which resulted in projected yields that were significantly different than expected yield (supported by local data, expert opinion). For these forest units, regional data was provided for import into MIST

(NWR_prw and NWR_pod). The variable stocking profiles in MIST did not provide a good correlation to inventory data, therefore regional data was used and resulted in statistically good variable stocking profiles.

2. (a) Due to the difference in stand conditions, NAT curves were generated for the Red Pine leading and the White Pine leading components of the PRW forest unit (represented by 2 analysis units within the strategic modelling). Average Whiskey Jack Forest stand attributes (from step 4 of Method 1: Whiskey Jack Forest Dataset) for species composition, stocking and site class was included into larger regional red pine – white pine dataset (NWR_prw) by FMP analysis unit to reflect average local Whiskey Jack Forest conditions for the PRW forest unit.
2. (b) Average Whiskey Jack stand parameters for the POD forest unit (Method 1, Step 4) were entered into MIST using the NWR_pod dataset, and the resulting NAT curve was generated.
3. The MIST default sample age range of 25 – 125 years was selected for the PRW and POD forest units.
4. Variable stocking was used for both POD and PRW.
5. The projected MIST PRSNT yield curves for the Whiskey Jack Forest were compared to:
   - nm volumes from Whiskey Jack Forest 2012 FMP by forest unit
   - nm volumes from adjacent Kenora Forest 2022 FMP.
6. The POD and PRW NAT (base present) yield curves were documented in tables and graphs with comparisons provided.

NAT Discussion by Forest Unit:

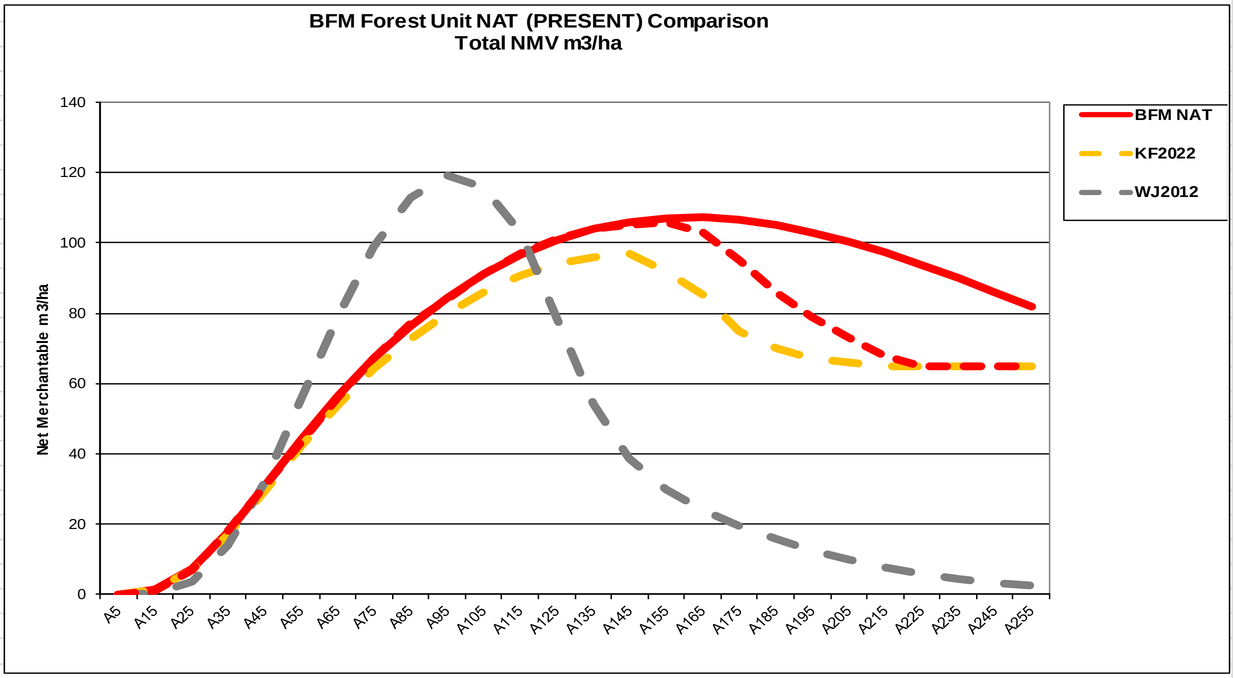
A discussion of Whiskey Jack Forest FMP 2024 NAT yield curves follows by forest unit. Changes in MIST inputs from the processes above are recorded. The rationale for use of regional data, rather than Whiskey Jack Forest data is included for POD and PRW, as well as the comparison of total volumes per hectare to the adjacent Kenora Forest 2022 FMP (Table 18). It should be noted that the yield curve peak information for the Kenora Forest is for reference only. Variances in inventory parameters (e.g. average stocking, site class or leading species within a forest unit) and yield curve parameters (e.g. variable stocking profile) will result in differences in yield curve results.

Table 18 Comparison of Yield Curve Peak Volumes by Forest Unit

	Whiskey Jack 2023 FMP Volume		Whiskey Jack 2012 FMP Volume		Kenora 2022 FMP Volume			
PLANFU	Peak Vol.	Age of peak	Peak Vol.	Age of peak	Peak Vol.	Age of peak		
BFM	**107**	**155**	120	100	97	145	Prsnt	
CMX			103	90	105	115		
CMX-spruce	**72**	**135**					Prsnt	
CMX-jack pine	**95**	**100**					Prsnt	
HMX	**121**	**105**	100	80	123	135	Prsnt	
HRD	**123**	**95**			124	125	Prsnt	
PJD			125	70	89	95		
PJDD (Deep)	**115**	**95**			101	85	Prsnt	
PJDS (Shallow)	**75**	**105**			70	95	Prsnt	
PJM	**80**	**95**	105	70	81	95	Prsnt	
POD	**122**	**95**	130	75	143	95	Aa	PoDom
PRW			148	100				
PRWR (PR)	**266**	**155**			479	255	Aa	PrwAl data
PRWW (PW)	**178**	**145**			280	175	Cc	PrwAl data
SBD	**103**	**125**	140	100	104	155	Prsnt	
SBL	**77**	**225**	83	125	81	205	Prsnt	
SBM	**116**	**135**	135	105	108	135	Prsnt	

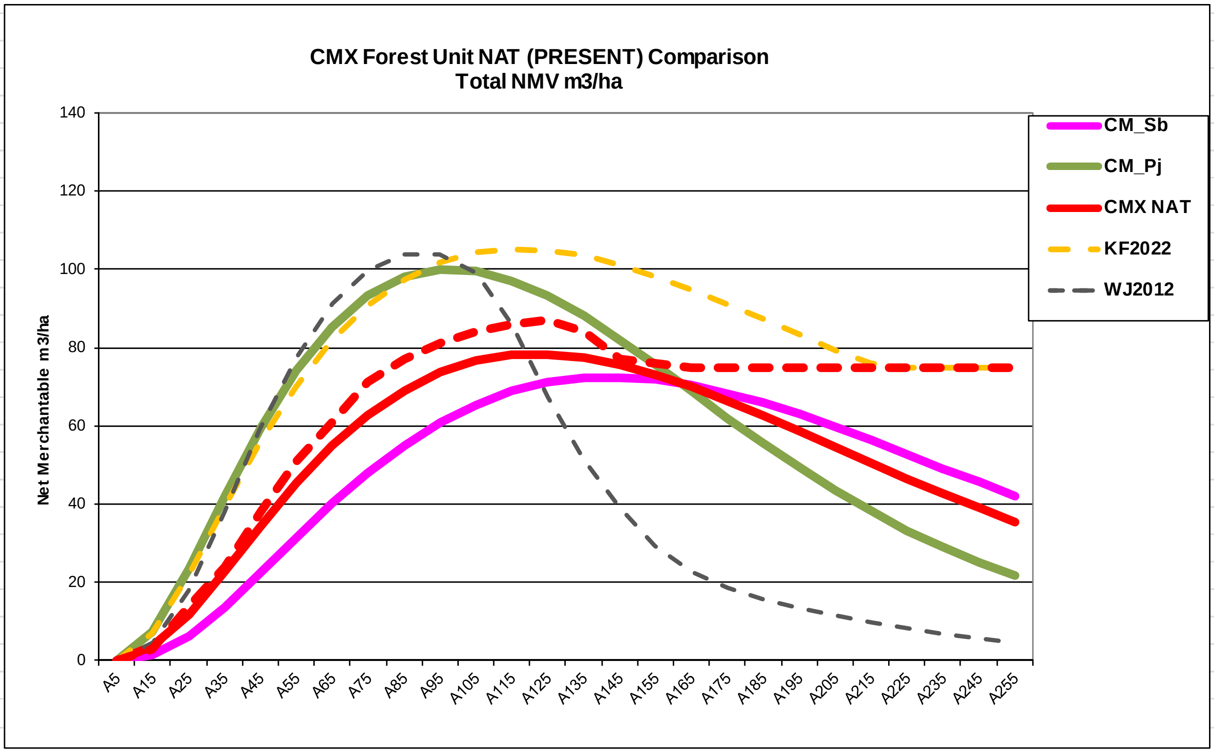
Note: The volume peaks for all forest unit NAT curves tend to be later than evident in the 2012 FMP curves and previous versions of MIST. This results from refinements within the MIST model for calculations as supported by expanded regional growth and yield data. This trend of later peak volume is consistent with yield curves developed for other management units across the Northwest Region.

<u>BFM – Balsam Fir Dominant Forest Unit:</u>



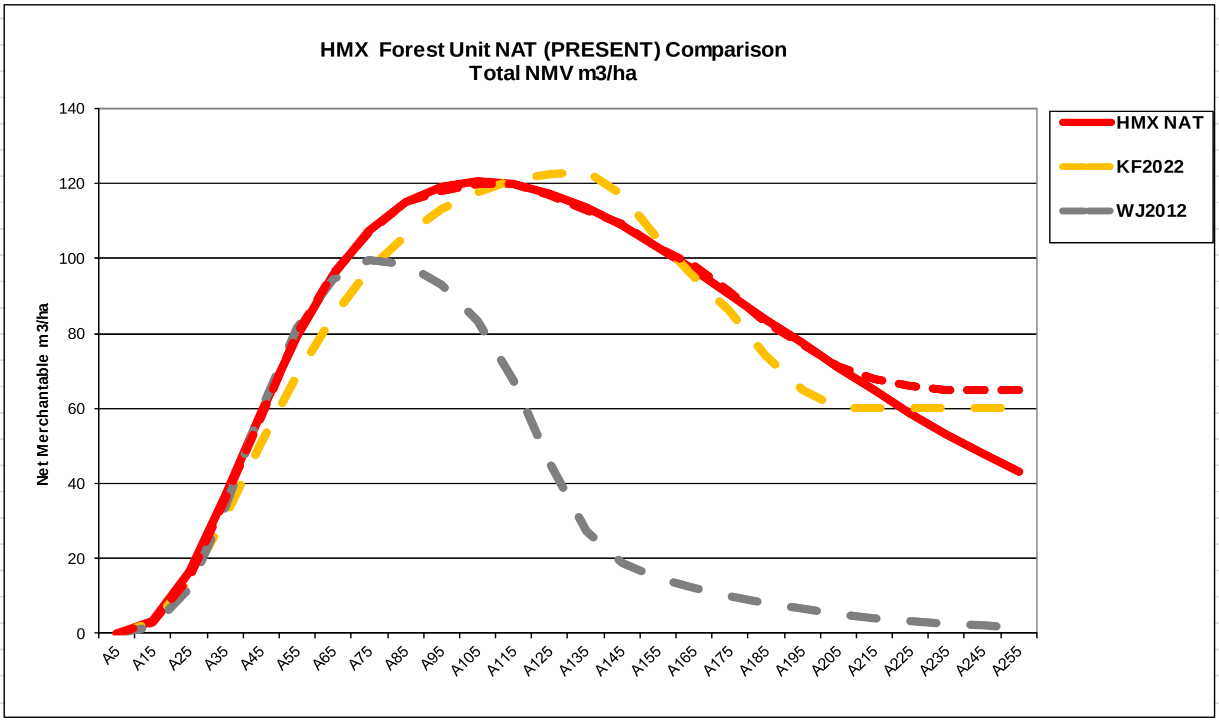
<u>Rationale:</u>
Used MIST with management unit data and variable stocking profile
Regional consensus that current MIST version is better than 2012 WJ volume generator
WJ2012 is BFM curve.
BFM NAT curve was reasonable when compared to Kenora Forest MIST.
RED curve chosen NAT volumes - tail end was later adjusted for natural succesion

CMX – Conifer Mix Forest Unit:



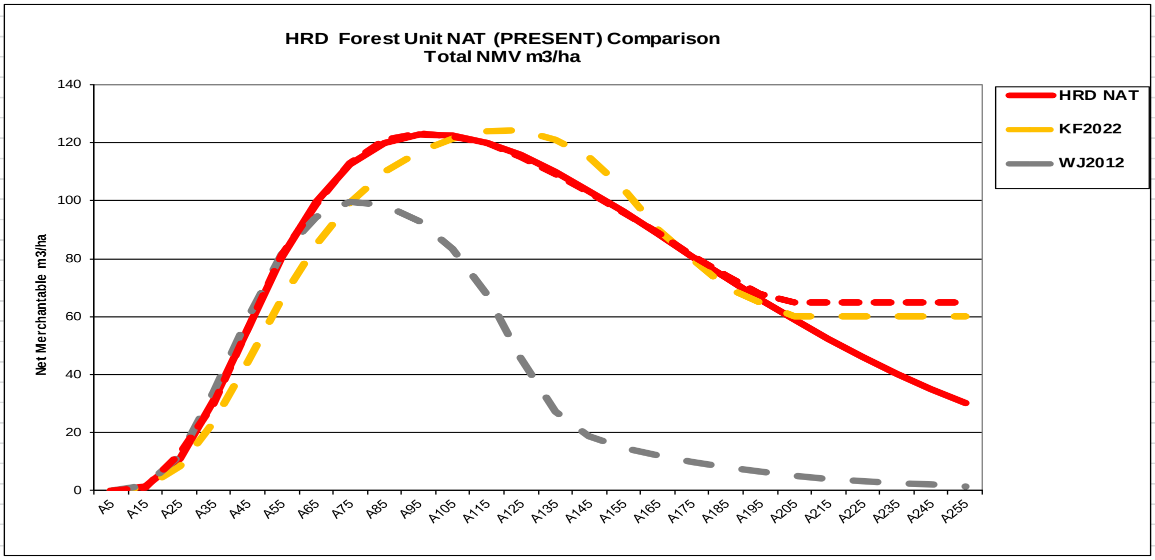
Rationale:
Used MIST with management unit data and variable stocking profile
Regional consensus that current MIST version is better than 2012 WJ volume generator
WJ2012 is CMX curve.
2 curves generated for Spruce-leading and Jack Pine-leading CMX
CM_sb curve used adjusted age range 35-125 for slightly better fit for stocking profile.
Curves blended based on occurrence of leading species (67% spruce, Pj 33%)
CMX NAT curve calculated (can only have 1 NAT curve with 1 analysis unit)
KF is CMX Pj leading and better stocking, hence curve is higher volume.
RED curve chosen NAT volumes - tail end was later adjusted for natural succesion

HMX – Hardwood Mix Forest Unit:



Rationale:
Used MIST with management unit data and variable stocking profile
Regional consensus that current MIST version is better than 2012 WJ volume generator
WJ2012 is HMX curve.
HMX NAT curve was reasonable when compared to Kenora Forest MIST.
Greater HMX volume than 2012 FMP estimated
RED curve chosen NAT volumes - tail end was later adjusted for natural succesion

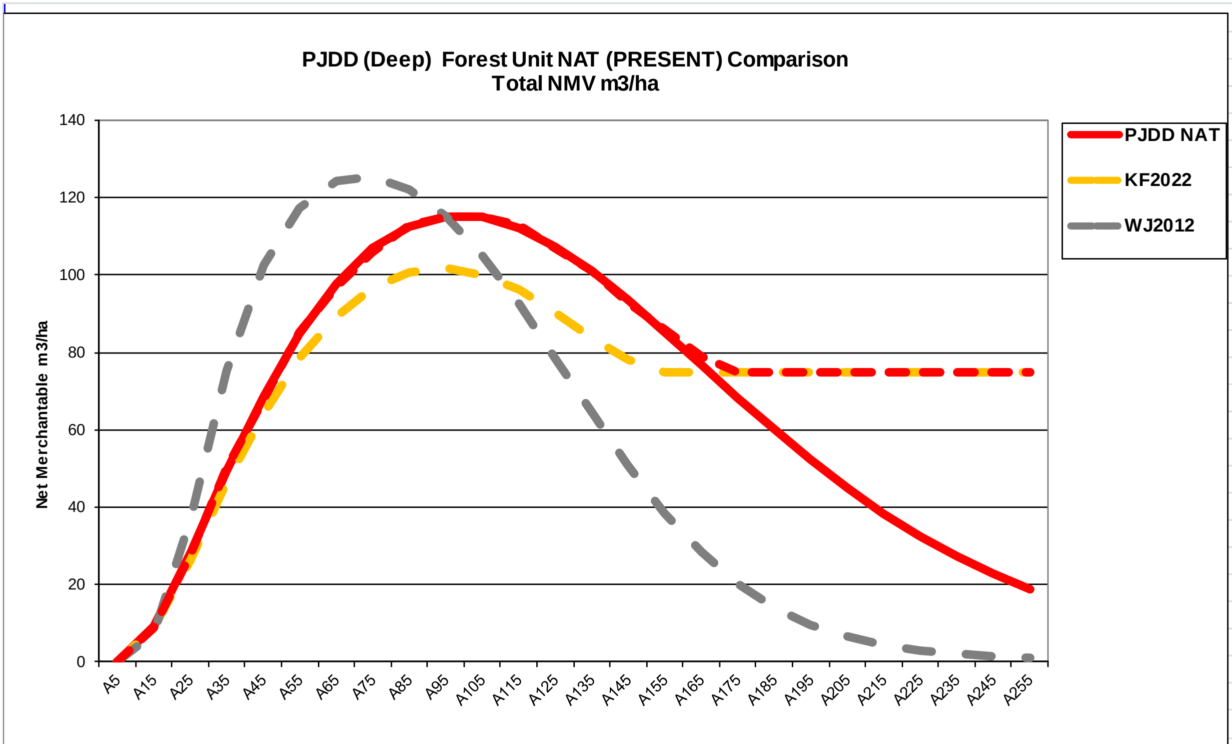
HRD – Hardwood Dominant Forest Unit:



Rationale:
Used MIST with management unit data and variable stocking profile
Regional consensus that current MIST version is better than 2012 WJ volume generator
WJ2012 is HMX curve, as they were combined into 1 PLANFU.
HRD NAT curve was reasonable when compared to Kenora Forest MIST.
Greater HRD volume than 2012 FMP estimated
RED curve chosen NAT volumes - tail end was later adjusted for natural succesion

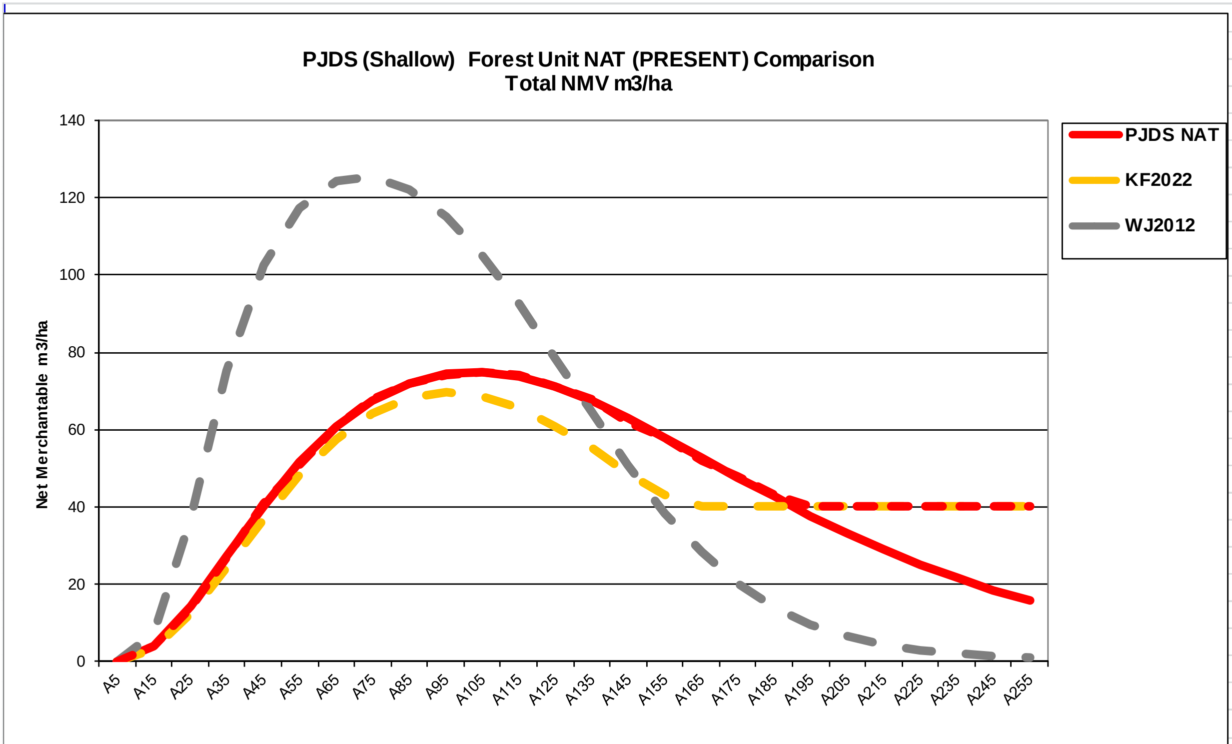
PJD – Jack Pine Dominant Forest Unit:

PJDD - Deep Component:



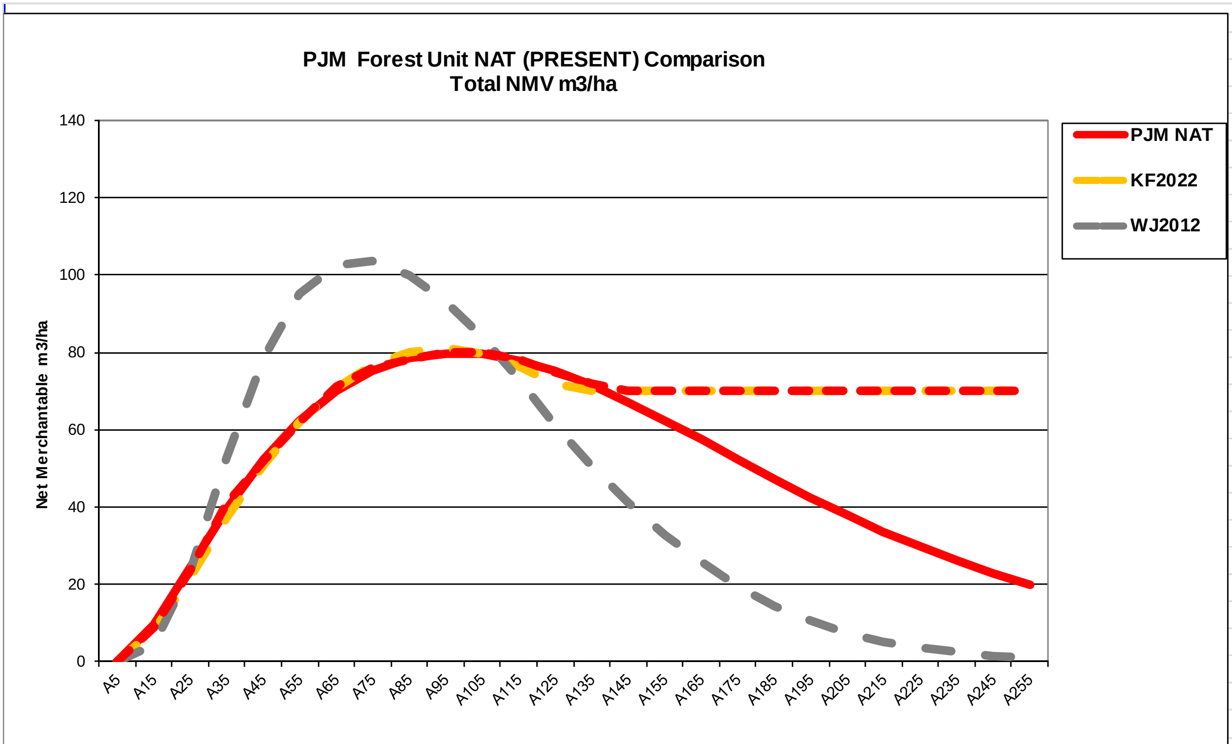
Rationale:
Used MIST with management unit data and variable stocking profile
Regional consensus that current MIST version is better than 2012 WJ volume generator
WJ2012 is PJD curve, as shallow and deep components were combined into 1 AU (and PLANFU).
PJDD NAT curve was reasonable when compared to Kenora Forest MIST.
Slightly less PJD volume than 2012 FMP estimated, Better than Kenora
RED curve chosen NAT volumes - tail end was later adjusted for natural succesion

PJDS - Shallow Component:



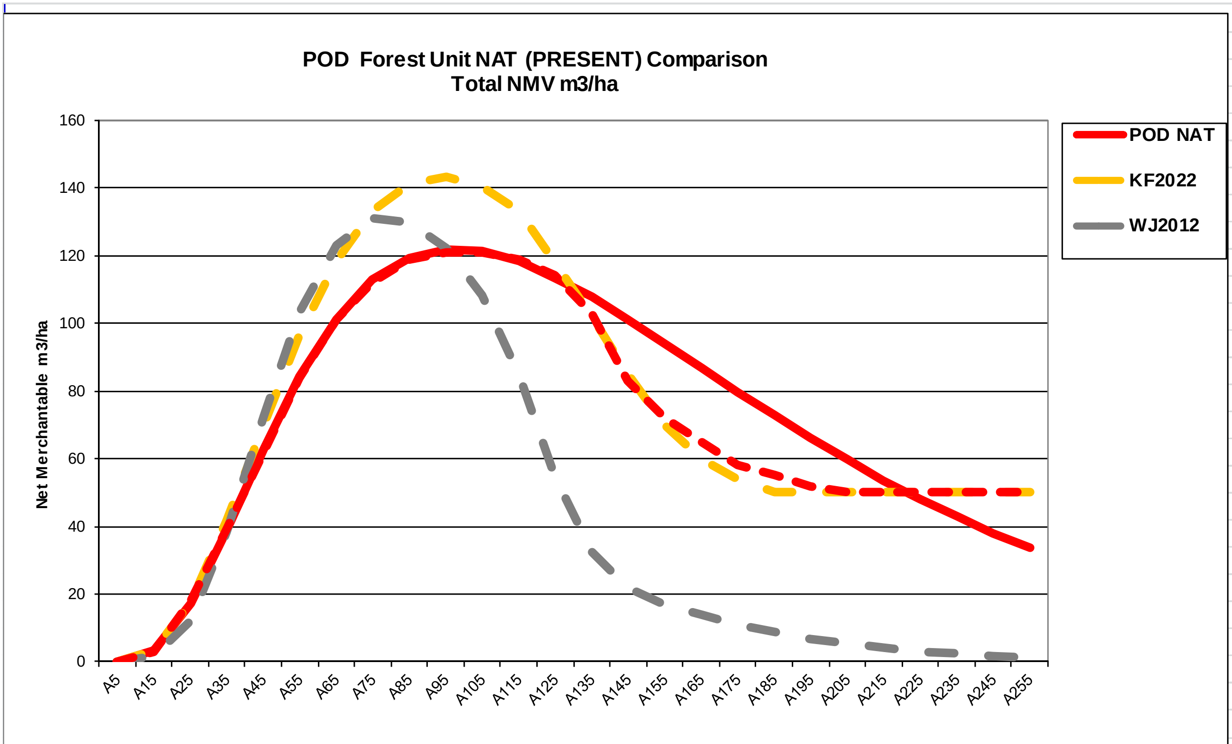
Rationale:
Used MIST with management unit data and variable stocking profile
Regional consensus that current MIST version is better than 2012 WJ volume generator
WJ2012 is PJD curve, as shallow and deep components were combined into 1 AU (and PLANFU).
PJDS NAT curve was reasonable when compared to Kenora Forest MIST.
Significanlty less than 2012 FMP estimated, now based on shallow sites only.
RED curve chosen NAT volumes - tail end was later adjusted for natural succesion

<u>PJM – Jack Pine Mix Forest Unit:</u>



<u>Rationale:</u>
Used MIST with management unit data and variable stocking profile
Regional consensus that current MIST version is better than 2012 WJ volume generator
WJ2012 is PJM curve.
PJM NAT curve was comparable to the Kenora Forest MIST.
Significanlty less than 2012 FMP estimated, but 2023 considered reliable.
RED curve chosen NAT volumes - tail end was later adjusted for natural succesion

POD – Poplar Dominant Forest Unit:

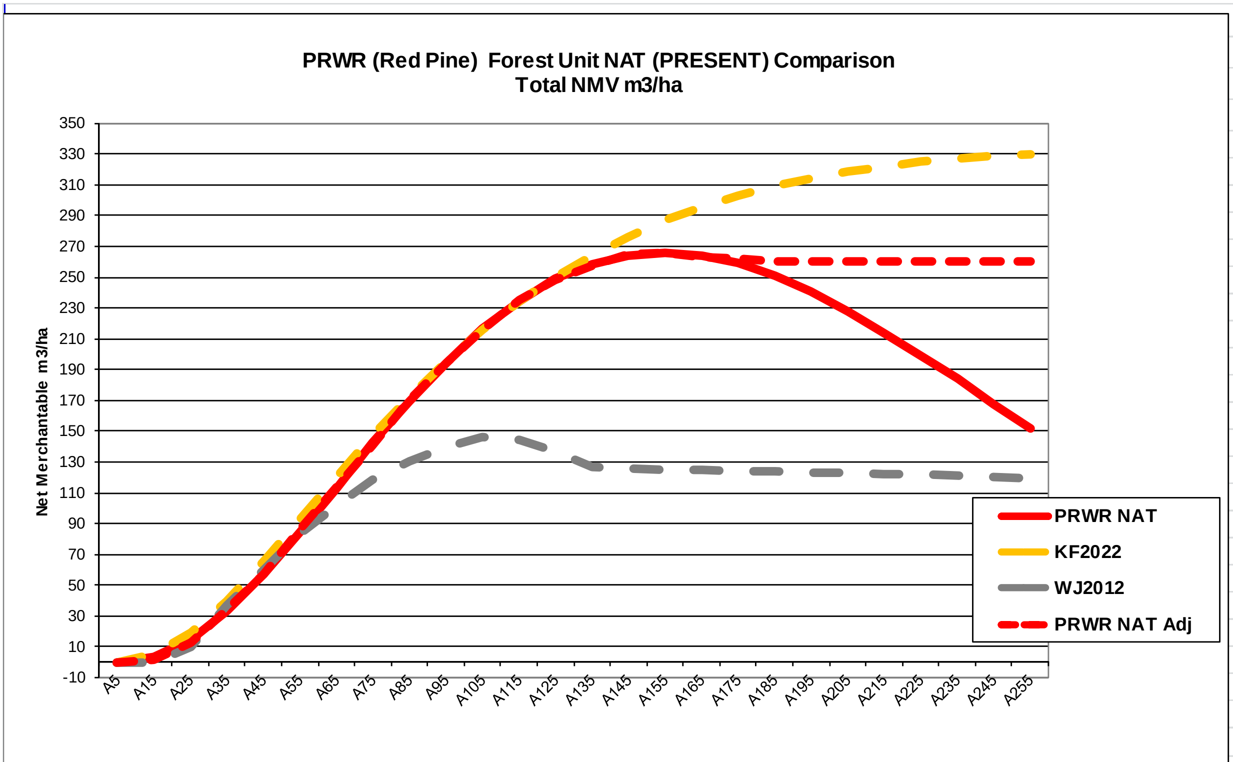


Rationale:
Used MIST with regional data and variable stocking profile
Regional consensus that current MIST version is better than 2012 WJ volume generator
WJ2012 is POD curve.
POD NAT curve was slightly lower than Kenora Forest MIST (KF higher stkg).
Comparable to 2012 FMP estimate, but 2023 considered reliable (later peak).
RED curve chosen NAT volumes - tail end was later adjusted for natural succesion

PRW – Red Pine and White Pine Mix Forest Unit:

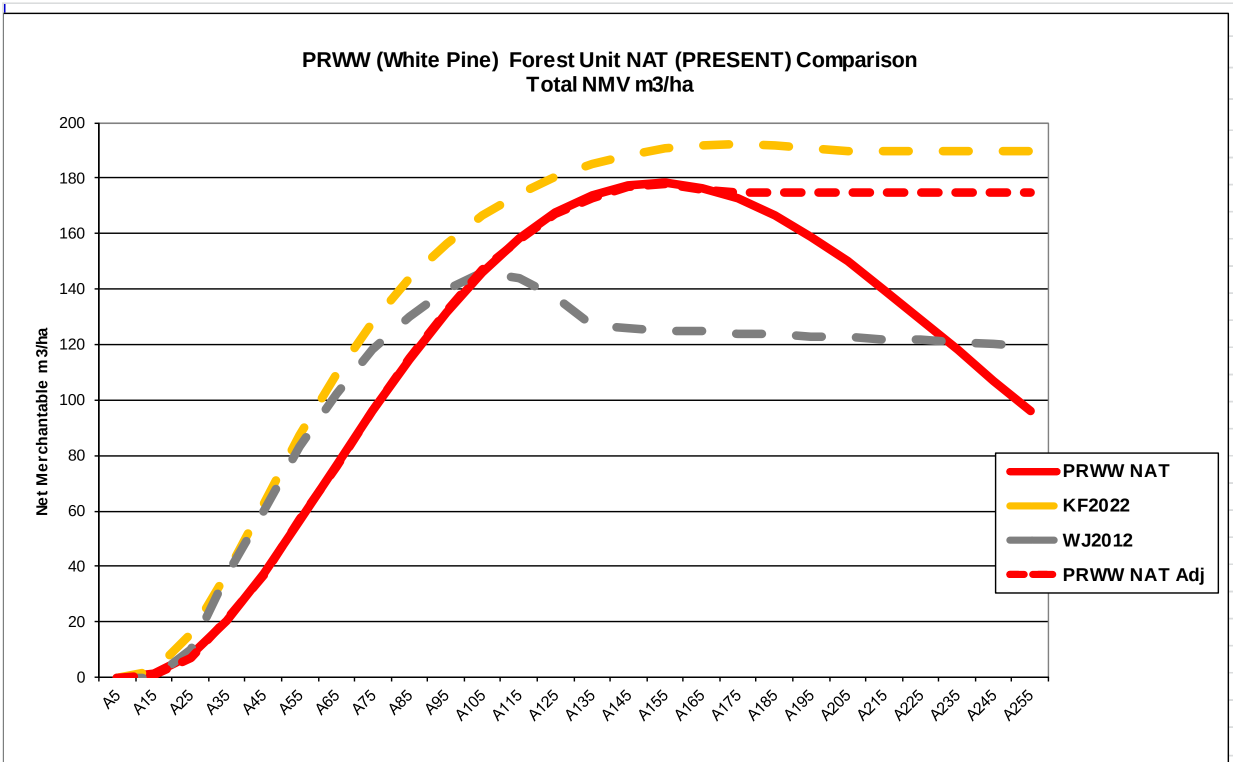
- Minimal PRW harvest area on the Whiskey Jack Forest.

PRWR - Red Pine Component:



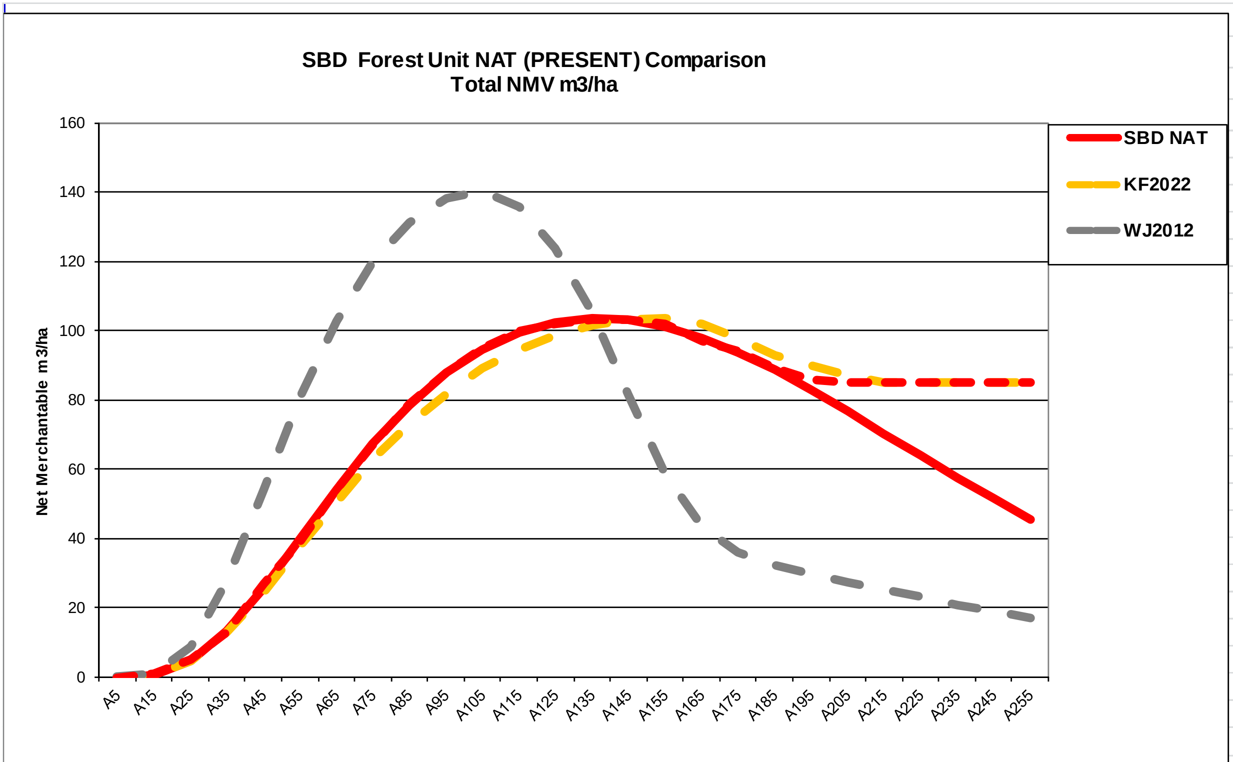
Rationale:
Used MIST with regional data and variable stocking profile
Regional consensus that current MIST version is better than 2012 WJ volume generator
WJ2012 is PRW curve, as red pine and white pine components were combined into 1 AU (and PLANFU).
PRWR NAT curve was lower than Kenora Forest MIST, but tail may be raised.
Current MIST dataset includes all PRW SFUs (not just Pr)
2012 FMP estimate significantly lower, but 2023 considered reliable (later peak).
RED curve chosen NAT volumes - tail end was later adjusted for natural succesion

PRWW – White Pine Component:



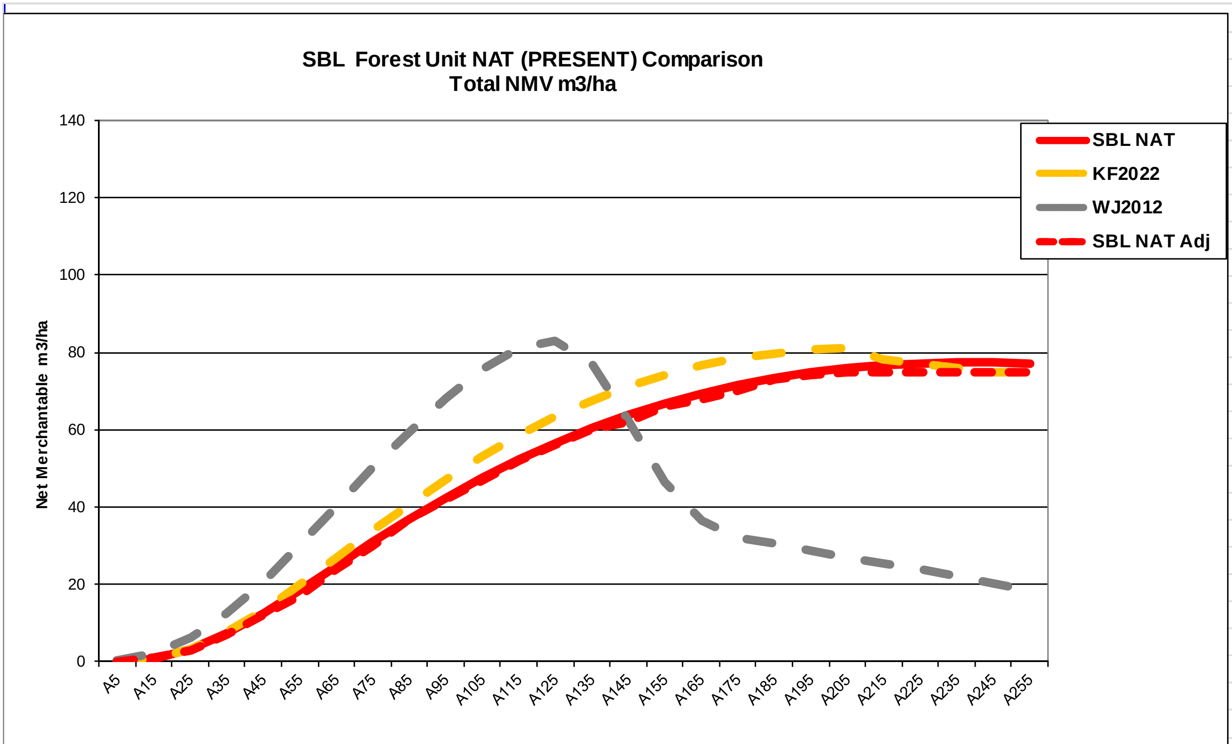
Rationale:
Used MIST with regional data and variable stocking profile
Regional consensus that current MIST version is better than 2012 WJ volume generator
WJ2012 is PRW curve, as red pine and white pine components were combined into 1 AU (and PLANFU).
PRWW NAT curve slightly lower than Kenora Forest MIST (higher stocking), but tail may be raised.
2012 FMP estimate significantly lower, but 2023 considered reliable (later peak).
RED curve chosen NAT volumes - tail end was later adjusted for natural succesion

SBD – Spruce Dominant Forest Unit:



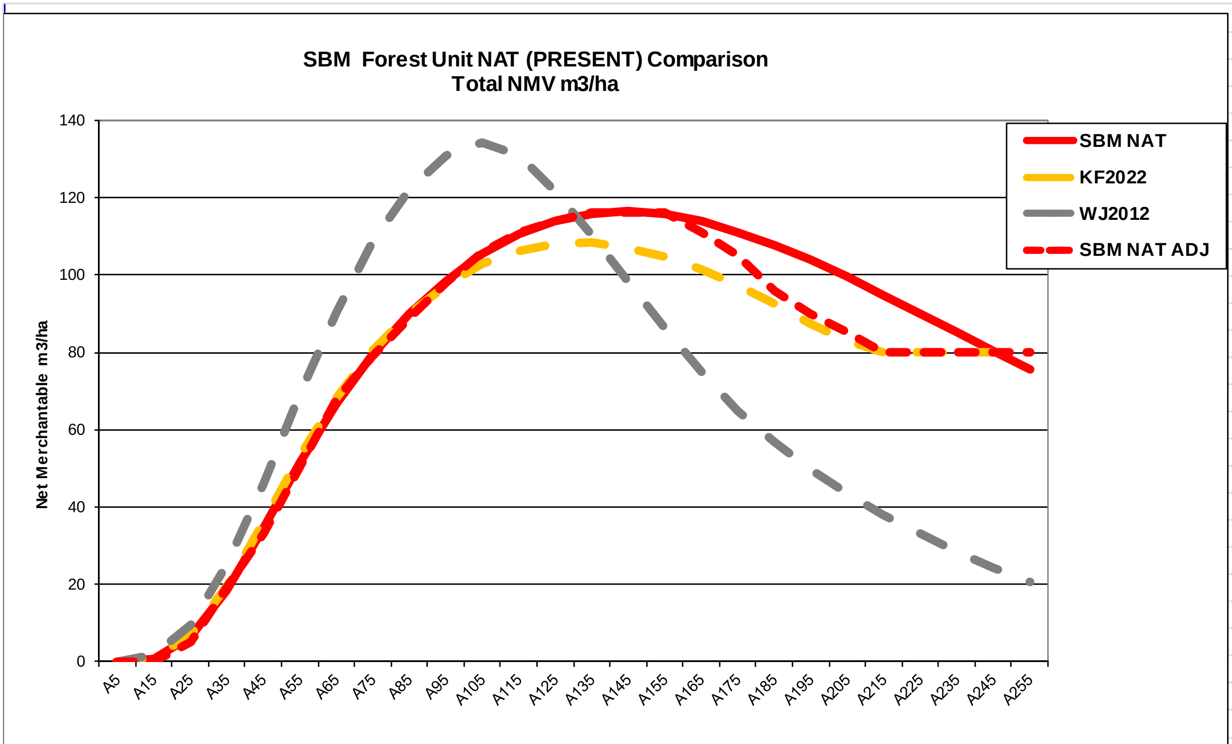
Rationale:
Used MIST with management unit data and variable stocking profile
Regional consensus that current MIST version is better than 2012 WJ volume generator
WJ2012 is SPD curve.
SBD curve is comparable to the Kenora Forest MIST.
2012 FMP estimate significantly higher, but 2023 considered reliable (later peak).
RED curve chosen NAT volumes - tail end was later adjusted for natural succesion

SBL – Spruce Lowland Forest Unit:



Rationale:
Used MIST with management unit data and variable stocking profile
Regional consensus that current MIST version is better than 2012 WJ volume generator
WJ2012 is SBL curve.
SBL curve is comparable to the Kenora Forest MIST.
2012 FMP estimate slightly higher, but 2023 considered reliable (later peak).
RED curve chosen NAT volumes - tail end was later adjusted for natural succesion

SBM – Spruce Mix Forest Unit:



Rationale:
Used MIST with management unit data and variable stocking profile
Regional consensus that current MIST version is better than 2012 WJ volume generator
WJ2012 is SPM curve.
SBM curve slightly higher than the Kenora Forest MIST.
2012 FMP estimate is higher, but 2023 considered reliable (later peak).
RED curve chosen NAT volumes - tail end was later adjusted for natural succesion

The resulting NAT yield curve peak volumes for MIST yield curves, and for adjusted Yield Curves by forest unit are documented in the following Table 19. With this information, the Task Team also had preliminary discussions on minimum operational volumes, and merchantability of older stands. This information was used to inform adjustments to yield curves to accommodate model calculations for old age natural succession, and to start further discussions on Harvest Operability ages (decisions documented in Section 6.2.3.1).

Table 19 Summary of NAT Yield Curve Peak Volumes (MIST and adjusted MIST)

Summary of Total nm Volume/Hectare - No Natural Succession Tail Adjustment

AGE:	BFM NAT	CMX NAT	HMX NAT	HRD NAT	PJDD NAT	PJDS NAT	PJM NAT	POD-NAT	PRWR NAT	PRWW NAT	SBD NAT	SBL NAT	SBM NAT
5	0	0	0	0	0	0	0	0	0	0	0	0	0
15	1	3	3	1	9	4	9	3	2	1	1	1	0
25	7	14	15	13	28	14	24	18	13	7	5	3	5
35	18	24	36	30	50	27	41	39	34	21	13	7	19
45	31	38	58	56	68	41	52	62	57	37	27	12	33
55	43	51	80	81	85	51	62	84	86	57	39	17	50
65	56	61	96	99	97	61	71	101	114	76	54	24	68
75	67	71	107	113	106	68	76	112	141	96	67	30	79
85	77	77	115	121	113	72	78	119	170	115	79	37	89
95	84	81	118	123	115	74	80	121	194	132	88	42	98
105	91	84	120	122	115	75	80	121	216	147	95	47	106
115	97	86	120	120	113	74	78	119	235	158	100	52	111
125	101	87	117	115	107	71	75	114	248	167	102	56	114
135	104	84	113	109	101	68	72	108	257	173	103	60	116
145	105	83	109	103	93	62	66	102	265	177	103	62	116
155	106	78	103	96	86	58	61	94	266	178	102	66	116
165	108	76	98	89	78	53	57	86	263	176	97	68	114
175	107	73	91	81	69	47	52	80	259	172	94	70	110
185	104	67	83	74	59	42	47	73	252	167	89	73	107
195	102	63	77	65	52	38	42	66	242	159	82	74	104
205	100	58	71	59	45	33	38	59	227	150	77	75	100
215	97	54	65	53	38	29	33	54	215	141	70	76	94
225	94	50	58	46	32	25	29	48	200	129	64	76	90
235	90	44	53	41	28	22	25	43	183	118	58	77	86
245	86	42	48	35	23	19	22	38	167	107	51	77	82
255	81	37	43	30	19	17	19	33	153	97	45	77	76

Summary of Total nm Volume/Hectare - With Natural Succession Tail Adjustment June 12, 2021 (v2 adj)

AGE:	BFM NAT	CMX NAT	HMX NAT	HRD NAT	PJDD NAT	PJDS NAT	PJM NAT	POD-NAT	PRWR NAT	PRWW NAT	SBD NAT	SBL NAT	SBM NAT
5	0	0	0	0	0	0	0	0	0	0	0	0	0
15	1	3	3	1	9	4	9	3	2	1	1	1	0
25	7	14	15	13	28	14	24	18	13	7	5	3	5
35	18	24	36	30	50	27	41	39	34	21	13	7	19
45	31	38	58	56	68	41	52	62	57	37	27	12	33
55	43	51	80	81	85	51	62	84	86	57	39	17	50
65	56	61	96	99	97	61	71	101	114	76	54	24	68
75	67	71	107	113	106	68	76	112	141	96	67	30	79
85	77	77	115	121	113	72	78	119	170	115	79	37	89
95	84	81	118	123	115	74	80	121	194	132	88	42	98
105	91	84	120	122	115	75	80	121	216	147	95	47	106
115	97	86	120	120	113	74	78	119	235	158	100	52	111
125	101	87	117	115	107	71	75	114	248	167	102	56	114
135	104	84	113	109	101	68	72	103	257	173	103	60	116
145	105	77	109	103	93	62	70	83	265	177	103	62	116
155	106	76	103	96	86	58	70	72	266	178	102	66	116
165	103	75	98	89	79	52	70	65	263	176	97	68	111
175	95	75	91	81	75	48	70	58	262	175	94	70	105
185	86	75	83	74	75	43	70	55	260	175	89	73	96
195	79	75	77	68	75	40	70	52	260	175	86	74	90
205	73	75	71	65	75	40	70	50	260	175	85	75	85
215	68	75	68	65	75	40	70	50	260	175	85	75	80
225	65	75	66	65	75	40	70	50	260	175	85	75	80
235	65	75	65	65	75	40	70	50	260	175	85	75	80
245	65	75	65	65	75	40	70	50	260	175	85	75	80
255	65	75	65	65	75	40	70	50	260	175	85	75	80

D. Managed Yield Curves (LOW, MED, HIGH)

LOW, MED and HIGH YIELD include managed areas that were depleted by harvest where DEPTYPE = HARVEST). YIELD generally reflects differences in site productivity.

Yield	General Description of Forest Condition
LOW: (Managed, Low Productivity)	Harvested (managed) forest stands that have lower, minimum site productivity (LOW) for the production of wood fibre. All areas with minimum site qualities that do not have the capability for full stocking due to site limitations. LOW areas are managed stands that are not density-regulated.
MED: (Managed, Mediium Productivity)	Harvested (managed) forest stands that have moderate site productivity (MED) for the production of wood fibre. Stands with moderate stocking (less than full stocking or with over stocked conditions). All stands that return to a present-like yield after harvest, with or without subsequent renewal treatments. MED areas are managed stands that are not density-regulated. Also results from natural succession of managed stands.
HIGH: (Managed, High Productivity)	Harvested (managed) forest stands that have better site productivity (HIGH) for the production of wood fibre. After harvest, these areas have generally received one or more renewal treatments to promote prompt regeneration. All stands with close to full stocking. HIGH areas are managed stands that are not density-regulated, however HIGH also includes any density regulated stands that may be established.

During development of managed yield curves, the LTMD Task Team agreed that LOW would not be a valid future intensity for the hardwood dominated forest units (HMX, HRD, POD), nor for Balsam Fir BFM. HIGH was not used for HMX, HRD nor BFM. Rationale for this decision was that HIGH future intensity was used to classify managed stands that had received renewal treatment to result in higher stand productivity. If the renewal treatment included planting or seeding to conifer, with or without subsequent tending treatment (s), the future regenerating stand would be classified as a different conifer –dominated forest unit. If a hardwood-dominated stand resulted from this silvicultural treatment, it would not be considered successful conifer regeneration. Therefore all hardwood-dominated or Balsam Fir stands resulting after harvest were classified as MED (or HIGH valid for POD), based on site productivity and resulting forest composition.

It was also recognized by the LTMD Task Team that the SBL forest unit was ecosite-based (lowland spruce stands). Since LOW was also ecosite-based limiting sites (lowland wet, or shallow), that all managed stands in the SBL forest unit would be classified as LOW.

CMX and PRW forest units include managed yield curves that reflect specific leading species, in addition to general site productivity differences:

CMX LOW – spruce leading
CMX MED – Jack Pine leading
PRWR NAT, and PRW MED, HIGH – Red Pine Leading
PRWW NAT, and PRW LOW – White Pine Leading

Based on Task Team discussions with regional advisors, the following yield curve development was documented:

1. The average area-weighted stand parameters (species composition, stocking, site class) for each managed forest unit-yield combination in the draft BMI was calculated. The average stand parameters are documented in Table 21.

2. These Whiskey Jack Forest specific managed stand parameters were entered into MIST, using the same dataset and stocking profile used for the NAT yield for that forest unit:

MIST files:	WhkJk1	is	whkjk yc1	Used for all forest units, except PRW and POD.
	NWR_prw	is	nwe regions grp prw	Used for PRW.
	NWR_pod	is	nwr po dominant	Used for POD.

   The NAT yield development discussion documents which dataset was used for each forest unit.

3. Yield curves for LOW, MED and HIGH were generated. As described above, not all forest units have all three managed yield intensities (Table 20 Valid YIELDs by Forest Unit).

4. The resulting managed yield curves were compared for relative peak volumes within each forest unit, including a comparison to the NAT yield.

See Analysis Package Appendix 6 for actual LOW, MED and HIGH yield curves by forest unit by tree species. Appendix 6 includes a graphic comparison of specific changes to forest unit managed yield curve tails, as was required for yield curves in a similar manner as was used for the NAT (base present) yield curve adjustment.

Table 20 Valid YIELDs by Forest Unit

	Natural	Managed		
PLANFU / SI	NAT	LOW	MED	HIGH
BFM	BFM	NA **	YES	NA *
CMX	CMX	YES	YES	NA *
HMX	HMX	NA **	YES	NA *
HRD	HRD	NA **	YES	NA *
PJD	PJDD, PJDS	YES	YES	YES
PJM	PJM	YES	YES	NA **
POD	POD	NA **	YES	YES
PRW	PRWR, PRWW	YES	YES	YES
SBD	SBD	NA **	YES	NA **
SBL	SBL	YES	NA **	NA **
SBM	SBM	NA **	YES	YES

* NA - HIGH YIELD is based on a blend of planting and seeding for conifer establishment, therefore is not a valid projected future yield for the hardwood dominated or conifer mix forest units.

** NA - Deleted YIELDS for certain forest units. SBL forest unit is wetland, site-limiting, ecosite-based, therefore no MED or HIGH

Table 21 Future Managed Stand Attributes and Strategic Renewal Assumptions

(OWNER=1,5,7, all ages from BMI sort)

PLANFU / YIELD: Reflect area weighted inventory sort stand parameters by silvicultural stratum.

MIST: Reflects minor adjustments to defined curve parameters for MIST curve development. These same parameters will inform appropriate Regeneration Standards in Table FMP-4 Silvicultural Ground Rules.

PLANFU	YIELD	Descript	SumOfHA	aw SC	awSTKG	awPW	awPR	awPJ	awSB	awSW	awBF	awCE	awLA	awPO	awBW	awUH	awLH	total	Peak m3/ha	MIST Curve	Dataset	Map-SFU
BFM	NAT	(aw BMI)	2,769	0.8	0.58	-	-	2	34	3	41	-	-	8	12	-	-	100				
BFM	NAT-MIST	(MIST sample)						5	33	6	35			6	13			98	107	Prsnt	WhkJk1	BfMx1
BFM	MED	BMI	23,847	1.4	0.60			6	33	7	36			6	12		-	100				
BFM	MED	MIST		1.4	0.60			6	33	7	36			6	12			100	112	Aa	WhkJk1	BfMx1
CMX	NAT	(aw BMI)	20,406	1.8	0.68	-	-	45	18	-	4	-	-	18	15	-	-	100				
CMX	NAT-MIST	(MIST sample Sb)		2	0.60		1	7	45	4	9	1		14	17			98	72	Prsnt	WhkJk1	CM_sb
CMX	NAT-MIST	(MIST sample Pj)		2	0.67			49	14	1	3			19	13			99	95	Prsnt	WhkJk1	CM_pj
CMX	NAT-MIST	(Blended)																-	78	Blended		
CMX	LOW	BMI: SP>PJ	76,334	1.5	0.61	-	-	8	46	3	9	2	-	15	17	-	-	100				
CMX	LOW	MIST		1.5	0.61			8	46	3	9	2		15	17			100	73	Aa	WhkJk1	CM_sb
CMX	MED	BMI: PJ>=SP	22,613	2.0	0.66	-	-	47	17	1	4	-	-	19	12	-	-	100				
CMX	MED	MIST		2.0	0.66			47	17	1	4			19	12			100	98	Aa	WhkJk1	CM_pj
HMX	NAT	(aw BMI)	8,761	1.9	0.69	-	-	23	15	1	4	-	-	36	21	-	-	100				
HMX	NAT-MIST	(MIST sample)		2	0.62			9	23	4	8			33	22			99	121	Prsnt	WhkJk1	HrdMx
HMX	MED	BMI	71,425	2.1	0.63	-	-	8	24	4	8	-	-	35	21	-	-	100				
HMX	MED	MIST		2.1	0.63			8	24	4	8			35	21			100	118	Aa	WhkJk1	HrdMx
HRD	NAT	(aw BMI)	10,922	1.9	0.73	-	-	13	9	1	2	-	-	47	27	-	1	100				
HRD	NAT-MIST	(MIST sample)		2	0.67			3	13	3	4			42	30		3	98	123	Prsnt	WhkJk1	HrDom
HRD	MED	BMI	74,803	2.2	0.66	-	-	2	14	4	4	-	-	42	30	-	4	100				
HRD	MED	MIST		2.2	0.66			2	14	4	4			42	30		4	100	112	Aa	WhkJk1	HrDom
PJDD	NAT	(aw BMI)	45,562	2.1	0.77	-	-	79	10	-	-	-	-	6	5	-	-	100				
PJDD	NAT-MIST	(MIST sample)		2	0.76			79	12					5	4			100	115	Prsnt	WhkJk1	PjDee
PJDS	NAT	(aw BMI)	17,470	2.5	0.57	-	-	82	9	-	-	-	-	4	5	-	-	100				
PJDS	NAT-MIST	(MIST sample)		3	0.56			80	11					4	5			100	75	Prsnt	WhkJk1	PjSha
PJD	LOW	BMI (incl PJDS)	12,238	2.7	0.61	-	-	75	17	-	1	-	-	3	4	-	-	100				
PJD	LOW	MIST		2.7	0.61			75	17		1			3	4			100	77	Aa	WhkJk1	PjSha
PJD	MED	BMI	28,262	2.0	0.73	-	-	79	14	-	-	-	-	4	3	-	-	100				
PJD	MED	MIST		2.0	0.73			79	14					4	3			100	111	Aa	WhkJk1	PjDee
PJD	HIGH	BMI	16,853	1.0	0.78	-	-	81	12	-	-	-	-	4	3	-	-	100				
PJD	HIGH	MIST		1.0	0.78			81	12					4	3			100	157	Bb	WhkJk1	PjDee
PJM	NAT	(aw BMI)	12,509	2.2	0.70	-	-	57	29	-	1	-	-	6	7	-	-	100				
PJM	NAT-MIST	(MIST sample)		3	0.66			54	31		2			6	6			99	80	Prsnt	WhkJk1	PjMx1
PJM	LOW	BMI	18,040	3.0	0.64	-	1	54	31	-	2	-	-	5	7	-	-	100				
PJM	LOW	MIST		3.0	0.64		1	54	31		2			5	7			100	67	Aa	WhkJk1	PjMx1
PJM	MED	BMI	39,841	1.7	0.67	-	-	55	33	-	1	-	-	6	5	-	-	100				
PJM	MED	MIST		1.7	0.67			55	33		1			6	5			100	101	Bb	WhkJk1	PjMx1

			PLANFU / YIELD	Reflect area weighted inventory sort stand parameters by silvicultural stratum.																		
			MIST	Reflects minor adjustments to defined curve parameters for MIST curve development. These same parameters will inform appropriate Regeneration Standards in Table FMP-4 Silvicultural Ground Rules.																		
PLANFU	YIELD	Descript	SumOfHA	aw SC	awSTKG	awPW	awPR	awPJ	awSB	awSW	awBF	awCE	awLA	awPO	awBW	awUH	awLH	total	Peak m3/ha	MIST Curve	Dataset	Map-SFU
POD	NAT	(aw BMI)	5,437	1.9	0.75	-	-	10	6	-	1	-	-	75	8	-	-	100				
POD	NAT-MIST	(MIST sample)		2	0.70			3	9	2	2			76	8			100	122	Aa	NWR_pod	PoDom
POD	MED	BMI	6,885	3.0	0.64	-	-	1	11	2	3	-	-	75	7	-	1	100				
POD	MED	MIST		3.0	0.64			1	11	2	3			75	7		1	100	79	Bb	NWR_pod	PoDom
POD	HIGH	BMI	36,321	1.8	0.72	-	-	3	9	2	3	-	-	76	7	-	-	100				
POD	HIGH	MIST		1.8	0.72			3	9	2	3			76	7			100	133	Cc	NWR_pod	PoDom
PRWR	NAT	(aw BMI)	50	1.9	0.86	4	52	29	10	-	-	-	-	1	4	-	-	100				
PRWR	NAT-MIST	(MIST sample)		2.0	0.68	10	48	5	13	1	3			8	12			100	266	Aa	NWR_prw	PrwAl
PRWW	NAT	(aw BMI)	57	1.3	0.55	50	3	-	3	-	17	-	-	15	12	-	-	100				
PRWW	NAT-MIST	(MIST sample)		2.0	60.00	46	12	2	4	1	7	2	1	14	11			100	178	Cc	NWR_prw	PrwAl
PRW	LOW	BMI - PW curve	731	1.9	0.60	44	12	2	3	-	6	4	-	13	14	1	1	100				
	LOW	MIST		1.9	0.60	44	12	2	3	-	6	4	-	13	14	1	1	100	188	Prsnt	NWR_prw	PrwAl
PRW	MED	BMI - PR curve	2,230	2.3	0.69	10	51	5	12	1	3	-	-	7	11	-	-	100				
	MED	MIST		2.3	0.69	10	51	5	12	1	3	-	-	7	11			100	246	ner	NWR_prw	PrwAl
PRW	HIGH	BMI - PR curve	520	0.9	0.67	4	52	14	12	-	4	-	-	5	9	-	-	100				
	HIGH	MIST		0.9	0.67	4	52	14	12	-	4	-	-	5	9			100	364	Bb	NWR_prw	PrwAl
SBD	NAT	(aw BMI)	3,721	1.3	0.57	-	-	10	78	1	3	-	-	2	6	-	-	100				
SBD	NAT-MIST	(MIST sample)		1.5	0.62			8	78	2	3			3	6			100	103	Prsnt	WhkJk1	SbDom
SBD	MED	BMI	90,696	1.4	0.64	-	-	9	79	1	3	-	-	3	5	-	-	100				
SBD	MED	MIST		1.4	0.64			9	79	1	3			3	5			100	111	Aa	WhkJk1	SbDom
SBL	NAT	(aw BMI)	4,713	1.9	0.62	-	-	5	80	-	-	-	12	-	2	-	1	100				
SBL	NAT-MIST	(MIST sample)		3	0.58			1	79		1	2	13	1	2		1	100	77	Prsnt	WhkJk1	SbLow
SBL	LOW	BMI	54,265	2.3	0.57	-	-	1	79	-	1	2	13	1	2	-	1	100				
SBL	LOW	MIST		2.3	0.57			1	79		1	2	13	1	2		1	100	83	Aa	WhkJk1	SbLow
SBM	NAT	(aw BMI)	4,456	1.4	0.62	-	1	29	54	2	2	-	-	4	8	-	-	100				
SBM	NAT-MIST	(MIST sample)		2	0.60		1	24	54	4	4			5	8			100	116	Prsnt	WhkJk1	SbMx1
SBM	MED	BMI	31,018	2.0	0.62	-	1	25	54	4	3	-	-	5	8	-	-	100				
SBM	MED	MIST		2.0	0.62	-	1	25	54	4	3			5	8			100	104	Aa	WhkJk1	SbMx1
SBM	HIGH	BMI	38,585	0.8	0.61	-	-	26	55	4	3	-	-	5	7	-	-	100				
SBM	HIGH	MIST		0.8	0.61			26	55	4	3			5	7			100	138	Bb	WhkJk1	SbMx1

6.2.2.5 Timber Product Proportions in Even-aged Forest

<u>Broad Size Class</u>

Strategic modelling includes projections for broad product size in accordance with the FMPM 2020. Two product sizes were determined for harvest volumes originating from the Whiskey Jack Forest: Small (SM) and Large (LG). Small product was considered any volumes <= 20 cm at diameter at breast height (dbh) for the leading species. Average diameter for the leading species by forest unit – yield combination was reviewed in MIST to determine the age at which the average tree diameter exceeded 20 cm dbh. This age was used in SFMM to differentiate small and large product volumes. Below that age, 100% of volume proportion was "small". Above that age, 20% was "large" and 80% was "small" until a point where old age results in an average DBH below or equal to 20 cm after which the "small" proportion applied. The 20% large factor was applied to reflect that while the average diameter reaches 20 cm or greater, all trees are not large trees, and also that not all large trees will be operationally sorted and processed. Net merchantable yield curve volumes totalled 100% product proportion for "small" + "large" volumes. This sort was applied by forest unit and YIELD. An example of the broad size class proportions follows in Table 22 (illustrating CMX NAT proportions per 10-year age class):

Table 22 Example of SFMM Inputs for Volume Proportion by Broad Size Class

Proportion by Broad Size Class:

AU / YIELD	FU / YIELD	AC10	avg DBH	Small	Large
BFM_ NAT	BFM NAT	5	-	1.00	
BFM_ NAT	BFM NAT	15	3.9	1.00	
BFM_ NAT	BFM NAT	25	5.9	1.00	
BFM_ NAT	BFM NAT	35	7.4	1.00	
BFM_ NAT	BFM NAT	45	8.8	1.00	
BFM_ NAT	BFM NAT	55	10.0	1.00	
BFM_ NAT	BFM NAT	65	11.2	1.00	
BFM_ NAT	BFM NAT	75	12.2	1.00	
BFM_ NAT	BFM NAT	85	13.2	1.00	
BFM_ NAT	BFM NAT	95	14.1	1.00	
BFM_ NAT	BFM NAT	105	15.0	1.00	
BFM_ NAT	BFM NAT	115	15.9	1.00	
BFM_ NAT	BFM NAT	125	16.7	1.00	
BFM_ NAT	BFM NAT	135	17.5	1.00	
BFM_ NAT	BFM NAT	145	18.2	1.00	
BFM_ NAT	BFM NAT	155	19.0	1.00	
BFM_ NAT	BFM NAT	165	19.7	0.80	0.20
BFM_ NAT	BFM NAT	175	20.4	0.80	0.20
BFM_ NAT	BFM NAT	185	21.1	0.80	0.20
BFM_ NAT	BFM NAT	195	21.7	0.80	0.20
BFM_ NAT	BFM NAT	205	22.4	0.80	0.20
BFM_ NAT	BFM NAT	215	23.0	0.80	0.20
BFM_ NAT	BFM NAT	225	23.6	0.80	0.20
BFM_ NAT	BFM NAT	235	24.2	0.80	0.20
BFM_ NAT	BFM NAT	245	24.7	0.80	0.20
BFM_ NAT	BFM NAT	255	25.3	0.80	0.20

6.2.2.6 Undersized and Defect Volumes

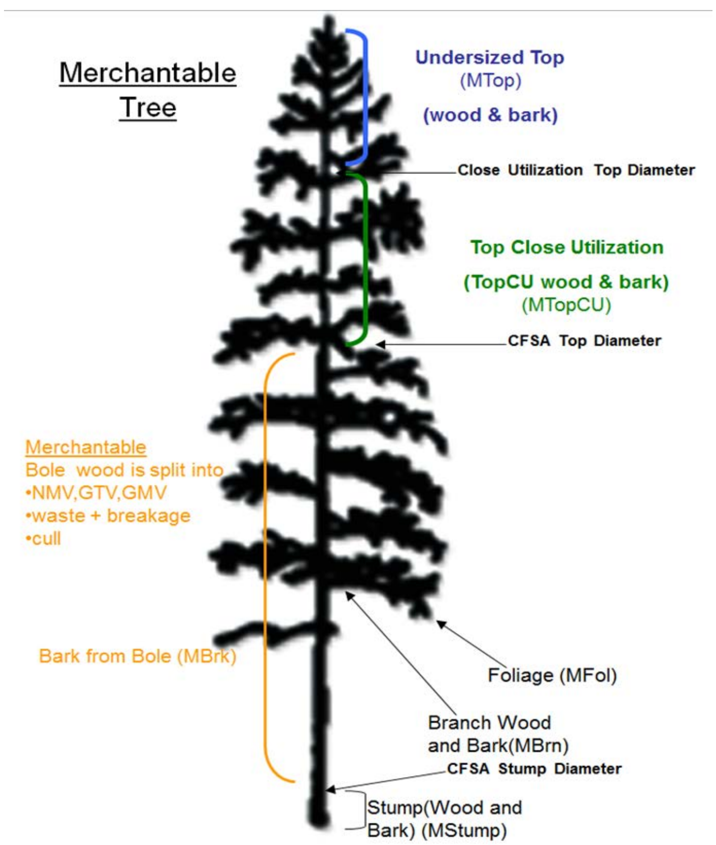
The FMPM requires that biomass volumes be projected for the LTMD and reported for planned harvest in the FMP. The FMPM defines biomass volumes as: *Timber or a tree that is not merchantable, including undersize material and defects, as defined in the Scaling Manual.* "

MIST was used to calculate "Undersized" and "Defect" volumes by tree species for each valid forest unit - yield curve combination. These biomass estimates were calculated with the following assumptions (Figure 4):

- Undersize is MIST (MTopCU) as per close utilization as per the Scaling Manual.
- Defect is MIST (MTopRem + MBrn + MBrk + MTopBW + MTopCull)
- Undersize or Defect does not include (UStump, Utop, MStump, MFol,)
- Road side recovery factor of 70%.

To represent biomass volumes in the SFMM model, MIST undersized and defect volumes were included by tree species in the yield curves by forest unit – yield (Growth and Yield in Even-age Forest).

Figure 4 Merchantable Parts of a Tree



In order for SFMM to calculate the volumes of undersized and defect volumes through time, two "products" were defined for Under (Undersized volumes) and Defct (Defect volumes). For each of volume types, Product Proportions were added to count the volumes. All undersized volumes in all yield curves counted 100% towards "Under" volumes. All defect volumes in all yield curves counted 100% towards Defct volumes. Neither Under nor Defct counted towards net merchantable volumes. Total Under and Defct volumes were summarized in SFMM Results – Volumes Harvested by Species & Product Group.

6.2.2.7 Generic Yield in Even-age Forest

SFMM yield curves (Growth and Yield in Even-age Forest) were also used to track area (i.e. hectares) through the planning horizon. These are termed “Generic Yield Curve” inputs. The tagging of “tree species” within the yield curves served as simple counters for hectares area of specific forest composition/age classes based on the forest unit and age class of the SFMM land base. These Generic Yield Curve inputs are needed for Management Objective targets.

Specific Generic Yield Curve inputs were included for:

- Boreal Landscape Guide Class area (7 classes: PSp, Icn, Icn, MLb, MLc, MLh, MLl);
- Old Growth forest (4 groupings: OGupC, OGhmx, OGloC, OGpwr);
- Caribou Habitat (2 types: refuge (Cr), winter-combined (Cw));
- Upland Conifer (PurCon);
- All ages Red Pine – White Pine (is included as the PRW PLANFU area);
- Young Forest (Young); and
- Moose Habitat (3 types: Browse (Mb), Mature Conifer (Mmc), Hardwood/Mix (Mhwd)).

Generic Yield Curve inputs (counters) vary by what they are intended to measure, and vary on forest unit, tree species and age of the stand being modelled. Specific inputs for these Generic Yield Curve inputs are saved in the electronic SFMM modelling files.

Note: Minor variation in SFMM classification is expected as compared to BLG indicator classification where 1 year shifting has occurred to match SFMM 10-year age classes. For example, Young Forest is <36 years old (<=35), whereas in SFMM we must count 50% (half) of the 31-40 year age class (plus 100% of the 1-10, 11-20, and 21-30 year classes). Another example is the onset of Mature-Late Balsam Fir is 60 years in the BLG, whereas SFMM shifts 1 year later to the nearest age class (61-70 and older).

The specific criteria by Analysis Unit (onset age and duration) used for various indicators: Landscape Classes, Old Growth, Upland Conifer, Young Forest, Caribou Habitat, and Moose Habitat follow in Table 23. The oldest age in the strategic modelling is represented by 260; actual tree age may be older.

An example of Generic Yield Curve Inputs by 10-year age class for the PJDD (Deep soiled analysis unit within the PJD forest unit) follows as Table 24. The “1”s in the inputs by 10-year age class track one hectare of the class area for each hectare in the land base.

Table 23 SFMM Boreal Landscape Guide Indicator and Wildlife Habitat Indicator Input Age Criteria by Analysis Unit

		(onset ages adjusted to SFMM 10-year age classes (+1 year))											Upland Conifer		(max age in SFMM is 260 years)					
			Landscape Classes:																	
		Class:	Pre-/Sapling	Imm Con	Imm Hwd	Mature+Older Forest				Old Growth				Forest Area		Caribou Habitat		Moose Habitat		
NWSFU	AU	Code:	PSp	Icn	Ihd	MLb	MLc	MLh	MLl	OGupC	OGloC	OGhmx	OGprw	PurCn	Young	Cr	Cw	Mb	Mmc	Mhmx
BfMx1	**BFM_**	Onset:	1	11	na	61	na	na	na	na	na	81	na	na	1	61	na	1	61	na
BfPur		Duration	10	60		260						260			<=35	260		<=35	260	
ConMx	**CMX_**	Onset:	0	31	na	na	71	na	na	na	na	111	na	na	1	71	na	1	na	36 (Use
		Duration	30	70			260					260			<=35	260		<=35		260
UplCe	**CMXC**	Onset:	1	31	na	na	71	na	na	na	na	101	na	na	1	71	na	1	71	na
		Duration	30	70			260					260			<=35	260		<=35	260	
HrdMw	**HMX_**	Onset:	1	na	11	na	na	61	na	na	na	111	na	na	1	na	na	1	na	36
		Duration	10		60			260				150			<=35			<=35		260
OthHd	**HRDA**	Onset:	1	na	11	na	na	51	na	na	na	101	na	na	1	na	na	1	na	36
		Duration	10		60			260				260			<=35			<=35		260
BwDee	**HRDB**	Onset:	1	na	11	na	na	51	na	na	na	111	na	na	1	na	na	1	na	36
BwSha		Duration	10		50			260				260			<=35			<=35		260
HrDom	**HRD_**	Onset:	1	na	11	na	na	61	na	na	na	111	na	na	1	na	na	1	na	36
		Duration	10		60			260				260			<=35			<=35		260
PjDee	**PJDD**	Onset:	1	31	na	na	71	na	na	101	na	na	na	all	1	always	41	1	71	na
		Duration	30	70			260			260					<=35		260	<=35	260	
PjSha	**PJDS**	Onset:	1	31	na	na	71	na	na	101	na	na	na	all	1	always	41	1	71	na
		Duration	30	70			260			260					<=35		260	<=35	260	
PjMx1	**PJM**	Onset:	1	31	na	na	71	na	na	101	na	na	na	all	1	41	41	1	71	na
		Duration	30	70			260			260					<=35	260	260	<=35	260	
PoDee	**POD_**	Onset:	1	na	11	na	na	61	na	na	na	101	na	na	1	na	na	1	na	36
PoSha		Duration	10		60			260				260			<=35			<=35		260
PrwMx	**PRWR**	Onset:	1	21	na	na	81	na	na	na	na	na	141	na	1	na	na	1	81	na
PrDom		Duration	20	80			260						260		<36			<=35	260	
PwDo	**PRWW**	Onset:	1	21	na	na	81	na	na	na	na	na	151	na	1	na	na	1	81	na
		Duration	20	80			260						260		<=35			<=35	260	
SbDee	**SBD_**	Onset:	1	31	na	na	71	na	na	121	na	na	na	all	1	41	61	1	71	na
SbSha		Duration	30	70			260			260					<=35	260	260	<=35	260	
SbLow	**SBL_**	Onset:	1	31	na	na	na	na	71	na	161	na	na	na	1	always	41	1	71	na
		Duration	30	70					260		260				<=35		260	<=35	260	
OCLow	**SBLC**	Onset:	1	31	na	na	na	na	71	na	121	na	na	na	1	always	51	1	71	na
		Duration	30	70					260		260				<=35		260	<=35	260	
SbMx1	**SBM_**	Onset:	1	31	na	na	71	na	na	111	na	na	na	all	1	41	61	1	71	na
		Duration	30	70			260			260					<=35	260	260	<=35	260	

Table 24 Example of Generic Yield Curve Data for PJDD NAT Analysis Unit

	Analysis Unit / Indicator:																	
Onset:	1	31	na	na	71	na	na	101	na	na	na	all	1	always	41	1	71	na
Duration	30	70			260			(x180)260					<36		260	<35	260	
Age Class	PJDD PSp	PJDD Icn	PJDD Ihd	PJDD MLb	PJDD MLc	PJDD MLh	PJDD MLl	PJDD OGupC	PJDD OGloC	PJDD OGhmx	PJDD OGprw	PJDD PurCn	PJDD Young	PJDD Cr	PJDD Cw	PJDD Mb	PJDD Mmc	PJDD Mhmx
5	1											1	1	1		1		
15	1											1	1	1		1		
25	1											1	1	1		1		
35		1										1	0.5	1		0.5		
45		1										1		1	1			
55		1										1		1	1			
65		1										1		1	1			
75					1							1		1	1		1	
85					1							1		1	1		1	
95					1							1		1	1		1	
105					1			1				1		1	1		1	
115					1			1				1		1	1		1	
125					1			1				1		1	1		1	
135					1			1				1		1	1		1	
145					1			1				1		1	1		1	
155					1			1				1		1	1		1	
165					1			1				1		1	1		1	
175					1			1				1		1	1		1	
185					1			1				1		1	1		1	
195					1			1				1		1	1		1	
205					1			1				1		1	1		1	
215					1			1				1		1	1		1	
225					1			1				1		1	1		1	
235					1			1				1		1	1		1	
245					1			1				1		1	1		1	
255					1			1				1		1	1		1	

6.2.3 Strategic Silvicultural Options

Silvicultural options are used to specify the silvicultural strategies (i.e. renewal and tending treatments) appropriate for the forest. Silvicultural options also include some strategic management assumptions which have an influence on silviculture (unharvested volume, reserve area, operability ranges, etc.).

6.2.3.1 Clearcut Harvest Operability Ranges

Harvest operability ranges are defined parameters which limit the age and or volume at which a forest unit is eligible to harvest in the SFMM model. These ranges are set as a constant though the planning horizon and are revisited and validated every 10-year FMP planning cycle. Projected available harvest areas and volumes levels are sensitive to these operability limits.

SFMM requires that harvest operability ranges to be defined as an age threshold, typically based on a minimum or maximum operable volume threshold. The operability limits are set for this FMP to meet the current industrial demand while also balancing achievement of Boreal Landscape Guide age class structure and forest composition management objectives. Ages were assigned as the lower operability limit each PLANFU and YIELD. These ages were assigned using a minimum volume threshold of 70-80 m^3/ha (where reasonable to do so) and were related to yield to determine the operability age. In the 2012 plan this was the same methodology which assigned the lower limit based on a 70 m^3/ha. The increase in the lower age threshold from the 2012 plan reflects the general management intent to not harvest all areas at the younger age range of harvest eligibility. It is recognized that the Whiskey Jack Forest will continue to be a multi-product forest and as a result will have operations that produce a range of piece sizes (small and large) suitable for delivery to various mills.

Setting operability limits too narrow can result in misleading reduced long-term wood supply estimates because a high proportion of stands will pass through the age range without a new operable stand growing up to replace them for long periods of time. An operability limit of 50 years old does not necessarily imply a rotation age for that forest type; rather, it means that more forest area can be considered eligible for harvest during the times of projected timber shortages, and that some stands over the age of 50 will be considered within the mix of older stands.

The upper operability limit used by Miisun is generally defined as “infinite”. This is not to say that a forest type is eligible for harvest infinitely. It does indicate that the forest type is deemed to be operable until the age at which it naturally succeeds (through old age), as defined by the natural succession rules for a given analysis unit (AU). The difference between the lower operability limits and the forest succession define a window of harvest operability. Operability ages used in the model are found in Table 25.

- **Min Age** represents the minimum eligible age of a stand at the time the model actions harvest.
- **Inf** represents no upper age limit for harvesting. Natural succession dictates when a stand is no longer eligible for harvest.
- **Na** represents that no value is set or in eligible treatment (YIELD does not exist)

In most cases the volume threshold produced operability ages that made sense operationally and aligned with the past plan. It was recognised that the volume target of 70-80m³/ha and the resulting operability ages for the POD and HMW NAT silviculture stratums were not well suited to the piece size required for hardwood utilization at the Weyerhaeuser mill in Kenora. As a result, the operability ages were adjusted (increased slightly) to project as slightly larger piece size. It was documented that the change in age would have little to no effect on the utilization of hardwood over time but would provide an immediate and accurate representation of what is suitable eligible for harvest in the stratums.

Table 25 Clearcut Harvest Operability Ages

	YIELD:	**NAT**		**LOW**		**MED**		**HIGH**	
Forest Unit	Analysis Unit	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
BFM	**all**	80	inf			70	inf		
CMX	**all**	90	inf	120	inf	60	inf		
HMX	**all**	60	inf			50	inf		
HRD	**all**	60	inf			50	inf		
PJD	**PJDD**	50	inf	80	inf	50	inf	40	inf
	PJDS	70	inf	80	inf	50	inf	40	inf
PJM	**all**	70	inf	70	inf	50	inf		
POD	**all**	60	inf			70	inf	60	inf
PRW	**PRWR**	80	inf	110	inf	90	inf	70	inf
	PRWW	110	inf	110	inf	90	inf	70	inf
SBD	**all**	80	inf			80	inf		
SBL	**all**	130	inf	110	inf				
SBM	**all**	70	inf			80	inf	60	inf

6.2.3.2 Clearcut Growing Stock Volumes Left Unharvested

Clearcut growing stock volumes left unharvested, referred to as "volumes left unharvested", are anticipated losses (reduction) in harvest volumes resulting from the Stand and Site Guide (SSG) wildlife leave tree requirements and the Wabaseemoong Stewardship Area Agreement. Unharvested tree volume proportions are assigned based on wildlife tree requirements, expected operability, commitment to leave 100% of incidental white pine and red pine trees unharvested in non-PRW forest unit areas during this plan period, and retention of portions of socially valued or less marketable species (cedar, larch, black ash).

Stand and Site Guide Direction for Wildlife Trees

The Stand and Site Guide requires an avg. of 25 stems/ha (>10cm and >3m in height) be maintained of which a minimum of 10 large (>= 25cm. Dbh) or large stubs/ha (>=3 m.ht.) with a minimum of 5 large living trees/ha. Stubbing 80%+ (>=20 stems/ha.) is recommended for Sb and Pj trees. Stubbing is not currently practiced on the Whiskey Jack Forest. Summary of SSG wildlife tree requirement:

Wildlife tree requirement - 25 trees per ha
10 large diameter, 10 other live trees, 5 dead/dying trees. (20 live trees).
All Red Pine and White Pine trees to be retained in non-PRW forest unit areas.
100% of other hardwood (black ash) to be retained
50% of Cedar and Larch trees to be retained.

General Assumptions for Unharvested Volumes

The reduction in harvest volume was assigned first based on variable commitment to leave white pine and red pine trees. Then a residual/bypass reduction reflects expected operability, the less marketable species 50% for cedar and larch (OC), and 100% for upland hardwood and lowland hardwood if incidental in the yield curve. Residual/bypass also reflects any potential unmapped residual patches in non-caribou zone. The residual/bypass estimate is 0% for all forest units, however residual patches will be planned for and implemented as required based on the operational block residual area (eFRT) analysis.

Although the SSG only requires 5 living trees be retained, the general operational assumption in this input is that 20 living (full crowns) trees/ha will be left after harvest. Large poplar or white spruce are the desired species to leave behind to meet the retained 10 large stems/ha as they provide the best opportunities for cavity nesters and stick nesters; however when not available jack pine, black spruce and birch will be chosen.

Of the 10-15 remaining required small stems (less than 25cm), the Planning Team estimated that it is likely that 7 will be dead and the others live. Where possible, incidental species within a stand such as cedar, larch, white spruce and black ash will contribute to the unharvested live trees being left to meet the wildlife tree requirements. The total of 20 live trees unharvested per hectare is an increase from the 15 live trees estimated to meet this requirement in the 2012 FMP.

Similar to the 2012-2024 FMP, volumes left unharvested during harvest for wildlife trees will be accounted for at the forest unit (PLANFU) level as a percent harvest volume reductions by species. It is expected that unharvested volumes will be left in similar proportions by species as was initially present in the allocated block with some consideration of merchantability. Yield curve data was utilized for the NAT curves only; however percentage reductions will be evenly applied to the managed yield curves for all YIELD productivity classes. This assumes that all yield intensities per forest unit will contain unharvested volume in the same proportions.

Volume reductions for wildlife tree retention are only included if volume is planned to be harvested. Estimate of wildlife trees per species is not a specific commitment to leave specific trees. Overall the Stand and Site Guide requirement and Wabaseemoong Stewardship Area agreement requirements will be met.

Finally, for tree species in a forest unit's average yield curve that are incidental or non-existent, an unharvested volume percentage of 1% was included. This adjustment allows for some volume net-down for operational volumes when the volumes are calculated at the stand level (other tree species may be included), rather than based on average forest unit stand conditions.

Table 26 documents the calculations used in determining the volumes left behind by species and forest unit. Average Available Harvest Area (AHA) age based on estimated minimum operability plus 10 years, rounded to 10-year age class midpoint. Table 27 summarizes these proportions by Analysis Unit used in the strategic modelling. This approach is consistent with the methodology used in the 2012-2024 Whiskey Jack Forest Management Plan.

Table 26 Determination of Volume Proportions Left Unharvested

BFM	PW	PR	PJ	SB	SW	BF	CE	LA	PO	BW	UH	LH	Total	Avg AHA Age	Average FU Species Composition
NAT YC (vol/ha=>)	0	0	10	29	6	22	0	0	8	9	0	0	84	95	Bf 41 Sb 34 Bw 12 Po 8 Sw 3 Pj 2
Live wildlife trees left:	0	0	1	10		7			1	1			20	3.0	m3/ha
Wildlife Trees % of Volume:	0%	0%	0%	2%	0%	1%	0%	0%	0%	0%	0%	0%		<== Represents volume of 25 wildlife trees per ha (20 live)	
Pw/Pr Protection %	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		(% included below for incidental species not in yield curve)	
Residual/Bypass %	0%	0%	0%	0%	0%	0%	50%	50%	0%	0%	100%	100%		<== Bypass percentage expected to be left unharvested	
Total Unharvested Volume %:	100%	100%	0%	2%	0%	1%	50%	50%	0%	0%	100%	100%		<== Total unharvested volume percentage by tree species	
Total Unharvested m3/ha=>	0.0	0.0	0.0	0.4	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.8	<== Total unharvested volume per hectare	
							Overall average Net-down Loss:						*1%*		
SFMM Modelling Input:	**100%**	**100%**	**1%**	**2%**	**1%**	**1%**	**50%**	**50%**	**1%**	**1%**	**100%**	**100%**			
CMX	**PW**	**PR**	**PJ**	**SB**	**SW**	**BF**	**CE**	**LA**	**PO**	**BW**	**UH**	**LH**	**Total**	**Avg AHA Age**	**Average FU Species Composition**
NAT YC (vol/ha=>)	0	1	29	20	2	3	1	0	13	8	0	0	77	105	Pj 45 Sb 18 Po 18 Bw 15 Bf 4
Live wildlife trees left:			7	10					3				20	3.6	m3/ha
Wildlife Trees % of Volume:	0%	0%	2%	2%	0%	0%	0%	0%	1%	0%	0%	0%			
Pw/Pr Protection %	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
Residual/Bypass %	0%	0%	0%	0%	0%	0%	50%	50%	0%	0%	100%	100%			
Total Unharvested Volume %:	100%	100%	2%	2%	0%	0%	50%	50%	1%	0%	100%	100%			
Total Unharvested m3/ha=>	0.0	1.0	0.4	0.3	0.0	0.0	0.5	0.0	0.2	0.0	0.0	0.0	2.5		
							Overall average Net-down Loss:						*3%*		
SFMM Modelling Input:	**100%**	**100%**	**2%**	**2%**	**1%**	**1%**	**50%**	**50%**	**1%**	**1%**	**100%**	**100%**			
HMX	**PW**	**PR**	**PJ**	**SB**	**SW**	**BF**	**CE**	**LA**	**PO**	**BW**	**UH**	**LH**	**Total**	**Avg AHA Age**	**Average FU Species Composition**
NATPR YC (vol/ha=>)	0	0	19	19	4	5	0	0	46	14	0	0	107	75	Po 36 Pj 23 Bw 21 Sb 15 Bf 4 Sw 1
Live wildlife trees left:			5	5					6	4			20	4.2	m3/ha
Wildlife Trees % of Volume:	0%	0%	1%	1%	0%	0%	0%	0%	2%	0%	0%	0%			
Pw/Pr Protection %	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
Residual/Bypass %	0%	0%	0%	0%	0%	0%	50%	50%	0%	0%	100%	100%			
Total Unharvested Volume %:	100%	100%	1%	1%	0%	0%	50%	50%	2%	0%	100%	100%			
Total Unharvested m3/ha=>	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	1.0	0.1	0.0	0.0	1.3		
							Overall average Net-down Loss:						*1%*		
SFMM Modelling Input:	**100%**	**100%**	**1%**	**1%**	**1%**	**1%**	**50%**	**50%**	**2%**	**1%**	**100%**	**100%**			
HRD	**PW**	**PR**	**PJ**	**SB**	**SW**	**BF**	**CE**	**LA**	**PO**	**BW**	**UH**	**LH**	**Total**	Avg AHA Age	Average FU Species Composition
NATPR YC (vol/ha=>)	0	0	7	12	4	3	0	0	65	21	0	1	113	75	Po 47 Bw 27 Pj 13 Sb 9 Bf 2 Sw 1 LH 1
Live wildlife trees left:			1	2					12	5			20	5.4	m3/ha
Wildlife Trees % of Volume:	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	0%			
Pw/Pr Protection %	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
Residual/Bypass %	0%	0%	0%	0%	0%	0%	50%	50%	0%	0%	100%	100%			
Total Unharvested Volume %:	100%	100%	0%	0%	0%	0%	50%	50%	4%	0%	100%	100%			
Total Unharvested m3/ha=>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.1	0.0	1.0	3.7		
							Overall average Net-down Loss:						*3%*		
SFMM Modelling Input:	**100%**	**100%**	**1%**	**1%**	**1%**	**1%**	**50%**	**50%**	**4%**	**1%**	**100%**	**100%**			

PJD	PW	PR	PJ	SB	SW	BF	CE	LA	PO	BW	UH	LH	Total	Avg AHA Age	Average FU Species Composition
NATPR YC (vol/ha=>)	0	0	87	6	0	0	0	0	3	1	0	0	97	65	Pj 79 Sb 10 Po 6 Bw 5
Live wildlife trees left:			16	2					1	1			20	3.5	m3/ha
Wildlife Trees % of Volume:	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
Pw/Pr Protection %	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
Residual/Bypass %	0%	0%	0%	0%	0%	0%	50%	50%	0%	0%	100%	100%			
Total Unharvested Volume %:	100%	100%	3%	0%	0%	0%	50%	50%	0%	0%	100%	100%			
Total Unharvested m3/ha=>	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5		
								Overall average Net-down Loss:					***3%***		
SFMM Modelling Input:	**100%**	**100%**	**3%**	**1%**	**1%**	**1%**	**50%**	**50%**	**1%**	**1%**	**100%**	**100%**			

PJM	PW	PR	PJ	SB	SW	BF	CE	LA	PO	BW	UH	LH	Total	Avg AHA Age	Average FU Species Composition
NATPR YC (vol/ha=>)	0	0	58	13	0	1	0	0	4	2	0	0	78	85	Pj 57 Sb 29 Bw 7 Po 6 Bf 1
Live wildlife trees left:			14	5					1				20	3.4	m3/ha
Wildlife Trees % of Volume:	0%	0%	3%	1%	0%	0%	0%	0%	0%	0%	0%	0%			
Pw/Pr Protection %	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
Residual/Bypass %	0%	0%	0%	0%	0%	0%	50%	50%	0%	0%	100%	100%			
Total Unharvested Volume %:	100%	100%	3%	1%	0%	0%	50%	50%	0%	0%	100%	100%			
Total Unharvested m3/ha=>	0.0	0.0	1.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9		
								Overall average Net-down Loss:					***2%***		
SFMM Modelling Input:	**100%**	**100%**	**3%**	**1%**	**1%**	**1%**	**50%**	**50%**	**1%**	**1%**	**100%**	**100%**			

POD	PW	PR	PJ	SB	SW	BF	CE	LA	PO	BW	UH	LH	Total	Avg AHA Age	Average FU Species Composition
NATPR YC (vol/ha=>)	0	0	6	6	2	1	0	0	93	4	0	0	112	75	Po 75 Pj 10 Bw 8 Sb 6 Bf 1
Live wildlife trees left:			2	2	1				13	2			20	5.8	m3/ha
Wildlife Trees % of Volume:	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	0%			
Pw/Pr Protection %	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
Residual/Bypass %	0%	0%	0%	0%	0%	0%	50%	50%	0%	0%	100%	100%			
Total Unharvested Volume %:	100%	100%	0%	0%	0%	0%	50%	50%	4%	0%	100%	100%			
Total Unharvested m3/ha=>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	4.0		
								Overall average Net-down Loss:					***4%***		
SFMM Modelling Input:	**100%**	**100%**	**1%**	**1%**	**1%**	**1%**	**50%**	**50%**	**4%**	**1%**	**100%**	**100%**			

PRW	PW	PR	PJ	SB	SW	BF	CE	LA	PO	BW	UH	LH	Total	Avg AHA Age	Average FU Species Composition
NATPR YC (vol/ha=>)	22	121	13	12	1	2	0	0	13	10	0	0	194	95	Pr 52 Pj 29 Sb 10 Pw 4 Bw 4 Po 1
Live wildlife trees left:	6	6	2	2					2	2			20	4.1	m3/ha
Wildlife Trees % of Volume:	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
Pw/Pr Protection %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
Residual/Bypass %	0%	0%	0%	0%	0%	0%	50%	50%	0%	0%	100%	100%			
Total Unharvested Volume %:	1%	1%	0%	0%	0%	0%	50%	50%	0%	0%	100%	100%			
Total Unharvested m3/ha=>	0.1	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0		
								Overall average Net-down Loss:					***1%***		
SFMM Modelling Input:	**1%**	**1%**	**1%**	**1%**	**1%**	**1%**	**50%**	**50%**	**1%**	**1%**	**100%**	**100%**			

1

SBD	PW	PR	PJ	SB	SW	BF	CE	LA	PO	BW	UH	LH	Total	Avg AHA Age	Average FU Species Composition
NATPR YC (vol/ha=>)	0	0	15	62	2	2	0	0	3	4	0	0	88	95	Sb 78 Pj 10 Bw 6 Bf 3 Po 2 Sw 1
Live wildlife trees left:			4	14					1	1			20	3.0	m3/ha
Wildlife Trees % of Volume:	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%	0%	0%			
Pw/Pr Protection %	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		Pr, Pw netdown reduced to 2% in PRWMX	
Residual/Bypass %	0%	0%	0%	0%	0%	0%	50%	50%	0%	0%	100%	100%			
Total Unharvested Volume %:	100%	100%	1%	2%	0%	0%	50%	50%	0%	0%	100%	100%			
Total Unharvested m3/ha=>	0.0	0.0	0.1	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4		
							Overall average Net-down Loss:						***2%***		
SFMM Modelling Input:	**100%**	**100%**	**1%**	**2%**	**1%**	**1%**	**50%**	**50%**	**1%**	**1%**	**100%**	**100%**			

SBL	PW	PR	PJ	SB	SW	BF	CE	LA	PO	BW	UH	LH	Total	Avg AHA Age	Average FU Species Composition
NATPR YC (vol/ha=>)	0	0	1	50	0	0	1	8	1	1	0	0	62	145	Sb 80 La 12 Pj 5 Bw 2 LH 1
Live wildlife trees left:			1	13			2	4					20	2.2	m3/ha
Wildlife Trees % of Volume:	0%	0%	0%	3%	0%	0%	0%	1%	0%	0%	0%	0%			
Pw/Pr Protection %	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
Residual/Bypass %	0%	0%	0%	0%	0%	0%	1%	1%	0%	0%	100%	100%		Ce, La netdown reduced to 1% in SBL	
Total Unharvested Volume %:	100%	100%	0%	3%	0%	0%	1%	2%	0%	0%	100%	100%			
Total Unharvested m3/ha=>	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	1.5		
							Overall average Net-down Loss:						***2%***		
SFMM Modelling Input:	**100%**	**100%**	**1%**	**3%**	**1%**	**1%**	**1%**	**2%**	**1%**	**1%**	**100%**	**100%**			

SBM	PW	PR	PJ	SB	SW	BF	CE	LA	PO	BW	UH	LH	Total	Avg AHA Age	Average FU Species Composition
NATPR YC (vol/ha=>)	0	1	37	37	3	2	0	0	5	4	0	0	89	85	Sb 55 Pj 29 Bw 8 Po 4 Sw 2 Bf 2 Pr 1
Live wildlife trees left:			8	9	1				1	1			20	3.2	m3/ha
Wildlife Trees % of Volume:	0%	0%	2%	1%	0%	0%	0%	0%	0%	0%	0%	0%			
Pw/Pr Protection %	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
Residual/Bypass %	0%	0%	0%	0%	0%	0%	50%	50%	0%	0%	100%	100%			
Total Unharvested Volume %:	100%	100%	2%	1%	0%	0%	50%	50%	0%	0%	100%	100%			
Total Unharvested m3/ha=>	0.0	1.0	0.6	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1		
							Overall average Net-down Loss:						***2%***		
SFMM Modelling Input:	**100%**	**100%**	**2%**	**1%**	**1%**	**1%**	**50%**	**50%**	**1%**	**0%**	**100%**	**100%**			

1

Table 27 Summary of Clearcut Growing Stock Left Unharvested by Analysis Unit

REORDER SPECIES FOR SFMM

	YIELD	Pj	Sw	Sb	Bf	Pw	Pr	Ce	La	Po	Bw	UH	LH
BFM_	MED	0.01	0.01	0.02	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
BFM_	NAT	0.01	0.01	0.02	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
CMX_	LOW	0.02	0.01	0.02	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
CMX_	MED	0.02	0.01	0.02	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
CMX_	NAT	0.02	0.01	0.02	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
CMXC	LOW	0.02	0.01	0.02	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
CMXC	MED	0.02	0.01	0.02	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
CMXC	NAT	0.02	0.01	0.02	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
HMX_	MED	0.01	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.02	0.01	1.00	1.00
HMX_	NAT	0.01	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.02	0.01	1.00	1.00
HRDA	MED	0.01	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.04	0.01	1.00	1.00
HRDA	NAT	0.01	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.04	0.01	1.00	1.00
HRDB	MED	0.01	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.04	0.01	1.00	1.00
HRDB	NAT	0.01	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.04	0.01	1.00	1.00
HRD_	MED	0.01	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.04	0.01	1.00	1.00
HRD_	NAT	0.01	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.04	0.01	1.00	1.00
PJDD	HIGH	0.03	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
PJDD	LOW	0.03	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
PJDD	MED	0.03	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
PJDD	NAT	0.03	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
PJDS	LOW	0.03	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
PJDS	NAT	0.03	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
PJM_	LOW	0.03	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
PJM_	MED	0.03	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
PJM_	NAT	0.03	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
POD_	HIGH	0.01	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.04	0.01	1.00	1.00
POD_	MED	0.01	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.04	0.01	1.00	1.00
POD_	NAT	0.01	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.04	0.01	1.00	1.00
PRWR	HIGH	0.01	0.01	0.01	0.01	0.01	0.01	0.50	0.50	0.01	0.01	1.00	1.00
PRWR	MED	0.01	0.01	0.01	0.01	0.01	0.01	0.50	0.50	0.01	0.01	1.00	1.00
PRWR	NAT	0.01	0.01	0.01	0.01	0.01	0.01	0.50	0.50	0.01	0.01	1.00	1.00
PRWW	LOW	0.01	0.01	0.01	0.01	0.01	0.01	0.50	0.50	0.01	0.01	1.00	1.00
PRWW	NAT	0.01	0.01	0.01	0.01	0.01	0.01	0.50	0.50	0.01	0.01	1.00	1.00
SBD_	MED	0.01	0.01	0.02	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
SBD_	NAT	0.01	0.01	0.02	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
SBL_	LOW	0.01	0.01	0.03	0.01	1.00	1.00	0.01	0.02	0.01	0.01	1.00	1.00
SBL_	NAT	0.01	0.01	0.03	0.01	1.00	1.00	0.01	0.02	0.01	0.01	1.00	1.00
SBLC	LOW	0.01	0.01	0.03	0.01	1.00	1.00	0.01	0.02	0.01	0.01	1.00	1.00
SBLC	NAT	0.01	0.01	0.03	0.01	1.00	1.00	0.01	0.02	0.01	0.01	1.00	1.00
SBM_	HIGH	0.02	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
SBM_	MED	0.02	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00
SBM_	NAT	0.02	0.01	0.01	0.01	1.00	1.00	0.50	0.50	0.01	0.01	1.00	1.00

6.2.3.3 Clearcut Post-Renewal Forest Succession and Costs

The Post-Harvest Renewal Transitions (PHRT) rules are called "Clearcut Post-Renewal Forest Succession" rules in SFMM. The Post-Harvest Renewal Transitions set to strategically model renewal pathways post-harvest. Succession is associated with two pathways; the natural succession pathway, by means of natural processes (forest aging, forest disturbances such as wildfire), and the managed pathway, by means of harvest and regeneration efforts. This section solely deals with the aspect of the managed pathway.

Strategic silviculture renewal pathways are based on broad renewal treatment types appropriate for the forest, namely Natural regeneration, Planting and Seeding. Broad treatment types are renewal strategies that contain an appropriate treatment or blend of treatments for the average forest unit condition. Post-harvest renewal transition inputs were documented for each forest unit which included assumptions about how the forest will develop after these broad treatment types are applied, their associated costs and future forest conditions. Clearcut Post-harvest Renewal Transition identifies the initial forest unit and broad treatment type applied to the forest, regardless of what YIELD stratum it was at harvest.

A systematic analysis was used to determine the post-harvest renewal transitions (PHRT) for the strategic model which utilized the draft "*MNRF Implementation Direction for Using Past Silvicultural Performance to Develop FMP Assumptions for Post-harvest Succession"* to inform this process.

Past silvicultural renewal information for successfully established renewal areas from the inventory was analyzed to summarize actual establishment success by PLANFU. The 2024 PLANFU definitions (Table FMP-2) must be used for both the "original", pre-harvest stand, and for the "resulting" established stand conditions. The summarized actual post-harvest renewal transitions are then the default, or starting point, for Post-Renewal Forest Transition inputs by PLANFU in SFMM.

The following methodology, descriptions and tables summarize the process undertaken to review the reported success of past renewal activities, and to make rationalized adjustments to transitions to develop the renewal transition rules for use in the 2024 FMP.

In short, the renewal data was prepared (Subsection A), then the data was sorted and analyzed, including data enrichment with regional data, as warranted (subsection B) resulting in Default Post-harvest Renewal Transition Rules by forest unit (Table FMP-5). Next default PHRT rules were further refined to reflect specific strategic silvicultural strategies by analysis unit for use in SFMM strategic modelling (subsection C). These refinements by analysis unit to the default PHRT were supported by local professional knowledge and were consistent with proposed silvicultural strategies for this plan period. Finally, a discussion of renewal costs used in strategic modelling is included in subsection D.

A – Inventory Preparation for the Analysis of Past Silviculture Performance

In order to calculate the change in forest conditions (by forest unit) between the pre-harvest condition and the post-renewal condition after broad renewal treatment types have been applied, data from the draft Operational Planning Inventory was prepared for this analysis.

First, the current post-harvest renewal forest condition and broad renewal treatments applied to harvested areas were assembled:

1. The draft Operational Planning Inventory was used, which was built from the Planning Composite Inventory with additional management fields added for 2024 FMP PLANFU, YIELD, regional AU, plan AU, etc. This inventory was sorted and polygons that had been harvested and renewed since 2001 were saved as a separate file, along with all OPI fields. This subset of renewal area since 2001 was considered appropriate as it encompassed the last 20 years in which good quality silvicultural effectiveness information was recorded. This OPI data was used for the current (regenerated) forest condition.

2. This partial OPI was updated with additional Miisun information for renewal treatments applied (Regeneration Database) and establishment survey timing and establishment results (Free-To-Grow Database). The management unit renewal treatment included additional information on treatment applied (Natural, Plant, Seed). Information for the broad renewal treatments applied, establishment success, and current forest condition. The Regeneration Data included the harvested forest unit using the forest unit definitions from the 2012-2024 FMP.

3. Next the pre-harvest forest unit was reclassified to approximate the 2024-2034 FMP PLANFU definitions. The PLANFU definitions in the 1999, 2004, 2009 and 2012 FMPs for the Whiskey Jack Forest all used different forest unit definitions as compared to this 2024 FMP. While the 2012 FMP forest unit definitions were relatively similar to those being used for this 2024 FMP, there were some minor differences (2024 PLANFUs are described in Section 5.1.3 and forest unit scripts for 2012 and 2024 FMPs are included below Table 28). Regional standard forest units (SFU) were the basis for 2024 FMP forest units, and these same SFUs were generally followed for the 2012 FMP forest units, with some minor variation in roll-up into plan forest units as compared to this 2024 FMP.

   By reclassifying the "pre-harvest stand conditions" for the regeneration data according to the 2024 FMP PLANFUs, meaningful analysis for renewal transitions was possible. The reclassification of harvested area in the regeneration database from 2012 forest units to 2024 FMP forest units followed the direct relationship illustrated in Table 29.

Table 28 Forest Unit Descriptions 2012 and 2024 FMPs (from Table FMP-2)

2012 FMP Forest Unit Code	Regional Standard Forest Unit (descending order of occurrence)	FRI Parameters & Criteria (Script to be applied in specific sort order.)
PRW	PrwMx, PwDom, PrDom	SORT ORDER 1: PW+PR >= 40
CMX	ConMx, UplCe	SORT ORDER 2: CE>=20 And (ECOSITE1 Like 'NW17*') SORT ORDER 13: SB+PJ+BF+SW+CE+PW+PR+LA+HE>=50
OCL	OCLow	SORT ORDER 3: ((CE+LA>=50 Or WG='Ce' Or WG='La')) And PR+PW+PJ+SW+BW<10
SBL	SbLow	SORT ORDER 4: (((ECOSITE1 Like 'NW34*' And PR+PW+PJ+SW+BF<=20) Or (ECOSITE1 Like 'NW35*' Or ECOSITE1 Like 'NW36*' Or ECOSITE1 Like 'NW37*') Or (ECOSITE1 Like 'NW38*' And (WG='Sx' Or WG='Sb' Or WG='Ce' Or WG='La'))))
SPD	SbDee, SbSha, SbMx1, BfMx1	SORT ORDER 5: SB+SW>=70 And PO+PB+BW<=20
PJD	PjSha, PjDee	SORT ORDER 6: ((PJ>=70 And PO+PB+BW<=20) Or (PJ>=50 And PO+PB+BW<=20 And AGE>=120) Or (PJ>=70 And (ECOSITE1 Like 'NW13*' Or ECOSITE1 Like 'NW14*')))
POD	PoDee, PoSha	SORT ORDER 7: PO+PB>=70
OTH	OthHd	SORT ORDER 8: MS+AB+EW+OW+QR+BD>=30
SPM	SbMx1	SORT ORDER 9: PR+SB+PJ+SW+BF>=70 And BF<=10 And PO+PB+BW<=20 And (SB+SW)>PJ
PJM	PjMx1	SORT ORDER 10: PR+SB+PJ+SW+BF>=70 And BF<=10 And PO+PB+BW<=20 And PJ>=(SB+SW)
BFM	BfMx1, BfPur, ConMx	SORT ORDER 11: PR+SB+PJ+SW+BF+PW+CE+LA+HE>=70 And BF>10 And BF+SW>=30
HMX	HrdMw, HrDom, BwDee, BwSha	SORT ORDER 12: PO+PB+BW+MS+AB+EW+OW+QR+BD>=50
2024 FMP Forest Unit Code	**Regional Standard Forest Unit** (descending order of occurrence)	**FRI Parameters & Criteria** (sort based on Regional Forest Unit classification) *"cn" is scripting for 'contains"*
BFM	BfMx1, BfPur	NWSFU cn 'bfpur' or NWSFU cn 'bfmx1'
CMX	ConMx, UplCe	NWSFU cn 'conmx' or NWSFU cn 'uplce'
HMX	HrdMw	NWSFU cn 'hrdmw'
HRD	HrDom, BwDee, OthHd, BwSha	NWSFU cn 'hrdom' or NWSFU cn 'bwdee' or NWSFU cn 'bwsha' or NWSFU cn 'othhd'
PJD	PjDee, PjSha	NWSFU cn 'pjdee' or NWSFU cn 'pjsha'
PJM	PjMx1	NWSFU cn 'pjmx1'
POD	PoDee, PoSha	NWSFU cn 'podee' or NWSFU cn 'posha'
PRW	PrwMx, PwDom, PrDom	NWSFU cn 'pwdom' or NWSFU cn 'prdom' or NWSFU cn 'prwmx'
SBD	SbDee, SbSha	NWSFU cn 'sbdee' or NWSFU cn 'sbsha'
SBL	SbLow, OCLow	NWSFU cn 'sblow' or NWSFU cn 'oclow'
SBM	SbMx1	NWSFU cn 'sbmx1'

Table 29 Conversion of 2012 Forest Units to 2024 FMP Forest Units

Regional Standard Forest Units (NWSFU) (22)	Landscape Guide Forest Units (LGFU) (14)	2024 Plan Forest Units (PLANFU) (11)	Approx. 2012 Forest Units (PLANFU) (12)
PwDom	PrwMx	PRW	PRW
PrDom			
PrwMx			
SbLow	SbLow	SBL	SBL
OCLow	OCLow		
SbSha	SbDom	SBD	SPD
SbDee			
PjSha	PjDom	PJD	PJD
PjDee			
PoSha	PoDom	POD	POD
PoDee			
BwSha	BwDom	(BWDOM) add to HRD	(in HMX)
BwDee			
OthHd	OthHd	**OTHHD** (add to HRD)	OTH
SbMx1	SbMx1	SBM	SPM
PjMx1	PjMx1	PJM	PJM
BfPur	BfDom	BFM	BFM
BfMx1			
HrDom	HrDom	HRD	HRD
HrdMw	HrdMw	HMX	HMX
ConMx	ConMx	CMX	CMX
UplCe			

The above steps resulted in a regeneration database including the pre-harvest condition, broad renewal treatment applied (natural, plant, seed), and resulting 2024 stand condition, all using the 2024 FMP forest units.

4. The regeneration database areas were rounded to the nearest 0.1 hectare (HA column) to aid the analysis summaries. Areas less than 1 hectare in size were tagged as “slivers” and not used for the calculation of post-harvest renewal transition rules. It was recognized that many of these areas resulted from overlaying 2-3 inventories with slightly different stand boundaries, and were not representative of actual treatment areas by PLANFU.

The processing of the regeneration data with recently established stands (since 2001) by 2024 PLANFU and broad treatment type was complete. This resulted in approximately 28,000 hectares of established area available for the analysis of past silvicultural performance.

B – Analysis of Past Silviculture Performance and Data Enrichment

The analysis looked at the tabularized pre-harvest conditions (depletion forest unit using 2024 PLANFU definitions) and examined how various treatment types (natural regeneration, planting, and seeding) influenced the future forest condition ("established" forest unit) and future YIELD combinations (previously called silviculture intensities; now forest productivity LOW, MED, HIGH). In short, the analysis determined how a PLANFU-YIELD can be created given a starting forest condition (PLANFU) and broad treatment type.

Each depleted forest unit was compared against the broad renewal treatment applied and the resulting (post-harvest renewal) forest unit. Table 30 documents the PLANFU transitions by broad renewal treatment type using Whiskey Jack Forest data. Overall, the data set created had good data so minimal data clean up and enrichment was needed.

Steps 1-3: Renewal Transition Clean-Up and Review

The results of the analysis of past silviculture performance were reviewed by the LTMD Task Team and regional plan advisors.

One anomaly in the data that was observed was a transition to or from SBLOW forest unit area that is defined to include only lowland ecosites. It is impossible for lowland area to be renewed to upland area, or vice versa. Such illogical transitions or explainable deviation was noted.

Some transitions had very small areas that were not strategically or statistically relevant, therefore these small areas were combined into the most similar transition. Where warranted and rationalized, these illogical transitions, very small areas or anomalies were combined with the intended management transition and/or YIELD. This enhanced the data to account for errors or anomalies in the data due to different inventory vintages.

The highlighted cells in Table 30 represent actual data area transitions (PLANFU to PLANFU-YIELD by broad treatment type) that were addressed during three steps of data cleanup and minor roll-ups to reflect strategic post-harvest renewal transitions. The data clean up occurred in multiple steps with LTMD Task Team and regional Plan Advisor discussions and agreements during each step. Task team discussion included questions about:

- Silvicultural strategy on herbicide use? (specifically comparing past renewal strategies versus 2024 FMP renewal strategies?)
- Likelihood of conifer renewal from depleted hardwood forest stands with little/no herbicide?
- Ensuring that there was greater understanding of the levels of chemical tending that are present in the analysis of past silviculture performance and
- Identifying if the Default Post-harvest Renewal Transitions needed to be adjusted to reflect the tending strategy that was being proposed for the 2024 FMP.

Renewal strategies and the resulting transitions were reviewed for consistency between the renewal conducted for the past 20 years (renewal data) and other regional data. This was also compared to the proposed silvicultural strategy for the 2024 FMP (same limited herbicide use, or increase?).

The amount of applied chemical tending that was able to be identified (i.e. 2002 to current) in the Analysis of Past Silviculture Performance (APSP) and is documented in the Post-Harvest Renewal Transition database is very small (approx. 660 ha received any herbicide) compared to the overall amount of renewal data in the database (27,904 ha). However, approximately 9,000 ha are from a period where it is not possible to determine if chemical tending was applied (i.e. pre 2002 FIM). In addition, the returns to pure conifer PLANFUs (PJM, PJD, SBD, SBM) from depleted pure conifer FUs is similar to regional trends. These trends include Management Units that have consistent chemical tending programs. During the past 20 years, the silvicultural strategies applied to the Whiskey Jack Forest have been consistent with very low levels of herbicide use.

The planning team intends to develop a low to no chemical tending program for the Whiskey Jack Forest 2024 FMP, consistent with forest management practices over the past 20 years, and in accordance with desired forest and benefits comments for this 2024 FMP (i.e. limit herbicide use, allow very limited herbicide use only when needed for objective achievement). Therefore, it was prudent to consider Adjustments to the Default PHRT rules to reflect this uncertainty in historic levels of tending.

These Adjustments, if needed, would be made to the third table labeled Step 3, located in Table 30. Specifically, a critical look at the returns to pure conifer FUs from all depleted FUs would be completed, and the netted down and shifted to the CMX FU would be considered as warranted. To facilitate this critical look, the ecosites of the renewed areas that were **harvested pre-2002** were identified and aggregated into analysis units based on soil and moisture conditions.

- High proportions of course/poor/dry soil ecosites would indicate that these areas were not ideal for poplar regeneration (e.g. off-site poplar) and therefore it is reasonable to assume that they may not have been chemically tended. This would then support the theory that the transitions identified in the Default PHRT only had minor to no chemical tending. If the ecosites however are predominantly finer textured/richer/moister soil ecosites then the inverse would apply, and the pathways should be Adjusted.

The LTMD Task Team noted that the renewal transition data included some transitions of hardwood-dominated stands to conifer-dominated stands through natural regeneration or planting treatments, with little or no herbicide application. At first review, these transitions looked optimistic given the very limited herbicide use. To inform the discussion on potential adjustments, Ricardo Velasquez (MNRF Regional Forest Science Specialist) produced an aggregated ecosite profile of the pure conifer FUs from the WJ_PHRT database which was provided by Susan Jarvis (WJ_PHRT_work (6).xlsx).

Results of the Review of the Ecosites Represented in the Analysis of Past Silviculture Performance

A review of the APSP database revealed that there is very little variability in ecosites across all forest units. The vast majority of each forest unit corresponds to a dry to fresh sandy to coarse loamy ecosites. Unfortunately, this is not very helpful when it comes to teasing out how productive these sites are and by extension how potent they are for hardwood regeneration, specifically poplar. This is due to the nature of dry to fresh sandy to coarse loamy ecosites (B044-B059) which widely range in productivity.

This high concentration of dry to fresh sandy to coarse loamy ecosites does support the minor renewal transitions to pure conifer PLANFUs from depleted hardwood dominated FUs without the use of chemical tending as these hardwood stands are not growing on ideal hardwood sites (e.g. off-site for poplar). The data however does not support or discount the renewal transitions that are documented in the Default PHRT for depleted pure conifer PLANFUs.

In conclusion, the LTMD Task Team and the regional advisor found that the data supported the expected renewal transition results from a silvicultural program with limited to no herbicide applied on the Whiskey Jack Forest.

Step 4: Data Enrichment

After the initial clean-up of data, and confirmation that data transitions were consistent with limited herbicide application (based on ecosite review), the renewal transitions were reviewed to determine if any treatments by forest unit lacked sufficient data to produce reliable results, or if results seemed to not be consistent with other regional renewal transition data.

Adjacent MU Data That Could Be Used for Enrichment:

Whiskey Jack MU: Ecoregion 4S

Adjacent MU that are mostly within the same Ecoregion and have significant Ecodistrict overlap with the Whiskey Jack:

- Red Lake - Very good fit for northern parcel
- Dryden - Similar ecologically to eastern portions of the north and south parcels
- Wabigoon - Similar ecologically to eastern portions of the north and south parcels
- Kenora - Similar ecologically to the western portions of the north and south parcels

Several WJ 2024 forest unit renewal transitions (PLANFU and broad treatment type) were reviewed and considered for enrichment, using regional and adjacent management unit data provided by the MNRF Regional Forest Science Specialist:

- BFM Natural and Plant
    - Updated with regional enrichment data
    - Seeding was not considered a valid treatment option for BFM.
- HRD Natural
    - Updated with regional enrichment data

  - LTMD Task Team further reduced PJD and PJM (50%) to be more conservative.
  - Strategically, there is no intent to plant or seed HRD. Seeding will not be a valid treatment option for strategic modelling. Planting will be strategically included in modelling and listed in FMP-4 SGRs as an acceptable alternate treatment to increase the conifer composition in HRD stands or to result in a conversion to other forest units with higher conifer compositions.
  - Seeding was not considered a valid treatment option for HRD.
- PJD Plant
  - Results trend to pure conifer FUs in higher proportions than regional trends if no herbicide was used.
  - Updated with regional enrichment data
  - LTMD Task Team reduced resulting PRW to 8 ha to be more conservative.
  - Historically there was very little PJ planted on the WJ MU, typically on prime sites where there would be little competition
- POD Plant
  - Some POD sites could be planted (where poplar is off-site), but not a common treatment with limited herbicide. Keep.
  - Updated with regional enrichment data
  - LTMD Task Team deleted future PRW to be more conservative.
  - Seeding was not considered a valid treatment option for POD.
- PRW Natural and Plant
  - Management unit data used (no enrichment)
  - Small sample set in database but fits well with regional trends
  - Very small amount of PRW on the MU
  - Model could be restricted to only plant after harvest thus maintaining current level of PRW on the forest (as per management objectives).

Step 5: Default PHRT

Enrichment in Step 4 was added and all transitions were converted to percentages resulting in the future forest units. Final transition data was reviewed to ensure that each PLANFU-broad treatment transition row equalled 100%. Future YIELDs were added consistent with sorted Whiskey Jack renewal data and 2024 FMP valid YIELDs by forest unit.

The result of the analysis of past silvicultural performance is called the Default Post-Harvest Renewal Transitions. These PHRT are documented as percentages of harvest area by forest unit and broad treatment type in Table 31, and in Table FMP-5. Strategic silvicultural options for this 2024-2034 FMP are similar to those incorporated into the 2012 FMP, and implemented 2012-2024.

See **C - Development of SFMM Strategic Modelling Inputs** – following Table 31 for the conversion of Default PHRT Rules by PLANFU to Analysis Units use in the SFMM model.

Table 30 Analysis of Past Silviculture Performance

		Step 1 - Sort regeneration/FTG data into new 2023 PLANFUs (OPI).													
		Cleaner SFU groups for 2023 than 2012 FMP.													
Depleted		Depleted													
Old PLANFU		**New PLANFU**	(AU if Used)	**BFM**	**CMX**	**HMX**	**HRD**	**PJD**	**PJM**	**POD**	**PRW**	**SBD**	**SBL**	**SBM**	**Grand Total**
BFM		**BFM**			**7**	**35**	**2**		**4**	**18**		**9**	**2**		**77**
NATURAL		NATURAL			7	35	2		2	18		9	2		75
PLANT		PLANT							2						2
SEED		SEED													
CMX		**CMX**		**14**	**658**	**464**	**88**	**550**	**231**	**120**		**444**	**76**	**323**	**2,967**
NATURAL		NATURAL		10	232	186	49	21	19	113		105	18	19	773
PLANT		PLANT		2	407	247	39	322	203	7		334	56	299	1,915
SEED		SEED		1	19	31		206	10			6	3	5	280
HMX		**HMX**	No past data to support "depleted" HMX and HRD split. To be estimated.	**28**	**208**	**370**	**197**	**60**	**41**	**499**		**136**	**6**	**123**	**1,667**
NATURAL		NATURAL		28	188	247	155	16	18	390		105	5	35	1,186
PLANT		PLANT			20	123	42	41	23	109		32	1	88	478
SEED		SEED						3							3
OTH		**HRD**	(this data is for		**36**	**2**			**4**				**3**		**43**
NATURAL		NATURAL	Ash only - not all HRD)		36	2			4				3		43
		PLANT													
		SEED													
PJD		**PJD**		**13**	**707**	**316**	**92**	**2,532**	**568**	**273**	**5**	**391**	**23**	**184**	**5,101**
NATURAL		NATURAL		13	285	250	79	88	92	219	2	163	10	74	1,273
PLANT		PLANT			45	15	9	103	18	2	3	128	3	26	351
SEED		SEED			377	51	4	2,342	458	53		100	10	84	3,477
PJM		**PJM**		**8**	**170**	**107**	**20**	**299**	**92**	**100**		**217**	**4**	**78**	**1,095**
NATURAL		NATURAL		5	123	77	8	31	15	88		178	3	26	552
PLANT		PLANT		4	39	5	12	67	69	1		28	2	44	271
SEED		SEED			8	24		202	7	11		11		8	272
POD		**POD**		**88**	**481**	**1,157**	**504**	**32**	**22**	**2,723**	**21**	**296**	**5**	**63**	**5,389**
NATURAL		NATURAL		88	466	1,156	487	28	19	2,681	21	288	5	50	5,287
PLANT		PLANT			15	1	17	4	3	40		8		13	101
SEED		SEED								1					1
PRW		**PRW**	(Can estimate for		**3**			**25**							**28**
NATURAL		NATURAL	depleted Pr/Pw AUs)		3			20							23
PLANT		PLANT						5							5
SEED		SEED													
SPD		**SBD**		**53**	**1,165**	**409**	**130**	**640**	**629**	**201**		**4,570**	**373**	**943**	**9,113**
NATURAL		NATURAL		10	59	104	13	47	9	37		417	52	37	784
PLANT		PLANT		43	1,106	306	104	430	609	161		4,139	319	906	8,121
SEED		SEED					13	164	11	3		15	2		208
SBL		**SBL**	(can maint Sb/Ce AUs)	**1**	**19**	**4**		**6**	**8**	**5**		**133**	**237**	**15**	**428**
NATURAL		NATURAL		1	11			1	4	3		40	138	11	210
PLANT		PLANT			8	3		3		2		93	98	5	212
SEED		SEED				1		1	4						6
SPM		**SBM**		**8**	**225**	**36**	**17**	**421**	**324**	**27**		**542**	**100**	**296**	**1,996**
NATURAL		NATURAL			63	24	17	21	12	3		67	10	30	246
PLANT		PLANT		8	162	12		385	304	24		475	91	237	1,697
SEED		SEED						16	8					30	53
Grand Total		**Grand Total**		**213**	**3,678**	**2,899**	**1,050**	**4,564**	**1,920**	**3,965**	**25**	**6,738**	**829**	**2,024**	**27,904**

Step 2 - Copy sorted area from above, and colour-code based on cleaning of data:

(Step 3 below incorporates the noted area changes)

Poor Data - delete, or small transition (<1%)

Poor Data - move to different future SFU field (based on regional data enrichment)

Bad Data - unacceptable lowland ecosite changes (due to different inventories), move to appropriate SFU

Adjustment for silvicultural strategy being diffferent 2023 than regen data.

	Depleted New PLANFU	(AU if Used)	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM	Grand Total
BFM	NATURAL			7	35	2		2	18		9	2		75
BFM	PLANT							2						2
BFM	SEED													
CMX	NATURAL		10	232	186	49	21	19	113		105	18	19	773
CMX	PLANT		2	407	247	39	322	203	7		334	56	299	1,915
CMX	SEED		1	19	31		206	10			6	3	5	280
HMX	NATURAL	(Data for HMX	28	188	247	155	16	18	390		105	5	35	1,186
HMX	PLANT	& HRD currently)		20	123	42	41	23	109		32	1	88	478
HMX	SEED						3							3
HRD	NATURAL	**HRD_, HRDB**												
HRD	PLANT													
HRD	SEED													
HRDA	NATURAL	(data for Ash only)		36	2			4				3		43
HRDA	PLANT													
HRDA	SEED													
PJD	NATURAL		13	285	250	79	88	92	219	2	163	10	74	1,273
PJD	PLANT			45	15	9	103	18	2	3	128	3	26	351
PJD	SEED			377	51	4	2,342	458	53		100	10	84	3,477

1
2

Step 2 - Copy sorted area from above, and colour-code based on cleaning of data:

(Step 3 below incorporates the noted area changes)

Poor Data - delete, or small transition (<1%)

Poor Data - move to different future SFU field (based on regional data enrichment)

Bad Data - unacceptable lowland ecosite changes (due to different inventories), move to appropriate SFU

Adjustment for silvicultural strategy being diffferent 2023 than regen data.

	Depleted New PLANFU	(AU if Used)	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM	Grand Total
PJM	NATURAL		5	123	77	8	31	15	88		178	3	26	552
PJM	PLANT		4	39	5	12	67	69	1		28	2	44	271
PJM	SEED			8	24		202	7	11		11		8	272
POD	NATURAL		88	466	1,156	487	28	19	2,681	21	288	5	50	5,287
POD	PLANT			15	1	17	4	3	40		8		13	101
POD	SEED								1					1
PRW	NATURAL			3			20							23
PRW	PLANT						5							5
PRW	SEED													
SBD	NATURAL		10	59	104	13	47	9	37		417	52	37	784
SBD	PLANT		43	1,106	306	104	430	609	161		4,139	319	906	8,121
SBD	SEED					13	164	11	3		15	2		208
SBL	NATURAL		1	11			1	4	3		40	138	11	210
SBL	PLANT			8	3		3		2		93	98	5	212
SBL	SEED				1		1	4						6
SBM	NATURAL			63	24	17	21	12	3		67	10	30	246
SBM	PLANT		8	162	12		385	304	24		475	91	237	1,697
SBM	SEED						16	8					30	53
	Grand Total		**213**	**3,678**	**2,899**	**1,050**	**4,564**	**1,920**	**3,965**	**25**	**6,738**	**829**	**2,024**	**27,904**

Step 3 result of the above noted area changes:

Poor Data - delete

Poor Data - move to different future SFU field (based on regional data enrichment)

Bad Data - unacceptable lowland ecosite changes (due to different inventories), move to appropriate SFU

Adjustment for silvicultural strategy being diffferent 2023 than regen data.

Ricardo would like to discuss

	Depleted														
	New PLANFU	(AU if Used)	**BFM**	**CMX**	**HMX**	**HRD**	**PJD**	**PJM**	**POD**	**PRW**	**SBD**	**SBL**	**SBM**	**Grand Total**	
BFM	NATURAL			7	35	2		2	18		11			75	
BFM	PLANT							2						2	
BFM	SEED	(not being done)												0	
CMX	NATURAL			232	186	49	21	19	113				19	640	
CMX	PLANT			407	247	39	322	203	7				299	1,523	
CMX	SEED			19	31		206	10					5	270	
HMX	NATURAL	(Data for HMX	28	188	247	155	16	18	390					1,042	move SBD to SBM
HMX	PLANT	& HRD currently)		20	123	42	41	23	109		33		88	478	with no tending its more probable to achieve a SBM
HMX	SEED	(not done)					3							3	(pj ingress outcompetes poplar on dry coarse sites) than an pure SBD
HRD	NATURAL	**HRD_, HRDB**												0	needs enrichment
HRD	PLANT													0	needs enrichment
HRD	SEED	(not done)												0	
HRDA	NATURAL	(data for Ash only)				43								43	
HRDA	PLANT	**HRDA**												0	
HRDA	SEED													0	
PJD	NATURAL	**PJDD, PJDS AUs**		285	250	299	88	92		2	173		74	1,262	
PJD	PLANT			45	15	9	103	18		3	131		26	350	OK PRW 1% as is (discuss later if needed for better BLG achievement
PJD	SEED			377	103		2,342	458			110		84	3,473	if seeding pj not probable and not consistant with Silviculture guide, delete SBD future
PJM	NATURAL			123	77	8	31	15	88		181		26	548	
PJM	PLANT			39	5	12	67	69			30		44	267	
PJM	SEED			8	24		202	7	11		11		8	272	if seeding pj not probable and not consistant with Silvicutre guide, delete SBD future should be removed as poor data
POD	NATURAL		88	466	1,156	487	28	19	2,681	21				4,944	delete PJ futures
POD	PLANT			15		17	4	3	40		8		13	100	
POD	SEED	(not done)												0	
PRW	NATURAL	**PRWR, PRWW AUs**		3			10			10				23	
PRW	PLANT									5				5	
PRW	SEED	(not done)												0	
SBD	NATURAL		10	59	104	13	47	9	37		469		37	784	
SBD	PLANT		43	1,106	306	104	430	609	161		4,458		906	8,121	
SBD	SEED					13	164	11	3		17			208	
SBL	NATURAL	**SBL_, SBLC AUs**										210		210	
SBL	PLANT	(split to maint same AU)										212		212	
SBL	SEED	(not done, poor data)												0	
SBM	NATURAL			63	24	17	21	12			77		30	244	
SBM	PLANT			162	12		385	304	24		566		237	1,689	
SBM	SEED						16	8					30	53	
1	**Grand Total**													**26,839**	

Step 4 result of the above noted changes: Enrichment transitions ADDED HERE IN STEP 4.

Depl. FU	Depleted Treatment	New AU	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM	Grand Total	
BFM	NATURAL	**BFM_**	19	97	83	153	8	58	70	3	1		17	509	updated with regional enrichment data
BFM	PLANT	BFM_	0	2	0	0	5	0	0	0	0		1	8	updated with regional enrichment data
BFM	SEED	BFM_													
CMX	NATURAL	**CMX_**		232	186	49	21	19	113				19	640	
CMX	PLANT	CMX_		407	247	39	322	203	7				299	1,523	
CMX	SEED	CMX_		19	31		206	10					5	270	
HMX	NATURAL	**HMX_**	28	188	247	155	16	18	390					1,042	
HMX	PLANT	HMX_		20	123	42	41	23	109				121	479	
HMX	SEED	HMX_													
HRD	NATURAL	**HRD_, HRDB**	17	100	65	109	50	21	317	7				686	updated with regional enrichment data
HRD	PLANT	HRD_, HRDB	9	86	4	28	21	11	2		11		33	205	updated with regional enrichment data for POD
HRD	SEED	HRD_, HRDB													
HRD	NATURAL	**HRDA**				43								43	
HRD	PLANT	HRDA													
HRD	SEED	HRDA													
PJD	NATURAL	**PJDD, PJDS**		285	250	299	88	92		2	173		74	1,262	
PJD	PLANT	PJDD, PJDS	3	113	13	7	41	49	2	8	75		95	406	updated with regional enrichment data
PJD	SEED	PJDD, PJDS		377	103		2,342	458					194	3,473	TT reduced PRW to 8 ha to be more conservative.
PJM	NATURAL	**PJM_**		123	77	8	31	15	88		181		26	548	
PJM	PLANT	PJM_		39	5	12	67	69			30		44	267	
PJM	SEED	PJM_		8	24		202	7	11				19	272	
POD	NATURAL	**POD_**	88	466	1,156	487			2,681	21				4,898	
POD	PLANT	POD_	9	86	4	28	21	11	2		11		33	205	updated with regional enrichment data
POD	SEED	POD_													TT deleted PRW to be more conservative.
PRW	NATURAL	**PRWR, PRWW**		3			10			10				23	
PRW	PLANT	PRWR, PRWW								5				5	
PRW	SEED	PRWR, PRWW													
SBD	NATURAL	**SBD_**	10	59	104	13	47	9	37		469		37	784	
SBD	PLANT	SBD_	43	1,106	306	104	430	609	161		4,458		906	8,121	
SBD	SEED	SBD_				13	164	11	3		17			208	
SBL	NATURAL	**SBL_, SBLC**										210		210	
SBL	PLANT	SBL_, SBLC										212		212	
SBL	SEED	SBL_, SBLC													
SBM	NATURAL	**SBM_**		63	24	17	21	12			77		30	244	
SBM	PLANT	SBM_		162	12		385	304	24		566		237	1,689	
SBM	SEED	SBM_					16	8					30	53	

Step 5 - Step 4 transitions changed to a percentage of renewal area, with YIELD added: (see FMP-5 PHRT Rules (Default) by PLANFU)

LTMD Task Team consensus on FMP-5 Default PHRT (next tab), after discussion of enrichment

Pre-harvest	Treatment	Depleted AU	BFM		CMX		HMX		HRD		PJD		PJM		POD		PRW		SBD		SBL		SBM		Grand Tot
Forest Unit	Type	(not in FMP-5)	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	IEL	%	YIELD	
BFM	NATURAL	**BFM_**	4	MED	19	LOW	16	MED	30	MED	2	MED	11	MED	14	HIGH	1	LOW					3	MED	100
BFM	PLANT	BFM_			25	LOW					62	MED											13	HIGH	100
BFM	SEED	BFM_																							
CMX	NATURAL	**CMX_, CMXC**			36	LOW	29	MED	8	MED	3	MED	3	MED	18	HIGH							3	MED	100
CMX	PLANT	CMX_, CMXC			27	LOW	16	MED	3	MED	21	MED	13	MED									20	HIGH	100
CMX	SEED	CMX_, CMXC			7	MED	11	MED			76	MED	4	MED									2	MED	100
HMX	NATURAL	**HMX_**	3	MED	18	LOW	24	MED	15	MED	1	MED	2	MED	37	HIGH									100
HMX	PLANT	HMX_			4	LOW	26	MED	9	MED	9	MED	5	MED	23	HIGH							24	HIGH	100
HMX	SEED	HMX_																							
HRD	NATURAL	**HRD_, HRDB**	2	MED	15	LOW	9	MED	17	MED	7	MED	3	MED	46	HIGH	1	MED							100
HRD	PLANT	HRD_, HRDB	4	MED	43	LOW	2	MED	14	MED	10	MED	5	MED	1	HIGH		0	5	MED		0	16	HIGH	
HRD	SEED	HRD_, HRDB																							
HRD	NATURAL	**HRDA**							100	MED															100
HRD	PLANT	HRDA																							
HRD	SEED	HRDA																							
PJD	NATURAL	**PJDD**			23	LOW	20	MED	23	MED	7	MED	7	MED					14	MED			6	MED	100
PJD	PLANT	PJDD	1	MED	28	MED	3	MED	2	MED	10	MED	13	MED			2	HIGH	18	MED			23	HIGH	100
PJD	SEED	PJDD			11	MED	3	MED			67	MED	13	MED									6	MED	100
PJM	NATURAL	**PJM_**			22	LOW	14	MED	1	MED	6	MED	3	MED	16	HIGH			33	MED			5	MED	100
PJM	PLANT	PJM_			15	LOW	2	MED	5	MED	25	MED	26	MED					11	MED			16	MED	100
PJM	SEED	PJM_			3	LOW	9	MED			74	MED	3	MED	4	HIGH							7	HIGH	100
POD	NATURAL	**POD_**	1	MED	10	LOW	24	MED	10	MED					55	HIGH									100
POD	PLANT	POD_	4	MED	43	LOW	2	MED	14	MED	10	MED	5	MED	1	HIGH			5	MED			16	HIGH	100
POD	SEED	POD_																							
PRW	NATURAL	**PRWR, PRWW**			11	LOW					44	MED					45	MED							100
PRW	PLANT	PRWR, PRWW															100	HIGH							100
PRW	SEED	PRWR, PRWW																							
SBD	NATURAL	**SBD_**	1	MED	8	LOW	13	MED	2	MED	6	LOW	1	MED	5	HIGH			59	MED			5	HIGH	100
SBD	PLANT	SBD_	1	MED	14	LOW	4	MED	1	MED	5	MED	7	MED	2	HIGH			55	MED			11	MED	100
SBD	SEED	SBD_							6	MED	80	MED	5	MED	1	HIGH			8	MED					100
SBL	NATURAL	**SBL_, SBLC**																			100	LOW			100
SBL	PLANT	SBL_, SBLC																			100	LOW			100
SBL	SEED	SBL_, SBLC																							
SBM	NATURAL	**SBM_**			26	LOW	10	MED	7	MED	9	MED	5	MED					31	MED			12	HIGH	100
SBM	PLANT	SBM_			10	LOW	1	MED			23	MED	18	MED	1	HIGH			33	MED			14	MED	100
SBM	SEED	SBM_									29	MED	15	MED									56	MED	100

1

Table 31 Post-Harvest Renewal Transition Rules (Default)

Pre-harvest	Treatment	BFM		CMX		HMX		HRD		PJD		PJM		POD		PRW		SBD		SBL		SBM		Total
Forest Unit	Type	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	
BFM	NATURAL	4	MED	19	LOW	16	MED	30	MED	2	MED	11	MED	14	HIGH	1	LOW					3	MED	100
	PLANT			25	LOW		0.00		0.00	62	MED		0.00									13	HIGH	100
	SEED																							
CMX	NATURAL			36	LOW	29	MED	8	MED	3	MED	3	MED	18	HIGH							3	MED	100
	PLANT			27	LOW	16	MED	3	MED	21	MED	13	MED									20	HIGH	100
	SEED			7	MED	11	MED			76	MED	4	MED									2	MED	100
HMX	NATURAL	3	MED	18	LOW	24	MED	15	MED	1	MED	2	MED	37	HIGH									100
	PLANT			4	LOW	26	MED	9	MED	9	MED	5	MED	23	HIGH							24	HIGH	100
	SEED																							
HRD	NATURAL	2	MED	15	LOW	9	MED	17	MED	7	MED	3	MED	46	HIGH	1	MED						0.00	100
	PLANT	4	MED	43	LOW	2	MED	14	MED	10	MED	5	MED	1	HIGH			5	MED			16	HIGH	
	SEED																							
PJD	NATURAL			23	LOW	20	MED	23	MED	7	MED	7	MED					14	MED			6	MED	100
	PLANT	1	MED	28	MED	3	MED	2	MED	10	MED	13	MED			2	HIGH	18	MED			23	HIGH	100
	SEED			11	MED	3	MED			67	MED	13	MED									6	MED	100
PJM	NATURAL			22	LOW	14	MED	1	MED	6	MED	3	MED	16	HIGH			33	MED			5	MED	100
	PLANT			15	LOW	2	MED	5	MED	25	MED	26	MED					11	MED			16	MED	100
	SEED			3	LOW	9	MED			74	MED	3	MED	4	HIGH							7	HIGH	100
POD	NATURAL	1	MED	10	LOW	24	MED	10	MED		0.00		0.00	55	HIGH				0.00				0.00	100
	PLANT	4	MED	43	LOW	2	MED	14	MED	10	MED	5	MED	1	HIGH			5	MED			16	HIGH	100
	SEED																							
PRW	NATURAL			11	LOW					44	MED					45	MED							100
	PLANT															100	HIGH							100
	SEED																							
SBD	NATURAL	1	MED	8	LOW	13	MED	2	MED	6	LOW	1	MED	5	HIGH			59	MED			5	HIGH	100
	PLANT	1	MED	14	LOW	4	MED	1	MED	5	MED	7	MED	2	HIGH			55	MED			11	MED	100
	SEED							6	MED	80	MED	5	MED	1	HIGH			8	MED					100
SBL	NATURAL																			100	LOW			100
	PLANT																			100	LOW			100
	SEED																							
SBM	NATURAL			26	LOW	10	MED	7	MED	9	MED	5	MED					31	MED			12	HIGH	100
	PLANT			10	LOW	1	MED			23	MED	18	MED	1	HIGH			33	MED			14	MED	100
	SEED									29	MED	15	MED									56	MED	100

C - Development of SFMM Strategic Modelling Inputs

Once the default renewal transition rules were built (subsection B, Table 31, and Table FMP-5), they were applied to the current conditions by plan analysis unit (AU) (Step 6). For some forest units certain analysis units were retained and modelled to allow options for the tracking of the area through time for objective measurement (e.g. Upland and lowland cedar, or white birch and other hardwood for BLG forest units). Within each forest unit additional assumptions were made and documented below. Each set of forest unit transitions (11 forest units) by broad treatment type were expanded to reflect the proportional transitions for each of the 17 plan analysis units.

Post-harvest Renewal Transitions to be used in SFMM modelling by Analysis Unit were initially the same as the DEFAULT Post-harvest Renewal Transitions described in Table FMP-5 by forest unit, but with some minor differences. All plan Analysis Units within a forest unit used the same PHRT rules, unless differences are specifically noted below:

- For certain forest units, broad treatments result in two or more productivity classes within a single forest unit. In these cases, the future YIELD projections were combined within the target forest unit and YIELD supported by the data (largest proportion).
- Edits for consistency with future Analysis Units with ecosite or leading species definitions (e.g. white pine renewal to PRWW must result in PRW LOW stratum which is white pine leading).

It was acknowledged that herbicide use was minimal to non-existent during the 2001 – 2020 portion of the renewal data timeframe used for development of the Post-Harvest Renewal Transitions. The low herbicide use was a result of management decisions made at the time, and not due to any limit on herbicides licensed for forestry use, nor lack of verified results confirming the appropriateness of hardwood vegetation control in conifer juvenile stands. This management strategy of minimal herbicide is consistent with FMP desired forest and benefits and is carried forward for the 2024-2034 plan period.

Low herbicide use may be considered in BFM (plant), CMX (plant and seed), PJD (natural, plant and seed), PJM (plant and seed), PRW (plant), SBD (plant) and SBM (plant and seed).

Poor transition data, or data changed to reflect realistic silvicultural strategies for this 2024-2034 plan period, were addressed through revisions to transitions by analysis unit for strategic model inputs (not adjustment to default PHRT). Since these changes to address poor transition data was supported by regional data or changes to the historic silvicultural program, no subsequent monitoring program will be required. Summary of Post-Harvest Renewal Transition Rules for SFMM strategic modelling is recorded in Table 32.

Table 32 Summary of FMP Post-Harvest Renewal Transitions by Analysis Unit for Strategic Modelling

Step 6 - FMP-5 (Step 5) transitions expanded by AU for SFMM Modelling Inputs

Future Analysis Unit:

Depleted AU	Treatment	BFM_		CMX_		CMXC		HMX_		HRDA		HRDB		HRD_		PJDD		PJDS		PJM_		POD_		PRWR		PRWW		SBD_		SBL_		SBLC		SBM		Grand To
	Type	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	
BFM_	NATURAL	4	MED	19	LOW			16	MED					30	MED	2	MED			11	MED	14	HIGH			1	LOW		0				0	3	MED	100
BFM_	PLANT		0	25	LOW				0						0	62	MED				0		0		0		0						0	13	HIGH	100
BFM_	SEED	0	0	0	0			0	0					0	0	0	0			0	0	0	0	0	0	0	0									
CMX_	NATURAL		0	36	LOW			29	MED					8	MED	3	MED			3	MED	18	HIGH		0		0		0		0		0	3	MED	100
CMX_	PLANT		0	27	LOW			16	MED					3	MED	21	MED			13	MED		0		0		0		0		0		0	20	HIGH	100
CMX_	SEED		0	7	MED			11	MED						0	76	MED			4	MED		0		0		0		0		0		0	2	MED	100
CMXC	NATURAL		0			36	LOW	29	MED		0		0	8	MED	3	MED		0	3	MED	18	HIGH		0		0		0		0		0	3	MED	100
CMXC	PLANT		0			27	LOW	16	MED		0		0	3	MED	21	MED		0	13	MED		0		0		0		0		0		0	20	HIGH	100
CMXC	SEED		0			7	MED	11	MED		0		0		0	76	MED		0	4	MED		0		0		0		0		0		0	2	MED	100
HMX_	NATURAL	3	MED	18	LOW			24	MED					15	MED	1	MED			2	MED	37	HIGH		0		0		0		0		0		0	100
HMX_	PLANT		0	4	LOW			26	MED					9	MED	9	MED			5	MED	23	HIGH		0		0		0		0		0	24	HIGH	100
HMX_	SEED	0	0	0	0			0	0					0	0	0	0			0	0	0	0	0	0	0	0									
HRDA	NATURAL		0						0	100	MED						0				0		0		0		0		0		0				0	100
HRDA	PLANT	0	0	0	0			0	0					0	0	0	0			0	0	0	0	0	0	0	0									
HRDA	SEED	0	0	0	0			0	0					0	0	0	0			0	0	0	0	0	0	0	0									
HRDB	NATURAL	2	MED	15	LOW			9	MED		0	17	MED			7	MED		0	3	MED	46	HIGH	1	MED		0		0		0				0	100
HRDB	PLANT	4	MED	43	LOW			2	MED		0	14	MED			10	MED		0	5	MED	1	HIGH		0			5	MED		0			16	HIGH	
HRDB	SEED	0	0	0	0			0	0					0	0	0	0			0	0	0	0	0	0	0	0									
HRD_	NATURAL	2	MED	15	LOW			9	MED					17	MED	7	MED			3	MED	46	HIGH	1	MED		0		0		0				0	100
HRD_	PLANT	4	MED	43	LOW			2	MED					14	MED	10	MED			5	MED	1	HIGH		0			5	MED		0			16	HIGH	
HRD_	SEED	0	0	0	0			0	0					0	0	0	0			0	0	0	0	0	0	0	0									
PJDD	NATURAL		0	23	LOW			20	MED					23	MED	7	MED			7	MED		0		0			14	MED		0			6	MED	100
PJDD	PLANT	1	MED	28	MED			3	MED					2	MED	10	MED			13	MED		0	2	HIGH			18	MED		0			23	HIGH	100
PJDD	SEED		0	11	MED			3	MED						0	67	MED			13	MED		0		0		0		0		0			6	MED	100
PJDS	NATURAL		0	23	LOW			20	MED		0		0	23	MED			7	LOW	7	MED		0		0		0	14	MED		0			6	MED	100
PJDS	PLANT	1	MED	28	MED			3	MED		0		0	2	MED			10	LOW	13	MED		0	2	MED		0	18	MED		0			23	MED	100
PJDS	SEED		0	11	MED			3	MED		0		0		0			67	LOW	13	MED		0		0		0		0		0			6	MED	100
PJM_	NATURAL		0	22	LOW			14	MED					1	MED	6	MED			3	MED	16	HIGH		0			33	MED		0			5	MED	100
PJM_	PLANT		0	15	LOW			2	MED					5	MED	25	MED			26	MED		0		0			11	MED		0			16	MED	100
PJM_	SEED		0	3	LOW			9	MED						0	74	MED			3	MED	4	HIGH		0		0		0		0			7	HIGH	100
POD_	NATURAL	1	MED	10	LOW			24	MED					10	MED		0				0	55	HIGH		0				0		0				0	100
POD_	PLANT	4	MED	43	LOW			2	MED					14	MED	10	MED			5	MED	1	HIGH		0			5	MED		0			16	HIGH	100
POD_	SEED	0	0	0	0			0	0					0	0																					
PRWR	NATURAL		0	11	LOW				0						0	44	MED				0		0	45	MED		0		0		0				0	100
PRWR	PLANT		0		0				0						0		0				0		0	100	HIGH		0		0		0				0	100
PRWR	SEED	0	0	0	0			0	0					0	0																					
PRWW	NATURAL		0	11	LOW				0		0		0		0	44	MED		0		0		0			45	LOW		0		0				0	100
PRWW	PLANT		0		0				0		0		0		0		0		0		0		0			100	LOW		0		0				0	100
PRWW	SEED	0	0	0	0			0	0	0	0	0	0	0	0																					
SBD_	NATURAL	1	MED	8	LOW			13	MED					2	MED	6	LOW			1	MED	5	HIGH		0			59	MED		0			5	HIGH	100
SBD_	PLANT	1	MED	14	LOW			4	MED					1	MED	5	MED			7	MED	2	HIGH		0			55	MED		0			11	MED	100
SBD_	SEED		0		0				0					6	MED	80	MED			5	MED	1	HIGH		0			8	MED		0				0	100
SBL_	NATURAL		0		0				0						0		0				0		0		0		0		0	100	LOW				0	100
SBL_	PLANT		0		0				0						0		0				0		0		0		0		0	100	LOW				0	100
SBL_	SEED	0	0	0	0			0	0					0	0	0	0			0	0	0	0	0	0	0	0									
SBLC	NATURAL		0		0				0		0		0		0		0		0		0		0		0		0		0			100	LOW		0	100
SBLC	PLANT		0		0				0		0		0		0		0		0		0		0		0		0		0			100	LOW		0	100
SBLC	SEED	0	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SBM_	NATURAL		0	26	LOW			10	MED					7	MED	9	MED			5	MED		0		0			31	MED		0			12	HIGH	100
SBM_	PLANT		0	10	LOW			1	MED						0	23	MED			18	MED	1	HIGH		0			33	MED		0			14	MED	100
SBM_	SEED		0		0				0						0	29	MED			15	MED		0		0				0		0			56	MED	100

D – Renewal Costs

Renewal costs allow for silviculture budgets to be set within the model. As in past plans, there are three basic renewal options that SFMM (the model) can strategically apply. The first, regeneration through natural processes such as seeding, root suckering, and coppice growth (treatment = Natural). Natural regeneration on the Whiskey Jack Forest does fairly well as majority of sites have high conifer content and through harvesting many seed cones are left. However, natural regeneration is primarily applied to hardwood stands and lowland spruce. The second possibility is regeneration through planting of conifer species (pine and spruce) to achieve the desired conifer forest unit. The third option is regeneration through aerial seeding to jack pine. These three basic regeneration methods have been included in the model and through the development of the post-harvest renewal transition rules (PHRT).

These renewal costs were generalized based on the broad treatment type (Natural, Plant, Seed). A fixed cost was applied to all treatment combinations to account for administration, disposal of roadside slash, and surveys. This administrative cost is the only cost applied to natural regeneration. Planting costs vary depending on the planting density, species, and whether mechanical site preparation is needed. Whether seeding or planting, an additional cost may be applied for the application of herbicide. This additional cost has been applied to specific AUs which have a hardwood component and are modelled to transition to a conifer dominant stand. Application of the herbicide will allow the unrestricted growth of the desired crop species through the limiting of the advanced hardwood regeneration.

Renewal transitions were reviewed by analysis unit, and the most likely treatment package was estimated based on the starting condition (pre-harvest) and the desired future condition (post-renewal). The generalized costs associated with the treatment combinations are in Table 33. These same costs area applied through each plan period and are not adjusted for inflation.

Table 33 Post-Harvest Renewal Transition Estimated Costs

Note: Costs were reviewed and revised March 2023 after pause in LTMD development.

Analysis Unit	Renewal Costs ($/ha)		
	Natural	**Plant**	**Seed**
BFM_	91.30	1351.90	
CMX_	91.30	1423.18	514.80
CMXC	91.30	1423.18	514.80
HMX_	91.30	1131.46	
HRDA	91.30	1131.46	
HRDB	91.30	1131.46	
HRD_	91.30	1131.46	
PJDD	206.80	1351.90	514.80
PJDS	168.30	1351.90	514.80
PJM_	91.30	1351.90	514.80
POD_	91.30	1131.46	
PRWR	91.30	1428.90	
PRWW	91.30	1428.90	
SBD_	91.30	1423.18	437.80
SBL_	91.30	988.90	
SBLC	91.30	795.30	
SBM_	91.30	1423.18	514.80

6.2.3.4 Renewal Revenues and Timber Harvesting Costs

Harvesting costs were not used in the SFMM modelling.

Renewal revenues in strategic modelling are the contributions to the Forest Renewal Trust Fund (FRTF) on a per-cubic metre of harvested wood basis (by tree species). Renewal revenue rates do not represent real timber prices, or mill-gate values of wood harvested. The renewal trust fund contribution rate per cubic metre of harvested wood is $8.93 for red pine and white pine, $6.30 for spruce-pine-fir and larch, $3.15 for cedar, $1.58 for lowland hardwood, and $1.58 for upland hardwoods. Change through inflation factors and changes between planning periods are not accounted for in any model runs. The renewal rates that were modelled were sufficient for future forest projections as they were based on past FRTF contribution rates, increased to the level appropriate to achieve management objectives in this plan. The FRTF rates are set annually, and no others scoping of renewal rates was required. Stumpage values (renewal revenues) and species groups are documented in Table 34.

Table 34 Tree Species and Associated Renewal Revenue

Tree Species	Product	Stumpage Values	Harvesting Costs
Bf	All	6.30	0.00
Bw	All	1.10	0.00
Ce	All	3.15	0.00
La	All	6.30	0.00
LH	All	1.58	0.00
Pj	All	6.30	0.00
Po	All	1.10	0.00
Pr	All	8.93	0.00
Pw	All	8.93	0.00
Sb	All	6.30	0.00
Sw	All	6.30	0.00
UH	All	1.58	0.00

Renewal revenues are applied to the full projected volumes estimated in the strategic modelling. It is recognized that the actual FRTF contribution rate is based on the MNRF calculation of scaled "full" utilization that is lower than the close utilization volumes. This difference is expected to be offset by the difference between silviculturally treating the full available harvest area (AHA – strategically modelled) and the actual treatment of only the net harvest area, less the standing residuals (AOC, wildlife trees) or untreatable sites such as roads and landings.

6.2.3.5 Areas Reserved from Harvesting

Areas reserved from harvesting are represented as percentages of harvest area which is not harvested but transferred to reserved forest classes. SFMM tracks reserved forest classes throughout the remainder of the planning horizon, as they accumulate area and increase in age.

Estimated riparian reserve (lake and streams) were estimated for each forest unit using slope based Digital Elevation Model, confirmed at the onset of planning, and included in the Base Model Inventory (BMI)(Section 6.2.1). This inclusion of estimated reserve area for modelling purposes reflects the "best estimated available information" to the Planning Team. No additional estimated riparian reserves were required, beyond the areas included in the SFMM initial land base. All riparian reserves were classified as "EstRes" in SFMM.

Estimated reserves around bird nests (outside of riparian areas) were not included in the initial land base due to the potential that locations of the value will change on the landscape over time. Nests were estimated by forest unit base on geographic locations of current 2022 nest values and reserve prescriptions. Estimated Nest reserves are included in the calculation below.

Some inoperable area typically is left during harvest operations on the Whiskey Jack Forest due to difficult terrain or shallow or unmerchantable forest conditions. This area was approximated to be 3% of the harvest area. It was not possible to geographically identify these areas for the initial SFMM land base, therefore a percentage for accumulating inoperable areas was added into this Areas Reserved calculation, applied to all forest units equally.

The estimated reserves from the initial land base, the area-based unharvested volume percentages, and the target percentages for landscape pattern (Stand and Site Guide) were compared to determine if additional residual (AcRes) reserve percentages were required in the SFMM modelling.

The Stand and Site Guide requires that insular and peninsular residual area be retained in or adjacent to harvest area in specific patch sizes and spatial concentrations. Past forest management plans and operational planning support that harvest practices on the Whiskey Jack Forest typically meet SSG requirements without the need to leave additional residual patches of standing trees. Therefore, strategic modelling did not include additional areas accumulating as reserve forest to meet this SSG requirement. During FMP Stage Three, Operational Planning, the spatial layout of harvest areas will be analyzed and additional residual area will be planned, if warranted.

Calculations for the Areas Reserves from Harvesting are included in Table 35.

Accumulating reserves may apply to first rotation (i.e. 20 years to complete the first rotation in the area eligible for forest operations), but are not further deducted during second harvest. The summary of the resulting SFMM inputs for Areas reserved from Harvesting are included as Table 36.

Table 35 Calculation for Additional Accumulating Reserve Residual Required

Forest Unit:	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM	Total		
Est. Additional Nest Reserve Ha.	156	410	422	649	125	71	475	29	184	104	208	2,833	<==	Calculated additional reserve area around current bird nest
Est. Additional Nest % (from above area)	0.01	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	<==	Calculated additional reserve % for current bird nest values
Est. Additional Inoperable / Bypass %	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	<==	Inoperable or bypassed areas associated with harvest operating blocks
TOTAL Nest and Inop. / Bypass %	**0.04**	**0.03**	**0.04**	**0.04**	**0.03**	**0.03**	**0.04**	**0.04**	**0.03**	**0.03**	**0.03**	**0.03**	**<==**	**SFMM Accumulating Reserve %**
Total Avail. (ha)	24,686	111,397	75,373	78,442	111,659	66,663	45,192	2,106	92,864	55,389	70,557	734,328	<==	Total area in available and estimated reserve (OWN=1, not including ProtF)
Total Riparian Reserve (ha)	**4,468**	**17,007**	**12,820**	**13,343**	**9,579**	**7,752**	**6,481**	**392**	**8,311**	**10,072**	**8,489**	**98,713**	<==	Total estimated riparian (reserve in initial land base)
Ripar Reserve %	0.18	0.15	0.17	0.17	0.09	0.12	0.14	0.19	0.09	0.18	0.12	0.13	<==	Est. Reserved percent of available land base (less ProtF).
Total Estimated Residual Area being retained	**0.22**	**0.18**	**0.21**	**0.21**	**0.12**	**0.15**	**0.18**	**0.23**	**0.12**	**0.21**	**0.15**	**0.16**	<==	Estimated reserve and inoperable/bypass area being left unharvested (%)
Est. SSG Target	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**		
Add'l RESID% required in SFMM?	**-0.16**	**-0.12**	**-0.15**	**-0.15**	**-0.06**	**-0.09**	**-0.12**	**-0.17**	**-0.06**	**-0.15**	**-0.09**	**More area is being left unharvested in and adjacent to harvest areas than required by the Stand and Site Guide.**		
	NO	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**			

Nest and Inoperable / Bypass % to be added to SFMM Accumulating Reserve %. No additional accumulating area is required to be included in the modelling to account for residual patch retention required by the Stand and Site Guide.

Stand and Site Guide Direction:

Pg. 19

25 ha	residual in 500 ha circle (mapped, greater than 0.1 ha in size).
5 ha	of the above 25 ha must be in patches of greater than or equal to 5 ha.
	- equals 5% and includes adjacent stands that are at least 10 m tall or older than 20 years.
	- expect this residual will be met through AOCs, inoperable areas and adjacent unallocated stands.
0.5 ha	residual in 50 ha circle (mapped, greater than 0.1 ha in size).
	- equals 1% but includes adjacent stands that are at least 10 m tall or older than 20 years.
	- may be met through estimated inoperable areas, nest reserves, etc.
	- determine if additional net-down in SFMM modelling required (use unharvested volumes if not mapping in advance, use areas reserved if will map in

Decision to map whole harvest areas and then determine inoperable areas and residual as appropriate. Therefore mapped harvest areas will include any estimated inoperable areas and planned harvest area is not amended into the plan if additional residual or inoperable areas are retained within the harvest blocks than estimated. Likewise, if guide residual requirements are met and less inoperable area is encountered than strategically estimated, the company will harvest the harvest blocks more fully.

Pg. 21

>= 25	wildlife trees per ha on average (>= 10 cm dbh), NOTE: only portion are live, see Volumes Left Unharvested worksheet.
>= 10	large wildlife trees or stubs on average per ha (>= 25 cm dbh) of which a minimum of 5 must be living.
	- wildlife trees must be well dispersed with a minimum of 15 trees per ha (other 10 trees per ha may be clumped).

Table 36 Summary of SFMM Inputs for Areas Reserves from Harvesting

SFMM Inputs for: AREAS RESERVED FROM HARVESTING

Forest Unit	Reserve Type	Planning Period: T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16
BFM	AccRes	0.04	0.04														
CMX	AccRes	0.03	0.03														
HMX	AccRes	0.04	0.04														
HRD	AccRes	0.04	0.04														
PJD	AccRes	0.03	0.03														
PJM	AccRes	0.03	0.03														
POD	AccRes	0.04	0.04														
PRW	AccRes	0.04	0.04														
SBD	AccRes	0.03	0.03														
SBL	AccRes	0.03	0.03														
SBM	AccRes	0.03	0.03														

AcRes Percentages applied to all areas eligible for operations (Terms 1-2 only) No additional DCHS accumulating reserves.

6.2.3.6 Conversion of Harvested Areas to Non-Forest Land

SFMM inputs contain rates of harvest area converting to non-forested land. These rates represent the portion of harvested area that is not regenerated back to forested land but transfer to another non-forest polygon type. These areas are the result of the development of primary and branch roads and operational landings; and are used to reduce the potential available future harvest area by forest unit. This input does not include an allowance for operational roads that will be constructed and decommissioned promptly after forest management activities are complete.

The majority of the Whiskey Jack Forest (area eligible for forest operations) is reasonably well-accessed at Plan Start. The western caribou zone (SMZ CAR1) is less accessed, however it is not eligible for operations in this FMP, therefore model inputs do not reflect operations nor loss of forested area to non-forest.

Considerations for calculation of Conversion to Non-Forest:

- accounts for loss to non-productive area during next 20 years when the zone eligible for forest operations is expected to be fully accessed with primary or branch road access.
- 1 km of road covers approx. 4 ha. (40m ROW x 1000 m = 40,000 m2 or 4 ha/km of road)
- For reference, the **2012 FMP** used a Loss of 1% (all forest units) to Roads and Landings. Loss occurred for 30 years in non-caribou zone, and 120 years in caribou zone). Area projections are similar in 2024 FMP, but with revised timelines and deletion of inputs for the timed DCHS zone.

The projected loss of harvested area to non-forest, through road development, is set at 1% for the all forest units (Table 37). The loss for roads and landings applies to the initial harvest of NAT areas, and is not applicable to future second harvests of these areas (managed stands classified as LOW, MED, or HIGH).

Table 37 Conversion of Harvested Area to Non-forest Land

All Eligible SUs		Planning Period:															
20 years		T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16
RdLdg	All Forest Units	**0.01**	**0.01**	0	0	0	0	0	0	0	0	0	0	0	0	0	0

6.2.3.7 Strategic (Biological) Forest Renewal Limits by Proportion

Forest renewal limits by proportion are set in the Base Model to represent biological limitations to implementing renewal treatments on the forest. Renewal treatments include (a) leave for natural regeneration, (b) planting and/or (c) seeding treatments, all with or without tending.

The first biological constraints added to the Base Model are ecologically site related, and not related to funding or desired future forest condition. The only biological limits included related to maximum proportions for planting related to shallow sites or ecosite-based limitations to the success of planting as calculated for the post-harvest renewal transitions (e.g. off-site hardwood being planted to conifer)(Section 6.2.3.3). These biological renewal limit inputs are included in the base SFMM model and all subsequent runs (Table 38).

Table 38 Biological Limits to Renewal Treatments (Ecological)

Minimum Proportion of Forest Unit Renewed with Silvicultural Intensity

FU	Treatment	Min. Proportion	Justification for Percentages
			No minimum limitations in BASE Model, Base01
			No minimum limitations in LTMD-00

Maximum Proportion of Forest Unit Renewed with Silvicultural Intensity

Biological Limits:

FU (AU)	Treatment	Max. Proportion	Justification for Percentages in Base Model
CMX_	Plant	0.50	Plant success biologically limited on hardwood-dominated sites, without herbicide (where hardwood off-site).
HMX, HRD, POD	Plant	0.25	
PJDS	Plant	0.30	Site limitations (shallow)

Management Limits *(Added into 00_Base Model, and carried into LTMD-00 development runs)*

FU (AU)	Treatment	Max. Proportion	Justification for Percentages in 00_Base and LTMD-00
BFM_	Natural	0.30	Reflects average renewal strategy for Whiskey Jack Forest.
CMX_	Natural	0.50	More Natural approporiate for CMX due to hardwood component.
PJDD, PJDS	Natural	0.30	
PJM_	Natural	0.30	Less Natural for Red Pine and White Pine stands. PRW projected to receive more intensive PR-PW renewal efforts to maintain PRW with limited herbicide.
PRWR, PRWW	Natural	0.25	
SBD_, SBM_	Natural	0.30	

Additional Forest Renewal limits are addressed with additional management constraints added to reflect common local practices or to force the model to do (or not do) specific treatments. These management decisions are not in the Base Model, and are discussed in Section 9.2.3.3.

6.2.3.8 Mid-rotation Tending and Non-forest Rehabilitation Options

Juvenile spacing is conducted as a component of stand establishment and was considered during the refinement of the post-renewal forest succession treatment costs and forest unit transitions (Section 6.2.3.3). No juvenile spacing, pre-commercial or commercial thinning options are included in the strategic modelling as none are operationally implemented on the management unit.

6.2.4 Wood Supply

Not Used - This SFMM input allows the user to control projections of species/products from subunits (sources) to destination mills or markets. The cost of getting wood to a mill may be controlled. This set of inputs was not used, and there are no strategic options used in this FMP modelling to manage wood flow geographically.

6.2.5 Base Model and LTMD Management Options

The management options inputs are used to define current policies, practices, targets, and strategies that apply to specific forest management situations in investigations or development of the Long-Term Management Direction. Inputs related to management decisions are discussed in the following sub-sections. Various inputs were used to define specific scoping investigations and also were added through development of the Proposed LTMD to aid in projections of forest sustainability or objective achievement.

6.2.5.1 Silvicultural Budgets, Distribution and Discount Rates

The base model did not include any constraints to renewal budgets. It allowed all necessary silvicultural expenditures to be projected ("infinite" budget). Certain scoping scenarios and the LTMD do limit the renewal expenditures to the level generated by revenues to the Forest Renewal Trust Fund based on projected harvest volumes per 10-year period, all subunits combined.

6.2.5.2 Management Objective Targets Represented in the Base Model

The following inputs were included in the Base Model to create a framework in .h specific management objectives could be controlled:

Sub-Unit Harvest and Renewal Operability Timing - This input is used to prevent scheduling of harvest and silviculture in an entire subunit during a specific planning term. Subunits (SU) in SFMM modelling are the same as the OMZs in the Base Model Inventory.

Timing of subunit operations were included in the modelling to allow for:

- Prohibiting operations in SMZA and CAR1 in all terms, as per the district management decision;
- Delays in harvest of LLP1 and LLP2 by 20 years (T1, T2) for landscape pattern;
- Reflecting management agreements to clean up OMZ LLP3 in this plan period (T1), followed by 60 years closed (T2-T7);
- CAR2 timing for operations for 20 years (T1, T2), then none for 80 years (T3-11), then open for 20 years (T12-13), then closed to reflect DCHS "B" block timing.

Rationale for timing of caribou DCHS block CAR2 is included in Appendix 1. Subunit timing for the Base Model, and all subsequent SFMM runs, is shown in Table 39.

See Appendix 1 – Caribou Habitat Analyses for a description of the development of the Dynamic Caribou Habitat Schedule. This subunit timing was sufficient to address caribou habitat through time, as well as provide for a sustainable harvest through time.

Table 39 Sub-Unit Harvest and Renewal Operability Timing

Eligible for operations (green) | 1 Not eligible for operations (red)

SU:	Caribou	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16
MEA1	NO																
MEA2	NO																
MEA3	NO																
DEA1	NO																
CAR1	YES	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CAR2	YES			1	1	1	1	1	1	1	1			1	1	1	1
LLP1	NO	1	1														
LLP2	NO	1	1														
LLP3	NO		1	1	1	1	1	1									
SMZA	NO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
LOTW	NO																
H105	NO																

Non-Declining Growing Stock – For the last period of the modelling horizon, total growing stock from the available forest (applied to AllOP subunit group) was not allowed to decline below 18 million cubic metres. This control in the Base Model forced SFMM to not project extremely high harvest levels in the last planning period. Strategic models will often maximize harvest volume in late planning periods when the value to retain certain forest types, or old growth forest, or need for harvest volume in future plan periods, is not evident. This is often referred to as the "end of the world" scenario. This was controlled in SFMM with a growing stock flow control.

Harvest Area Limits by Forest Unit – Since Black Ash is a Species At Risk, the Planning Team agreed that no Black Ash area (HRDA analysis unit) would be planned for harvest in this FMP. Therefore in the Base Model and subsequent LTMD development, a maximum limit of 0 ha of HRDA AU harvest area was added for all 10-year terms in the 160-year planning horizon (T1-T16).

Boreal Landscape Guide Indicator Targets:

Boreal Landscape Guide indicator minimum desirable level targets were included in the Base Model at Term 17 only. This facilitated activation by copying numbers in earlier terms to achieve the desirable levels in subsequent model scenarios. This placeholder added into the Base Model served to confirm early in the strategic modelling process that the Planning Team was using the correct targets for BLG indicators. The targets used for this plan could include either minimum or maximum targets, however only minimum targets (lower interquartile ranges area) were used in this FMP as referenced in Table 40.

NOTE: The T17 target area for Upland Conifer in the Base Model was reduced from 475,260 ha to 450,000 ha to allow the SFMM model to solve. Also the Young Forest area target for T17 was reduced from the lower desirable level of 196,754 ha to 100,000 ha.

Table 40 Boreal Landscape Guide Indicator Targets

Minimum areas are the lower IQR as calculated by OLT.			
Indicator:	Abbreviation	Minimum Area (ha)	Applies to:
Caribou - Winter (Combined)	Cw	63,721	CAR zone only
Caribou - Refuge	Cr	147,605	CAR zone only
Landscape Classes:	PSp		
Pre-/Sapling	PSp	na	Entire forest
Imm Con	Icn	na	Entire forest
Imm Hwd	Ihd	na	Entire forest
Mature-Late Balsam Fir	MLb	8,706	Entire forest
Mature-Late Lowland Conifer	MLl	12,845	Entire forest
Mature-Late Upland Conifer	MLc	178,461	Entire forest
Mature-Late Hardwood & Mixedwood	MLh	43,021	Entire forest
Old Growth - Lowland Conifer	OGloC	4,282	Entire forest
Old Growth - Upland Conifer	OGupC	51,310	Entire forest
Old Growth - Hardwood & Mixedwood	OGhmx	35,996	Entire forest
Old Growth - Red Pine - White Pine	OGprw	incr (above 195 ha)	Entire forest
All ages Red Pine - White Pine (forest unit area)	PRW	incr (above 2491 ha)	Entire forest
Upland Conifer (Pure)	PurCn	475,260	Entire forest
Young Forest	Young	196,754	Entire forest

The following Boreal Landscape Guide indicators were not required to be part of the Base Model, however these indicators were set up to facilitate later use with management objective achievement controls during model investigations and development of the LTMD scenario.

Landscape Class Area targets were all minimum area targets, and the Planning Team was satisfied that they had met the direction from the Boreal Landscape Guide which was supported by the best available science as recorded in Ontario's Landscape Tool (OLT).

Old Growth Area - Old growth groupings were included in SFMM inputs using definitions consistent with the regionally recommended groupings. Old growth onset and duration ages were varied by analysis unit, and are consistent with both the Old Growth Policy and with calculations in Ontario's Landscape Tool. Old growth area targets were included in various investigations and the Long-term Management Direction.

All Ages Red Pine and White Pine Area – This indicator tracks the area of the PRW forest unit through time (all ages). No specific target was prescribed as the general target was to increase PRW area towards 46,940 ha long-term (whole forest).

Upland Conifer Area (Jack Pine and Spruce) was defined as area of the PJD, PJM, SBD and SBM PLANFUs, which is consistent with the definition used in Ontario's Landscape Tool (OLT) model provided desirable levels for this indicator.

Young Forest Area is all area <36 years old, consistent with definitions calculated in Ontario's Landscape Tool (OLT) model which provided the desirable level for this indicator.

Note: Minor variation in SFMM classification is expected as compared to BLG indicator classification occurs where 1 year shifting has occurred to match SFMM 10-year age classes. For example, Young Forest is <36 years old, whereas in SFMM we much count 50% of the 31-40 year age class (plus 100% of the 1-10, 11-20, and 21-30 year classes). Another example is the onset of Mature-Late Balsam Fir is 60 years in the BLG, whereas SFMM shifts 1 year to the nearest age class (61-70 and older).

6.2.5.3 Timber Volume Species Group Definitions & Harvest Flow Policies

Timber volume species groups included in the strategic modelling reflect the volume species groups used by the Forest Resource Assessment Policy required for this 2024 FMP.

This SFMM input is used to define harvest volume by groupings of timber species. For the Whiskey Jack Forest FMP, Spruce-Pine-Fir (SPF), Poplar (PO) and White Birch (BW) were defined as major species groups and reported. Major harvest volume group definition inputs for SFMM are documented in Table 41. Red Pine and White Pine volume (PWR), though not considered a major species group on the forest, is included and reported in this plan. Also PRW is an area indicator as the increase of red pine and white pine to pre-industrial conditions is a long-term objective on the forest.

Other Conifer (OC) and Other Hardwood (OH) are not major species volume groups on the Whiskey Jack Forest.

Table 41 Major Harvested Timber Species Groups

Species Group Definitions:	Inclusion in a species group denoted by "1", exclusion denoted by "0".											
Species	**Tree Species:**											
Group:	**Pw**	**Pr**	**Pj**	**Sb**	**Sw**	**Bf**	**Ce**	**La**	**Po**	**Bw**	**UH**	**LH**
PWR	1	1	0	0	0	0	0	0	0	0	0	0
SPF	0	0	1	1	1	1	0	0	0	0	0	0
PO	0	0	0	0	0	0	0	0	1	0	0	0
BW	0	0	0	0	0	0	0	0	0	1	0	0
TOTAL	1	1	1	1	1	1	1	1	1	1	1	1

For the Base Model, no harvest flow control limits were used. Various harvest volume targets were included in scoping or investigations and the LTMD in order to either define the investigation (investigate achievement of specific volumes per plan period), or to aid in the overall harvest volume achievement of certain runs (see results of investigations in Section 8.3 and LTMD development Section 9.2.3). No individual species targets were included in the Base Model or the LTMD.

6.2.5.4 Timber Values

The LTMD Task Team members determined relative timber values which were set to reflect estimated relative "value" of each tree species' volume. Timber values were constant for all investigations as summarized below. These timber values were included in the Base Model, investigations and development of the LTMD (Table 42). While included in the SFMM scenarios, timber value weighting was not adjusted further to constrain the results between scenarios.

Table 42 Relative Timber Value by Tree Species

Tree Species	Timber Value
Bf	10
Bw	3
Ce	3
La	3
LH	3
Pj	10
Po	10
Pr	7
Pw	7
Sb	10
Sw	10
UH	3

6.2.5.5 Execution Control Options

The following SFMM execution control options used in the Base Model and subsequent runs:

- Simulate forest dynamics with no forest management activities was used with the Base Model during review and testing. Greatest value of timber harvested over the entire planning horizon (unless noted as being changed for a specific investigation) was used in all scenarios with timber harvest.
- Natural succession delayed Term 1
- Natural disturbance delayed Term 1
- Silviculture Spending Limit equal limited to Stumpage Revenues (all subunits combined)
- No "deferred" areas. Harvest controlled by subunit timing.
- A general constraint on change in SBL harvest area of +/- 30% between 10-year terms was included in the Base Model and all other scenarios (see Section 9.2.3.2).
- The Black Ash analysis unit (HRDA) was eliminated from harvest (max. 0 ha, AllSU combined) in all terms T1-T16 in response to it being a Species At Risk (see Section 9.2.3.2 Harvest Area Limit by Forest Unit).
- (Selection harvest was excluded).

6.2.6 Assembly and Calibration of the SFMM Base Model Land Base

After the Base Model Inventory was completed, the various land base classifications were sorted to ensure the initial land base was entered correctly into the SFMM for use in investigations and the development of a Long-term Management Direction for the Whiskey Jack Forest. This SFMM initial land base was reconciled to Tables FMP-1 and FMP-3 (Table 43).

As referenced in Section the areas of Ownerships 2-3-4-6-8-9 are non-Crown ownerships and are not eligible for forest management activities, nor do they contribute to achievement of Boreal Landscape Guide indicators (non-timber objectives). These areas were included as “non-forest” categories, to ensure the hectares were represented, but that they did not contribute to any projected objective achievement. This complete land base import was done to facilitate the reconciliation of the strategic modelling land base for the entire Whiskey Jack Forest.

The SFMM model initial land base totalled 1,063,318 ha and the total land base in the Base Model Inventory totals 1,063,319 ha. Crown Productive forest (Owner=1 “Managed”, and “Other” Owner= 5, 7) in Table FMP-1 equals 782,338 ha, and matches the 782,337 ha in the SFMM initial land base (Available + Reserve land, difference of 1 ha).

The second step in reconciling the SFMM initial land base involved a check of the SFMM calculation of the Plan Start 2024 areas for BLG indicators, versus the calculation by Ontario’s Landscape Tool using the Base Model Inventory. This check ensured that the Analysis Unit and 10-year age class definitions for BLG indicators used in SFMM did count areas comparable to those calculated by OLT (Section 6.2.2.7)(Table 44).

During this SFMM to OLT check of BLG indicators, most indicators had similar Plan Start 2024 areas projected by SFMM as were measured by OLT with the BMI. Indicator areas for Landscape Class area, Old Growth area groupings, Red Pine – White Pine area, Young Forest and Caribou Refuge habitat were similar between SFMM and OLT, and where there was a minor variance, the SFMM projection was lower than OLT (conservative approach, acceptable).

Certain indicators were measured more specifically in OLT (to the single year age) versus more generally in SFMM (to the nearest 10-year age class, or to ½ of a 10-year age class). This difference in measurement may account for a ~2% higher plan start value in SFMM for Caribou Winter Combined habitat than evident with OLT. This minor discrepancy is apparent at plan start, but is not expected to impact strategic projections as areas age into older age classes.

The Upland Conifer area indicator was higher in SFMM than OLT, however the SFMM calculation for Plan Start was verified as matching area of the applicable forest units in the BMI (see note under Table 44).

This check confirmed that SFMM projected similar Plan Start areas for BLG indicators, supporting confidence in long-term projections through the modelling horizon.

Table 43 Reconciliation of SFMM Initial Land Base to Tables FMP-1 and FMP-3

Reconciliation of SFMM Initial Land Base to Tables FMP-1 and FMP-3.

SFMM Classification	Area in Hectares SFMM Model	Area in Hectares FMP-1 and FMP-3	Inventory Classification (OWNER, and POLYTYPE)
Available	196,134	196,134	OWNER = 1, POLYTYPE = FOR. Available breakdown from FMP-3.
Reserve (Unavailable)			
Estimated Riparian Reserve - EstRes	26,416	538,195	FMP-3 Estimated Unavailable (incl. riparian/other EstRes, and MgRes (no operations))
Protf	4,057	4,057	FORMOD = PF, OWNER = 1, 5, or 7.
Parks	43,951	43,952	FORMOD =FOR, OWNER = 5 or 7 only.
Management Reserve	507,249	0	
Forested Islands	4,530	0	MGMTCON1 = ISL, OWNER = 1
Reserve (Unavailable) Subtotal	586,203	586,204	
Non-forest and Non-Productive			
Brush & Alder (BSH)	10,390	10,390	POLYTYPE = BSH, OWNER = 1, 5, or 7.
Designated Agricultural Land (DAL)		0	POLYTYPE = DAL, OWNER = 1, 5, or 7.
Grass & Meadow (GRS)	54	54	POLYTYPE = GRS, OWNER = 1, 5, or 7.
Non-forested Islands (ISL)	1,879	1,879	POLYTYPE = RCK, ACCESS1 = ISL, OWNER = 1, 5, or 7.
Open Muskeg (OMS)	38,108	38,109	POLYTYPE = OMS, OWNER = 1, 5, or 7.
Rock (RCK)	23	23	POLYTYPE = RCK, OWNER = 1, 5, or 7.
Treed Muskeg (TMS)	4,483	4,483	POLYTYPE = TMS, OWNER = 1, 5, or 7.
Unclassified Land (UCL)	3,420	3,420	POLYTYPE = UCL, RRW, or BFL, OWNER = 1, 5, or 7.
Water (WAT)	206,013	206,013	POLYTYPE = WAT, OWNER = 1, 5, or 7.
Patent Owner = 2, 3, 4 (PATENT)	9,736	0	
FN Reserve, Federal (Owner = 6, 8) (OTHER)	6,874	0	
Non-Forest Subtotal	280,980	264,371	
	1,063,317	1,046,709	**Total Crown Ownerships 1, 5, and 7.**
PATENT		9,736	Total Patent Ownership = 2, 3, 4
OTHER		6,874	FN Reserve Ownership 6, Federal Ownership 8
TOTAL SFMM AREA	**1,063,317**	**1,063,319**	**TOTAL INVENTORY LAND BASE**

Hierarchy for Classification of SFMM Initial Land Base: (unique sort - once an area is tagged, it is not retagged.)

rder:

Pat - Sort for Patent Land, non-Crown ownership 2, 3 or 4

Other - Sort for Other non-Crown ownerships 6, 8 and 9.

NOTE: Non-Crown ownerships 6, 8, 9, and Patent ownerships 2, 3, 4, all land types, are not included in included in Table FMP-1 and are not included in SFMM calculations (MU area place holder only).

RESERVE - ProtF - Sort for Protection Forest

NON-FOREST - Sort for non-productive forest classes based on POLYTYPE, includes:

ISL	POLYTYPE = RCK and ACCESS1 = ISL (sorted before rock is tagged)		
OMS	Open Muskeg	**DAL**	Designated Agricultural Land
TMS	Treed Muskeg	**UCL**	UCL, PIT, RRW, BFL
BSH	Brush & Alder	**WAT**	Water
GRS	Grass & Meadow	**RCK**	Rock

Sort for unavailable **RESERVE** classifications:

PARKS	Productive Crown park land (ownership 5 and 7)
ISLND	Forested islands (Ownership 1)
Ripar	Estimated slope-based Riparian reserve (includes estimate for shoreline nest reserves)
Access	Classified actual areas with access issues.
MgRes	Classified Management Reserves not otherwise classified as reserve (above).

AVAIL - Remainder of forest available for timber production
- Crown, managed ownership 1 only
- productive, forested land and not otherwise estimated to be reserved from harvest or non-forest.

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Table 44 Reconciliation of Plan Start 2024 BLG Indicators between SFMM and OLT

Comparison of OLT Calculations to SFMM Estimate at Plan Start 2024						
Minimum areas are the lower IQR as calculated by OLT.				00_Base	FMP-10	
Indicator:	Abbreviation	Minimum Area (ha)	Applies to:	**SFMM**	**OLT**	
Caribou - Winter (Combined)	Cw	63,721	CAR zone only	86,255	84,575	higher
Caribou - Refuge	Cr	147,605	CAR zone only	132,854	132,184	close
Landscape Classes:	PSp					
Pre-/Sapling	PSp	na	Entire forest			
Imm Con	Icn	na	Entire forest			
Imm Hwd	Ihd	na	Entire forest			
Mature-Late Balsam Fir	MLb	8,706	Entire forest	14,802	14,784	close
Mature-Late Lowland Conifer	MLl	12,845	Entire forest	46,587	46,556	close
Mature-Late Upland Conifer	MLc	178,461	Entire forest	243,544	244,859	close
Mature-Late Hardwood & Mixedwood	MLh	43,021	Entire forest	143,145	144,335	close
Old Growth - Lowland Conifer	OGloC	4,282	Entire forest	1,071	1,111	close
Old Growth - Upland Conifer	OGupC	51,310	Entire forest	23,536	24,617	close
Old Growth - Hardwood & Mixedwood	OGhmx	35,996	Entire forest	22,603	23,010	close
Old Growth - Red Pine - White Pine	OGprw	incr (above 195 ha)	Entire forest	30	30	match
All ages Red Pine - White Pine (forest unit area)	PRW	incr (above 2491 ha)	Entire forest	3,588	3,587	match
Upland Conifer (Pure)	PurCn	475,260	Entire forest	359,248	349,953	OLT issue
Young Forest	Young	196,754	Entire forest	136,124	136,870	close

Upland Conifer:	OLT issue	- SFMM Upland Conifer area matches the Base Model Inventory total area for PJD, PJM, SBD and SBM forest units.
		- SFMM Upland Conifer area (from generic yield calculation) matches the SFMM total for PJDD, PJDS, PJM_, SBD_ and SBM_ analysis units (that make up the four upland conifer forest units).
		- the same issue with OLT Upland Conifer area has been observed on other forests.
		- it is likely that SFMM is counting the correct area and OLT is missing area.

The LTMD Task Team and Planning Team reviewed the results of the land base import into SFMM and calibration analysis. The SFMM Plan Start 2024 land base was accepted as the starting point for the development of the Whiskey Jack Forest LTMD for the 2024-2034 FMP. Base model inputs were also reviewed and accepted for use in LTMD development.

6.3 Documentation of the Base Model Inventory and Base Model Checkpoint

Progress Checkpoint #3 approval of the Base Model Inventory and the Base Model was received via email from Mitch Legros, R.P.F Regional Planning Forester to Kurt Pochailo, R.P.F., Plan Author and Service Provider Lead on May 9, 2023.

7.0 Documentation of SFMM Model Results

The results of all strategic planning investigations were assessed for projections and implications on forest conditions (forest composition and age structure components), caribou habitat (within the caribou zone), wood supply and other non-timber resources (e.g. landscape class area, old growth forest conditions) for the short-term (10 years), medium-term (20 years) and long-term (100 years).

The investigations and development of the long-term management direction were documented with key investigations included in this analysis package. Investigations are part of the iterative process used in the development of the LTMD, therefore not all of the investigations, or interim steps to build an investigation, were considered noteworthy.

A four-page results summary forms the documentation for the key investigations and includes:

(a) Projections for productive forest and available forest through time;
(b) Boreal Landscape Guide Overview (projections for BLG management indicators);
(c) Projections for harvest area, volumes, and renewal treatment areas/costs;
(d) Breakdown of harvest areas by subunit groups for Years 1-40.

Key investigation results during development of the LTMD are summarized and included in Appendix 7. The summarized results for the Long-term Management Direction (LTMD-01) are summarized in Appendix 8. The Base Model, key investigations, and the Long-term Management Direction are included in electronic modelling files provided to MNRF for review and confirmation. The SFMM modelling files do not form part of the electronic FMP, but are supplied to MNRF for review and verification purposes.

PART 4: MANAGEMENT OBJECTIVES

8.0 Introduction

This section of the Analysis Package documents the information, assumptions, and decisions made during the determination of management objectives during development of the Long-term Management Direction (LTMD).

Required information is included or referenced in the following sub-sections:

(a) Results of the planning team's review of management objectives from the current forest management plan including rationale for decisions to confirm, update or revise existing management objectives;
(b) How background information, specifically recommendations from the Year Five management unit annual report and forest management guides, was considered in the development of management objectives (was Whiskey Jack Forest Year Seven Annual Report according to the FMPM 2009 was used for this review);
(c) Summary of scoping investigations and significant conclusions or results including:
    (i) changes and/or additions that are made to base model inputs and assumptions;
    (ii) results and conclusions that provide rationale for specific management objectives, indicators and desired levels and;
    (iii) a digital copy of a selected model run(s) that best represents each investigation;
(d) Documentation of Management Objectives Checkpoint.

8.1 Review of Objectives from the 2012 FMP

The Planning Team and Local Citizens' Committee reviewed and discussed objectives from the 2012-2024 forest management plan to confirm which objectives were still desired forest and benefits applicable to the 2024 FMP. This review was conducted with information on what mandatory management objective indicators are required by the FMPM 2020 and the *Forest Management Guide for Boreal Landscapes*. Meetings were held in June-July 2021 with representatives from the Kenora LCC, the Red Lake LCC, local First Nation communities, the Métis Nation of Ontario and the Planning Team. These meetings were held to provide participants with background information on the forest, an overview of landscape level guidelines, and to develop a list of desired forest and benefits from the Whiskey Jack Forest. Desired Forest and Benefits included sustainable wood supply, water quality, forest access, protection of identified values, and consideration for tourism and mining sectors.

Management objectives and indicators from the 2012 FMP were reconfirmed as being important, and most were carried forward into the FMP 2024 since indicators in the 2012 FMP were consistent with the (then) earlier draft boreal forest landscape guide. Minor variations in objective wording and indicator groupings occurred, however the strategic direction for the Whiskey Jack Forest was not appreciably changed. Minor changes in objectives or indicators from 2012 to 2024 FMPs are noted below in Table 45 (objective and indicator discussion continues following the table).

Table 45 Review of Management Objectives from the 2012-2024 FMP

Note: Table reflects that at time of objectives review, the FMP was a 2023-2033 FMP.

		Objective wording is subject to review.	
SUMMARY OF MANAGEMENT OBJECTIVES		2012 Indicators in red font may not be included in the 2023 FMP.	
		(FMPM 2009)	**(FMPM 2020)**
CFSA Objective Category	**Indicator**	**in WJF 2012 FMP?**	**Mandatory? (in 2023 FMP)**
Management Objective 1: Caribou Habitat	To maintain forest function for caribou habitat in the Whiskey Jack Forest (caribou zone).		
Forest Diversity – habitat for animal life	(1a) Caribou Winter Habitat Area (forest-related species at risk)	✓ Indicator 3a	✓ required by BLG
	(1b) Caribou Refuge Habitat Area (forest-related species at risk)	✓ Indicator 3a	✓ required by BLG
	(1c) Landscape Pattern (Texture) of Caribou Winter Habitat	✓ Indicator 3c	✓ required by BLG
	(1d) Landscape Pattern (Texture) of Caribou Refuge Habitat	✓ Indicator 3b	✓ required by BLG
	(1e) Conifer Purity in Jack Pine and Black Spruce LGFUs	✓ Indicator 3f	✓ aligns with Caribou Recovery Strategy
	(1f) Amount and arrangement of online caribou habitat (%)	X (supplementary documentation)	✓ required by BLG
	(1g) Planned and actual % of total upland conifer area succesfully regenerated to upland conifer	X	✓ **new** (aligns with Caribou Recovery Strategy)
	(1h) Road density - Kilometres of SFL roads per square kilometre of Crown forest (caribou zone)	✓ Indicator 8a	X (deleted from FMPM) (✓ now caribou zone only)
	% of conifer forest units in the caribou zone.	✓ Indicator 3e	X
Management Objective 2: Forest Composition	To emulate natural forest composition and age classes which includes old growth forest.		
Forest Diversity – forest structure, composition and abundance	(2a) Landscape Class Area - Mature and Late classes (includes various species and age groups) (used for Area of habitat for forest-related species)	✓ Indicator 2a	✓ required by BLG
	(2b) Old Growth Forest (by groupings)	✓ Indicator 2c	✓ required by BLG
	(2c) Area of red pine and white pine forest unit	✓ Indicator 2d	✓ required by BLG
	(2d) Upland Pine and Spruce Area	✓ Indicator 2e	✓ required by BLG
	(2e) Young Forest Area: (<36 years)	✓ Indicator 2b	✓ required by BLG
	Productive area by forest unit and age grouping	✓ Indicator 2b	X (now in Obj 2a)
Management Objective 3: Landscape Pattern	To emulate natural disturbance and landscape patterns characteristic of the Whiskey Jack Forest.		
Forest Diversity – natural landscape patterns	(3a) Landscape Pattern (Texture) of Mature and Old Forest	✓ Indicator 1a	✓ required by BLG
	(3b) Young forest patch size	✓ Indicator 1b	✓ required by BLG
	Landscape pattern - Mature and Old Conifer	✓ Indicator 1c	X (in other indicators)
	Landscape pattern - interior, Marten Core Habitat	✓ Indicator 3d	X (in indicator 3a and 2a above)
Management Objective 4: Wildlife Habitat	To maintain forest function for wildlife habitat in the Whiskey Jack Forest.		
Forest Diversity and Provision of Forest Cover	Habitat for Forest-related Species: (4a) Habitat in Moose Emphasis Areas (if MEAs applicable in 2023 FMP)	X (not objective, MEA in operational planning)	✓ required by FMPM, if MEAs
	(4b) Young Forest Patch Size in Moose Emphasis Areas (if MEAs applicable in 2023 FMP)	X (not objective, MEA in operational planning)	✓ required by FMPM, if MEAs
	Habitat for Forest-related Species at Risk (other than caribou, if strategically modelled and managed)	X	✓ Obj. 1 (others, if modelled)

MANAGEMENT UNIT NAME: Whiskey Jack Forest
PLAN PERIOD: April 1, 2023 to March 31, 2033

FMPM = Forest Management Planning Manual
BLG = Boreal Landscape Guide
Objective wording is subject to review.
2012 Indicators in red font may not be included in the 2023 FMP.

SUMMARY OF MANAGEMENT OBJECTIVES

CFSA Objective Category	Indicator	(FMPM 2009) in WJF 2012 FMP?	(FMPM 2020) Mandatory? (in 2023 FMP)
Management Objective 5: Wood Supply	To provide a predictable and continuous supply of wood to the forest products industry from the Whiskey Jack Forest.		
Social and Economic – Harvest levels, Community well-being	(5a) Managed, Crown forest available for timber production	✓ Indicator 5a	✓ required by FMPM
Social and Economic – Long-term harvest levels	(5b) Long-term projected available harvest area	✓ Indicator 4a	✓ required by FMPM
	(5c) Long-term projected available harvest volume by species group (includes short-term 10-year volume target)	✓ Indicator 4b, 4c	✓ required by FMPM
	(5d) Long-term projected available harvest volume by broad size	X	✓ **new** (required by FMPM)
Social and Economic - Planned harvest levels, Community well-being	(5e) Actual harvest area, by forest unit (% of planned harvest area)	✓ Indicator 4d	✓ required by FMPM
	(5f) Actual harvest volume, by species group (% of planned harvest volume)	✓ Indicator 4e	✓ required by FMPM
Management Objective 6: Indigenous Engagement	To engage during plan development Indigenous communities.		
Social and Economic - Involvement in forest management planning	(6a) Opportunities for involvement of Indigenous communities and Métis Nation of Ontario in plan development	✓ Indicators 6a, 6b	✓ required by FMPM
Management Objective 7: LCC Engagement	To have the Local Citizens' Committees effectively participate in plan development.		
Social and Economic - Community well-being	(7a) Local Citizens' Committee's self-evaluation of its effectiveness in plan development	✓ Indicator 7a	✓ required by FMPM
Management Objective 8: Forest Renewal	To effectively regenerate harvest areas consistent with the regeneration standards outlined in the Silvicultural Ground Rules.		
Silviculture	Percent of harvested forest area assessed as free-growing.	✓ Indicator 9a	X (replaced by 8a)
	(8a) Percent of harvested forest area assessed as successfully established, by forest unit	X	✓ required by FMPM
	8b) Planned and actual percent of harvest area treated, by broad treatment type (wording to be reviewed)	✓ Indicator 9b	✓ required by FMPM
	(8c) Planned and actual percent of area successfully regenerated to the target forest unit, by forest unit.	✓ Indicator 9c	✓ required by FMPM
Management Objective 9: Forest Values	To implement forestry operations in a manner that minimizes negative impacts on all identified resource users, and protects all identified values.		
Ecological Sustainability - Healthy forest ecosystems	(9a) Percent of forest operation inspections in non-compliance, by activity and remedy type.	✓ Indicator 10a	✓ required by FMPM
Management Objective 10: Healthy Ecosystems	To maintain productivity of soil function, and to protect water quality and fisheries habitat where forest management activities occur in the Whiskey Jack Forest.		
Ecological Sustainability – Healthy forest ecosystems	(10a) Compliance with management practices that prevent, minimize or mitigate site damage (% of inspections in non-compliance)	✓ Indicator 11a	✓ required by FMPM
	(10b) Compliance with management practices that protect water quality and fish habitat (% of inspections in non-compliance)	✓ Indicator 11b	✓ required by FMPM

Several management objectives and indicators are streamlined and reorganized as a result of the indicators required by the FMPM 2020 and Boreal Landscape Guide.

- The indicator for Landscape Classes replaces the FMPM 2009 indicators for forest type and age, and areas of wildlife habitat for various wildlife species.
- One indicator for Mature and Older Forest landscape pattern, along with Landscape class areas, replaces previous indicators for marten core areas and Mature-Older Conifer pattern.
- One silviculture/renewal indicator (for "established area") now replaces the previous "free-growing area" indicator from the 2009 FMPM. This reflects the updated direction on assessment of regeneration standards and survey methodology.
- The FMPM 2017 and FMPM 2020 require a new mandatory indicator for long-term volume by broad size class or product group.
- Short-term wood supply, and associated socio-economic benefits, will continue to be managed in the 2024 FMP, but it will not be a separate objective, but rather the plan target for the long-term wood supply objective indicator.

The above changes to Objectives and Indicators of objective achievement were discussed and supported by the Planning Team in June 2021. Then in July 2021, in response to an interest expressed by a local First Nation community, an additional Objective and Indicator (Obj. 11, Indicator 11a) were added for the identification of candidate blueberry harvesting areas in the FMP. Finally, in April 2023, and additional indicator was added with agreement from the Planning Team (Obj. 3 Moose Habitat renamed as Wildlife Habitat) to assess the proportion of Deer Critical Thermal Cover in the DEA, as a percentage of the Stratum 1 habitat in the DEA.

The above initial objectives and indicators, with the additional changes, resulted in 11 management objectives and 35 indicators of objective achievement for this 2024-2034 FMP (Table FMP-10).

8.2 Consideration of Background Information and MNRF Direction

Background information considered during development of management objectives and indicators included forest management guides (including new MNRF forest management manuals, guides and direction), the 2018 Independent Forest Audit recommendations, and Year Seven Annual Report.

MNRF FMP Direction

Since the approval of the 2012 FMP, several major MNRF guidance documents have been revised or prepared that are being implemented on the Whiskey Jack Forest for the first time for this 2024 forest management plan, including the 2017 and 2020 FMPMs. These documents contain new (and many previously measured) indicators of forest sustainability to be included in forest management plan development. Where new indicators are prescribed by new MNRF direction, the indicators may be assessed in association with existing, confirmed management objectives from the 2012 FMP (if appropriate), or be included with new objectives for the 2024 FMP. The documents containing new MNRF direction include:

1. Forest Management Planning Manual (2020)

In accordance with the *Crown Forest Sustainability Act*, forest sustainability will be determined in accordance with the approach described in the FMPM. The *Forest Management Planning Manual* prescribes the requirements for Ontario's forest management planning system including a detailed description of the planning process and the required products. The forest management planning cycle, established by the manual, consists of planning, implementation, monitoring and reporting. Since preparation of the 2012 FMP, the FMP manual was revised in 2017 for implementation starting with 2019 FMP planning teams. The FMPM (2017) requires certain indicators of forest sustainability be included in each forest management plan, and requires that indicators from the Boreal Landscape Guide be included. As noted in Section 8.1, draft BLG indicators were included in the 2012 FMP, so is not a change for this 2024 FMP. Most of the objectives and indicators from the 2012 FMP remain, with minimal change.

2. Forest Management Guide for Boreal Landscapes (2014)

The *Forest Management Guide for Boreal Landscapes* (BLG) provides direction on various aspects of conserving biodiversity at the landscape level. The approved BLG includes a number of guidelines which must be incorporated into the FMP. 2022 Planning Teams must utilize this guide for maintaining or enhancing natural landscape structure, composition and patterns that provide for the long-term health of forest ecosystems in an efficient and effective manner. The Boreal Landscape Guide is supported by a science package developed by MNRF which is considered to be the best available science and information for many of the landscape related indicators. The Planning Team also relied on Ontario's Landscape Tool (OLT) that was developed by MNRF to support the Boreal Landscape Guide for the determination of desirable levels for many management indicators. The OLT projections were considered more appropriate for the forest than just relying on broad descriptions included in the historic forest condition. Again, this does not represent a change for this plan, rather a continuation of early draft direction included in the 2012 FMP.

3. Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales (March 2010)

The Stand and Site Guide was used during preparation of the 2012 FMP, therefore strategic and operational direction in the 2022 FMP is similar to that approved in the 2012 FMP. The Stand and Site Guide provides direction on various aspects of conserving biodiversity at the stand and site levels, including aquatic and wetland habitats and shoreline forests, special habitat features (e.g. bird nests, dens, bat hibernacula), and habitat for species at risk. It also addresses topics like road and water crossing construction and maintenance, category 14 aggregate pits, and soil and water conservation (e.g. rutting, erosion, nutrient loss), and salvage and biofibre harvest operations. While most direction in the Stand and Site Guide is "operational direction" at the stand and site level, the guide contains some landscape level direction that may be applicable in the Long-term Management Direction of a forest management plan. Indicators for moose habitat and young forest patch sizes within a Moose Emphasis Area are included in the LTMD, according to direction in the Stand and Site Guide.

4. Crown Land Use Policy Atlas

Crown Land Use Policy Atlas (CLUPA) is a web mapping application that is the source of area-specific land use policy for Crown lands. CLUPA information is mandatory for inclusion in FMP development.

Independent Forest Audit (IFA) Findings Related to FMP Development

The last Independent Forest Audit (IFA) was conducted on the Whiskey Jack Forest in 2019, covering the 2014-2019 period. The IFA contained certain findings that pertained to the development of the forest management plan, however not all findings related to development of the LTMD.

Findings related to FMP development:

- **Indigenous engagement** by MNRF on forest use, forest benefits, education and training related to forestry, and other topics of interest to people who live in and make extensive use of the Whiskey Jack Forest (FMP requirement was met, this is separate from FMP preparation, speaks to inter-FMP relationship building / community expectations).
- **No harvest zone** designated after plan approval without consultation. Next FMP LTMD must reflect harvest/no harvest zones.
- Renewal strategy for **tending** not met (Actual tending level lower than planned).
- **Poplar management** not consistently successful, especially on in-block roads, landings and skid trails.
- Red pine and white pine **seed** in storage for renewal low/insufficient. (still working work)
- **Compliance issues**, including litter in an aggregate pit, number of inspections
- Plan objectives related to, or dependent on, **harvest** area and use of **herbicides** will not be achieved.
- Consistency in **Forest Units** between FMPs (mentioned in summary)
- Indigenous (and Public) information on **use of herbicides** as a silvicultural tool in forest management (mentioned in summary)

How Addressed in FMP:

- Efforts by District and Miisun staff to engage Indigenous communities in FMP development (described in Section 3.7.3).
- Indigenous communities may negotiate Customized Consultation Approaches (CCAs) for the FMP to aid meaningful engagement.
- The Kenora District decision on Strategic Management Zones (SMZs) was provided to Planning Team for this FMP. The Kenora District SMZ decision was also considered in

Operational Management Zones (OMZs) and resulting desirable levels of harvest area-related objective indicators.
- Forest units following FMPM to be consistent with BLG LGFU (and regional SFUs)
- Renewal transitions and costs consider level of anticipated (realistic) herbicide use.

<u>Enhanced Year Seven Annual Report (AR)</u>

The Year Seven Annual Report is to include an assessment, analysis and review of the implementation of the first seven years of an FMP (FMPM 2009). Any conclusions and recommendations that should be considered in the preparation of the next FMP are to be documented.

<u>Year Seven Annual Report Conclusions and "How Addressed" in this FMP:</u>

- After approval of the 2012-2022 FMP, an MNRF district decision was implemented to not harvest on a large area (76%) of the Whiskey Jack Forest.
- The Whiskey Jack Forest is a "forest divided" and the next LTMD needs to reflect this reality
    - The 2024 FMP reflects the current MNRF decision on eligible harvest area, resulting in a realistic LTMD.
    - The 2024 FMP includes operational management zones used to develop the LTMD, including what areas are eligible for harvest.
    - The "no harvest" zone still contributes to many forest diversity objectives (as a park does), but no harvest is planned in this zone at any time in the 160 year modelling timeframe.
- Strategic models should continue to use forest unit and age groupings that are meaningful to wildlife as indicators.
    - Is addressed through required BLG indicators that are meaningful to wildlife.
- Reporting on past wildlife habitat indicators would also be useful to compare trends between FMPs over time.
    - Not required with current provincial direction, as it is replaced through BLG indicator reporting.
    - Relevant BLG indicators were in the 2012 FMP and will be carried forward to future FMPs.
- Maintaining consistency in forest unit classification would be beneficial to the evaluation of trends between FMPs over time, including use of Regional forest unit classification
    - Regional standard forest units (consistent with BLG Landscape Guide Forest Units) are used for plan forest unit development).
- The low level of harvesting relative to the extent planned has contributed to the underachievement of the 2012 Forest Management Plan's objectives.
    - Actual harvest 2012-2018 (in harvest zone) was approx. 10% of Planned (based on whole Whiskey Jack Forest FMP)
    - Harvest being lower than planned affected some FMP objective achievement:

        - 2012 Indicator 4d – The actual harvest area by forest unit - NOT ACHIEVED
        - 2012 Indicator 4e – The actual harvest volume by species group - NOT ACHIEVED
        - 2012 Indicator 9b –The renewal program is keeping up with the limited harvest.– ACHIEVED

- There is a need to promote and educate the general public and Indigenous Communities on the use of herbicide as a silviculture tool for future FMP renewal programs
    - Discussion and feedback on herbicide use from DFB Meeting participants.
    - On-going discussions with First Nation communities and Métis Nation of Ontario at meeting through plan development and implementation.

The final management objectives and indicators for the FMP are recorded in Table FMP-10.

8.3 Summary of Management Objective Scoping and Investigations

Desirable levels that were not provided directly by guides or other sources of direction were refined through investigations or analyses to provide insight to what the forest is capable of producing in order to develop realistic and feasible desirable levels for objective indicators. Analyses may be conducted through an iterative process that involves a series of investigations to provide insight to what the forest is capable of producing in order to develop realistic and feasible desirable levels for objective indicators. Investigations may also involve assembling data from sources other than strategic modelling. Investigations consider implications on wood supply, forest conditions, habitat, and other non-timber resources for the short- term (10 years), medium-term (20 years), and long-term (100 years).

For all investigations, unless specifically noted otherwise, the following management decisions were consistently included in each investigation as per the Base Model (saved **00-Base**).

- estimated slope-based reserve areas as per the Stand and Site Guide (riparian) and other known reserves;
- management decisions subunit timing for caribou management based on the approved Dynamic Caribou Habitat Schedule (subunit OMZ CAR2) and operational harvest timing limits to OMZs LLP1, LLP2, and LLP3;
- with Boreal Landscape Guide indicator achievement for Interquartile Ranges (mandatory desirable level) – timing of achievement varies;
- crude control of projected TOTAL harvest volumes of +/- 20% variance allowed between 10-year terms;
- broad control of lowland spruce forest unit area harvest (+/- 30% changed allowed between 10-year terms);
- no harvest in Black Ash analysis unit (HRDA), Species At Risk; and
- execution of SFMM for the greatest volume of timber harvested over the entire planning period.

Specific SFMM model inputs varied for each investigation and projected results are documented in a standardized 4-Page Summary for all documented investigations in Appendices 7 and 8. Digital copies of selected model runs (labels with SFMM case code noted in bold below) that best represent the following investigations to support strategic analysis are included in the SFMM files provided to MNRF for review. They do not form part of the public portion of the electronic FMP and are provided to MNRF for review and verification.

The following summary of investigations and significant conclusions or results were considered in the development and rationalization of desirable levels for management indicators.

00-Base Base Model with initial model inputs. No results documented.

00-NoHarv Scenario without harvest, only natural forest dynamics to check SFMM model function.

FMPM Direction: Investigations for Setting of Desirable Levels

The following investigations will be considered in the development of desirable levels (FMPM A-40):

a) An investigation into the ability of the forest to meet **forest diversity** and forest cover desirable levels (based on current forest condition and forest dynamics); and
b) An investigation and assessment of the ability of the forest to continue to supply forest benefit levels associated with the current FMP (**wood supply**).

FMPM Page A-42:

(a) historic wood utilization;
(b) current industrial wood requirements;
(c) Ontario Forest Accord Advisory Board benchmark harvest levels, as identified in the Provincial Wood Supply Strategy; and
(d) maximum even-flow harvest volume by major species group.

LTMD Investigations:

Forest Diversity Investigations:

a) Forest Diversity - Investigations into the ability of the forest to meet forest diversity and forest cover desirable levels (based on current forest condition and forest dynamics);

For various Boreal Landscape Guide indicators, investigations were run to scope the impact of forcing the achievement of the Interquartile Range (IQR) (middle 50% of the Simulated Range of Natural Variation). The LTMD Task Team agreed that achieving at least the minimum IQR or above was desirable, and that overachievement of the IQR could also be managed but decreasing overachievement was less critical (unless a resulting underachievement of another indicator resulted, then lower indicator would be forced up).

SFMM Case:	Description:
01-BLG-Max	Achieve lower SRNV for OLT ASAP - (below) parameters together:
02-BLG+20	Achieve SRNV for mature/late OLT landscape classes
	Achieve SRNV for OLT old forest classes
	Achieve SRNV for OLT Caribou Habitat (Cr, Cw) - caribou zone only
these were the latest indicators achieved:	Lowered targets for OLT upland conifer, and young forest area (Other targets were achieved earlier, some from Plan Start)
03-BLG+30	relaxed targets for LTMD development (many still achieved earlier)

Based on results, can vary when SRNV achievement occurs (i.e. as soon as possible, relax 20 years for certain indicators, relax levels achieved further through timing or target levels, improve achievement (earlier/higher) if possible).

See **01-BLG-Max, 02-BLG+20, 03-BLG+30** results summaries in Appendix 7.

Results:

Caribou Habitats: All three BLG runs have similar results. Caribou Winter habitat in IQR for 40 years, then above IQR.

Landscape Classes – all Mature-Late landscape classes have area in or above their desirable levels (IQRs) at Plan Start 2024. Achievement remains acceptable (in IQR or above) in all three runs through all planning periods.

Old Growth Classes: All 3 runs have similar results with very minor changes in area achievement, but same results for 10-years when OG levels are achieved. All OG areas are below IQRs at Plan Start and require aging of the forest to achieve,

- OG Up Conifer – takes 10 years to be in IQR for 1 term, then is above (and maintained above) from 21-160 years.
- OG Low Conifer - takes 30 years to be in IQR for 1 term, then is above (and maintained above) from 51-160 years.
- OG Hardwood - takes 10 years to be in/above IQR, then is above (and maintained above) from 11-160 years.
- OG Red Pine-White Pine - takes 50 years to meet (above) IQR, then is above (and maintained above) from 51-160 years.

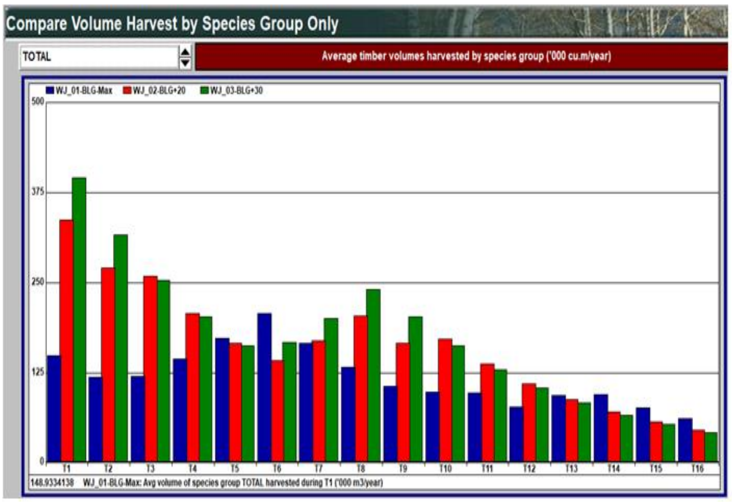
Upland Conifer – Lower IQR would not solve. Minor reduction in target needed (475,260 ha reduced to 450,000 ha on 01-BLG-Max, 420,000 ha used for 02-BLG+20, 400,000 ha used for 03-BLG+30). In all scenarios, the lowered targets were achieved in 160 years, with gradual increases in Upland Conifer area through time. This showed that increasing Upland Conifer is a challenge and when balancing other objective achievement, 03-BLG+30 level is likely the best we can expect.

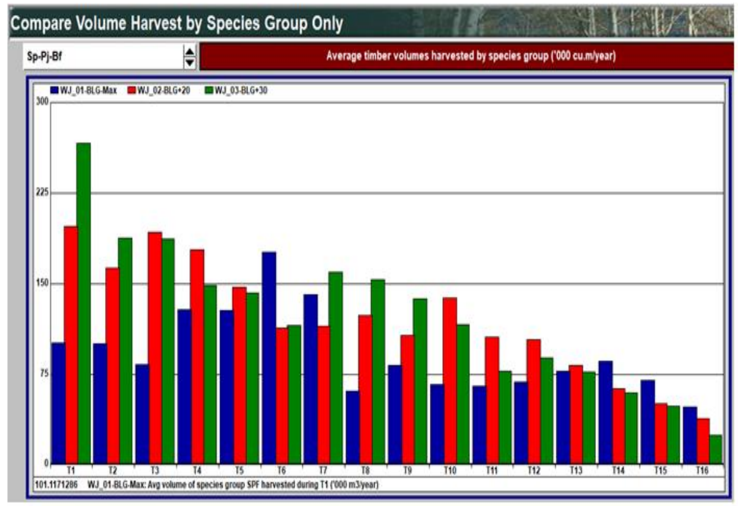
Young Forest – Lower IQR would not solve. Minor reduction in target needed (196,754 ha reduced to 120,000 ha on 01-BLG-Max, 110,000 ha used for 02-BLG+20, 100,000 ha used for 03-BLG+30). In all scenarios, the lowered targets were achieved in 160 years, with gradual increases in Young Forest area through time. This showed that increasing Young is a challenge and when only creating Young forest through harvest on 24% of the WJF, and while balancing other objective achievement, 03-BLG+30 level is likely the best we can expect. Consider increasing in LTMD run for better achievement. May also do supplemental analysis to see what Young Forest level is for Operable Zone, versus Entire Forest.

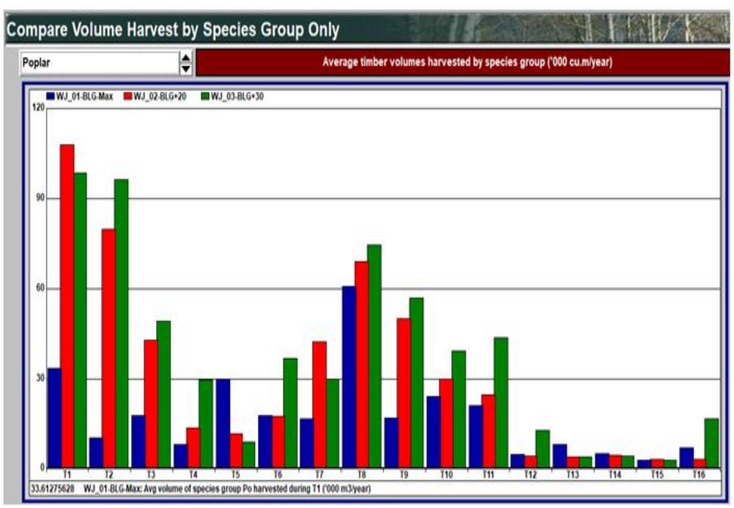
Note: Need to review to ensure that LTMD run is not over harvesting the Operable Zone, as per Desired Forest and Benefits comments and Planning Team direction.

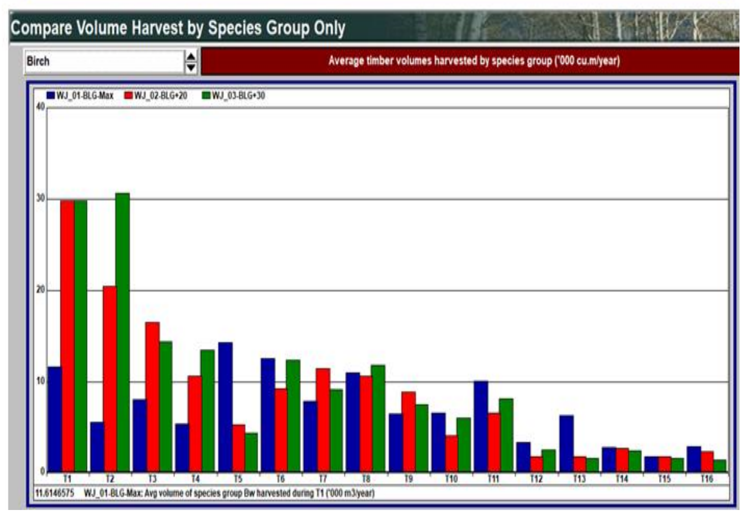
Wood Supply:

		Species:		
		WJ_01-BLG-Max	WJ_02-BLG+20	WJ_03-BLG+30
T1	SPF	101.117	197.851	266.268
	Pwr	0.000	0.000	0.000
	Po	33.613	107.948	98.723
	Bw	11.615	29.817	29.848
	TOTAL	148.933	337.796	396.178









Wood Supply Investigations:

b) Wood Supply - Investigations and assessments of the ability of the forest to continue to supply forest benefit levels associated with the current FMP (and other wood supply levels).

All run built from 03-BLG+30 with "relaxed BLG" timing for targets.

(a) maximum even-flow harvest volume by major species group. (removed +/- 20% TOTAL vol. constraint, that was in 03-BLG+30)

Reduced T4 Young limit to 90,000 ha in all wood supply investigations.

SFMM Case:	Description:	Flatline Volume per year:
04-Flat-SPF	Even SPF volume all terms	89,570
05-Flat-PO	Even PO volume all terms	40,983
06-Flat-BW	Even BW volume all terms	9,300
07-Flat-TOTAL	Even TOTAL volume all terms	91,903

BUILT ON 03-BLG+30, no volume targets added, only added vol flow control on specific volume group.

Volume flow constraints of 0% decrease and 0% increase for each species group as individual scoping runs, no volume targets.

Will determine lowest point that can be achieved for timber by each species group in any given term.

(b) (Optional) Non-declining flow harvest volume by major species group. (removed +/- 20% TOTAL vol. constraint)

Reduced T4 Young limit to 90,000 ha in all wood supply investigations.

SFMM Case:	Description:	Non-Declining Volume per year:
08-NonD-SPF	Non-declining SPF volume all terms	89,570 (all terms, highest volume in T1)
09-NonD-PO	Non-declining PO volume all terms	40,983 (all terms, highest volume in T1)
10-NonD-BW	Non-declining BW volume all terms	9,300 (all terms, highest volume in T1)
11-NonD-TOTAL	Non-declining TOTAL volume all terms	91,903 (all terms, highest volume in T1)

BUILT ON 03-BLG+30, no volume targets added, only added vol flow control on specific volume group.

Volume flow constraints of 0% decrease and 0% increase for each species group as individual scoping runs, no volume targets.

Will determine lowest point that can be achieved for timber by each species group in any given term.

An investigation and assessment of the ability of the forest to continue to supply forest benefit levels associated with the current forest management plan;

(c) historic wood utilization;

Current wood demand by species group:

SFMM Case:	Description:
12-2012FMP	Achieve approved plan T1 volume for as long as possible

Inputs:

Unlimited budget, will determine if minimum demand volumes by species group are achievable, and for how many terms, and at what future cost to wood.

Binding volume targets added for as long as they can be met. Volume flow constraints infinite for allowable decreases and increases between terms.

Group:	**2012FMP**	thousands of m3 per year.	
SPF	340.0	from T1 2012 FMP.	**BUILT ON 03-BLG+30 investigation, vol targets added.**
PO	190.0	from T1 2012 FMP.	Removed +/- 20% TOTAL vol. constraint
BW	33.6	from T1 2012 FMP.	
PWR	3.8	from T1 2012 FMP.	
TOTAL	574.6		

Results:

2012 FMP volumes FEASIBLE 1 Term. BLG targets were achieved T7 onwards to aid short-term volumes. Young 130K T5, UpCon 400K T7 onwards

- significant reduction in eligible harvest area makes 2012 FMP volumes unsustainable, and INFEASIBLE with today's planning requirements.

(d) Ontario Forest Accord Advisory Board benchmark harvest levels, as identified in the Regional Wood Supply Strategies; and

Benchmark volume by species group (OFAAB):

SFMM Case:	Description:
13-BENCH	Achieve OFAAB benchmark volumes by species group

Group:	**Bench**	thousands of m3 per year
SPF	354.0	**BUILT ON 03-BLG+30 investigation, vol targets added.**
PO	149.0	Removed +/- 20% TOTAL vol. constraint
BW	4.0	
PWR	0.6	
TOTAL	507.6	

Results:

OFAAB Benchmark levels FEASIBLE 2 Terms. BLG targets were achieved T7 onwards to aid short-term volumes. Young 130K T5, UpCon 400K T7 onwards

- lower volumes than 12-2012FMP, but still not achieveable for more terms, nor is it sustainable.

(e) Current Wood Supply Commitments, as identified in the Available Wood report:

Benchmark volume by species group (OFAAB):

SFMM Case:	Description:
14-Commit	Achieve wood supply commitment volumes by species group

Group:	**Commit**	thousands of m3 per year
SPF	76.0	
PO	100.0	**BUILT ON 03-BLG+30 investigation, vol targets added.**
BW	-	Removed +/- 20% TOTAL vol. constraint
PRW	-	
TOTAL		

Results:

Draft 2023 Commitment volumes achieveable for two (2) 10-year terms. BLG targets were achieved T7 onwards to aid short-term volumes. Young 130K T5, UpCon 400K T7 onwards

- lower volumes than 12-2012FMP, therefore achieveable for more terms into the future. Not sustainable.

Next Steps:	
15-Bal + others	**Integration and balancing of all objectives towards an LTMD option**
Review investigations to determine combinations of target achievement to project the best balance of objective achievement and forest sustainability.	
Add in flow controls for volumes between terms (more predictable for forest industry)	
Conflicts in achievement of all objectives may dictate the minor refinement of previous decisions or target levels.	
Review silvicultural projections and add any management limitations required.	
Review any additional desired levels or investigations that are suggested by the planning team, advisors, LCC, etc.	
Only key scenarios or conclusions are documented for development of the Proposed LTMD.	
LTMD-00 ...	**numbering begins when "balancing" becomes "fine-tuning" and is close to a feasible LTMD scen**
Proposed LTMD is reviewed by planning team, LCC, plan advisors (Progress Checklpoint #5) and ultimately the public.	
When acceptable, the 10-year harvest from the Proposed LTMD is allocated to confirm that projections are reasonable and able to be implemented.	
Spatial analysis is conducted on the preferred LTMD harvest allocations. Assessment of objective achievement, determination of sustainability and primary road corridor planning.	

Forest Condition Change Between FMPs:

c) **Forest Composition and Age** – The indicators for forest composition and age reflect the achievement of desired forest and benefits for forest diversity, wildlife habitat and harvest area. Habitat for many selected wildlife species are no longer measured in the strategic modelling, rather the combination of landscape class area, old growth groupings, and landscape pattern / texture indicators are considered cumulatively as better measures of forest condition.

Below is a comparison of Landscape Class areas from 2012 and 2024 Whiskey Jack Forest FMP land bases using the BMI (Table 46). The table below shows some variance in productive area by Mature-Late landscape class between plans, primarily as a result of a revised forest resources inventory for the 2024 FMP, and aging of the forest over the past 12 years.

Table 46 Comparison of Landscape Class Area between 2012 and 2024 FMPs

Landscape Class:	2012 (ha)	2024 (ha)
Mature and late balsam fir and balsam fir mixed	8,361	14,784
Mature and late lowland spruce and low other conifer	12,695	46,556
Mature and late conifer mixedwood	182,885	244,859
Mature and late hardwoods and hardwood mixedwoods	104,760	144,335
	308,701	**450,535**

The productive forest area in the 2024 FMP is now higher (778,366 ha) than reported at the start of the 2012 FMP (725,394 ha). Therefore, it is concluded that the Whiskey Jack Forest's ability to continue to provide (or to increase) various forest benefits associated with the productive forest should be able to be maintained throughout this 2024-2034 FMP period.

Old Growth Area – Next, the quantity of old growth forest was compared for Plan Starts 2012 and 2024 (Table 47). The comparison utilizes the old growth forest definitions used in each of the plans, with 2012 PLANFUs organized and grouped to roughly align with the 2024 FMP old growth groupings.

The total area of Old Growth has decreased from the start of the 2012 FMP to this 2024 FMP which is not expected due to aging of the forest 10 years and an under-harvest during 2012-2024. The difference is primary a result of the reinventory of the Whiskey Jack Forest for this 2024 FMP. It is expected that the Whiskey Jack Forest can continue in this plan period to provide similar levels of forest and benefits associated with old growth conditions, as compared to the 2012 FMP.

Table 47 Comparison of Old Growth Area between 2012 and 2024 FMPs

Old Growth Forest Area:	2012 (ha)	2024 (ha)
Lowland Conifer	3,858	1,111
Upland Conifer	37,129	24,617
Mixedwood and Hardwood	26,913	23,010
White Pine and Red Pine	457	30
	68,357	**48,767**

Caribou Habitat – A similar dynamic caribou habitat schedule was spatially applied for both the 2012 and 2024 forest management plan land bases. Minimal harvesting of forest has occurred in the caribou zone during the 2012-2024 FMP period. Therefore it is expected that the projected benefits to caribou are comparable for both plans.

OVERALL CONCLUSION: Based on the comparison of projected wood supply, productive landscape class area, old growth area and caribou habitat, it is expected that the 2024-2034 Whiskey Jack Forest FMP will continue to be able to supply forest diversity areas that include classifications for mature and older forest and habitats. Due to the management decision on the zone of the Whiskey Jack Forest eligible for harvest and renewal activities, all forest condition and social and economic benefits that rely on wood supply harvesting and forest access will not be able to be supplied in this FMP period at the same levels approved in the 2012-2024 forest management plan.

8.4 Documentation of the Management Objectives Checkpoint

Progress Checkpoint #4 approval of the Management Objectives was received via email from Mitch Legros, R.P.F., Regional Planning Forester to Kurt Pochailo, R.P.F., Plan Author and Service Provider Lead, on May 26, 2023.

PART 5: PROPOSED LONG-TERM MANAGEMENT DIRECTION

9.0 Introduction

This section of the Analysis Package documents the development of the proposed Long-term Management Direction (LTMD). Information required by the FMPM in this section of the Analysis Package includes:

- (a) How management objectives were represented in the analysis;
- (b) How the achievement of objectives was interpreted from the model results;
- (c) A summary of changes to the base model and rationale for those changes;
- (d) A summary of modelling results including:
  - (i) key results and conclusions that provide rationale for adjustment to targets, if applicable;
  - (ii) results of risk assessment investigations;
  - (iii) the conclusions of the analysis, with a digital copy of the model run for the proposed Long-Term Management Direction; and
- (e) Documentation of Support for the Proposed Long-Term Management Direction, Determination of Sustainability and Primary Road Corridors Checkpoint

This information and a summary of development of the LTMD are documented in the following sections.

9.1 Management Objective Representation and Interpretation of Results in the Analysis

Management objectives and indicators for the Whiskey Jack Forest 2024 FMP are recorded in Table FMP-10. How management objectives and indicators were represented in the analysis and how the achievement of objectives was interpreted from the model results (points (a) and (b) above) are documented in the following table (Table 48).

Table 48 How Management Objectives were Represented and Interpreted from the Analysis

OBJECTIVE		INDICATOR		HOW REPRESENTED IN ANALYSIS	HOW INTERPRETED FROM RESULTS
1	**Caribou Habitat**	1a)	Caribou Habitat - Winter Combined	SFMM model tracks projected area of caribou winter combined habitat	Projected area for winter combined habitat is compared to BLG IQR desirable area levels to determine achievement.
		1b)	Caribou Habitat Area	SFMM model tracks projected area of caribou refuge habitat	Projected area for refuge habitat is compared to BLG IQR desirable area levels to determine achievement.
		1c)	Texture of Caribou Winter Habitat	Spatial measurement in OLT model at 6,000 ha and 30,000 ha scales.	Results at Plan End (after final year of plan) with planned harvest depleted are compared in OLT at the 6,000 ha and 30,000 ha scales to assess if results achieve minimum desirable levels (from OLT projection) or are showing movement from Plan Start % towards desirable level.
		1d)	Texture of Caribou Refuge Habitat	Spatial measurement in OLT model at 6,000 ha and 30,000 ha scales.	Results at Plan End (after final year of plan) with planned harvest depleted are compared in OLT at the 6,000 ha and 30,000 ha scales to assess if results achieve minimum desirable levels (from OLT projection) or are showing movement from Plan Start % towards desirable level.
		1e)	Conifer Purity in Jack Pine and Black Spruce LGFUs	Not included in strategic modelling.	Percentage of Pj, Sb and Sw totalled from average forest inventory species composition at Plan End for PJD, PJM, SBD, SBL, and SBM forest unit areas (match regional standard forest unit areas). Plan End proportions are compared to desirable levels to assess achievement.
		1f)	Amount and arrangement of online caribou DCHS blocks:	Caribou DCHS areas (subunits) in modelling land base, with associated harvest timing by subunit	Not analyzed in SFMM model. GIS query for proportion of area in DCHS subunits considered online habitat is divided by total DCHS area (with current timing limitations). DCHS blocks are deemed to be online prior to harvest when they reach suitable habitat condition. Once harvested in the DCHS cycle, DCHS blocks return to online status 60 years from year of entry. Non-capable blocks are by definition never online, and are netted out of the calculation. All DCHS blocks in the Whiskey Jack Forest caribou zone are deemed capable.
		1g)	Planned and Actual percent of total upland conifer harvest area successfully regenerated to upland conifer (in caribou zone)	Not included in strategic modelling.	Measured after final year of plan implementation. Total of the harvest area during plan period for PJD, PJM, SBD and SBM forest units (upland conifer). Assess total successfully established area by forest unit for this upland conifer area harvested during the plan period. Divide total upland conifer regeneration, by total upland conifer harvested.
		1h)	Road Density - Kilometres of FMP roads per square kilometre of Crown Forest (caribou zone)	Not included in strategic modelling.	Measured after final year of plan implementation. For caribou zone only: Total km. of primary and branch roads (exisiting roads layer) is dividied by the total km2 of Crown forest in the caribou zone (Ownerships 1-5-7). Resulting road density is compared to Plan Start density to determine trend in road density.
2	**Forest Composition**	2a)	Landscape Class Area	SFMM model tracks landscape class areas in initial land base and projections though time.	Projected areas for the four Mature and Late landscape classes are compared to BLG IQR desirable levels to determine achievement.
		2b)	Old Growth Forest Area	SFMM model tracks Old Growth areas in initial land base and projections though time.	SFMM projected areas for Old Growth groups are compared to minimum desirable levels to determine achievement.
		2c)	All Ages Red Pine and White Pine Forest Unit Area	SFMM model tracks PRW forest unit area in initial land base and projections though time.	SFMM projected areas for all ages red pine/white pine (PRW forest unit, PRWR and PRWW analysis unit areas) is compared to the minimum desirable level to determine achievement.

OBJECTIVE		INDICATOR		HOW REPRESENTED IN ANALYSIS	HOW INTERPRETED FROM RESULTS
		2d)	Upland Jack Pine and Spruce	SFMM model tracks PJD, PJM, SBD, SBM area in initial land base and projections though time.	Projected areas for Upland Jack Pine and Spruce (Upland Conifer) is compared to BLG minimum desirable level to determine achievement.
		2e)	Young Forest Area	SFMM model tracks young forest area in initial land base and projections though time.	Projected areas for Young Forest is compared to BLG minimum desirable level to determine achievement.
3	**Landscape Pattern**	3a)	Texture of Mature and Old Forest	spatial measurement in OLT model at 500 ha and 5,000 ha scales.	Results at Plan End (after final year of plan) with planned harvest depleted are compared in OLT at the 500 ha and 5,000 ha scales to assess if results achieve minimum desirable levels (from OLT projection) or are showing movement from Plan Start % towards desirable level.
		3b)	Young forest patch size by size class	spatial measurement in OLT model.	Results at Plan End (after final year of plan) with planned harvest depleted are compared in OLT to projected proportions by size class from OLT for this indicator to assess if results achieve minimum desirable levels or are showing movement from Plan Start % towards desirable level.
4	**Wildlife Habitat**	4a)	Habitat Proportion by Moose Emphasis Area	spatial measurement in OLT model.	Projected percentages for the 3 moose habitats within the three MEAs are compared to the desirable level proportions to determine achievement.
		4b)	Frequency of Young Forest Patch Size by MEA	spatial measurement in OLT model.	Results for the three MEA areas are compared to projected proportions by size class from OLT for this indicator to assess if results achieve minimum desirable levels or are showing movement from Plan Start % towards desirable level.
		4c)	Proportion of Deer Critical Thermal Cover in Deer Emphasis Area	measurement in through GIS sort	In the Deer Emphasis Area only: Area of deer Critical Thermal Cover is divided by total area of Stratum 1 habitat in DEA. Resulting proportion is compared against the desirable level.
5	**Wood Supply**	5a)	Area of managed Crown forest available for timber production	SFMM projected total available area.	Projected total long-term (Period 11, end of 100 years) available forest area is compared to minimum desirable level to determine achievement.
		5b)	Long-term projected available harvest area (all forest units combined)	SFMM projected AHA by forest unit.	Projected total available harvest area is compared to the minimum desirable level to determine achievement.
		5c)	Long-term projected available harvest volume by species group	SFMM projected AHV by species group.	Projected available harvest volume by species group is compared to the minimum desirable level to determine achievement.
		5d)	Long-term projected available harvest volume by broad size group	SFMM projected AHV by size group group.	Projected available harvest volume by broad size group is reported in FMP-10. Proportion of Small and Large sized volumes is calculated by dividing by Total harvest volume. Compare to desirable level to assess trend.
		5e)	% actual harvest area as a percentage of planned, by forest unit	Not measured in strategic modelling. Measured after implementation based on GIS analysis of updated harvest area.	Not assessed through strategic analysis.
		5f)	% actual harvest volume as a percentage of planned, by species group	Not measured in strategic modelling. Measurement after implementation based on analysis of actual harvest volumes.	Not assessed through strategic analysis.

OBJECTIVE		INDICATOR		HOW REPRESENTED IN ANALYSIS	HOW INTERPRETED FROM RESULTS
6	**First Nation and Métis Engagement**	6a)	Opportunities for involvement of First Nation communities and Métis Nation of Ontario in plan development	Not included in strategic modelling.	Not assessed through strategic analysis.
		6b)	First Nation evaluation of their engagement during FMP development	Not included in strategic modelling.	Not assessed through strategic analysis.
		6c)	Métis evaluation of their engagement during FMP development	Not included in strategic modelling.	Not assessed through strategic analysis.
7	**LCC Engagement**	7a)	LCC self-evaluation of its effectiveness in plan	Not included in strategic modelling.	Not assessed through strategic analysis.
8	**Forest Renewal**	8a)	Percent of harvested forest area assessed as successfully established, by forest unit	Not included in strategic modelling.	Not assessed through strategic analysis.
		8b)	Planned and actual percent of harvest area treated broad treatment type.	Not included in strategic modelling.	Not assessed through strategic analysis.
		8c)	Planned and actual percent of area successfully regenerated to the target forest unit, by forest unit over the entire forest.	Not included in strategic modelling.	Not assessed through strategic analysis.
9	**Forest Values**	9a)	Percent of forest operation inspections in non-compliance, by activity and remedy type.	Not included in strategic modelling.	Not assessed through strategic analysis.
10	**Healthy Ecosystems**	10a)	Compliance with management practices that prevent, minimize or mitigate site damage (% of inspections in non-compliance, by remedy type).	Not included in strategic modelling.	Not assessed through strategic analysis.
		10b)	Compliance with management practices that protect water quality and fish habitat (% of inspections in non-compliance, by remedy type).	Not included in strategic modelling.	Not assessed through strategic analysis.
11	**Blueberry Harvesting Areas**	11a)	Blueberry harvesting areas identified for harvest	Not included in strategic modelling.	Not assessed through strategic analysis.

1

9.2 Summary of Development of the Long-term Management Direction

9.2.1 LTMD Development Overview

The base model (**00_Base**) was used as the starting point for the development of the proposed Long-Term Management Direction. The SFMM model was used as a decision support system during strategic analysis. Strategic analysis is an iterative process used to determine the types and levels of access, harvest, renewal, and tending activities required to balance the achievement of management objectives associated with the management of forest cover, and to develop achievable targets in the proposed Long-Term Management Direction.

Targets were established for each indicator. The establishment of targets for each indicator considered:

(a) The current forest condition;
(b) A balance of social, economic and environmental considerations;
(c) The associated indicator and the desirable level;
(d) The potential achievement for the short term (10 years), medium term and long-term; and
(e) Projections from past forest management plans and historical levels of objective achievement.

In addition, for harvest level indicators, the targets also considered:

(a) Historic wood utilization
(b) Current industrial wood requirements;
(c) Ontario Forest Accord Advisory Board (OFAAB) benchmark harvest levels, as identified in the Provincial Wood Supply Strategy; and
(d) Maximum even-flow harvest volume by major species group.

The above considerations were addressed in the following investigations and in development of the Long-Term Management Direction:

1. Historic Wood Utilization
2. Ontario Forest Accord Advisory Board (OFAAB)

Upon completion of the investigation of the types and levels of activities and setting of desirable levels (Section 8.3) and conducting broad and specific investigations, the Planning Team began developing a Long-term Management Direction (LTMD). All investigations conducted for the development of the LTMD considered implications on wood supply, forest conditions, habitat, and other non-timber resources for the short-term (10 years), medium-term (20 years) and long-term (100 years). These values were also considered throughout the 160-year planning horizon. These investigations were part of the iterative process used in the development of the Long-term Management Direction. All strategic modelling was conducted and reviewed co-operatively between Whiskey Jack Forest Service Provider staff, consultants, and MNRF district and regional staff, with valued input and advice from the plan advisors.

Specific SFMM model inputs varied for each investigation and projected results are documented in a standardized 4-Page Summary for all **documented key investigations (red bolded)** as included in Appendices 7 and 8. Digital copies of selected model runs (labels with SFMM Case code noted in bold below) that best represent the following investigations to support strategic analysis are included in the SFMM files provided to MNRF for review and verification.

9.2.2 Development of the LTMD

The Long-Term Management Direction was developed through an iterative process of adding modelling constraints to the Base Model to reach a good balance of management objective achievement and operational reality. The development of the LTMD is summarized by model run name, scenario description and key findings below (key model runs are bolded, with results summaries included in Appendix 7):

00-Base - was progressively assembled with Base Model land base and inputs for forest dynamics, silviculture, and management options.

00-noHARV - A no-harvest scenario was run for reference purposes. What is the Whiskey Jack Forest projected to be like, in the absence of harvest? Only natural succession through aging and fire-driven natural disturbance (with projected fire suppression activities) was included which resulted in changed forest condition through time.

<u>Investigations:</u>

Investigation results were summarized in Section 8.3.

Investigation of the potential achievement of BLG indicator desirable levels was fundamental information on which the Task Team built the LTMD. Therefore, the following three investigations are considered key runs with results documented in Appendix 7:

01-BLG-Max - Achieve SRNV (IQR) for most BLG indicators at Plan Start, or within 10-30 years, rest as soon as feasible. Upland Conifer and Young Forest area were not achieved in the 160-year planning horizon.

02-BLG+20 - Built on 01-BLG-Max with targets for Upland Conifer and Young Forest lowered (relaxed) slightly from the levels in Run 01 (420,000 ha and 110,000 ha respectively).

03-BLG+30 - Built on 02-BLG+20 with targets for Upland Conifer and Young Forest lowered (relaxed) further from the levels in Run 01 and 02 (400,000 ha and 100,000 ha respectively). This more relaxed achievement of Upland Conifer and Young Forest area, while still achieving other forest diversity indicator achievement, was used for the framework of all other SFMM runs.

Wood Supply investigations were conducted to scope the potential of projected wood supply, while achieving at least the same results for BLG biodiversity indicators as included in 03-BLG+30. These runs are not documented in 4-page summaries as they were not considered key runs (results are summarized in Section 8.3).

Even wood supply by volume species groups were investigated in runs:
04-Flat-SPF
05-Flat-PO
06-Flat-BW
07-Flat-TOTAL
Non-declining wood supply by volume species groups (increase allowed between 10-year terms, but no decreases allowed) were investigated in runs:
08-NonD-SPF
09-NonD-PO
10-NonD-BW
11-NonD-TOTAL

12-2012FMP - Investigation to see if harvest volumes from 2012 FMP are possible (and for how long). Built on 03-BLG+30 includes consideration for relaxed BLG indicator achievement.

13-Bench - Investigation to see if harvest volumes from Ontario Forest Accord Advisory Board (OFAAB) Benchmark are possible (and for how long). Built on 03-BLG+30 includes consideration for relaxed BLG indicator achievement.

14-Commit - Investigation to see if current wood supply commitment volumes are possible (and for how long). Built on 03-BLG+30 includes consideration for relaxed BLG indicator achievement.

Integration of all objectives into an LTMD:

- Review investigations to determine combinations of target achievement to project the best balance of objective achievement and forest sustainability.
- Conflicts in achievement of all objectives may dictate the minor refinement of previous decisions or target levels.
- Review silvicultural projections and add any management limitations required.

Input changes for start of LTMD development:

- Built on 14-Commit with current wood supply commitments levels, but control decrease in Poplar and Spruce-Pine-Fir through addition of volume change flow constraints (PO +/- 30%, SPF +/- 20%) and PO target T1, and SPF targets all terms (at wood supply commitment levels T1).

Saved as: **15-Bal-Flow**

Findings: Scenario INFEASIBLE with T1 wood supply commitments, and +/- 20% PO and SPF. Lessened PO flow to 30.
Current 2023 Draft wood supply commitments are feasible for 1 term only (limited by 100K Poplar commitment) due to smaller land base from which to harvest the

volume. SPF is available for all 10-year terms. Harvest is variable and higher in T1-3 than desired. TOTAL volumes not controlled. Volume change flow (PO specifically) will be needed for development of LTMD run. Consider increasing Upland Conifer target (will still be below IQR) to reduce conifer harvest.

16-Bal-Harv - Built on 15-Bal-Flow with current wood supply commitments levels, but control decrease in Poplar and Spruce-Pine-Fir through addition of volume change flow constraints (PO +/- 30%, SPF +/- 20%) and PO target T1 95 and T2 75 , and SPF targets all terms (at wood supply commitment levels T1).

Findings: Same very good/overachieve BLG indicator achievement, except Upland Conifer and Young forest. Slightly underachieve PO T1 (95 vs 100K), SPF met in all terms. PO decreases over first 5 terms. Harvest is variable and higher in T1-4 than desired, then low in T5. TOTAL volumes not controlled. Consider using TOTAL volume target to better control harvest through time.

17-Bal-Flow - Built on 16-Bal-Harv with adjusted harvest volumes to control decrease in Poplar and Spruce-Pine-Fir through time. Same flow constraints (PO +/- 30%, SPF +/- 20%) and PO target T1 95 - T2 75 - T3 55, and SPF targets all terms (at wood supply commitment level 76).

Findings: Same very good/overachieve BLG indicator achievement, except Upland Conifer and Young forest. Slightly underachieve PO T1 (95 vs 100K), SPF met in all terms. PO decreases over first 6 terms Harvest is variable and higher in T1-4 than desired, then low in T5. TOTAL volumes not controlled. Consider using TOTAL volume target to better control harvest through time. Very similar to 16-Bal-Harv.

18-Bal-TOTv – Built on 17-Bal-Harv with adjusted harvest volumes to control decrease in Poplar and Spruce-Pine-Fir through time. Same flow constraints (PO +/- 30%, SPF +/- 20%) and PO target T1 95 - T2 75 - T3 54 , and SPF targets all terms (at wood supply commitment level 76). New TOTAL volume through time target 170,000 (except T16 130K) to boost harvest in low periods. Reduced UpCon (PurCn) same level 400K, but T9 on rather than T7.

Findings: Same very good/overachieve BLG indicator achievement, except Upland Conifer and Young forest. Slightly underachieve PO T1 (95 vs 100K), SPF met in all terms. PO decreases over first 6 terms Harvest is variable and higher in T1-4 than desired, then low in T5. TOTAL volumes sustainable at 170,000+ m3 except T16. However harvest shifts from poplar domiinated to conifer through time (as expected, and as projected in previous FMPs). Best balance of harvest area and volume so far.

19-Bal-Vol – Built on 18-Bal-TOTv with adjusted harvest volumes to control harvest of Poplar and Spruce-Pine-Fir through time. Flow constraints (PO +/- 30%, SPF/TOTAL +/- 10%) and PO target T1 80 - T2 70, and SPF 100K all terms. New TOTAL volume through time target 170,000 (except T14-16 150K) to boost harvest in low periods.

Findings: Same very good/overachieve BLG indicator achievement, except Upland Conifer and Young forest. Underachieve PO T1 (81 vs 100K), SPF met (over) in all terms. PO decreases over first 4 terms. Harvest is relatively stable for 40 years, then decreases. TOTAL volumes sustainable at 170,000+ m3 except T14-16 (150K). However harvest shifts from poplar dominated to conifer through time (as expected, and as projected in previous FMPs). Improved balance of forest unit harvest area and volume so far. Renewal - high projection for Natural treatment (needs review), Is T1 AHA of 2,300 ha operational?

20-Bal-Vol - Built on 19-Bal-Vol with adjusted harvest volumes to control harvest of Poplar and Spruce-Pine-Fir through time. Flow constraints (PO +/- 20%, SPF/TOTAL still +/- 10%) and PO target T1-2 = 70K and SPF still 100K all terms, TOTAL 170K (except T14-16 150K) to boost harvest in low periods.

Findings: Same very good/overachieve BLG indicator achievement, except Upland Conifer and Young forest. Underachieve PO commitment T1-2 (70 vs 100K) but stable for 20 years, SPF met (over) in all terms. PO decreases 6-7 terms. Harvest is relatively stable for 40 years, then decreases slightly. TOTAL volumes sustainable at 170,000+ m3 except T14-16 (150K). Harvest shifts from poplar dominated to conifer through time (as expected). Improved balance of forest unit harvest area and volume so far. Renewal - Reduced PO volume aids renewal treatment projections.

21-Bal-Vol **–** Built on 20-Bal-Vol with adjusted harvest area changes in SBL to control amount of SBL change between terms. Same (as 20) flow constraints (PO +/- 20%, SPF/TOTAL still +/- 10%) and PO target T1-2 = 70K and SPF still 100K all terms, TOTAL 170K (except T14-16 150K) to boost harvest in low periods.

Findings: Same very good/overachieve BLG indicator achievement, except Upland Conifer and Young Forest. Helped reduce SBL harvest areas, but still too much in Term 1.

22-Bal-AHA – Built on Run 21 – Reduced SBL harvest to +/-10% change. Added 1,500m3/year PRW group volume T1.

Findings: Same very good/overachieve BLG indicator achievement, except Upland Conifer and Young Forest. AllOP (harvest area) Young in IQR by T4 (still low in entire forest), Upland Conifer improved but still below IQR (low in entire forest). CMX harvest area low, SBL better through time. Some PRW volume is PW (but want PR). Good to have minimal area to allocate.

23-Bal-AHA **–** Built on Run 22 with adjusted harvest area changes between terms (+/-25%) for CMX, PJD, PJM, SBD and SBM. Same (as 20-22) harvest volume targets and flow constraints.

Findings: Same very good/overachieve BLG indicator achievement, except Upland Conifer and Young Forest. Improved Red Pine volume (minimal White Pine). Jack Pine harvest areas (PJD, PJM) dropped, and Spruce and CMX areas increased. Improved balance of forest unit harvest area and volume. Renewal - Improvement in balance of Natural, Plant, Seed. Concern - drop in PJD AHA from Run 22?

24-Bal-AHA **–** Built on 23-Bal-Vol with adjusted harvest area changes +/-30% for CMX, PJDD, PJDS, PJM, SBD, SBM. Same (as 20-23) harvest volume targets and flow constraints.

Findings: Same very good/overachieve BLG indicator achievement, except Upland Conifer and Young Forest. Similar volumes to Run 21-23: Underachieve PO commitment T1-2 (70 vs 100K) but stable for 20 years, SPF met (over) in all terms. PO decreases 6-7 terms. Very minor increase to Jack Pine harvest areas (PJD, PJM). Improved balance of forest unit harvest area and volume. SBL AHA needs further reduction in short-term. Good renewal treatment balance. Is future PRW a concern (can't increase much)?

25-Bal-SBL – Built on 24-Bal-AHA with max. SBL harvest area T1 and T2 set at 50 ha per year to control amount of SBL harvest area per year. All other target and flow controls the same as Run 24.

Findings: Same very good/overachieve BLG indicator achievement, except Upland Conifer and Young Forest. Similar volume projections. Control of SBL harvest area achieved. Renewal - good balance of Natural, Plant, Seed. Is future PRW a concern (can't increase much)?

26-BAL-SBL-PRW – Built on 25-Bal-AHA with increased entire forest all ages Red Pine - White Pine (PRW forest unit) area target to nudge PRW area achievement higher, if it is possible. Same harvest area and flow controls as Run 25 (acceptable). Red Pine-White Pine forest unit area from 4,000 ha T17 (end of the world) to 4,200 ha. This was only a small nudge upwards.

Findings: Same very good/overachieve BLG indicator achievement, except Upland Conifer and Young Forest. Similar volume projections as previous refined runs. Renewal - good balance of Natural, Plant, Seed. Future PRW area may be increased somewhat through operational treatments. Task Team is satisfied this balance of objective achievement is good as the LTMD run.

26-Bal-SBL-PRW was acceptable to operationalize for preferred LTMD harvest allocations. Run 26-Bal-SBL-PRW was saved as **LTMD-01 (LTMD Task Team consensus).**

LTMD-01 was created with inputs from 26-Bal-SBL-PRW, with inputs added to calculate biomass volumes through time.

LTMD-01 was recommended by the LTMD Task Team for approval by the Planning Team for use as the LTMD for the 2024-2034 FMP. After review and discussion, the Planning Team also supported LTMD-01 on May 18, 2023.

9.2.3 Documentation of Management Constraints in the LTMD Scenario

The following subsections describe the final constraints included in LTMD-01. These constraints were investigated and added, as warranted, through an iterative process to avoid overly constraining SFMM solution space while optimizing a balance of management objective achievement.

9.2.3.1 Harvest Volume Controls

Various harvest volume targets were included in the LTMD in order to aid in the overall harvest volume achievement and control the rate of change in harvest volumes between 10-year plan periods.

Harvest Volume Flow by Species Group

Harvest flow controls were included for the major species groups Spruce-Pine-Fir, Poplar, and for TOTAL volume (

Table 49). These flow % values are the maximum decrease or maximum increase allowed for the species group volumes between 10-year plan periods.

Table 49 LTMD-01 Harvest Volume Flow Controls

SPGroup	**Direction:** (max. % change between	
	Decrease	Increase
PWR	inf	inf
SPF	10	10
PO	20	20
BW	inf	inf
TOTAL	10	10

Harvest Volume Targets by Species Group

Annual average harvest volume targets per species group (in 1,000s of cubic metres per year) were added to the LTMD scenario to provide a target to force harvest volume by species group in specific terms. Targets for all subunits combined were added to control the short-term availability of Spruce-Pine-Fir and Poplar to consider current wood supply commitments, now and over the next 20 years. The targets for TOTAL of all species were used to regulate the volume through time, and specifically to manage the decrease over the next 40 years. The harvest volume targets in LTMD-01 are recorded in Table 50.

Harvest Volume Targets by Species

LTMD-01 included a volume target for 1,500 m3/year Red Pine volume for the 2024-2034 period in consideration of a potential wood processing opportunity Table 50.

Table 50 LTMD-01 Harvest Volume Targets

	All Subunits combined:			
Volume in 1,000s:	Tree Species Volume Group:			
	SPF	PO	PWR	TOTAL
Term	Lower	Lower	Lower	Lower
T1	100	70		170
T2	100	70		170
T3	100			170
T4	100			170
T5	100			170
T6	100			170
T7	100			170
T8	100			170
T9	100			170
T10	100			170
T11	100			170
T12	100			170
T13	100			170
T14	100			150
T15	100			150
T16	100			150

All Subunits combined:	
Volume in 1,000s:	Tree Species: Red Pine
Term	Lower
T1	1.5
T2	
T3	
T4	
T5	
T6	
T7	
T8	
T9	
T10	
T11	
T12	
T13	
T14	
T15	
T16	

9.2.3.2 Harvest Area Controls

Stability of Harvest Area

This input is used to constrain the amount of change in harvest area between 10-year terms by analysis unit. This input is typically used (a) to reflect the biological limitations to operational harvest areas (i.e. must moderate lowland spruce area since you want some winter harvest every year). Constraints may be considered (b) for other forest units that have projected harvest area significantly fluctuating between terms. Ensuring some harvest area is projected in each term ensures that operational block planning will not leave patches of unallocated mature timber simply because there is no available harvest areas for certain forest units for a full 10-year period. Finally, this constraint may be used (c) to moderate projected harvest area for small forest units or other sensitive sites (shallow soiled forest units). Constraints must be kept general enough to not dictate the specific Available Harvest Area (AHA) by forest unit.

The Base Model included a constraint on the SBL harvest area of +/- 30% between terms. The LTMD included constraints as recorded in Table 51 of generally -30% to +30% change between terms for larger forest units (analysis units), except the jack pine mix forest unit was +30% / -25%, and the spruce lowland (SBL) was +/- 10%. These harvest area constraints served to balance out harvest area by forest unit between 10-year terms to aid operability.

Harvest Area Limit by Forest Unit

The Black Ash analysis unit (HRDA) was eliminated from harvest (max. 0 ha) in all terms T1-T16 in response to it being a Species At Risk.

The amount of lowland spruce harvest areas (SBL) was limited by the addition of a harvest area maximum for Terms 1-2- (2024-2044) of 50 ha/year.

No harvest area limits by subunit were used.

Table 51 LTMD-01 Stability of Harvest Areas

				Harvest Flow Limit:			Harvest Area Limit:	
Forest Unit	Analysis Unit	BASE MODEL		LTMD-01			LTMD-01	
		% Decrease	% Increase	% Decrease	% Increase		Max. Ha/year	Terms:
BFM	BFM_	inf	inf	inf	inf			
CMX	CMX_	inf	inf	30	30			
	CMXC	inf	inf	inf	inf			
HMX	HMX_	inf	inf	inf	inf			
HRD	HRDA	inf	inf	inf	inf		0	all terms
	HRDB	inf	inf	inf	inf			
	HRD_	inf	inf	inf	inf			
PJD	PJDD	inf	inf	30	30			
	PJDS	inf	inf	30	30			
PJM	PJM_	inf	inf	30	25			
POD	POD_	inf	inf	inf	inf			
PRW	PRWR	inf	inf	inf	inf			
	PRWW	inf	inf	inf	inf			
SBD	SBD_	inf	inf	30	30			
SBL	SBL_	30	30	10	10		50	T1, T2
	SBLC	inf	inf	inf	inf			
SBM	SBM_	inf	inf	30	30			
	Limits apply to ALL SUBUNITS only.							

9.2.3.3 Renewal Controls

<u>Forest Renewal Limits</u>

Forest renewal limits by proportion are set to reflect common local practices or to force the model to do (or not do) specific treatments. "All Forest Renewal Limits" were used in LTMD-01 to reflect the silvicultural strategy for this plan period on the Whiskey Jack Forest.

See Section 6.2.3.7 for the renewal limits included in the Base Model.
No additional limits or changes to Base Model renewal limits were made for LTMD-01.

<u>Balanced Silvicultural Budget</u>

LTMD-01 included controls to limit silvicultural expenditures to not exceed the silvicultural revenue (contributions to Forest Renewal Trust Fund):

9.2.3.4 Additional Management Objective Controls

<u>Boreal Landscape Guide Indicators</u>

Specific targets were added for BLG indicators to prompt achievement of desirable levels (see Section 6.2.5.2 and Table FMP-10 for desirable levels). Targets (Table 52) were added in multiple terms to force maintenance of achievement through the long-term, and as noted below, to aid push achievement towards the desirable range for Upland Conifer and Young Forest:

Table 52 LTMD-01 BLG Indicator Targets

Indicator:	Desirable Level (Min. ha)	Applies to:	Targets Used	Terms Targets Used
Caribou - Winter (Combined)	63,721	CAR zone only	Desirable Level	T2-T17
Caribou - Refuge	147,605	CAR zone only	Desirable Level	T3-T17
Landscape Classes:				
Pre-/Sapling	na	Entire forest		
Imm Con	na	Entire forest		
Imm Hwd	na	Entire forest		
Mature-Late Balsam Fir	8,706	Entire forest	Desirable Level	T2-T17
Mature-Late Lowland Conifer	12,845	Entire forest	Desirable Level	T2-T17
Mature-Late Upland Conifer	178,461	Entire forest	Incr. to 250,000 to aid Up. Conifer	T2-T17
Mature-Late Hardwood & Mixedwood	43,021	Entire forest	Desirable Level	T2-T17
Old Growth - Lowland Conifer	4,282	Entire forest	Desirable Level	T4-T17
Old Growth - Upland Conifer	51,310	Entire forest	Desirable Level	T2-T17
Old Growth - Hardwood & Mixedwood	35,996	Entire forest	Desirable Level	T2-T17
Old Growth - Red Pine - White Pine	increase	Entire forest	used 1,500	T7-T17
All ages Red Pine - White Pine (forest unit area)	increase	Entire forest	used 4,200	T17
Upland Conifer (Pure)	475,260	Entire forest	used 400,000	T9-T17
Young Forest	196,754	Entire forest	used 120,000	T5-T17
Young Forest	na	AllOP harvest zone	used 72,209	T4-T17

LTMD DEVELOPMENT CONCLUSION:

LTMD-01 was a result of running previous LTMD development scenarios and increasing the operational considerations as described above in the LTMD management decision inputs/limits.

This LTMD-01 scenario was reviewed at length by the LTMD Task Team, Planning Team and Plan Advisors and considered a viable LTMD option. It provided a good balance of objective achievement and included forest management activities of harvest and renewal that were reasonable for the forest and had the potential to be successfully operationalized and implemented.

Scenario LTMD-01 was selected as the Proposed Long-Term Management Direction.

Results of LTMD-01 are summarized in Appendix 8.

9.2.4 Historic Wood Utilization and OFAAB Investigation

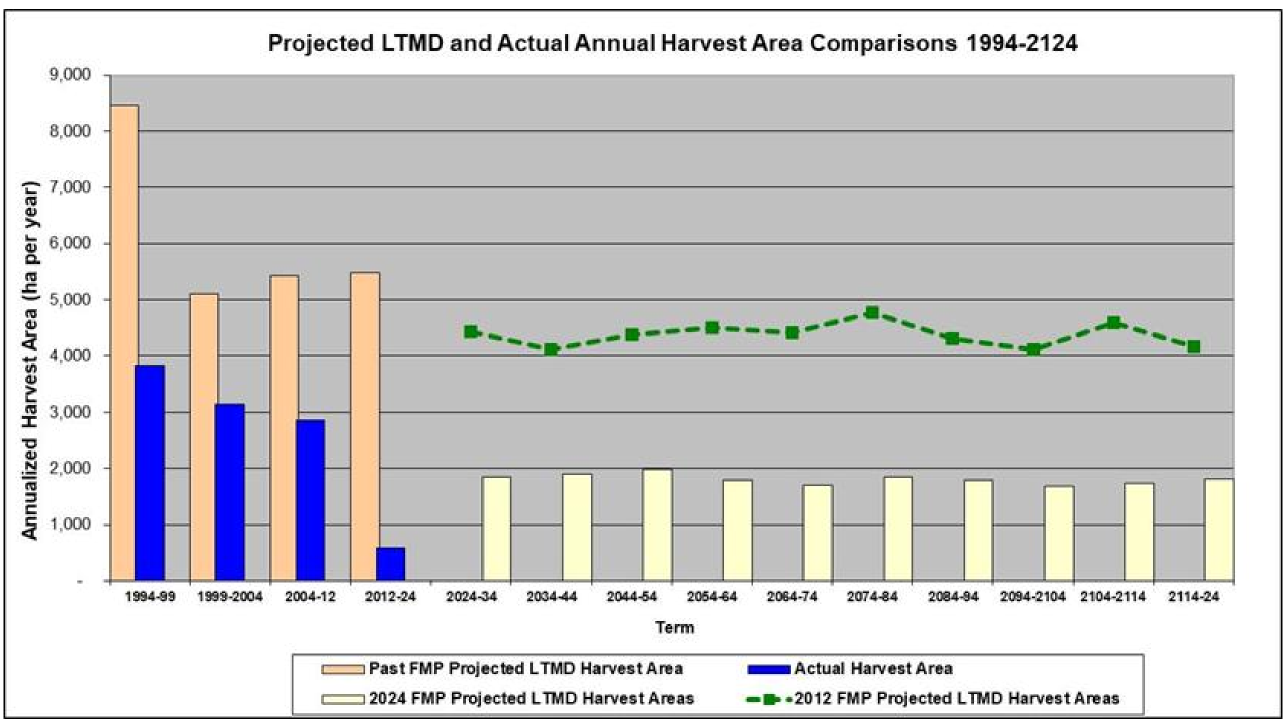
All harvest areas and volumes are reported as average annual amounts.

HARVEST AREA

Short-term Harvest Areas 2024-2034:

The Long-term Management Direction (LTMD-01) projects a harvest of 1,851 hectares per year from 2024-2034. The projected annual harvest area in the LTMD was compared to the historical planned and actual total harvest areas for 1994 through to 2124 (Figure 5). The LTMD harvest area level is significantly less than the 2012 FMP available harvest area (1,851 ha versus 5,483 ha per year in the 2012 FMP, a 66% decrease). The decrease in projected available harvest area directly results from the 2024 FMP management decision regarding the zone of the Whiskey Jack Forest that may have forest operations planned (e.g. harvest, renewal). The eligible harvest zone in this FMP period is 24% of the forest, whereas the LTMD for the 2012 FMP was based on the entire forest. Minor other changes in information used to model the 2024 FMP LTMD included a revised forest resources inventory and updated modelling assumptions. These updates did not have a noticeable impact on development of the LTMD, as the strategic direction for the Whiskey Jack Forest is unchanged, aside from the harvest zone decision. The planning team considers these modelling adjustments the best available information at the time of plan development and has considered the desired forest and benefits determined for the Whiskey Jack Forest in the strategic modelling.

Figure 5 Planned and Actual Annual Harvest Area Comparisons 1994-2124



Long-term Harvest Areas 2034-2124:

Annual total harvest areas are projected to average approximately 1,809 hectares per year for the next 100 years (vary from 1,678 to 1,980 ha per year), significantly lower than projections in the 2012 FMP (4,382 ha per year over same 100 years). Variation in projected harvest areas between 10-year periods primarily results from the zone of the forest eligible for planned harvest. Minor variations between terms result from the age class distribution of the forest and the amount of area required to be retained for BLG indicator areas (amount of Landscape Class mature-older forest areas, old growth forest, upland conifer, young forest, etc.), as well as optimizing harvest volumes for socio-economic benefits from the Whiskey Jack Forest. Long-term strategic planning trends in projected harvest area have changed significantly with the management decision on the zone eligible for planned harvest.

HARVEST VOLUME

Short-term Harvest Volume 2024-2034:

The 2024-2034 Long-term Management Direction annual harvest area is projected to yield approximately 196,900 cubic metres of timber each year from 2024-2034. This is comprised of 100,000 cubic metres of Spruce-Pine-Fir (SPF), 70,000 cubic metres of Poplar (PO), and 24,200 cubic metres White Birch (BW) per year. Red Pine - White Pine volume (PWR)(2,100 cubic metres per year) is reported but not considered a major species group on the Whiskey Jack Forest. Other Conifer (OC)(cedar, larch), Upland Hardwood (UH) and Lowland Hardwood (LH)(black ash) are incidental species on the Whiskey Jack Forest, all together totalling approximately 500 cubic metres per year.

The annual total harvest volume level in the LTMD for the 2024-2034 Whiskey Jack FMP (196,900 cubic metres) is 66% lower than the harvest volumes projected in the selected management alternative for the 2012-2024 FMP (574,600 cubic metres). The decreased harvest volume corresponds to the decrease in harvest area discussed above. The decrease in harvest area and volume is a result of the management decision on the reduced area on which forest operations (e.g. harvest, renewal) are eligible to be planned. The decrease in projected harvest volumes was balanced with desired forest and benefits included in management objective indicators while balancing other socio-economic indicators and forest sustainability that are consistent with strategic direction from the 2012-2024 FMP. The Planning Team carefully considered the impact of the 2024-2034 projected harvest area on long-term harvest area/volume and future desired forest and benefits. The Planning Team supports this balance of long-term objective achievement.

Associated with the available harvest volumes are additional potential volumes of defect volume (branches, twigs, leaves, bark) and undersize volumes (top wood). As reported in Table FMP-9, an estimated 101,500 m3 of defect volume and 37,100 m3 of undersized volume per year are potentially available through harvest of the full available harvest area for this 10-year plan period. The total of net merchantable available harvest volume, defect and undersized volume is estimated to be 3,354,740 m3 for this 10-year plan period 2024-2034 (total 335,500 m3 per year for all three volumes types combined).

Long-term Harvest Volume 2034-2124:

The LTMD projects that the total net merchantable volume will remain relatively stable from this plan period (2024-2034) throughout the next 100 years to 2124 (100-year average of 178,700 cubic metres per year). On average, strategic total harvest volumes are significantly less through time for the 2024-2034 forest management plan as compared to the 2012-2024 FMP. This long-term reduction in projected harvest volume is a direct result of the management decision to plan for future harvest on a smaller land base than was used in 2012-2024 FMP development.

This long-term reduction in harvest volumes, as compared to the 2012-2024 FMP, is evident in all harvest volume species groups (TOTAL, Spruce-Pine-Fir, Poplar and White Birch).

OFAAB Benchmark Investigation:

The projected volume in the LTMD was compared to the historical and benchmark levels identified the Ontario Forest Accord Advisory Board (OFAAB) report. The following graphs show the historical and benchmark harvest levels which have occurred on the Whiskey Jack Forest from 1994 to the present. The planned and actual harvest volumes are also illustrated by 10-year FMP period from 1994 to 2024, and projected volumes from 2024 to 2124. Volume comparisons are included for all volumes (TOTAL, Figure 6), Spruce-Pine-Fir (Figure 7), Poplar, (Figure 8), and White Birch (Figure 9). Red Pine - White Pine is not a major volume species group on the Whiskey Jack Forest, however comparative information is also included in Figure 10.

Projections for TOTAL volume, SPF and Poplar volumes are all projected to be lower than their OFAAB benchmark levels through to 2124 (result of harvest zone management decision). White Birch volumes are projected to be greater than OFAAB benchmark levels in all terms. Red Pine – White Pine is projected to be greater than the OFAAB Benchmark level for this 10-year plan period, then again for 2044-2094 (not achieved in 2034-2044).

Figure 6 Planned and Actual Harvest Volume Comparisons, Species Group – TOTAL

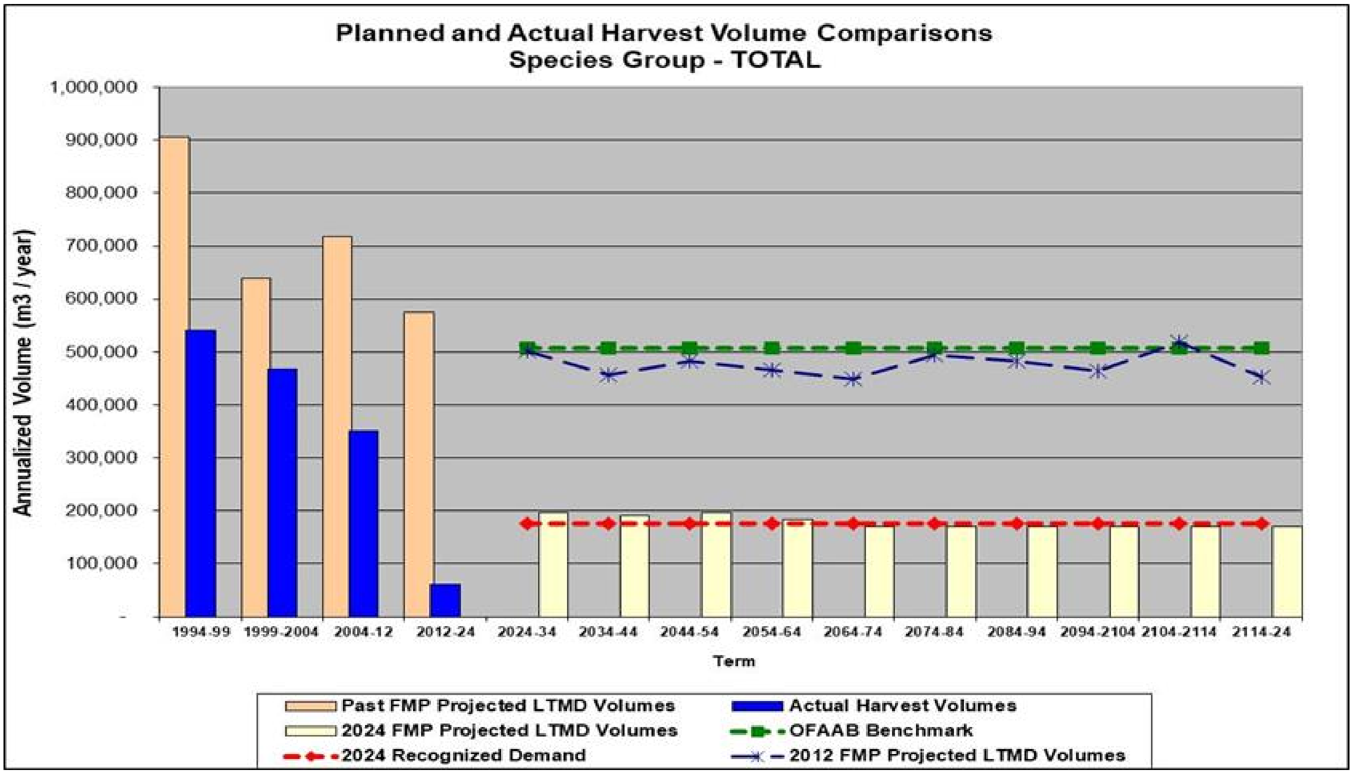


Figure 7 Planned and Actual Harvest Volume Comparisons, Species Group – Spruce-Pine-Fir

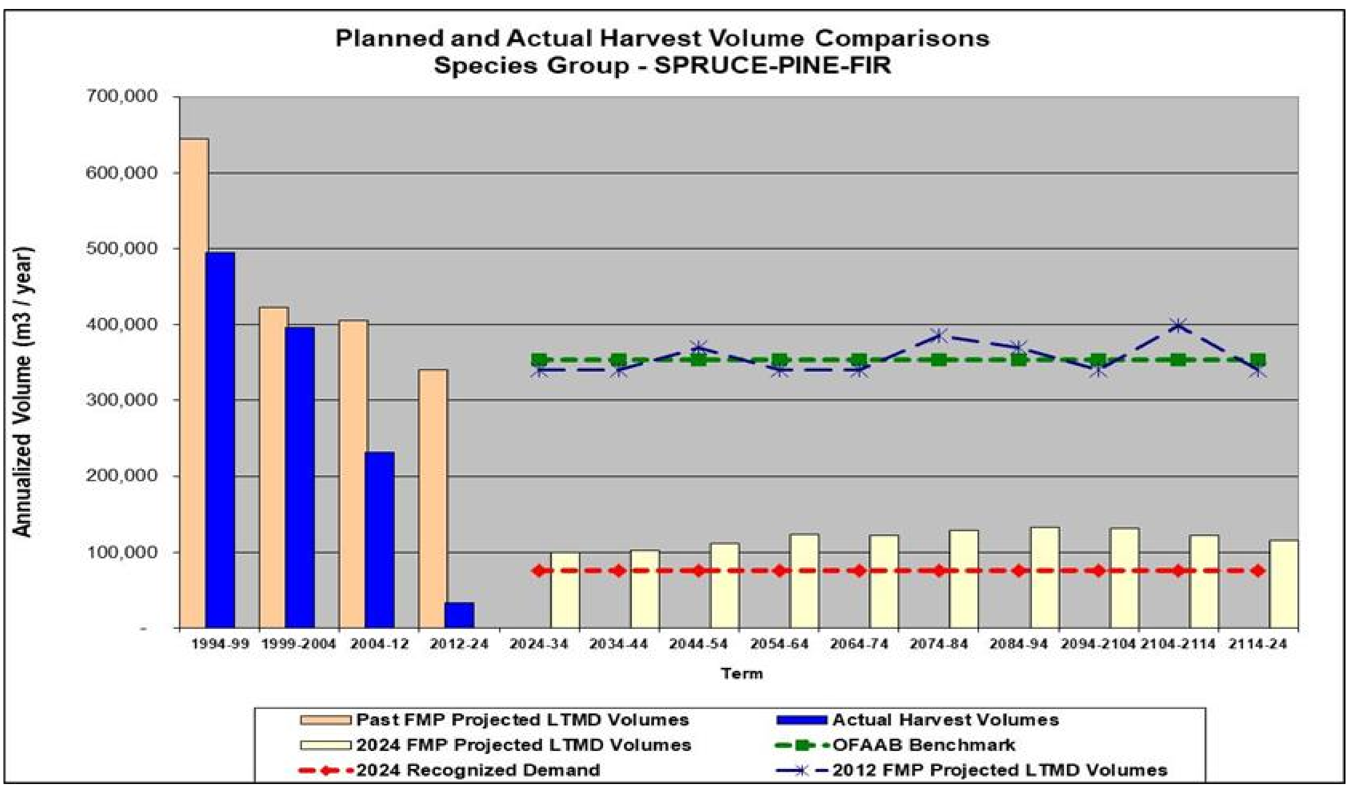


Figure 8 Planned and Actual Harvest Volume Comparisons, Species Group – Poplar

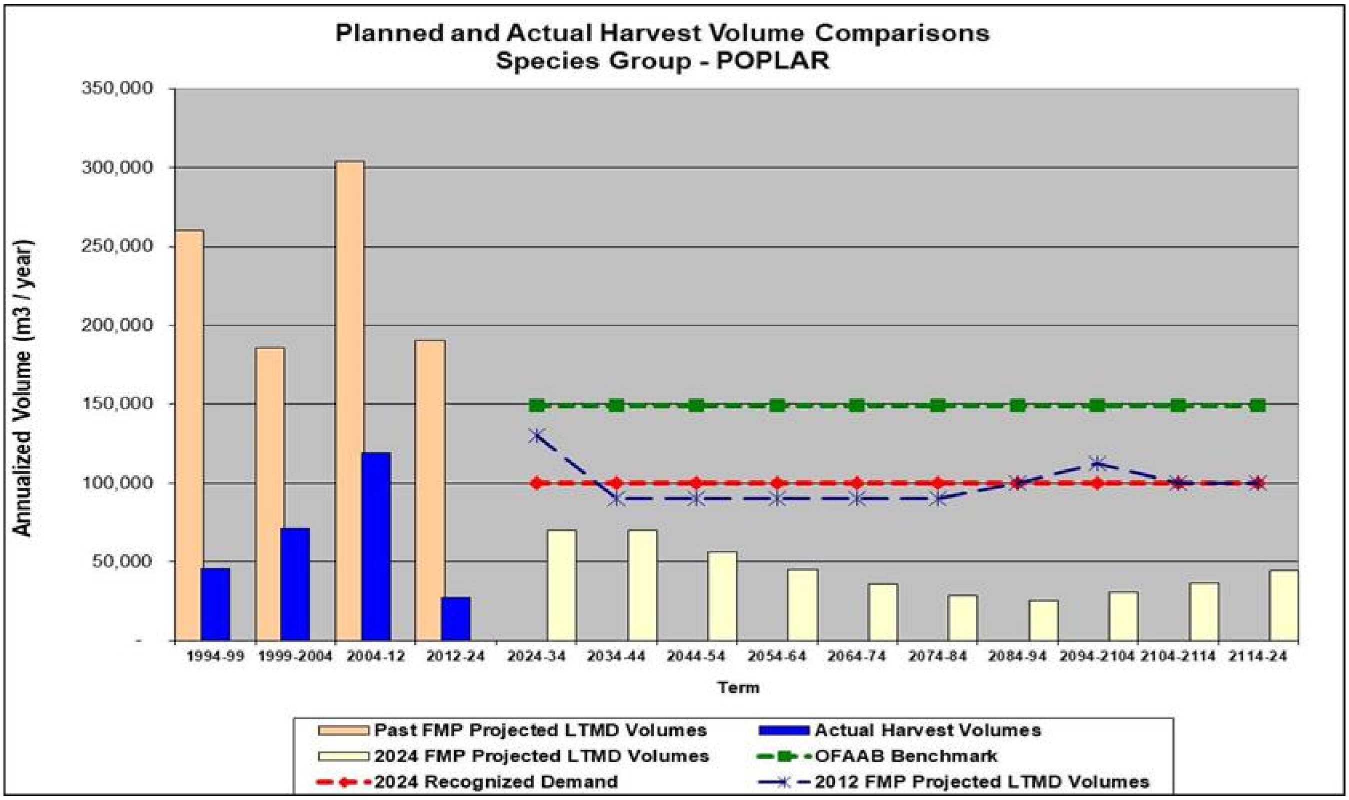
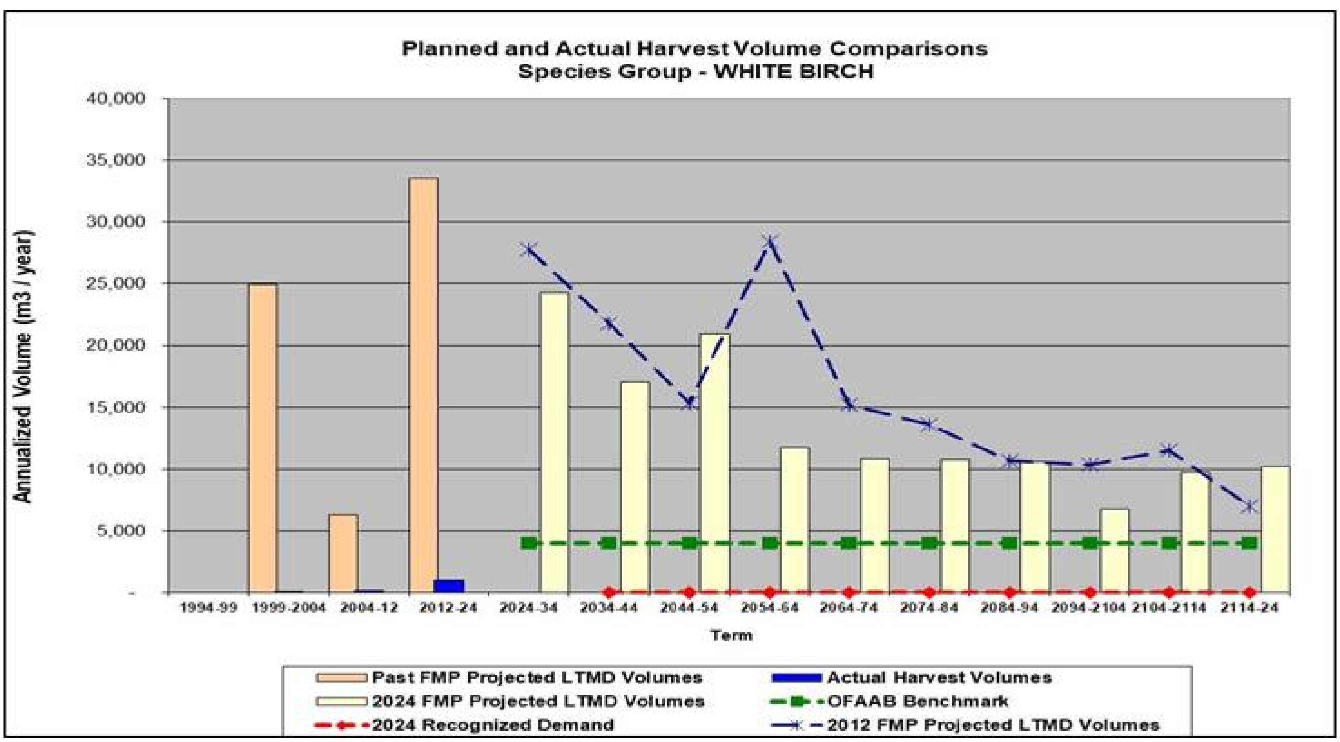
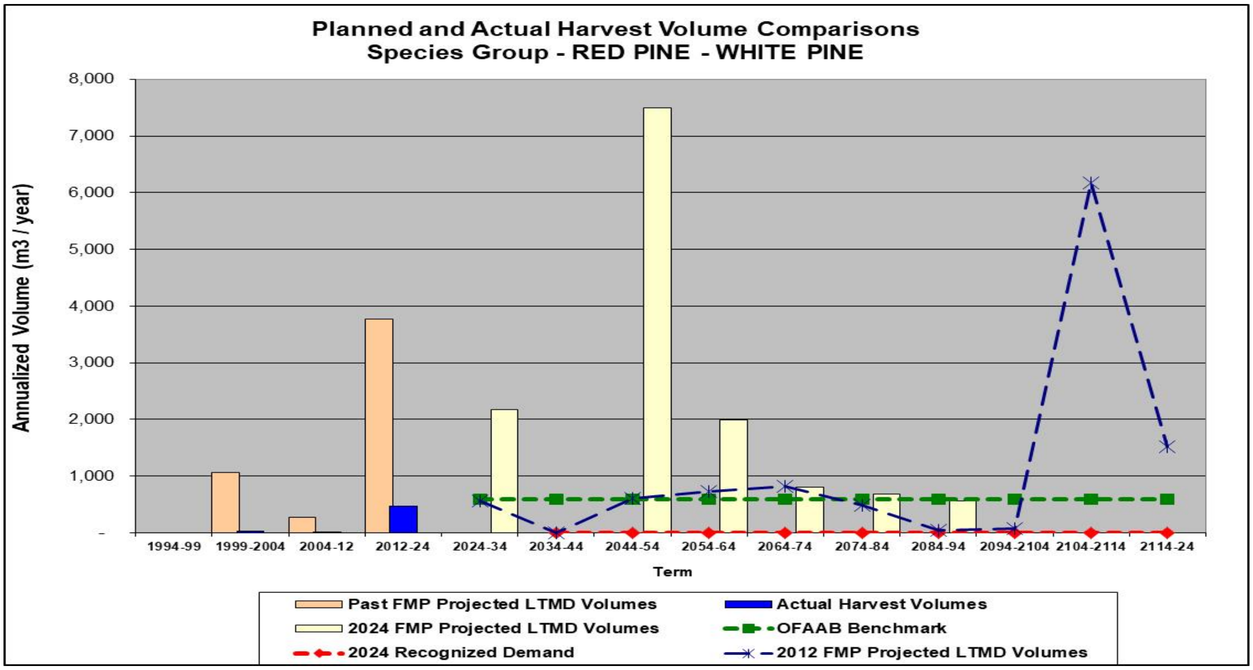


Figure 9 Planned and Actual Harvest Volume Comparisons, Species Group – White Birch



Red Pine – White Pine is not a major species volume group on the Whiskey Jack Forest for this 2024-2034 FMP. However, comparison volumes are included for information and to aid future comparisons.

Figure 10 Planned and Actual Harvest Volume Comparisons, Species Group – Red Pine – White Pine



9.3 Long-term Management Direction Documentation

The management objectives, indicators, desirable levels, target levels and the timing of assessment for each indicator are documented in Table FMP-10. Projected results for the Long-term Management Direction (LTMD-01) are documented or discussed in:

<u>FMP Tables:</u>

FMP-6	Projected Forest Condition for the Crown Productive Forest
FMP-7	Projected Habitat for Selected Wildlife Species
FMP-8	Projected Available Harvest Area by Forest Unit
FMP-9	Projected Available Harvest Volume by Species Group and Broad Size Group
FMP-10	Assessment of Objective Achievement
FMP-10a	Assessment of Objective Achievement (Indicator 8C)

<u>FMP Text Sections:</u>

- 3.7 Long-term Management Direction
- 5.0 DETERMINATION OF SUSTAINABILITY
  - 5.1 Collective Achievement of Management Objectives
  - 5.2 Spatial Assessment
  - 5.3 Social and Economic Assessment
  - 5.4 Risk Assessment
  - 5.5 Conclusion on the Sustainability of the FMP

9.4 Documentation of Proposed LTMD Checkpoint

This progress checkpoint confirmed support by the MNRF district and regional staff for the information and products associated with the Long-Term Management Direction, the preliminary determination of sustainability and the primary road corridors developed in the FMPM Part A, Section 1.2 to 1.2.7.

Progress Checkpoint #5 Support for the Proposed Long-term Management Direction was received via email from Mitch Legros, R.P.F., Regional Planning Forester, to Kurt Pochailo, R.P.F., Plan Author and Service Provider Lead, on June 13, 2023.

APPENDICES

Appendix 1 Caribou Habitat Analyses
Includes:
Plan Start Caribou Habitat Tract Analysis Using the Ecosite-based Habitat Model and Caribou Occurrence Information, and
Development of the Dynamic Caribou Habitat Schedule for the 2024 Whiskey Jack Forest FMP

Appendix 2 Moose Emphasis Area Documentation

Appendix 3 Deer Emphasis Area Delineation and Identification of Critical Thermal Cover

Appendix 4 Large Landscape Patches for Mature and Old Forest

Appendix 5 Boreal Landscape Guide Indicator Analyses

Appendix 6 Yield Curves

Appendix 7 Summary of Investigation and LTMD Development Results

Appendix 8 Summary of Long-term Management Direction Results

Appendix 1

Caribou Habitat Analyses

Includes:

Caribou Tract Analysis:

Plan-start Caribou Habitat Tract Analysis for the Whiskey Jack Forest 2024 Forest Management Plan using the Ecosite- based Habitat Model and Caribou Occurrence Information

Caribou Block Closure Report:

Caribou Tract/Block Closure Report

DCHS Development Report:

Development of the Dynamic Caribou Habitat Schedule for the 2024 Whiskey Jack Forest FMP

Plan-start Caribou Habitat Tract Analysis for the Whiskey Jack Forest 2024 Forest Management Plan using the Ecosite- based Habitat Model and Caribou Occurrence Information

Final May 5, 2023

Plan-start Caribou Habitat Tract Analysis for the Whiskey Jack Forest 2024 Forest Management Plan using the Ecosite- based Habitat Model and Caribou Occurrence Information

Introduction

The initiation or renewal of a forest management plan (FMP) in continuous caribou distribution requires that FMP planning teams have a general understanding of the state of the landscape for caribou habitat attributes that are capable and suitable for conserving caribou at plan start, and into the future. Capability in caribou range relates to the soils, vegetation and geology, where a stand is considered "capable" if it can develop into "suitable" condition for supporting caribou use now, or sometime in the future where the stand needs time to age and transform from a young forest unsuitable state, into an intermediate or mature state where habitat attributes develop. Current occupancy and likelihood of future occupancy are also attributes or potential that considered in the habitat tract analysis.

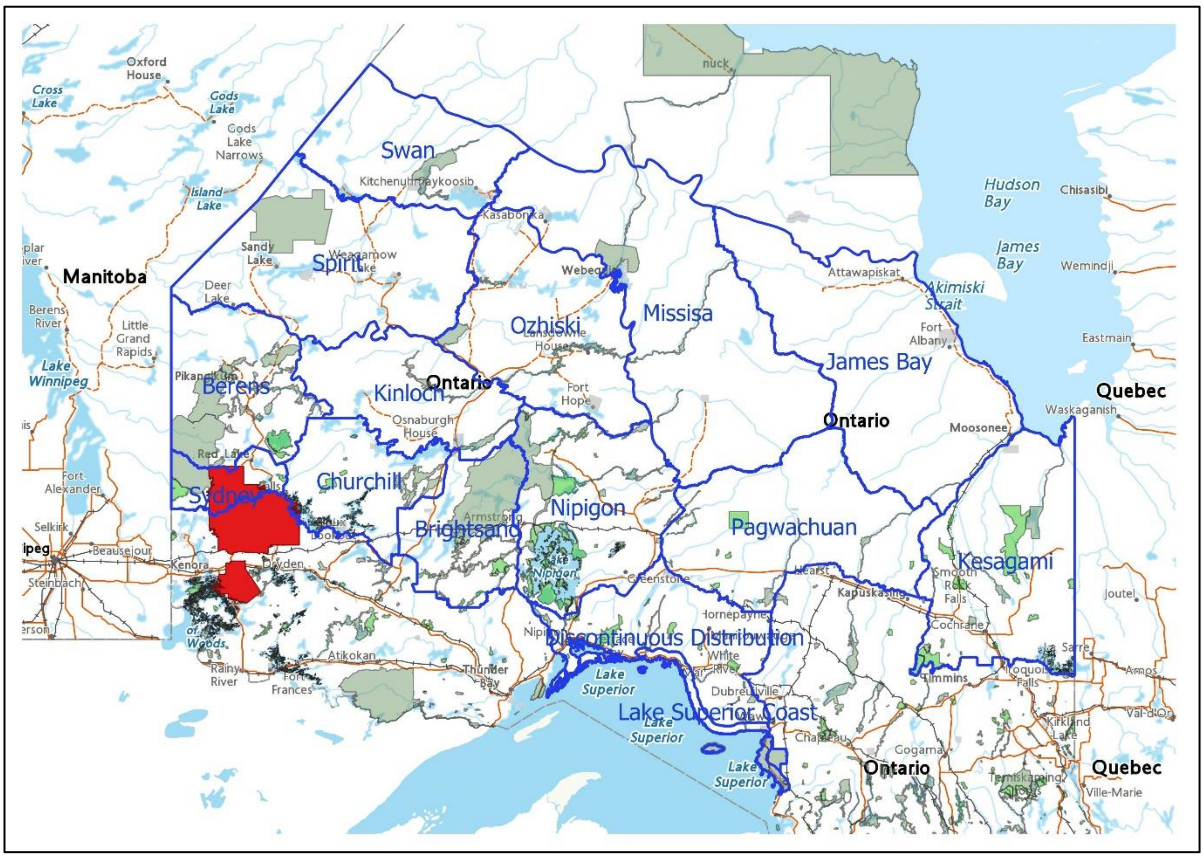


Figure 1 Location of the Whiskey Jack Forest in Northern Ontario Relative to Delineated Caribou Ranges

Forest-dwelling boreal woodland caribou occupy and move about the landscape at large scales, with individual home ranges in the hundreds of thousands of hectares in size, and seasonal home ranges in tens of thousands to hundreds of thousands of hectares. The landscape is naturally heterogeneous with a range of habitat capability potential arranged in large landscape patches, and a pattern of unsuitable and suitable habitat condition large landscape patches that are continually changing through time due to natural forest aging, natural disturbances, and human generated disturbances such as forest harvesting.

The relative degree of habitat capability tends to be fixed by geology, landforms, waterbodies, soils, and biological legacy of forest vegetation. We use the ecosite classification in the eFRI (enhanced Forest Resource Inventory) to assess basic capability. Suitability in forested and wetland ecosites are used to assess suitability at the stand level initially, and the pattern of suitable stands is rolled up to large landscape patches for an appropriate scale that is meaningful for the way caribou use the landscape.

In Northwestern Ontario, the Whiskey Jack Forest (WJF) exists within Landscape Guide Region 3S/4S (Figure 1). This area is typified by a relatively dry and cool climate, characterized by bedrock exposures with a large proportion of land area being forested or occurring as lakes, streams and other waterbodies.

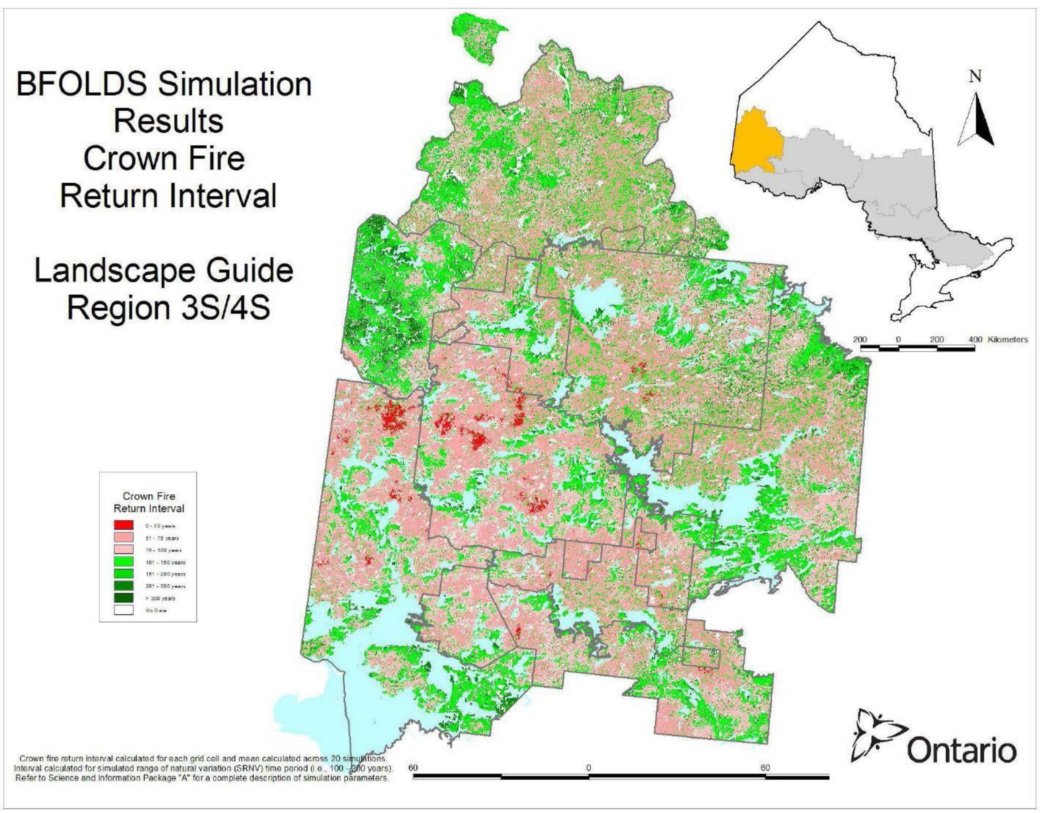


Figure 1 Fire Return Interval for Landscape Guide Region 3S/4S. The Whiskey Jack Forest is located centrally

For Landscape Guide Region 3S/4S, where the Whiskey Jack Forest is located, the fire return interval ranges from 50-100 years with portions of the Whiskey Jack Forest having shorter or longer intervals (Figure 1, Elkie et al, 2018A). Of note, shoreline areas along Lake of the Woods and the English River have a longer fire return interval of 100-300 years. There are also patches in the northern portion of the Whiskey Jack Forest with fire return intervals of 0-50 years. This is typical of Landscape Guide Region 3S4S where 'Upland coniferous forest fire cycles range between 50 and 187 years, and fires in these ecosystems tend to be stand replacing. Mixed forest fire cycles tend to be longer, between 63 and 210 years, and fire intensity is more variable' (van Sleeuwen 2006 in Crins et al 2009).

Only the northernmost portion of the Whiskey Jack Forest is currently considered capable of supporting woodland caribou. This area is demarcated with the continuous caribou distribution boundary (Fig. 2). Within the Whiskey Jack Forest there are two distinct areas within the continuous caribou distribution: 1) the area associated with the Sydney Range and Berens range, in the northwest portion of the forest, and 2) the area associated with the Churchill Range in the northeast portion of the forest (Fig. 2). Both locations are within the continuous caribou distribution.

The area of the Whiskey Jack Forest within the continuous caribou distribution was impacted by several fires in the 1980s as well as more recently in 2021. Notable fires, since the 1980s, which occurred in at least a portion of the caribou zone, include RED14 (in 1980 – 43 666 ha), KEN73 (in 1983 – 82 323 ha), RED149 (in 1983 – 21 597 ha) and KEN51 (in 2018 – 191 811 ha). The 1991 Pakwash Blowdown wind event also affected many stands around Confusion Lake and likely reduced habitat quality for caribou (Appendix Map 7). These natural disturbances in the northern portion of the Whiskey Jack Forest led to variation in the ages of stands which occur and where anthropogenic disturbance sources, including forestry and the clearing of land for other activities, has made these areas of the forest predominately < 60 years old.

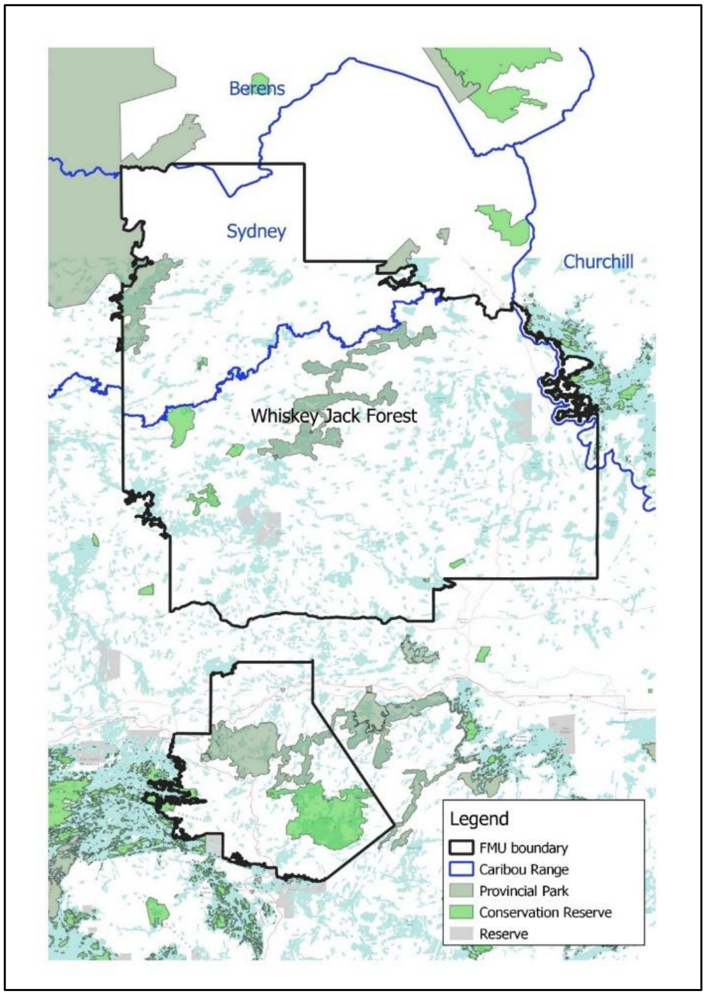


Figure 2 Continuous Caribou Distribution in the Whiskey Jack Forest

Habitat Tract Development

Habitat tracts are delineated at coarse, large landscape scales that reflect the scale at which caribou use the landscape, and the scale where large natural disturbance patterns drive landscape pattern. The habitat tract analysis is not quantitative, but rather qualitative to produce a simple picture to understand the landscape.

Tract linework is not intended to be precise because there is no precision concept to lump or split forest stand groupings at small scales when thinking about how caribou use the landscape at hundreds of thousands of hectares.

Habitat Tract Direction:

Direction for forest management planning teams to produce a habitat tract map to inform forest management decisions, is prescribed in *Ontario's Forest Management Guide for Boreal Landscapes* (OMNR 2014).

Technical guidance is provided in the document *Science and Information in support of policies that* *address the Conservation of Woodland Caribou in Ontario* (Elkie et al 2018B). Included in this document is a technical update of the current habitat metrics of each of Ontario's caribou ranges, and this update provides planning teams with additional range scale context for making management decisions.

Habitat Classes: Winter and Refuge

Winter Habitat:

Suitable winter habitat is characterized by the least productive of soils and peatlands. Terrestrial lichens comprise the bulk of the winter diet for caribou, and lichens are the least competitive of species, only growing where other species cannot, and requiring relatively high sunlight exposure. Winter habitat suitability is comprised of ecosites which have the potential to provide terrestrial lichens, and to some extent, arboreal lichens. The classic example of ecosites which provide abundant terrestrial lichens are open rock knobs, very dry and shallow soils with open spruce and pine canopies, peatlands with abundant dead wood substrate open to sunlight, or peatland raised peat formations or islands dry enough for lichen to compete for growing space.

Winter caribou habitat has a low to extremely low productivity for moose browse, and therefore winter moose densities are predicted to be low to very low in large landscape patches of suitable caribou winter habitat of the best quality. Therefore, suitable winter habitat is expected to support lower wolf densities because of lower alternate prey densities. Boreal woodland caribou live at low densities, and space away from higher predator densities, and therefore all winter habitat is considered the best quality "refuge" habitat, i.e. refuge from predation.

Winter habitat in forested ecosites is strongly influenced by age class and the stand development history. After a fire, lichen may be burned off the forest floor, trees may develop into full canopy closure with no light reaching the understory to support abundant lichen. Forest stands developing from disturbance need time to go through self thinning, acidification and accumulation of the duff layer, suppression of forest floor competition for growing space, and the eventual opening up of the forest canopy at onset of maturity to allow more light to reach the forest floor, where lichen can grow on top of the forest floor duff, feathermoss and woody substrates.

Refuge Habitat:

All suitable winter habitat is refuge habitat. However, there are forest and wetland conditions that also contain relatively low amounts of moose browse, but do not support abundant terrestrial lichen and therefore lack the nutritional underpinning of being good winter habitat. Examples of refuge habitat in uplands are tightly stocked spruce and pine forests with a closed canopy, acidified duff layer, very shaded dark in the understory (where little to no lichen can grow due to shade), and understory dominated by feather moss and a herb-poor and browse shrub-poor condition. Examples of refuge habitat in wetlands includes large acidic peatlands, or sedge dominated wetlands, all with very little moose browse or preferred aquatic forage plants that are consumed by moose. Although these ecosites do not provide abundant lichen for caribou winter food, they do provide summer forage for caribou while supporting low to very low densities of moose.

Lower moose densities are supported in large landscape patches of refuge habitat, and therefore support lower wolf densities, and perhaps lower bear densities (although bear population densities and boreal ecosite associations are not well understood at landscape scales). Caribou tend to select large landscape patches with lower predator densities, and relatively good permeability for escape opportunities, i.e. forest structure with more open understories. An abundance of lakes and wetlands can often be considered as important 'escape' habitat in the summer months but this is considered independently from the refuge habitat model.

Refuge habitat is a broader class than winter with additional capable ecosites, and broader age class ranges for suitability. Refuge habitat value is not classified for prime sources of nutrition for caribou. Refuge is classified for its value as refuge from predation, where predator densities are expected to be lower, and avoidance of predators is more likely. Suitable refuge contains all winter suitable ecosites, plus all ecosites in age classes that have the potential to provide little moose forage. Where moose (alternate prey) are at naturally lower densities, there are less prey resources to support higher predator densities. Refuge habitat includes young post-fire extremely tightly stocked stands where caribou may not physically move but which provide very little productivity for moose food. Classic upland examples of young forest refuge include dense closed canopies of young jack pine with dense needle litter in the understory. Examples in wetlands include large sedge dominated fens with little to no quality moose food. Large patches of landscape with low moose nutritional potential is considered refuge habitat, regardless of whether caribou use, because this forest or wetland composition and structure supports lower predator densities that make caribou less susceptible to this form of mortality.

Habitat Capability and Suitability Classification

The ecosite-based habitat capability and suitability model was originally developed in the Northwest Region's 1999 *Forest Management Guidelines for the Conservation of Woodland Caribou: A Landscape Approach* (Racey et al, 1999). This model used a classification system based on ecosites, as described in *Terrestrial and Wetland Ecosites of Northwestern Ontario* (Racey et al, 1996).

The eFRI for the 2024 WJF landbase is using Ontario's *Ecological Land Classification Field Manual* (Ecological Land Classification Working Group, 2009), which replaced the regional ELC systems with one comprehensive system. The original 1999 model was translated to use the new provincial ecosites, and the model was kept true to the original 1999 concepts which have proven highly predictive in NW Region over two decades, and therefore it is a model with high confidence in predicting caribou occupancy. The general groupings of ecosites ranked for habitat also correspond to various resource selection function models for boreal forest dwelling woodland caribou, again supporting regional confidence in this ecosite model. Table 1 is the Northwest Region's provincial ecosite-based habitat model.

Note for reading Table 1: although classification is done for each individual eFRI community (polygon), true ecological habitat suitability for caribou individuals or groups of animals requires a large landscape scale patterns of suitable habitat, interconnected through space and time to function at home range scales. Individual classified EFRI polygons roll up to emerging patterns of relative suitability. Generally, we use 10,000 ha as guidance for minimum size for delineating habitat tracts, with most being larger, and a few distinct patches being smaller. Caribou individual home ranges are typically made up of many suitable tracts.

Table 1: Northwest Region Ecosite-based Winter and refuge Habitat Model used to classify forest resource inventories. Blank is not suitable. Value of 1 is “useable”. Value of 2 is “preferred”. A value of 1 or 2 means the ecosite is “capable” of developing into a suitable habitat condition.

Nov. 2017: NW Region Boreal Ecosite-Based Caribou Habitat Model, V2.0, translated from the original NW Ecosite-based 1999 Caribou Guideline Habitat Model										
Boreal Ecosite	**Winter Habitat Suitability**					**REFUGE Habitat Suitability**				
	Successional Stage					Successional Stage				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
	<=20y	**21-40y**	**41-60y**	**61-100y**	**>100y**	**<=20y**	**21-40y**	**41-60y**	**61-100y**	**>100y**
B012		1	2	2	2	1	2	2	2	2
B024		1	2	2	2	1	2	2	2	2
B026		1	2	2	2	1	2	2	2	2
B034			1	2	2	1	2	2	2	2
B035			1	2	2		1	2	2	2
B036							1	2	2	2
B037			1	1	1		1	2	1	1
B038			1	2	2		1	2	2	2
B049				1	2		1	2	2	2
B050				1	1		1	2	2	2
B052									1	1
B053									1	1
B064				1	1			2	2	2
B065				1	1			2	2	2
B067								2	2	2
B068								2	2	2
B082								2	2	2
B083								2	2	2
B097									1	1
B098								2	2	2
B099								2	2	2
B114				1	1			2	2	2
B126	1	1	1	2	2	2	2	2	2	2
B127			1	1	2	2	2	2	2	2
B128				1	1	1	1	2	2	2
B136	1	1	1	1	1	2	2	2	2	2
B137	1	1	1	2	2	2	2	2	2	2
B138	1	1	1	1	1	2	2	2	2	2
B139						2	2	2	2	2
B140						2	2	2	2	2
B141						2	2	2	2	2

B163		1	2	2	2	2	2	2	2	2
B164		1	2	2	2	2	2	2	2	2
B165		1	2	2	2	2	2	2	2	2
B179		1	2	2	2	2	2	2	2	2
B180		1	2	2	2	2	2	2	2	2
B181		1	2	2	2	2	2	2	2	2
B222			1	1	2	2	2	2	2	2
B223				1	1	1	1	2	2	2

In Table 1, all ecosites listed are capable for refuge habitat. Winter habitat capability is for ecosites that have the potential to develop suitability, as represented by values of 1 or 2. Values of 1 means “useable”, and 2 means “preferred”. However, these values are relative, and observation of caribou occupancy over the decades indicates that often there is not necessarily a difference in “useable” and preferred”. On the ground there is inherent natural variability to ecosites, and models by definition over-simplify nature. The eFRI itself is a model, and one must be careful to think hierarchically at all scales before assuming patches assembled from interpreted aerial imagery equal a precise meaning of “habitat”. For example, caribou will use large lakes surrounded by mixedwoods (non-capable and non-suitable ecosites) in the summer for calving and post-calving, and its likely that the lake morphology and refuge/escape habitat functions of lake islands are what is being selected for at larger scales rather than a specific ecosite type. Caribou eat various herbs and tree/shrub foliage in summer, and lichen abundance alone does not explain habitat use in summer. Landscape pattern, lake morphology and location, peatlands, and inter-patch connectivity all influence habitat selection and use, i.e. what is referred to as “arrangement” in policy and technical guidance documents. In addition, caribou are individuals, space apart from each other in summer, and they do different things that simple models do not necessarily account for.

Caribou Occurrence, Occupancy and Use data

There are various terminologies for caribou location data, such as presence, occurrence, and occupancy. These various data types are used to interpret use of the landscape for various life history functions. The raw data and interpreted functions are used to inform habitat tract delineation. Knowledge of caribou occupancy or presence comes from several decades of data including:

- Observation: various aerial surveys, lake surveys by boat, on-foot surveys, various observations from industry, publics, and indigenous knowledge reports. Note that search and survey effort is not similar through time, and absence of observations does not mean caribou absence.
- Radio and satellite collar transmission data from individual animals from various projects going back to the late 1980's. Note that the vast majority of caribou have never been collared, and therefore absence of collar data does not mean absence of occupancy or use.

Caribou use for a particular life history function (e.g. calving, post-calving, nursery, winter concentration) is interpreted from data, and various points and polygon layers have been developed. Again, caution must be used because absence of data does not mean absence of occupancy, use, or habitat value. Caribou as a species at risk, requires careful presentation of locational data and habitat functions. Generally, the current use of the Whiskey Jack Forest landscape by woodland caribou is:

- Considered to occur north of the continuous caribou distribution boundary but in two distinct areas (Sydney and Berens range portion in the NW, Churchill Range portion in the NE);
- Relatively unstudied although habitat modelling indicates similarities to other forest management units occurring at the southern extent of the continuous caribou distribution, including moderate to high levels of anthropogenic disturbance and low levels of natural disturbance;
- Porous with forested areas located inside the other Ontario Forest Management Units as well as Woodland Caribou Provincial Park located to the west. Much of Woodland Caribou Provincial Park occurs at a young forest age in 2023 based on successive fires that occurred in 2011 (RED124), 2016 (RED3), 2018 (RED76, RED81, RED97), 2019 (RED45) and in 2021 (RED16, RED77, KEN51). Similarly, the Kenora Forest was also heavily impacted in 2021 by KEN51 leaving much of the Sydney Range in a disturbed state.

The portion of the Whiskey Jack Forest inside the continuous caribou distribution is predominately made up of jack pine dominant and black spruce dominant stands. These forest stands currently provide suitable preferred or usable refuge habitat but is of limited value as winter habitat. It should be noted that the extent of the caribou range overlapping the Whiskey Jack Forest was previously more limited in comparison to what occurs currently (Appendix Map 8). The associated harvest strategies prior to 2012 resulted in younger age stands interspersed with mature conifer cover. These forest characteristics are alternately preferable to moose by providing a mix of browse (young stands < 36 years old) with neighbouring mature conifer stands as cover. Those areas impacted by early-1980s fires, notably RED14 (1980) and RED149 (1983), are starting to come online as these areas are of decreased suitability to moose in moving to more mature stands with less browse. Unlike previously harvested areas, the areas where there were forest fires form continuous stretches of even-aged forest more indicative of landscapes where caribou are found.

There are a considerable number of lakes within the portion of the Whiskey Jack Forest overlapping the continuous caribou distribution. Many of these shorelines exhibit high productivity where there is the potential for mixedwood and hardwood stands to grow. These areas are often considered less suitable when considering winter and refuge habitat as they are preferred moose browse areas and where caribou experience higher predation risk. Islands and shorelines often also serve an important role as caribou calving and nursery areas as these areas provide escape routes (into the water) should predators occur nearby. Boreal woodland caribou are often identified by their tendency to space-out and maintain low densities during the calving and rearing season as a means of reducing predation risk.

Sydney Lake, within Woodland Caribou Provincial Park, is an identified high potential caribou area with the immediate surrounding landscape constituting some of the oldest growth area in this portion of the Whiskey Jack Forest. Notably, however, the KEN51 fire in 2021 affected the area immediately south of Sydney Lake and reduced the availability of mature woodland caribou habitat. Other patches of older growth forest, 80 years or older, occur along the Longlegged River as well as the peninsula that extends between Medicine Stone and Upper Medicine Stone lakes. Most other portions of the Whiskey Jack Forest overlapping the caribou zone are less than 60 years old.

The portion of the continuous caribou distribution that extends along the shore of Lac Seul, within the Whiskey Jack Forest, is within the Churchill Range. There is a low expectation for caribou to be present in this area. This area occurs as a 1km shoreline boundary which shows a relatively high potential for mixedwood and hardwood stands more suitable to moose. This range also extends into Wildlife Management Unit 5 which supports good moose population densities and would normally receive consideration as an area which could support a Moose Emphasis Area.

Results: Age Class, Forest Units, Habitat Classification and Habitat Tract Map

Age class is a major driver of forest landscape pattern for habitat, and wildfires are a significant driver in the boreal forest of the shape and extent of natural even-aged patches.

Fig. 3 shows the mapped perimeters of wildfires by decade. Perimeters are coarse outlines of the event, and there are residual unburned patches within, and therefore the concept of "even-aged" is for the stands making up the predominant age class as a result of the fire, and not the entire polygon. Note also that fires from more recent decades have the more accurate perimeter mapping, and older decades have a smoother approximate outline.

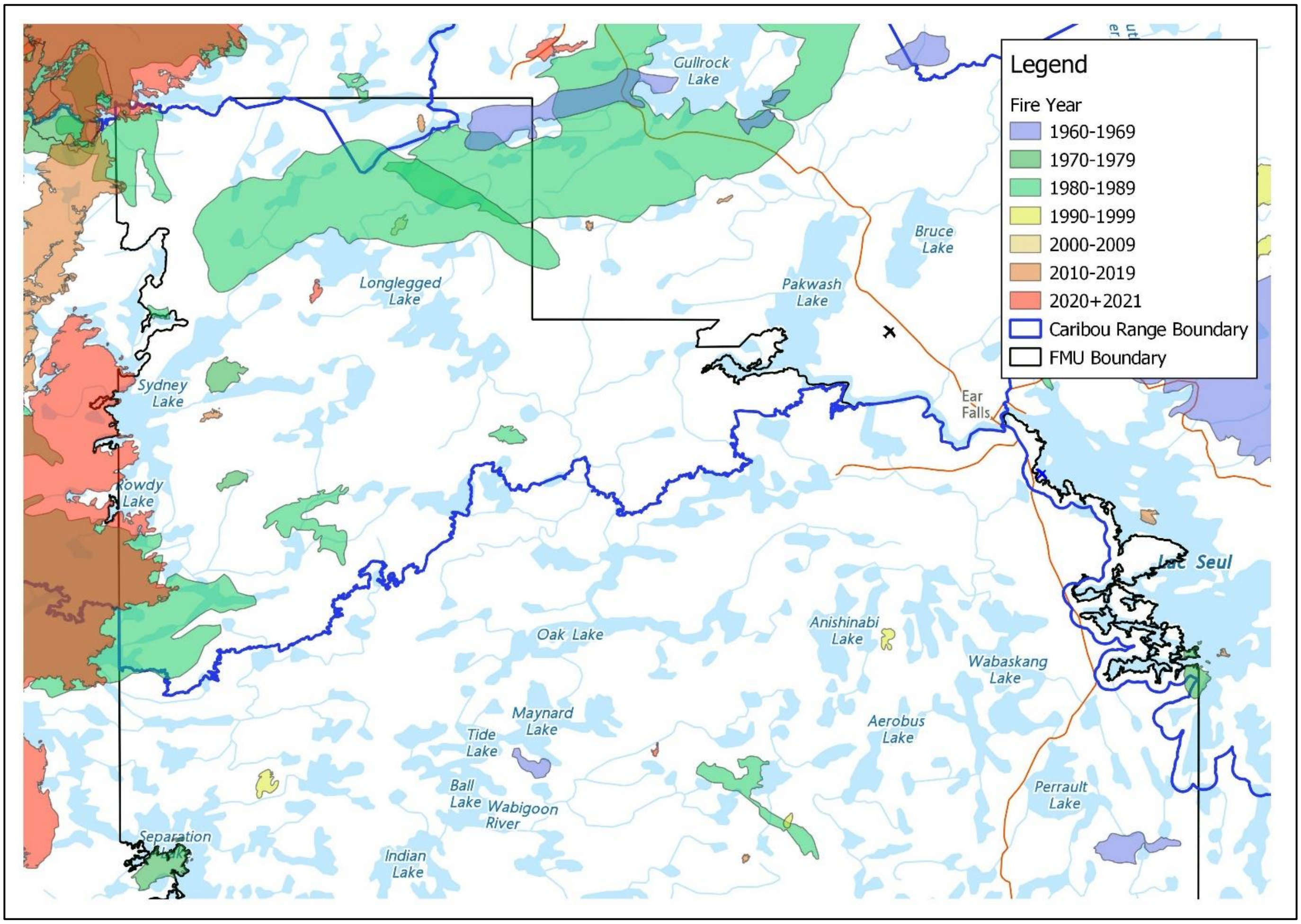


Figure 3 Mapped Fires by decade in the portion of the caribou zone overlapping the Whiskey Jack Forest 1960 – 2021

Fig. 4 shows the age class for the forest in 20-year age classes. Patterns of caribou refuge and winter habitat suitability are highly influenced by age of the pure conifer dominated forest patches, and by location and extent of low to non-capable patches dominated by mixedwoods and hardwoods.

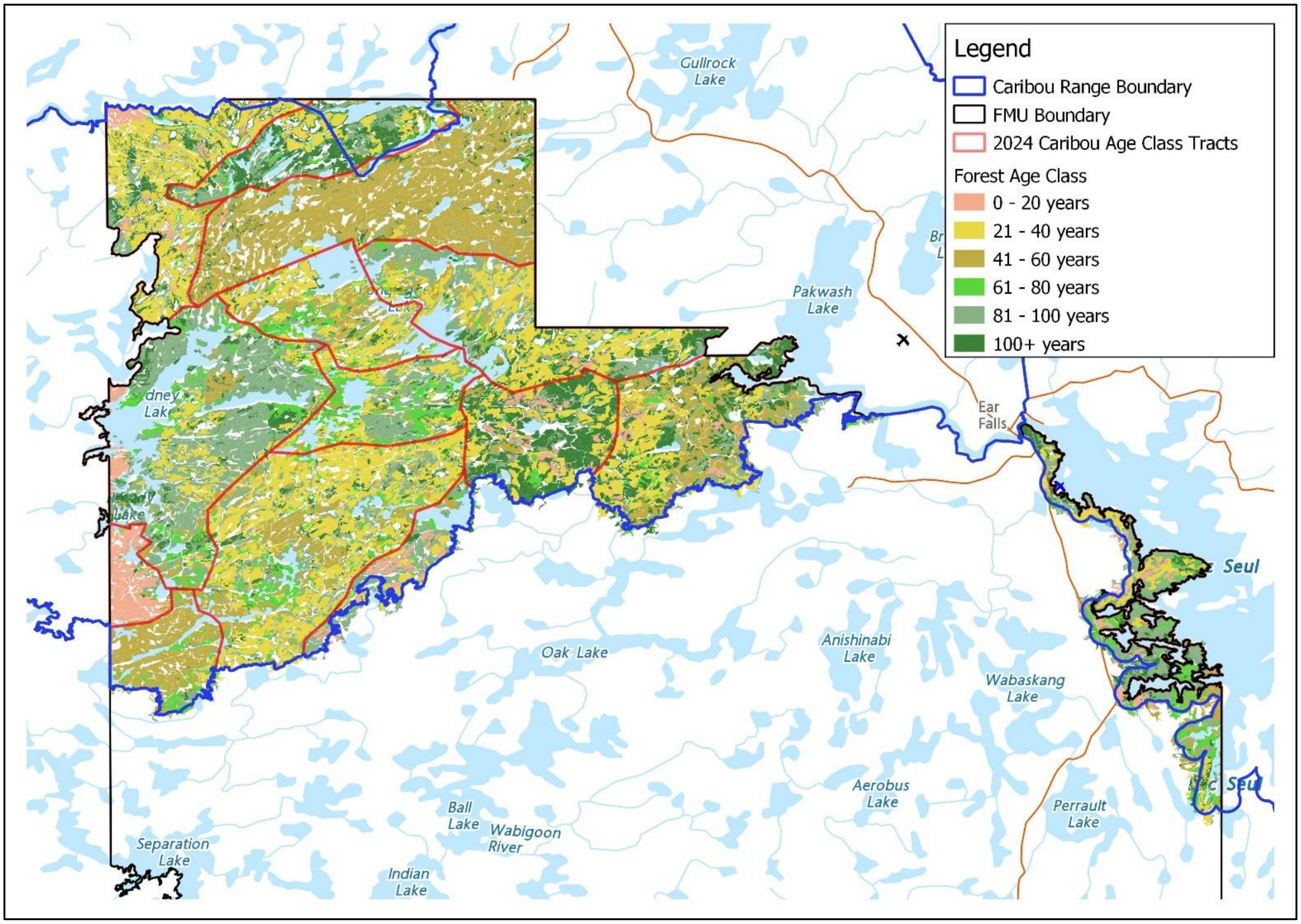


Figure 4 Forest Age Classes in the Whiskey Jack Forest overlapping the continuous caribou distribution. Forest age classes are based on a 2024 plan start and using the available Planning Composite Inventory

Figure 5 shows the landbase classified for winter habitat capability using the NW Region's ecosite-based caribou habitat model discussed above. Capability is independent of age class. There are natural degrees of true biological capability, but for the model purposes it only is a yes/no classification, and therefore the capability classification needs to be interpreted with a view to forest units and soils.

In assessing the winter habitat capability of the portion of the Whiskey Jack Forest north of the continuous caribou distribution boundary, it is apparent that the geographic land area is almost entirely capable with the exception of some shoreline areas which are better represented by hardwood and mixedwood dominant stands that are preferred by moose.

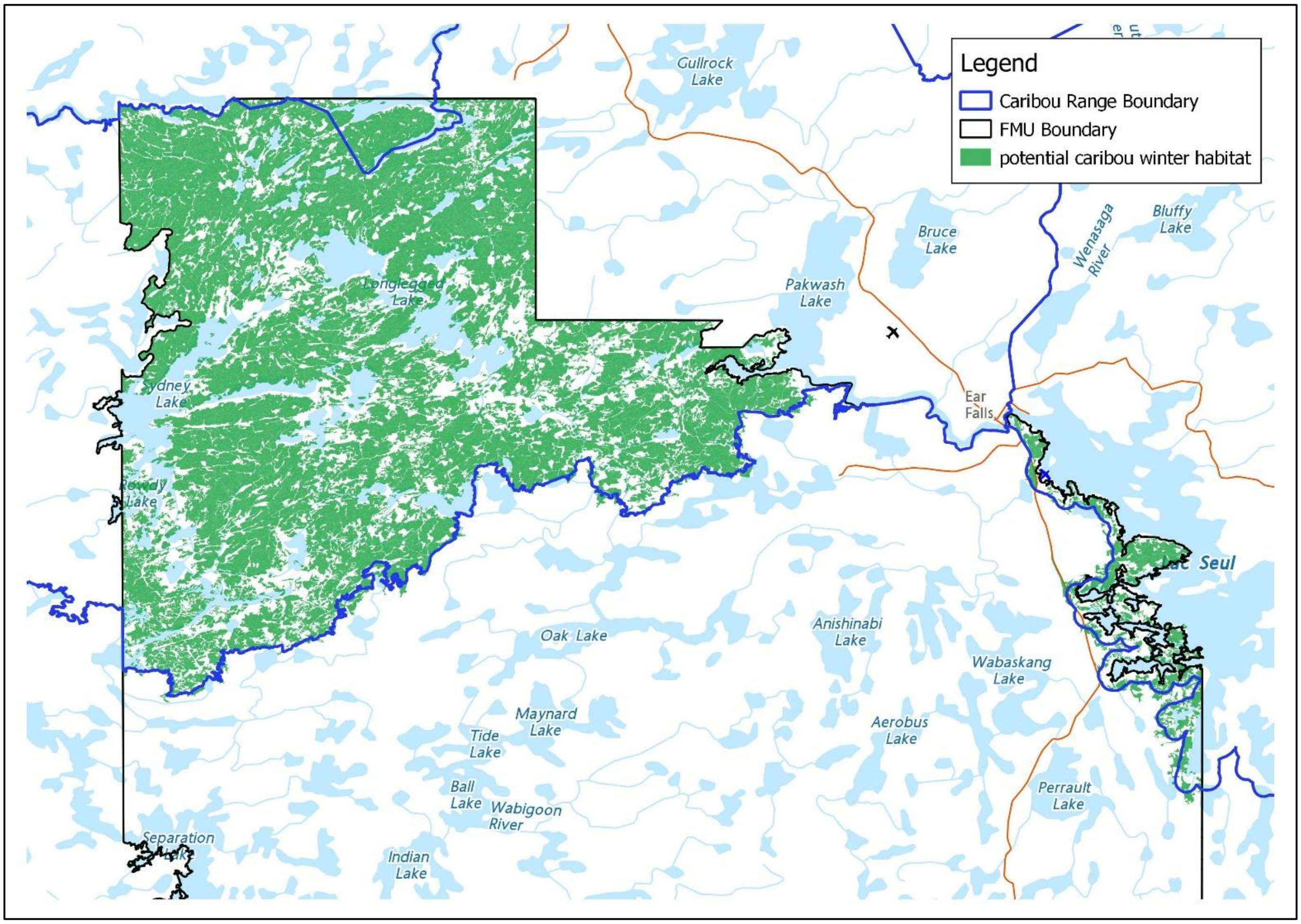


Figure 5 Winter habitat capability for the portion of Whiskey Jack Forest overlapping the continuous caribou distribution. Potential caribou winter habitat is based on a 2024 plan start and using the available Planning Composite Inventory

Figure 6 shows the NW Region Landscape Guide Forest Units classified from the eFRI. Most stands are jack pine dominant or black spruce dominant. The hardwood dominant stands constitute approximately 16.5% of available forest unit types, by area, and occur in areas where there are numerous waterbodies and higher soil productivity.

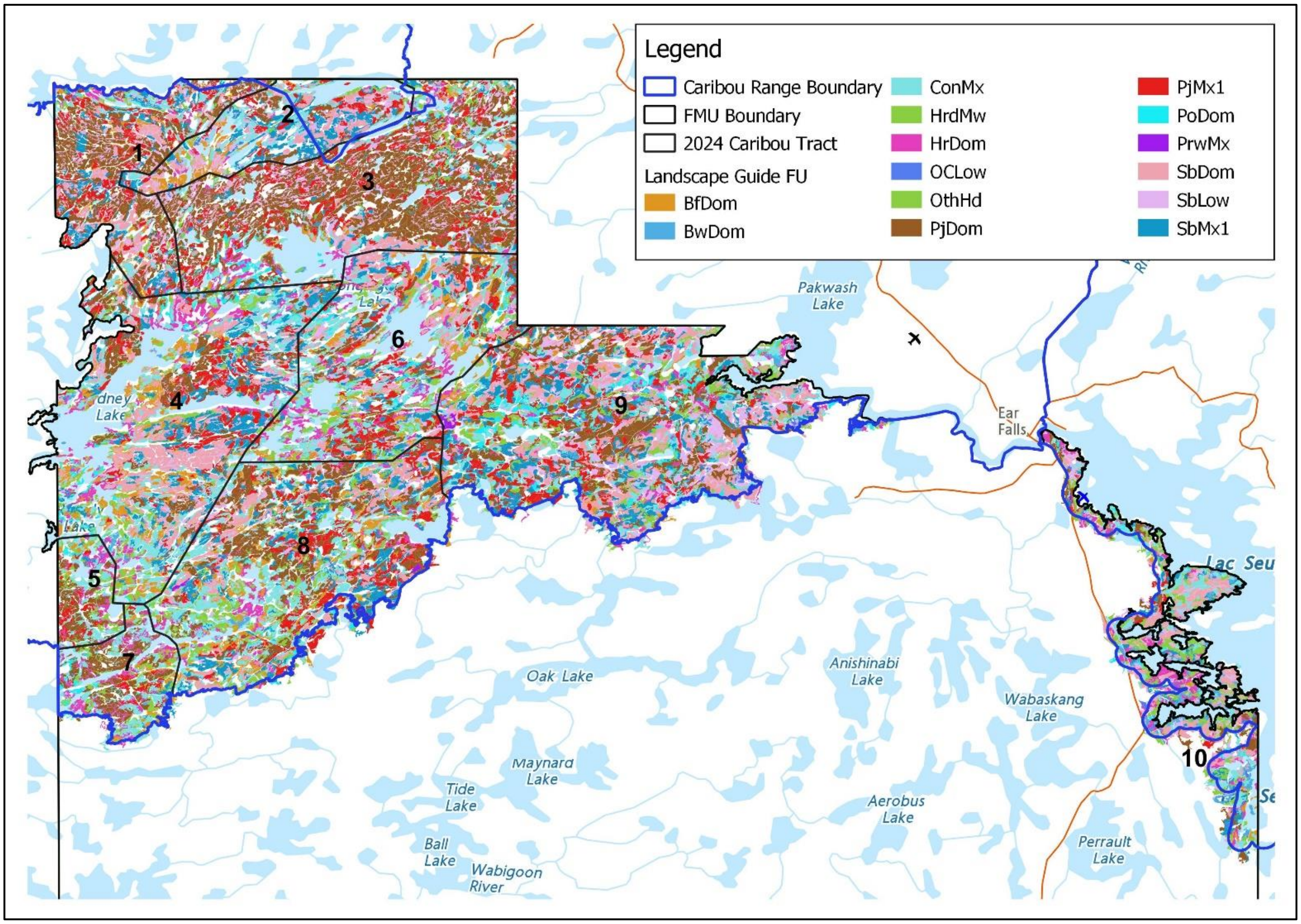


Figure 6 Landscape guide forest units identified for the portion of Whiskey Jack Forest overlapping the continuous caribou distribution. Analysis based on a 2024 plan start date and ecosite data available in the Whiskey Jack Forest Planning Composite Inventory.

Table 2: Northwest Region Landscape Guide Forest Units in the Whiskey Jack Forest and overlapping the Continuous Caribou Distribution

Landscape Guide Forest Unit	Stands (#)	Stands (%)	Amount (ha)	Amount (%)
BfDom	953	6.2%	12,453	5.6%
BwDom	184	1.2%	2710	1.2%
ConMx	2095	13.6%	30,862	13.9%
HrdMw	1183	7.7%	18,011	8.1%
HrDom	771	5.0%	12,875	5.8%
OCLow	89	0.6%	945	0.4%
OthHd	38	0.2%	299	0.1%
PjDom	2460	16.0%	43,069	19.3%
PjMx1	1345	8.7%	23,989	10.8%
PoDom	390	2.5%	5581	2.5%
PrwMx	19	0.1%	269	0.1%
SbDom	1874	12.2%	27,647	12.4%
SbLow	2610	17.0%	20,075	9.0%
SbMx1	1381	9.0%	23,828	10.7%
TOTAL (no water)	15,392	100.0%	222,612	100.0%
TOTAL (with water)	23,910	-	328,380	-

Figure 7 shows the landbase classified for current winter habitat suitability, using the ecosite-based habitat model. Each stand is classified in the model, but true habitat suitability is a function of the larger landscape scale pattern of suitable and non-suitable forest ecosites. Please refer to Table 1 for the age of onset for winter habitat suitability by ecosite. In the review of Figure 7, it is apparent that there are limited areas identified as preferred or useable winter caribou habitat using the ecosite-based habitat model. This result is somewhat in contrast with the results of a model which otherwise defines usable and preferred winter caribou habitat using an age-based forest unit model, as applied by Ontario's Landscape Tool.

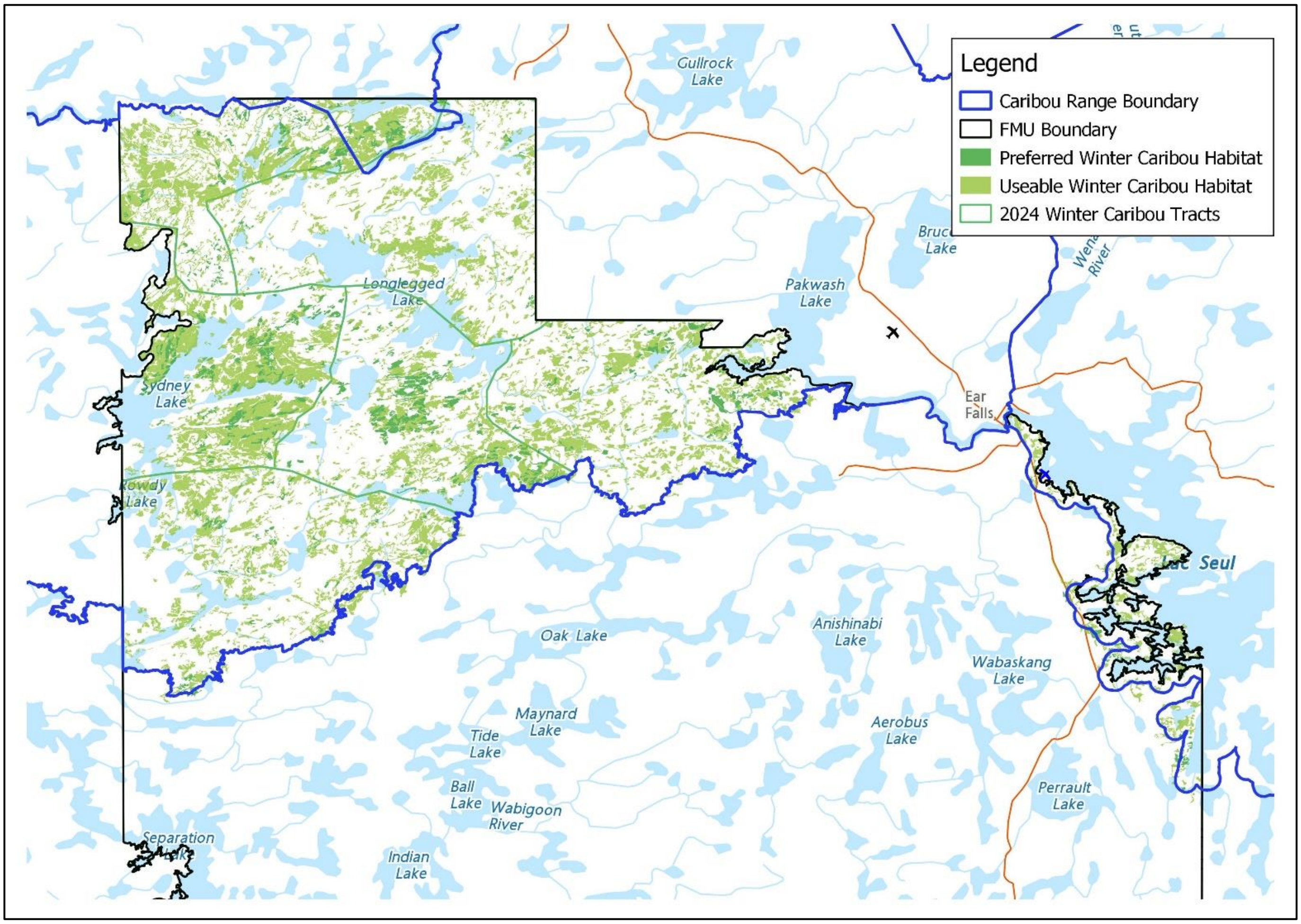


Figure 7 Winter habitat Suitability identified for the portion of Whiskey Jack Forest overlapping the continuous caribou distribution. Analysis based on a 2024 plan start date and ecosite data available in the Whiskey Jack Forest Planning Composite Inventory.

Figure 8 shows the landbase classified for current refuge habitat suitability, using the ecosite-based habitat model. Each stand is classified in the model, but true habitat suitability is a function of the larger landscape scale pattern of suitable and non-suitable forest ecosites. Please refer to Table 1 for the age of onset for refuge habitat suitability by ecosite. Note that values of "preferred" and "useable" from the model in nature may be of similar function. Through the review of Figure 8, it is apparent that much of the Whiskey Jack Forest within the Caribou Zone can be considered preferred or usable refuge areas.

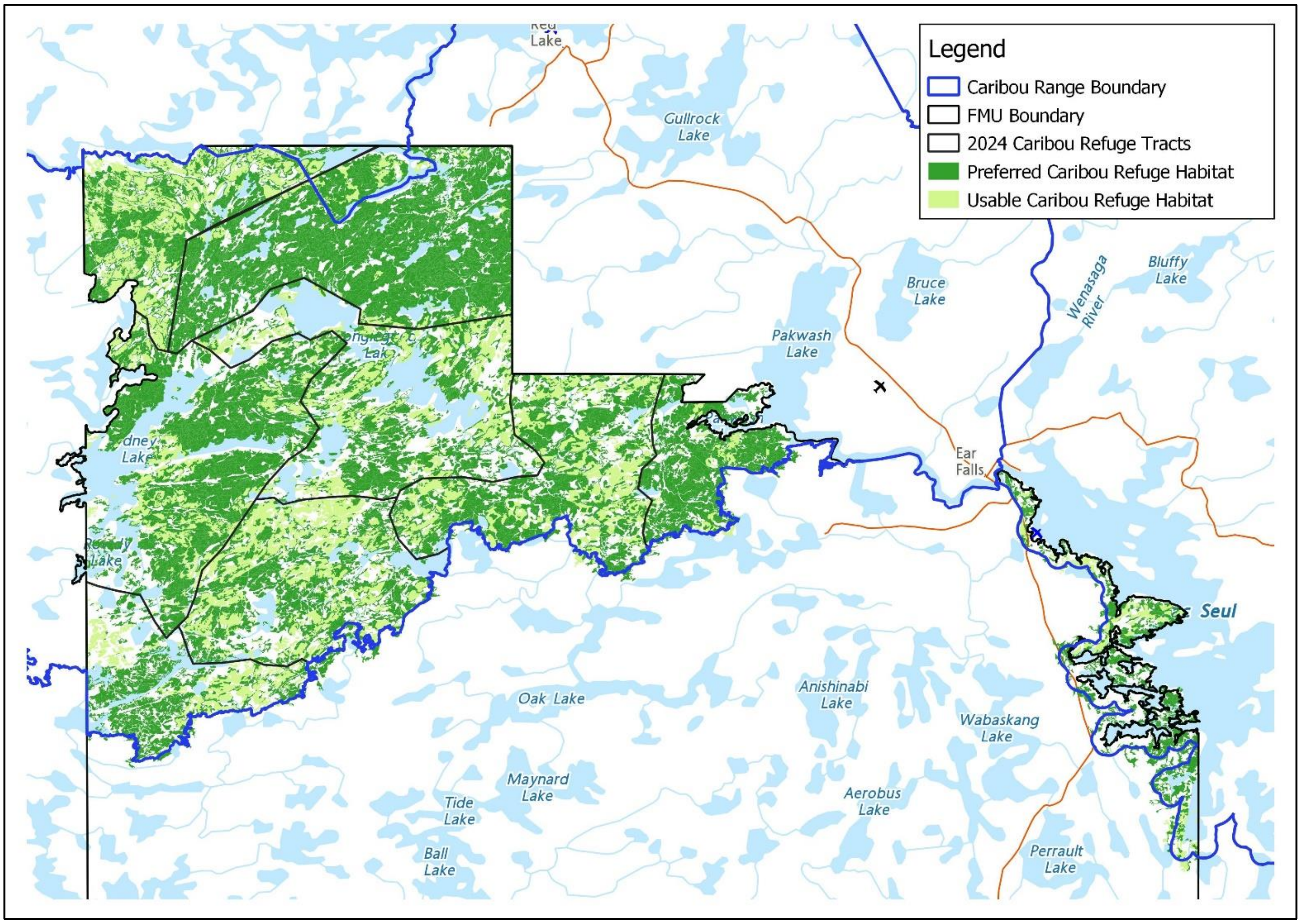


Figure 8 Refuge habitat Suitability identified for the portion of Whiskey Jack Forest overlapping the continuous caribou distribution. Analysis based on a 2024 plan start date and ecosite data available in the Whiskey Jack Forest Planning Composite Inventory.

Delineated Habitat Tracts for the Plan-Start Condition

Each forest management unit has its own landscape signature of geology, soils, forest cover, wetlands, and current forest composition and pattern. Each forest management unit is therefore different as to the information that drives delineated habitat tracts.

For the portion of the Whiskey Jack Forest within the continuous caribou distribution, age class is the dominant influence on habitat amount and arrangement. Evidence of caribou use of the landscape is relatively limited with exception to the portion extending from Sydney Lake to Medicine Stone and Upper Medicine Stone lakes. Where the use of radio- collars and observational data confirmed different lakes and wetland areas as calving and nursery areas, these were considered in the development and placement of habitat tracts.

The creation of the habitat tract along Lac Seul was based on the separate spatial extent of this area lending itself to the creation of only a single tract. Because there is only a limited spatial extent to work with it is less likely that this area has a set of unifying habitat characteristics in forming current or potential caribou habitat. To this extent, much this tract is considered mature but where some harvest has occurred.

Landscape guide forest units in the Whiskey Jack were considered in the creation of habitat tracts. Most of the area under consideration is jack pine dominant and black spruce dominant stands resulting in no clear boundaries for demarcating different tracts and where other data sources, namely age class, were the primary consideration. Shoreline areas where hardwood and mixedwood forest stands were identified were considered too insignificant to delineate as separate habitat tracts as each tract is meant to represent large landscape use patterns.

Note that habitat tracts are delineated coarsely. Tracts are not intended to be quantitative and are not management delineations. Precision and accuracy to eFRI polygon scale (e.g. snapping to stand boundaries as is done for management decisions) are not relevant concepts in this exercise. Rather it is a simple exercise to understand general patterns on the landscape that are meaningful to the scale at which caribou use the landscape. The manual process of doing this exercise includes a team effort of foresters, biologists and plan author, and this process builds knowledge of the caribou landbase by participating in the exercise.

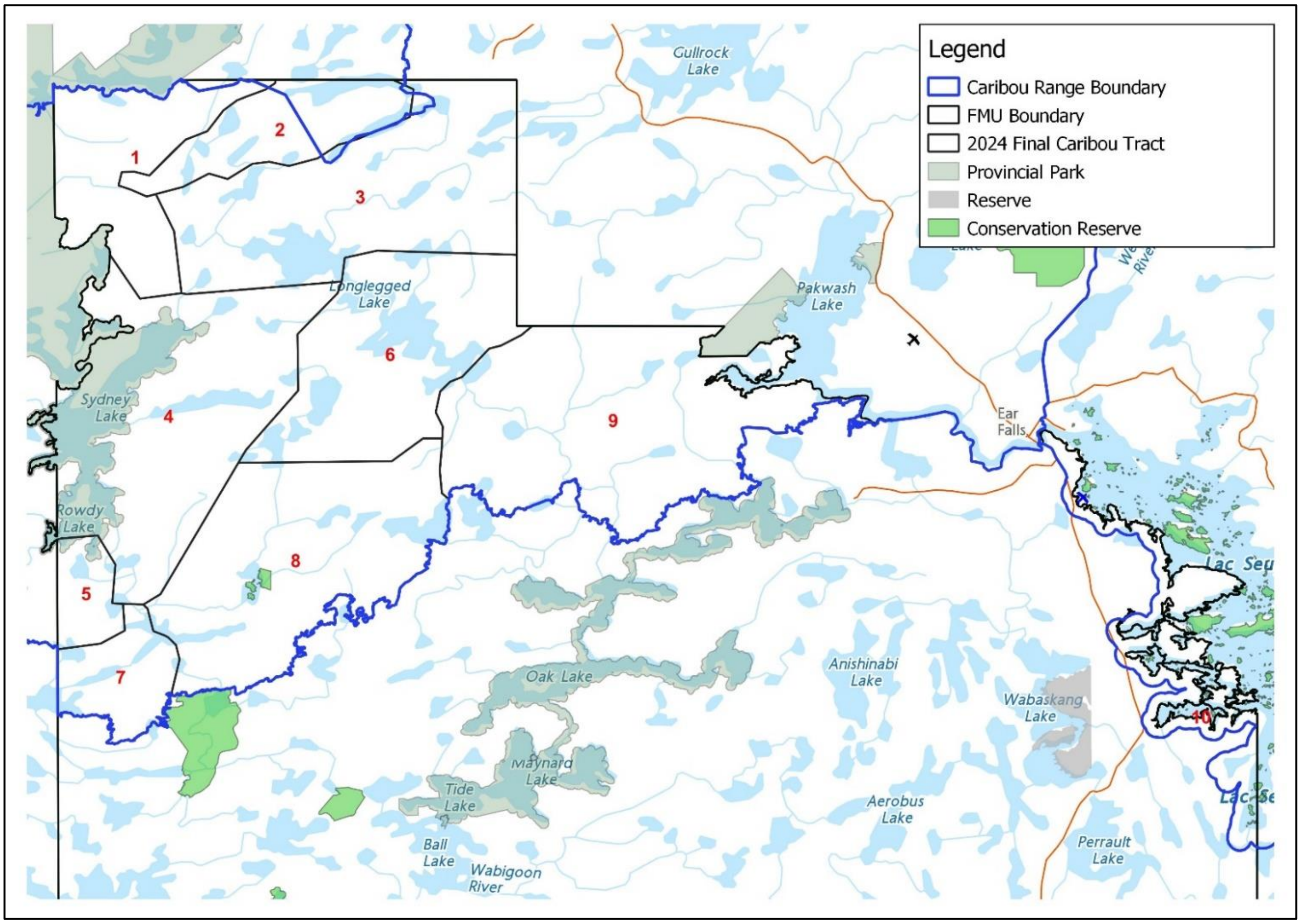


Figure 9 Whiskey Jack Forest Caribou Habitat Tracts prepared for 2024 Forest Management Plan.

19

Table 2: Habitat Tract attributes for delineated tracts on the Whiskey Jack Forest in preparation of the 2024 Forest Management Plan

ID	Age Range	Winter Use	Snowfree	Winterhab	Refugehab	Travelcorr	Calving_si	Calving_ty	Calvingcom	Strategica	Comments	MU_name	Uniqcode
1	21-40	Unknown	Unknown	No	Yes	Unknown	Yes	Wetland	Wetland and shoreline (two areas)	Yes	Adjacent to WCPP with calving polys	Whiskey Jack Forest	WJF_tract01
2	Mixed/old	Unknown	Unknown	Yes	Yes	Unknown	Yes	Islands	Includes peninsula between Medicine Stone and Upper Medicine Stone lakes	Unknown	Mature tracts used for calving	Whiskey Jack Forest	WJF_tract02
3	41-60	Unknown	Unknown	No	Yes	Unknown	Yes	Islands	Polygon overlap from WJF_tract02	Yes	Area of 1980 and 1983 fire	Whiskey Jack Forest	WJF_tract03
4	61-100	Unknown	Unknown	Yes	Yes	Unknown	Yes	Islands	Sydney Lake	Yes	Includes portion of WCPP	Whiskey Jack Forest	WJF_tract04
5	0-20	Unknown	Unknown	No	Yes	Unknown	No	-	-	Yes	2021 fire	Whiskey Jack Forest	WJF_tract05
6	Mixed	Unknown	Unknown	No	Yes	Unknown	Unknown	-	-	Unknown	Anecdotal reports of caribou on Longlegged Lake	Whiskey Jack Forest	WJF_tract06
7	41-60	Unknown	Unknown	No	Yes	Unknown	No	-	-	Yes	1983 fire	Whiskey Jack Forest	WJF_tract07
8	Mixed/young	Unknown	Unknown	No	Yes	Unknown	No	-	-	Yes	Predominately younger aged through natural and anthropogenic disturbance	Whiskey Jack Forest	WJF_tract08
9	Mixed	Unknown	Unknown	No	Yes	Unknown	No	-	-	Yes	Good moose area	Whiskey Jack Forest	WJF_tract09
10	Mixed	No	No	No	Yes	No	Yes	Islands	Lac Seul - north	No	Low caribou potential	Whiskey Jack Forest	WJF_tract10

Discussion

The placement of habitat tracts in the Whiskey Jack Forest are based on multiple attributes which, when taken in concert, form a composite of caribou use. This information can then be used in planning forestry operations in attempting to maintain adequately large habitat patches for caribou for the current plan period and into the future. While forest fires can serve to deteriorate and alter the availability of caribou habitat, the ten-year planning cycle for each Forest Management Unit allows Planning Teams a chance to re-evaluate habitat availability and caribou use and occupancy in defining new habitat tracts.

Through the evaluation of forest age class, it is apparent that much of the Whiskey Jack Forest, within the continuous caribou distribution, is made up of forests <60 years of age. This is due to several fires which have occurred in this area and left a legacy of younger age habitat. Despite the characterization of forest <60 years of age being 'younger,' these areas (habitat patches) are still primarily made up of jack pine dominant and black spruce lowland patches. Despite its 'younger' age this has resulted in much of the Whiskey Jack Forest (inside the caribou zone) being less suitable for moose and, at minimum, being suitable refuge habitat for caribou.

The transition of forested areas <60 years of age to being suitable winter habitat will occur over successive Forest Management Plans. The addition of large quantities of preferred and usable winter habitat will be based on a sufficient time having passed for lichens to regenerate and which are a primary winter food source for caribou. The 1980 and 1983 fires (tracts 3 and 7) will ideally provide suitable winter habitat in 20 years and become increasingly suitable for caribou in addition to a few other tracts already considered mature. Currently, the concentrations of preferred winter habitat in the Whiskey Jack Forest include those areas surrounding Woodland Caribou Provincial Park (tract 4) and around Medicine Stone and Upper Medicine Stone Lakes (tract 2).

While Woodland Caribou Provincial Park would have previously supported caribou populations, its utility as caribou refuge and winter habitat has been limited by recent fires. Similarly, the portion of the Kenora Forest, to the west, which overlaps the continuous caribou distribution was also impacted by a large fire in 2021 which limits its utility as caribou refuge and winter areas but where there remains some potential for caribou calving and rearing based on available islands, shorelines and low-lying wetland areas. The portion of the KEN51 fire that occurs in the Whiskey Jack Forest is expected to mature and in 60 years will be a potential caribou winter use area (tract 5).

Additional Products for Understanding Caribou Habitat Landscape Pattern:

Ontario's Landscape Tool (OLT) (Elkie et al, 2020) is the forest analysis tool required for all planning teams to use in identifying the biodiversity indicators listed in Ontario's Boreal Landscape Guide, or BLG (*Forest Management Guide for Boreal Landscapes.* OMNR 2014). OLT provides outputs for the forest unit- based caribou habitat classification system. This forest unit-based habitat classification uses the common currency of forest units, which are the unit of modelling for biodiversity indicators, wood supply, and the future forest condition. The forest unit-based caribou habitat model was created from the original ecosite model, and condenses 39 provincial ecosites into 8 Landscape Guide forest units.

(see page 44 in the BLG for the Northwest Region's forest unit-based habitat model).

OLT's habitat mapping products are somewhat different than the ecosite-based products, because forest units are aggregations of ecosite by age class. However, the general landscape patterns that inform forest management planning are generally the same between these two models.

The ecosite model and habitat tract exercise is done from raw data by LTMD Task Team members. This is a training exercise as well as a product-producing exercise, which builds a common knowledge and understanding by doing it. By doing this manual ecosite-based exercise, the instant push-button outputs of OLT can be better understood by all involved in the habitat modelling. See Appendix 1 for examples of OLT output products for caribou habitat mapping.

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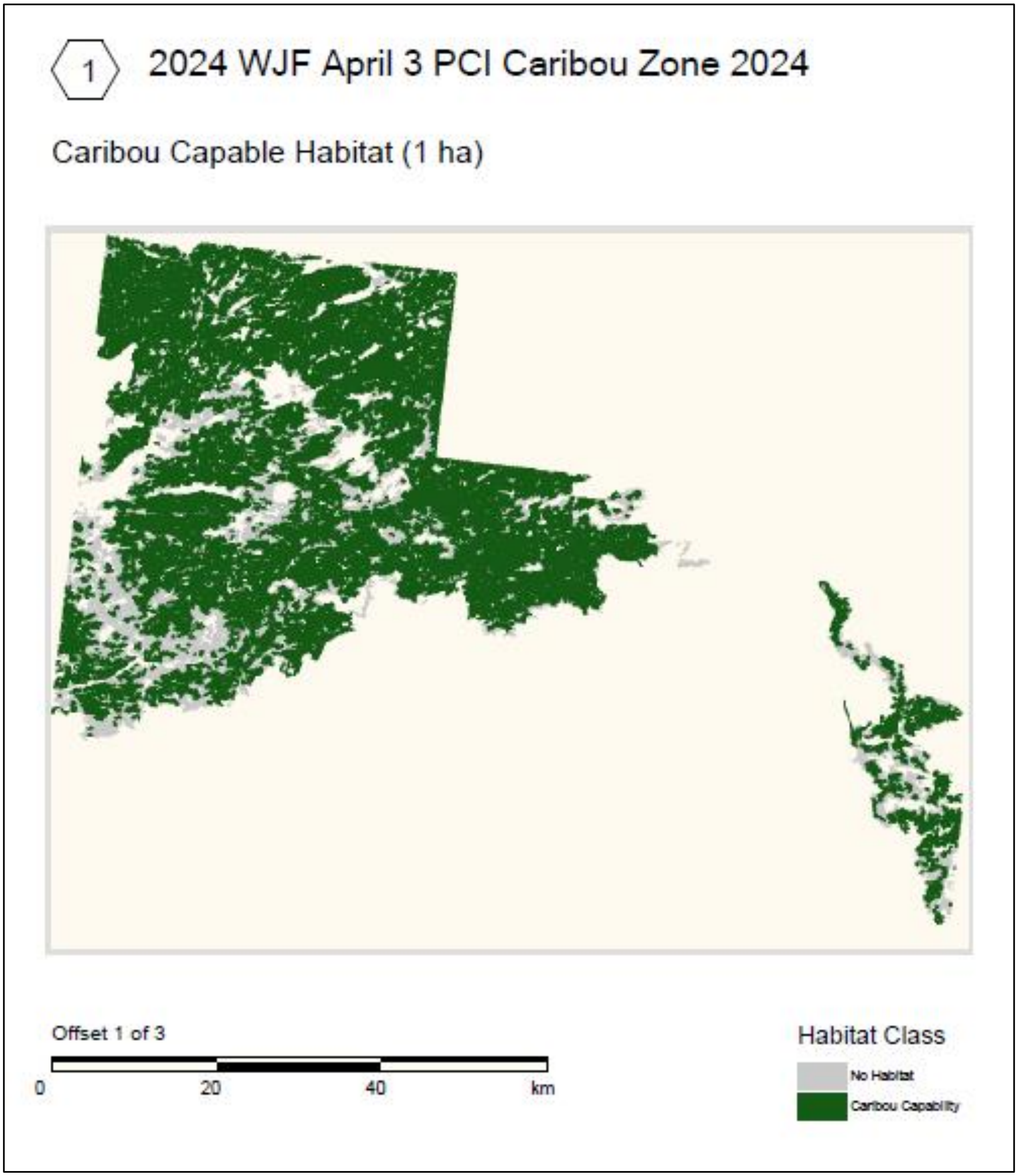
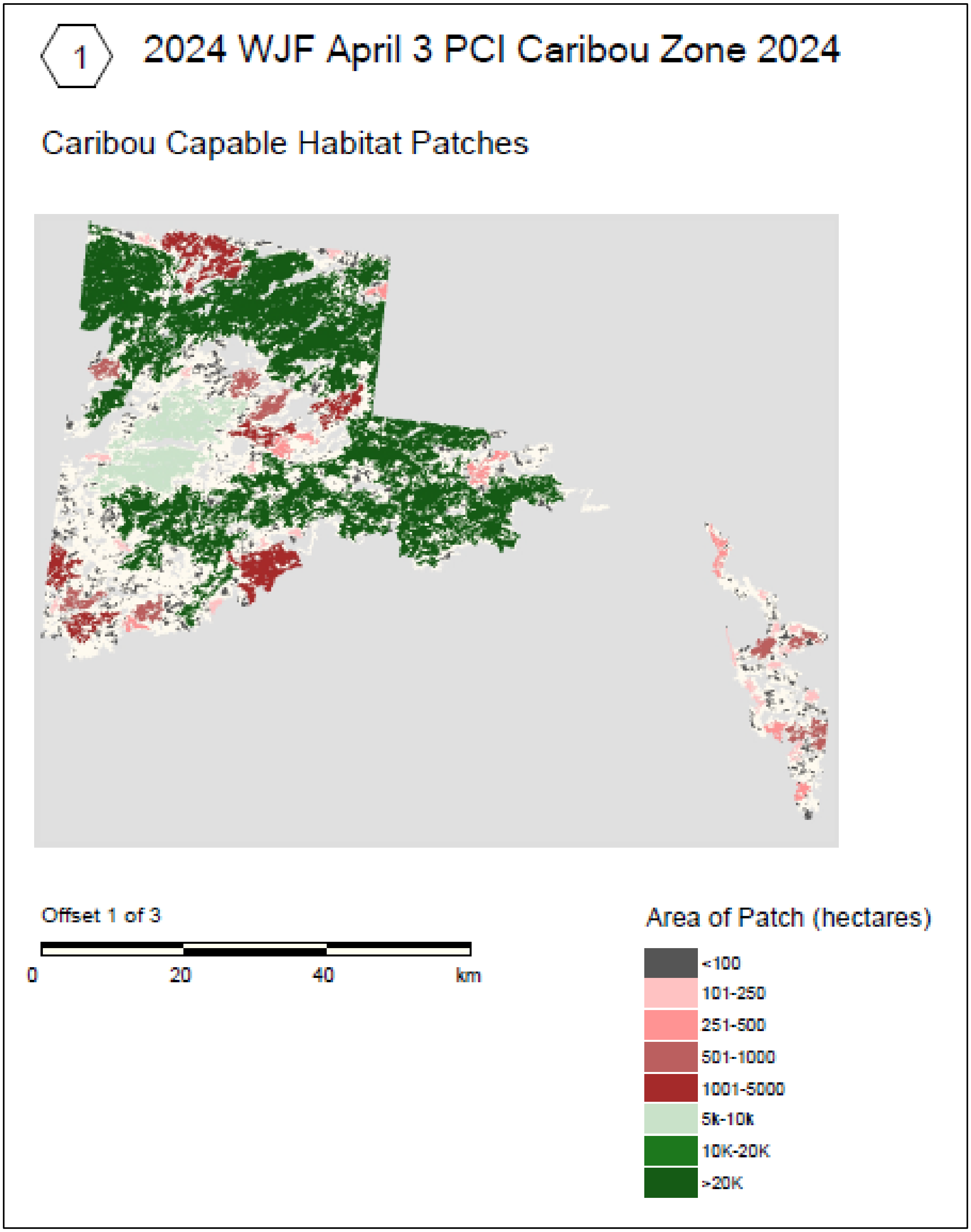
Appendix 1

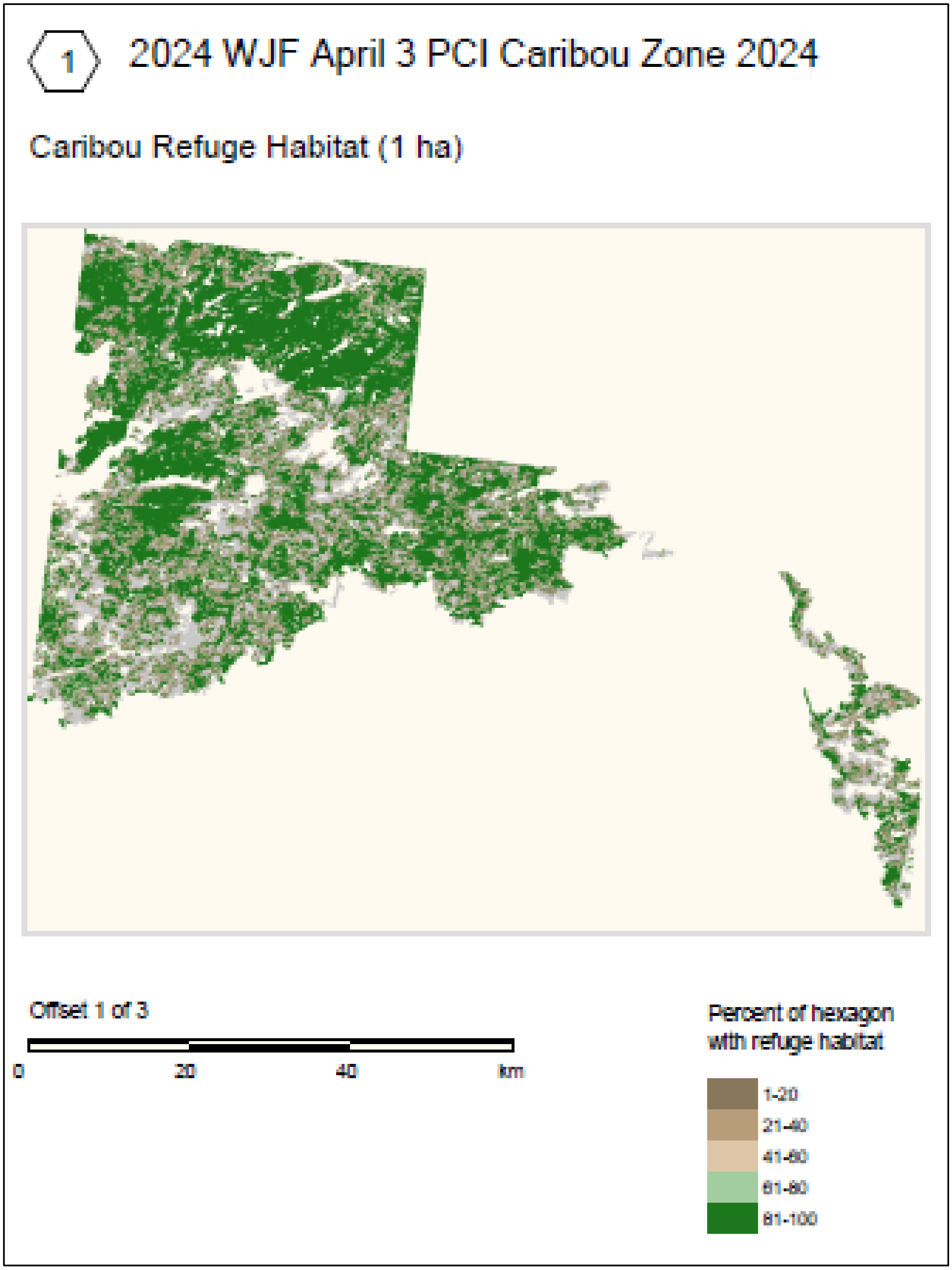
Appendix Map 1 Caribou capable habitat in the portion of the Whiskey Jack Forest overlapping the Continuous Caribou Distribution



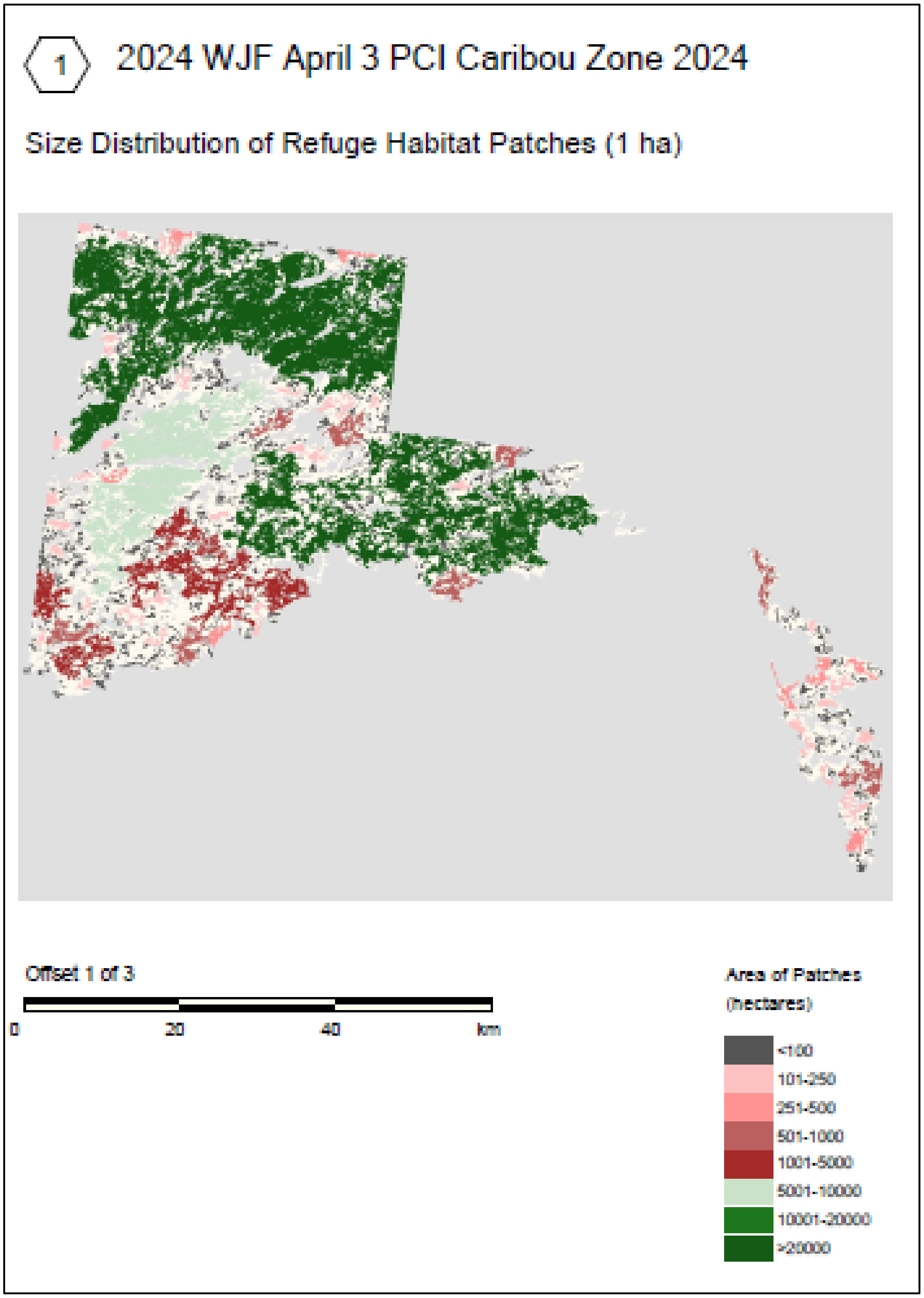
Appendix Map 2 Caribou capable habitat patches in the portion of the Whiskey Jack Forest overlapping the Continuous Caribou Distribution



Appendix Map 3 Caribou refuge habitat in the portion of the Whiskey Jack Forest overlapping the Continuous Caribou Distribution

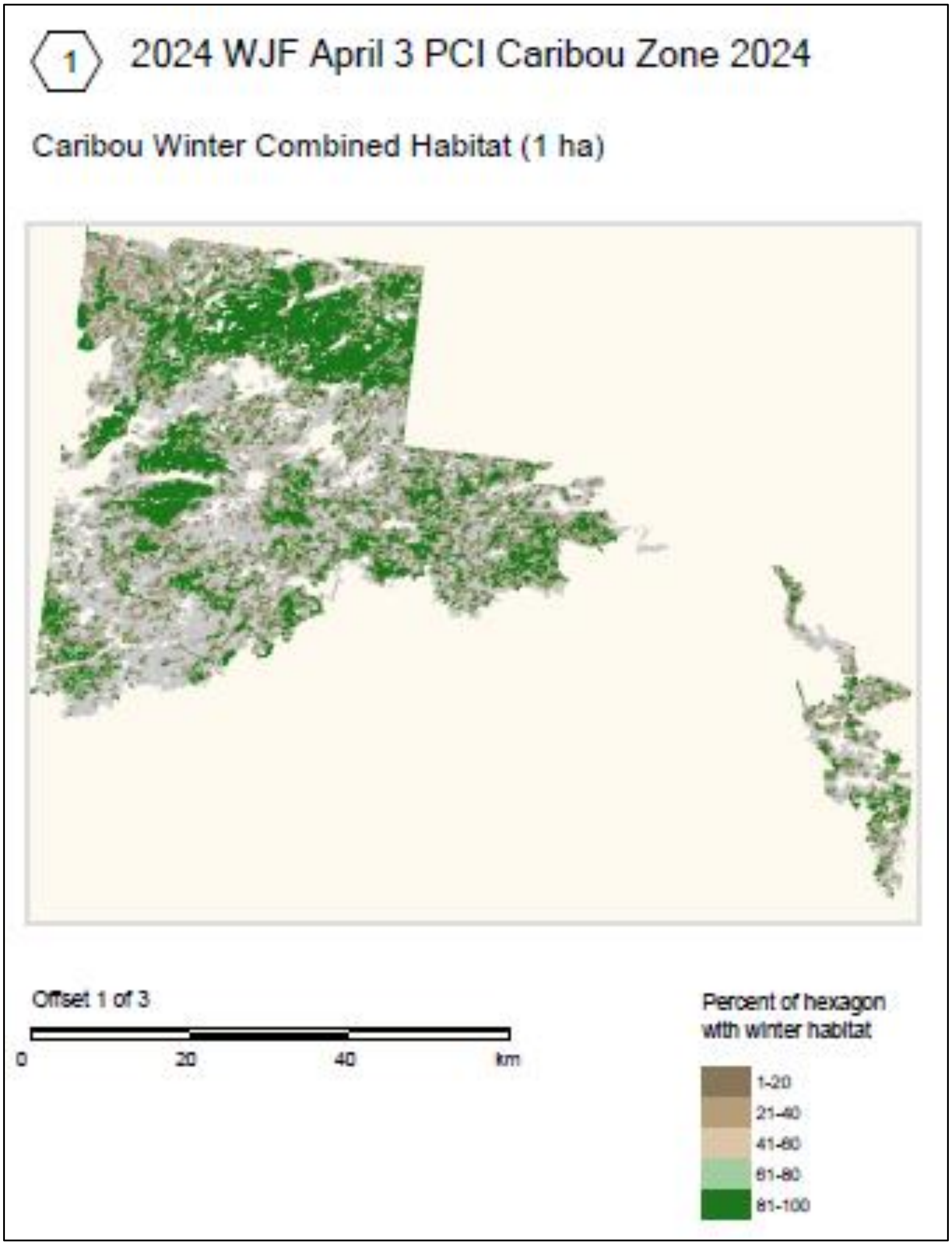


Appendix Map 4 Caribou refuge habitat patches in the portion of the Whiskey Jack Forest overlapping the Continuous Caribou Distribution



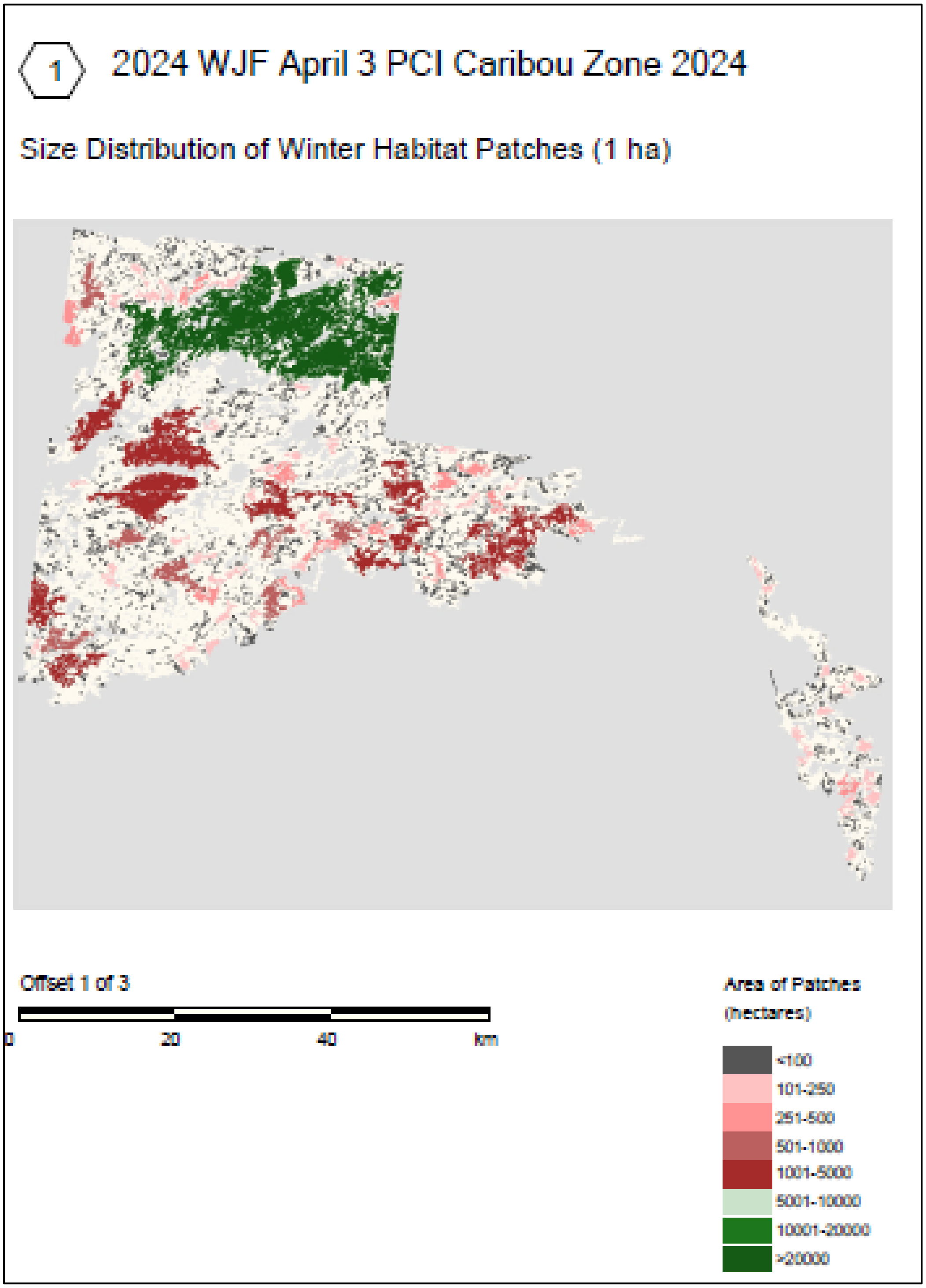
28

Appendix Map 5 Caribou winter combined habitat in the portion of the Whiskey Jack Forest overlapping the Continuous Caribou Distribution



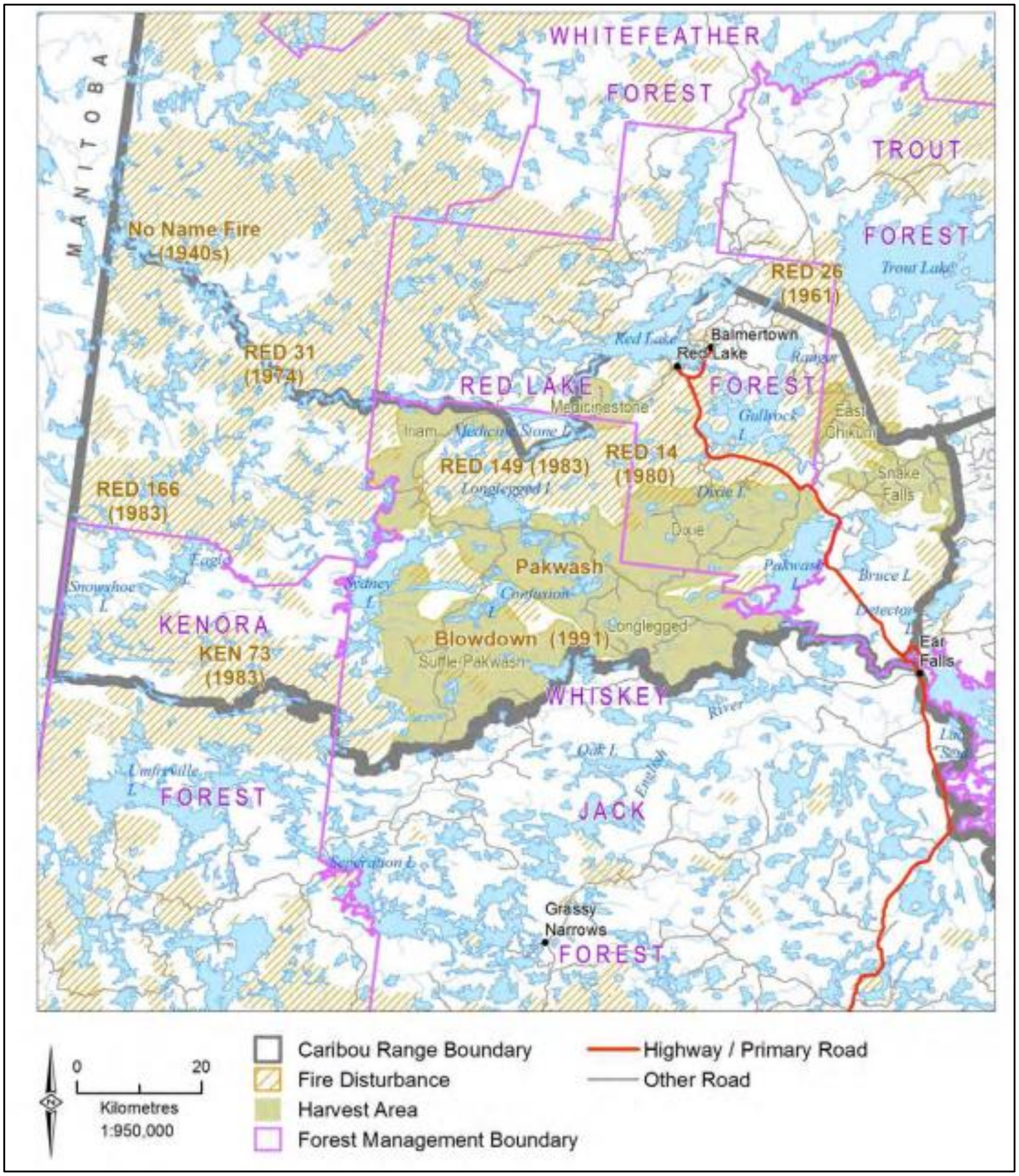
29

Appendix Map 6 Caribou winter combined habitat patches in the portion of the Whiskey Jack Forest overlapping the Continuous Caribou Distribution



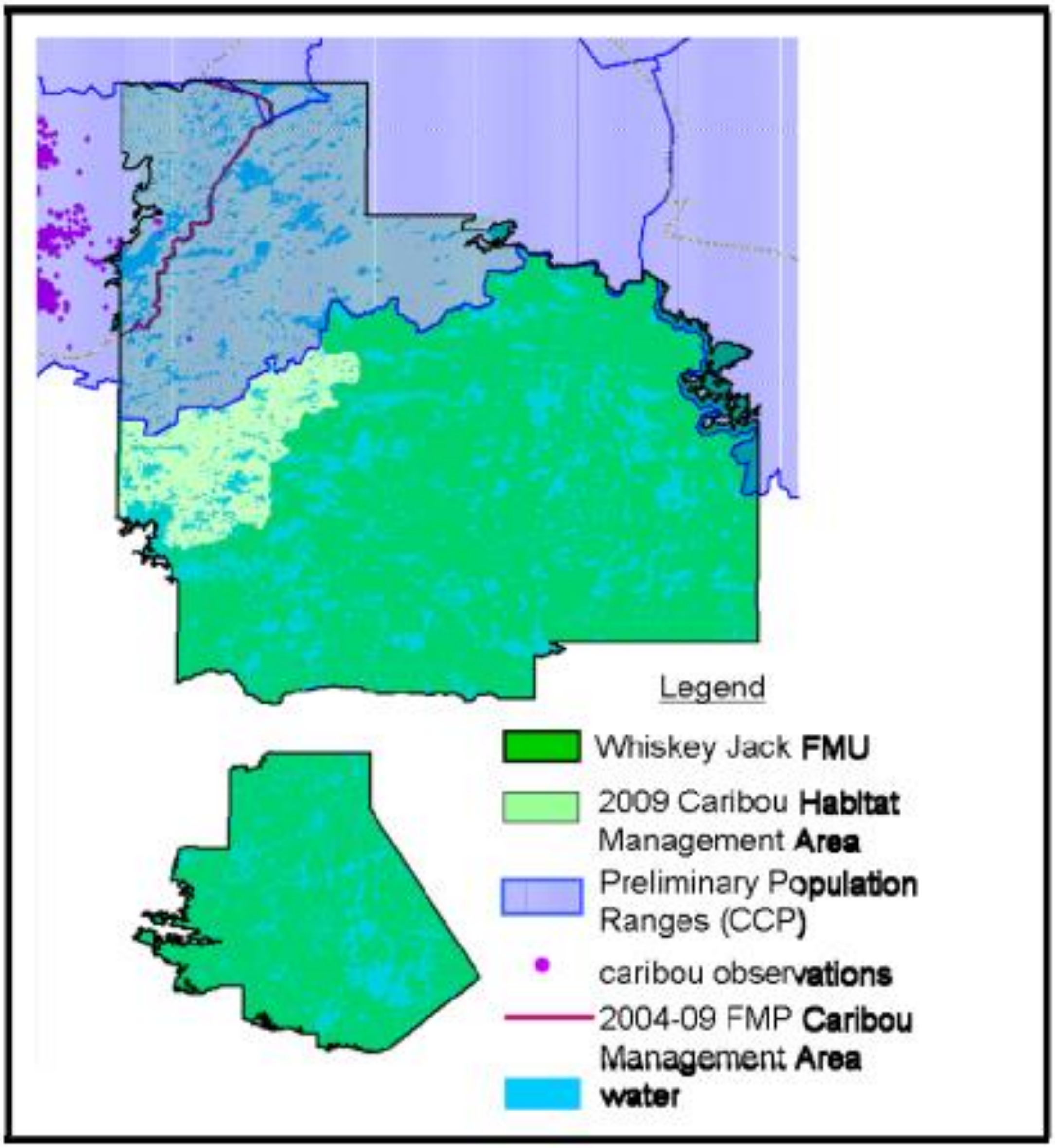
Appendix 2

Appendix Map 7 Mapped disturbance sources in the portion of the Sydney Range Overlapping the Whiskey Jack Forest to 2012. From MNRF 2014



31

Appendix Map 8 Delineated caribou ranges used for consideration of Forest Management Planning in Whiskey Jack Forest 2004-2024. Taken from Whiskey Jack Forest 2012 Forest Management Plan Supplementary Documentation 'N.' Map identifies portion of continuous caribou distribution considered from 2004-2009 for Forest Management Planning.



32

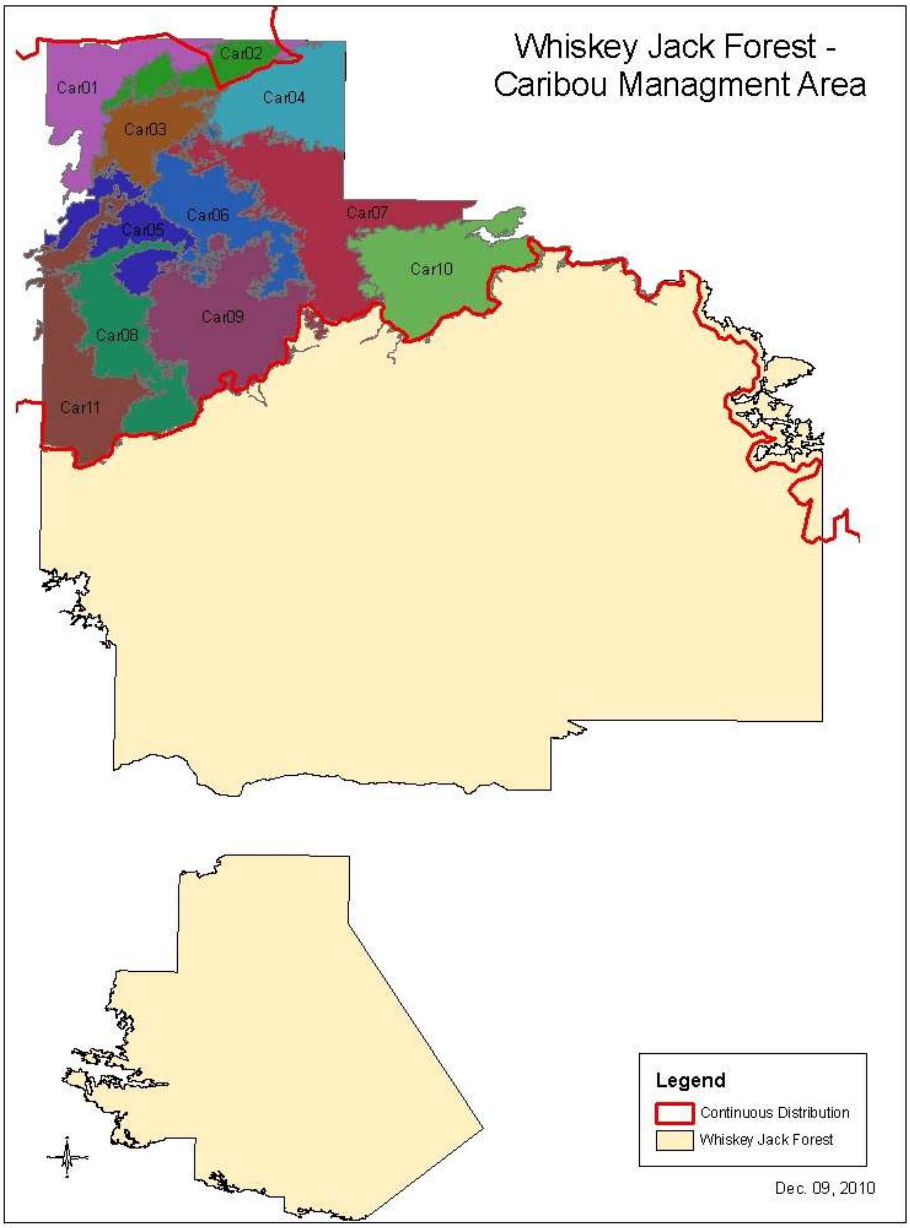
Caribou Tract/Block Closure Report

1.0 General Block Description and History

During the 2012-2024 FMP, the Whiskey Jack Forest consists of 11 “Caribou Habitat Tracts”. In the FMP, planned harvest was included in only Tracts 6-10, meaning there was no planned harvest in Tracts 1-5 or 11.

The location and numbering of caribou tracts for the 2012-2024 FMP follow in Figure 1:

Figure 1 Caribou Habitat Management Zone on the Whiskey Jack Forest



A general description of each caribou tracts follows:

Tract 6 (ID: Car06) is located east of the intersection of South Pakwash Road and Longlegged Road, and one of the two northern-most tracts. Tract 6 is comprised of Northwest ecosites 12, 13, 14, 19, 20 and 22, and has more of a heterogeneous tract forest composition than the tracts further to the north. Historically, harvesting has taken place in this tract, which has resulted in a generally younger forest of around 1-40 years. Most of the stands within this tract are conifer dominated, comprised of mainly jack pine and spruce. Of these stands, the most common working group is spruce.

Tract 7 (ID: Car07) is stretched out across the northwestern part of Longlegged Road, and is the other northernmost tract of the tracts that received harvest allocations. Like Tract 6, Tract 7 is also comprised of Northwest ecosites 12, 13, 14, 19, 20 and 22, and is very similar to Tract 6 in terms of their heterogeneity regarding their composition. As a result of harvesting, most of the forest within this tract is aged between 1 and 40, and is mostly conifer dominated. Tract 7, however, has a stronger component of jack pine in its mixed conifer sites, than Tract 6 does.

Tract 8 (ID: Car08) is the westernmost tract, mostly located west of the South Pakwash. It is made up of Northwest ecosites 12, 13, 14, 20, and 22. There has historically been significant harvesting taking place in this area, which has resulted in a 1-40 year old forest composition, mainly dominated by jack pine and followed by spruce.

Tract 9 (ID: Car09) is located north of the Conifer Road and east of South Pakwash, and is comprised of Northwest ecosites 12, 13, 14, 20, and 21. As a result of significant harvesting, the dominant forest type is conifer leading aged 1-40, with jack pine and spruce playing relatively equal roles as leading species.

Tract 10 (ID: Car10), the easternmost block, which is located around the Longlegged Road, contains Northwest ecosites 13, 14, 20, 21, 22, 31, and 35. Due to substantial harvesting, a 20-40 year conifer dominated forest has established, dominated by jack pine and spruce.

2.0 Block Classification and Summary

The following subsections describe the caribou blocks through their inventory classification, disturbances, landscape classes, and road decommissioning.

2.1 Inventory Classification

The total area of all selected tracts combined is 146,873 hectares, with 79% of the total area being classified as forested land (Table 1). There was little variation regarding the proportion of forested land between the blocks, with the exception of Car07, which contained only 68% forested land, but is 25% water. There was very little area classified as rock (RCK) or unclassified land (UCL), with water (WAT) being second most common unproductive land classification, followed by brush (BSH), open muskeg (OMS), and treed muskeg (TMS).

	Polytype							
Tract ID	BSH	FOR	OMS	RCK	TMS	UCL	WAT	Grand Total
Car06	617	17347	693	198	362	61	1495	20772
	3%	84%	3%	1%	2%	0%	7%	
Car07	1725	26216	464	75	337	108	9644	38569
	4%	68%	1%	0%	1%	0%	25%	
Car08	824	18576	695	110	261	45	1889	22401
	4%	83%	3%	0%	1%	0%	8%	
Car09	943	27351	803	37	364	250	5289	35035
	3%	78%	2%	0%	1%	1%	15%	
Car10	1364	25918	504	10	483	51	1766	30096
	5%	86%	2%	0%	2%	0%	6%	
All	5472	115409	3159	430	1805	515	20083	146873
	4%	79%	2%	0%	1%	0%	14%	

Table 1

2.2 Disturbance

Over the course of the 2012-2024 Forest Management Plan, there was no harvest that occurred in any of the identified caribou tracts (Table 2). However, there was a fire of about 112 hectares in size within Tract 8, which made up of approximately 7% of the planned depletions in that area over the course of the 2012-2024 FMP.

Tract ID	Planned Harvest Area	Forested Area	Forested area planned for harvest	Actual harvest	harvest completed to date %	Forecast depletions (ha)	Natural disturbance (ha)	Total natural and planned depletions	Total planned depletions (%)
Car06	449	17347	2.6%	0	0.0%	0	0	0	0%
Car07	2553	26216	9.7%	0	0.0%	0	0	0	0%
Car08	1693	18576	9.1%	0	0.0%	0	112	112	7%
Car09	1531	27351	5.6%	0	0.0%	0	0	0	0%
Car10	207	25918	0.8%	0	0.0%	0	0	0	0%
Grand Total	6433	115409	5.6%	0	0.0%	0	112	112	2%

Table 2

2.3 Landscape Classification

With only one year left of implementation of the 2012-2024 FMP, and no harvest allowed in these caribou tracts, little will change in the landscape classification of tracts 6-10 (Table 3). With no harvest occurring, the younger Pre-sapling/Sapling stages will begin to decline, while immature and late aged forest types will begin to increase in area. The only new Pre-sapling/Sapling area resulted from the single fire that occurred in Tract 8.

Tract ID	Presapling / sapling (ha)	Immature Conifer (ha)	Immature Hardwood (ha)	Mature Late Bf (ha)	Mature Late lowland Conifer (ha)	Mature Late hardwood/mixed (ha)	Mature Late Conifer/mixed (ha)
Car06	2386	9646	1871	162	18	604	2678
Car07	5440	9020	3159	281	19	2138	6153
Car08	3795	8109	1343	87	16	1145	4031
Car09	7301	11069	1537	128	0	927	6494
Car10	3212	11915	1463	27	101	1968	7233

Table 3

2.4 Silviculture Summary

Since there was no harvest that occurred in any of the identified caribou tracts, no renewal activities occurred from 2012-2024, nor are any renewal activities planned to occur in these areas in the future.

2.5 Road Decommissioning and Use

Throughout the course of the 2012-2024 plan, no new operational or branch roads were constructed within the identified caribou tracts. As a result, there was no road decommissioning in the area. Any primary and branch roads that were present in the area have been deteriorating naturally since 2008, with the exception of the Conifer Road that received some road maintenance. These unmaintained roads were not actively decommissioned but are no longer drivable with a licensed highway vehicle, therefore they are being removed from existing roads on the management unit.

3.0 Recommendation

For the 2024-2034 FMP, the Planning Team has received direction to not plan for any forest management activities (e.g. harvest, renewal, etc.) in the identified caribou Tracts 6-10. Therefore, Tracts 6-10 are recommended to be closed with no future forest management activities planned.

Development of the Dynamic Caribou Habitat Schedule for the 2024 Whiskey Jack Forest Management Plan

Final May 8, 2023

Development of the Dynamic Caribou Habitat Schedule for the 2024 Whiskey Jack Forest Management Plan

Harvest areas for the 2024 Whiskey Jack Forest Management Plan (FMP) were developed through consideration of the Dynamic Caribou Habitat Schedule (DCHS) but where it has been identified that harvest will not occur within the Sydney and Berens ranges as part of the 2024-2034 FMP. With the harvest of forested areas occurring in the continuous caribou distribution, the intention of the DCHS is to maintain a supply of woodland caribou habitat through emulating natural disturbance patterns e.g., large-scale forest fires through the harvesting of large continuous forest blocks. As such, the extent of the continuous caribou distribution occurring inside the Whiskey Jack Forest was broken into blocks which represent where harvest could occur not just within the 2024-2034 FMP but to plan for sufficient caribou habitat to be available into the future. Future plans will also provide an opportunity to update DCHS blocks where required but where, barring any large landscape disturbances e.g., forest fires, the delineation of DCHS blocks is expected to remain relatively consistent.

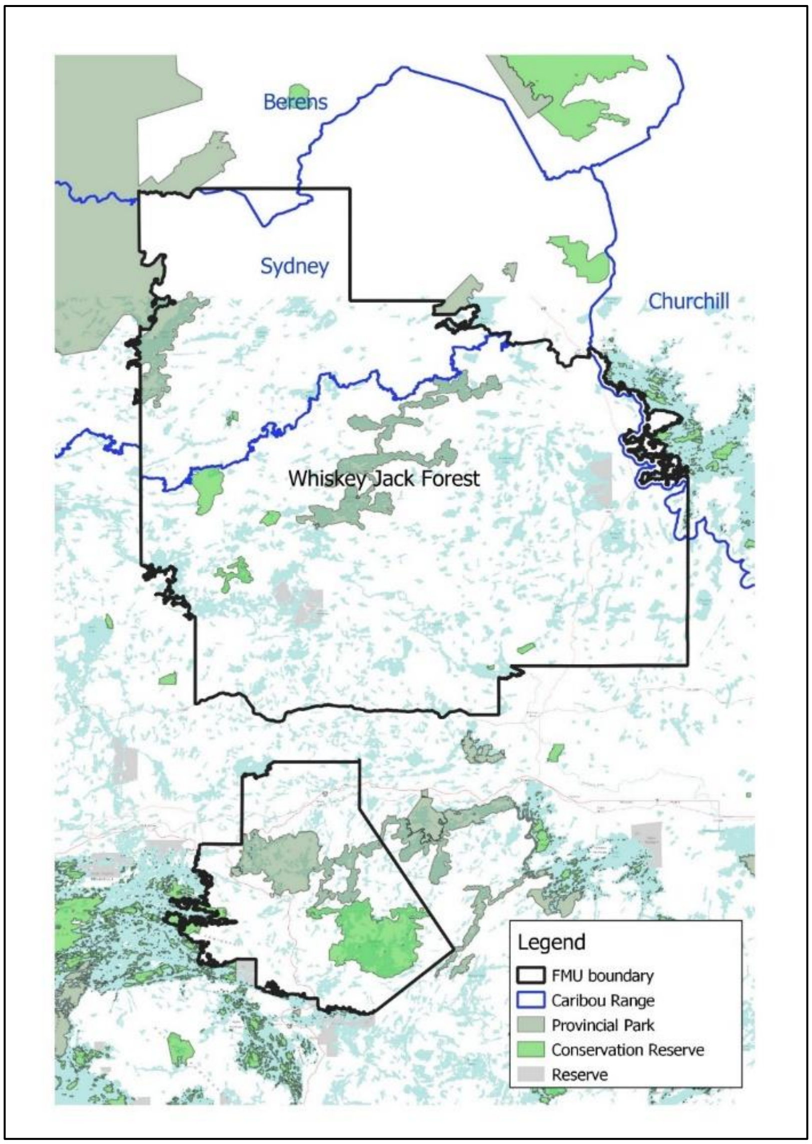


Figure 1 Location of caribou zone within the Whiskey Jack Forest

Developed DCHS blocks were based on delineated caribou habitat tracts in the Whiskey Jack Forest. Documentation of the steps taken in the development of habitat tracts are detailed in 'Plan-start Caribou Habitat Tract Analysis for the Whiskey Jack Forest 2024 Forest Management Plan using the Ecosite-based Habitat Model and Caribou Occurrence Information' report. The habitat tracts, shown in Figure 2, were largely delineated based on forest age class composition as well as the spatial distribution of caribou winter and refuge habitat. Forest fires that impacted areas within this portion of the Whiskey Jack Forest were considered to have formed naturally occurring habitat tracts with those areas impacted by forestry being more difficult to assess through having a range of stand ages through previous, non-DCHS, harvest patterns. The presence of a provincial park, Woodland Caribou Provincial Park, exists as part of one of the tracts but was incorporated into a separate DCHS block given its unique management considerations.

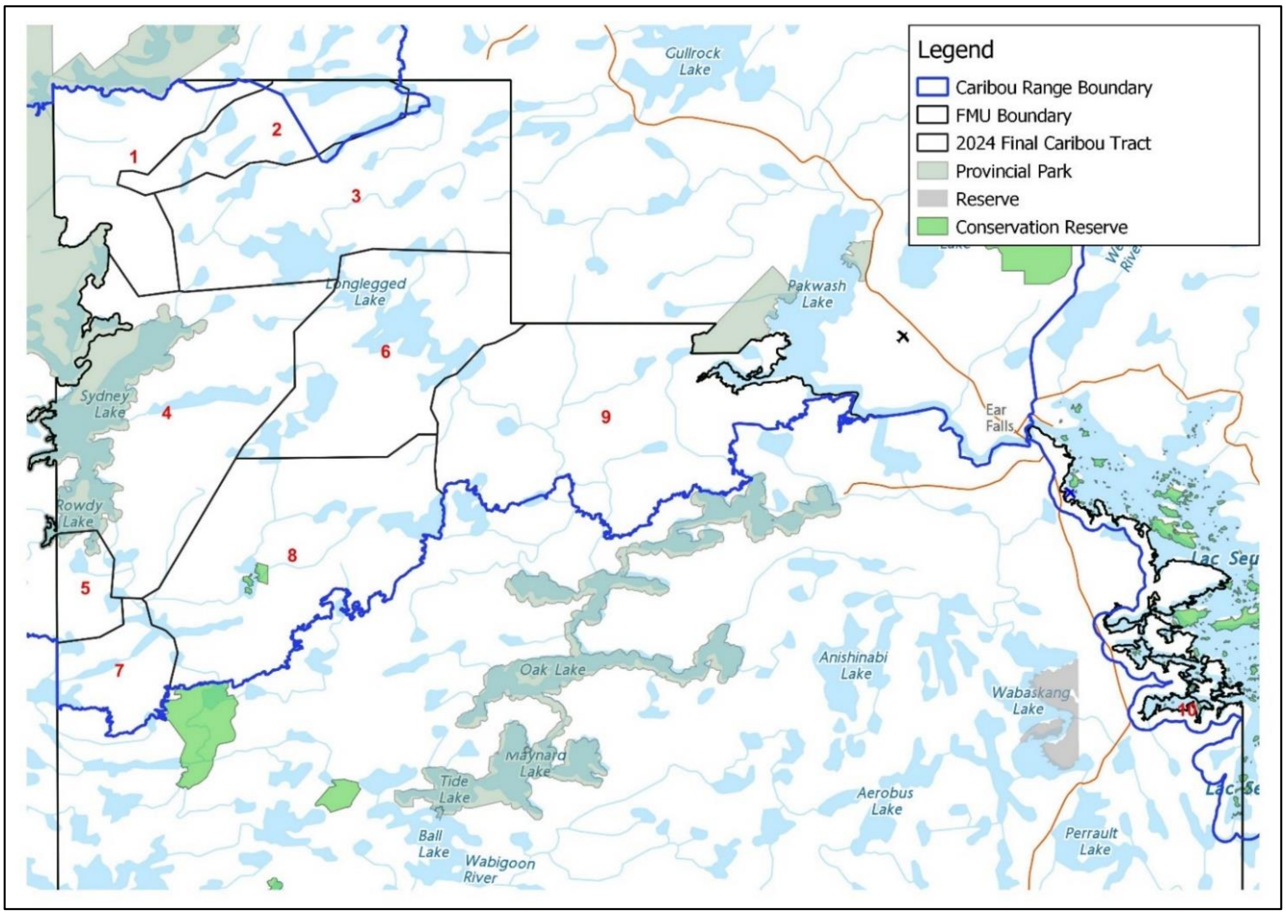


Figure 2 Delineated caribou habitat tracts in the Whiskey Jack Forest 2024 FMP

Following the delineation of caribou habitat tracts, DCHS blocks were developed based on stand information available in the Planning Composite Inventory. The internal borders between habitat tracts occurred using rough approximations based on stand age classes, winter and refuge habitat data while the DCHS delineates these borders at a finer scale based on identified stand boundaries from the Planning Composite Inventory. While other FMPs would also attempt to delineate DCHS blocks based on operability, in creating opportunities to harvest different portions of the continuous caribou distribution over twenty-year intervals, in the case of the 2024 Whiskey Jack FMP this was not required.

Within the Whiskey Jack Forest, there will be no harvest of those areas associated with tracts one through nine but where tract ten, in the northeast portion of the forest and part of the Churchill range, has planned forestry activities. To this extent tract ten became a 'B' block with the expectation it is harvested within a twenty-year span, starting with the 2024-2034 FMP and extending throughout the 2034-2044 FMP. Afterwards, this DCHS block will remain offline from 2042 to 2122 at which point it is expected to get harvested again as part of the 2122-2132 and 2132-2142 FMPs. This timing is consistent with B blocks considered as part of other plans.

While there is no harvest expected for tracts one through nine, there is still a requirement to evaluate the availability of woodland caribou habitat to determine achievement of FMP objectives. A time-slice analysis was completed to demonstrate where there is currently online caribou habitat during the 2024-2034 FMP and where there will be online caribou habitat during subsequent plans. To this extent, planning teams can work towards providing a sufficient supply of caribou habitat while continuing to renew the forest through forest operations aimed at emulating natural disturbance. The delineated DCHS blocks and when they are expected to come online within the Whiskey Jack Forest is available in Table 1. The numbering of tracts one through nine is mirrored geographically in the naming of DCHS blocks one through nine. The P block is based on dividing out the portion of tract 4 which occurs as part of Woodland Caribou Provincial Park or those small areas along the border of the Whiskey Jack Forest that can only be accessed through the Kenora Forest (due to access restrictions through the park).

Table 1. Caribou habitat online in the Whiskey Jack Forest continuous caribou distribution at 2024 plan start and predicted online habitat to 2144 based on harvest of identified Dynamic Caribou Habitat Schedule (DCHS) blocks. Y signifies online habitat for caribou and N signifies offline habitat for caribou during a given plan term

DCHS Block	Area (ha)	Area (%)	Harvest Year	Habitat Online pre-2024	Habitat online 2024-2034	Habitat online 2034-2044	Habitat online 2044-2064	Habitat online 2064-2084	Habitat online 2084-2104	Habitat online 2104-2124	Habitat online 2124-2144
B	18053	6.7	2022-2032 2124-2144	Y	N	N	N	N	N	Y	N
1	17226	6.3	NA	N	N	N	N	Y	Y	Y	Y
2	15497	5.7	NA	Y	Y	Y	Y	Y	Y	Y	Y
3	32768	12.1	NA	N	N	N	Y	Y	Y	Y	Y
4	33073	12.2	NA	Y	Y	Y	Y	Y	Y	Y	Y
5	3483	1.3	NA	N	N	N	N	N	Y	Y	Y
6	38980	14.4	NA	N	N	N	N	Y	Y	Y	Y
7	10708	3.9	NA	N	N	N	Y	Y	Y	Y	Y
8	39752	14.6	NA	N	N	N	N	Y	Y	Y	Y
9	48729	18.0	NA	N	N	N	N	Y	Y	Y	Y
P	13171	4.9	NA	Y	Y	Y	Y	Y	Y	Y	Y
TOTAL	271440	100.0	-	-	-	-	-	-	-	-	-
Online Block Area (ha)				79794	61741	61741	105217	249904	253387	271440	253387
Online Block Area (%)				29.4	22.7	22.7	38.8	92.1	93.3	100.0	93.3

The calculation of Online Block Area is used in assessing indicator 1f in FMP-10, “Amount and arrangement of on-line Caribou DCHS blocks.” Indicator 1f is based on % of the caribou zone that is considered suitable caribou habitat at any given time (is ‘online’). The aim of this indicator is to maintain a target 40% of the caribou zone as suitable habitat at any given time with another 20% available for harvest (the ‘B’ blocks in place over the 2022-2032 and 2032-2042 Whiskey Jack FMPs) and 40% of the forest maturing to a condition suitable as caribou habitat. Typically, five DCHS terms (considering A, B, C, D or E blocks harvested at twenty-year intervals) create a mosaic of caribou habitat suitability over a 100-year span and provided there are no large-scale natural disturbances. In the case of the Whiskey Jack Forest, there is no planned harvest of DCHS blocks one through nine, as well as DCHS Block ‘P’, leaving only a single B block that follows the expected DCHS harvest patterns. This B block will be harvested over the 2024-2034 and 2034-2044 Whiskey Jack FMPs and then be offline for 80 years when it will be available again for harvest over the 2122-2132 and 2132-2142 FMPs.

Based on measured Online Block Area (%) in Table 1, the portion of habitat online from 2024-2034 is 22.7%. This represents a drop from 29.4% before plan start and is under the 40% desirable level. In addition, the portion of Online Block Area (%) will remain at 22.7% over the 2034-2044 FMP although there are patches of suitable caribou habitat in blocks currently identified as offline. Beginning in the 2044-2054 FMP, DCHS blocks three and seven, associated with forest fires that took place in the early 1980s, will become online with there being a transition to 38.8% online habitat. From the 2064 plan onwards there will be in excess of 90% online caribou habitat but does not include the potential for any large fires on the landscape. The addition of large forest fires will be considered in DCHS planning exercises as part of subsequent FMPs and likely result in declines in the amount of available online caribou habitat. The reason for the portion of online habitat being below 40% currently is based on disturbance that has occurred through a series of forest fires in the 1980s (~18% or 48 655 ha) with other portions due to harvesting that took place prior to the continuous caribou distribution being extended to its current southern extent. Prior to this change, the harvest pattern was reflective of a more fragmented habitat to increase forest edge and the abundance of other species, namely moose. Should the DCHS be adopted throughout the portion of the continuous caribou distribution overlapping the Whiskey Jack Forest, it is expected there will be a minimum of 40% online habitat for use by caribou. The corresponding portion of the Whiskey Jack Forest must first age to reach this state, however.

The following figures show the shifting mosaic of caribou habitat suitability in the Whiskey Jack Forest from pre-plan start to 2144 based on the identified B block following DCHS harvest timing and other numbered blocks based on their becoming online but not part of a regular harvest schedule or considering potential forest fires which occur in the interim. It should be noted that some harvest has already occurred in the identified B block as part of the Whiskey Jack Forest 2012-2022 and earlier FMPs and the association of this area as a B block is based on efforts to bring the entire block to as even an age as possible. This is in accordance with managing forested areas within the caribou continuous distribution as to DCHS specifications and why it was not an option to defer harvest of this ‘B’ block until a later time.

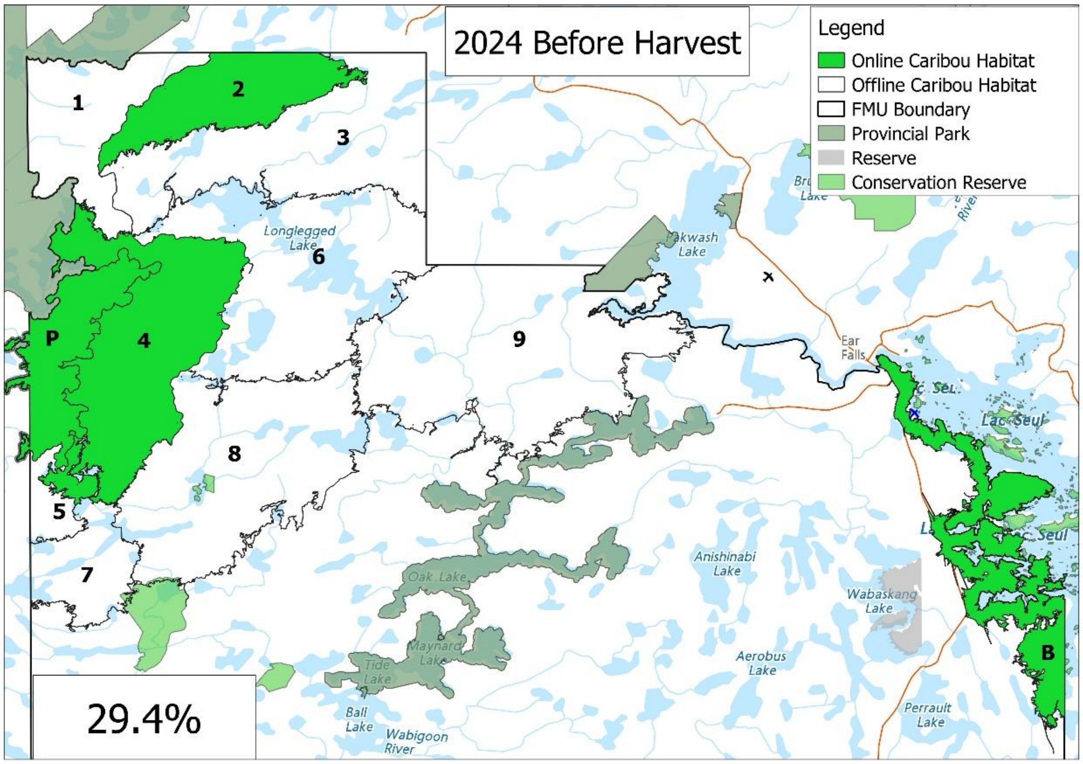


Figure 3 2024 Whiskey Jack Forest plan start condition before harvest commences in the caribou zone

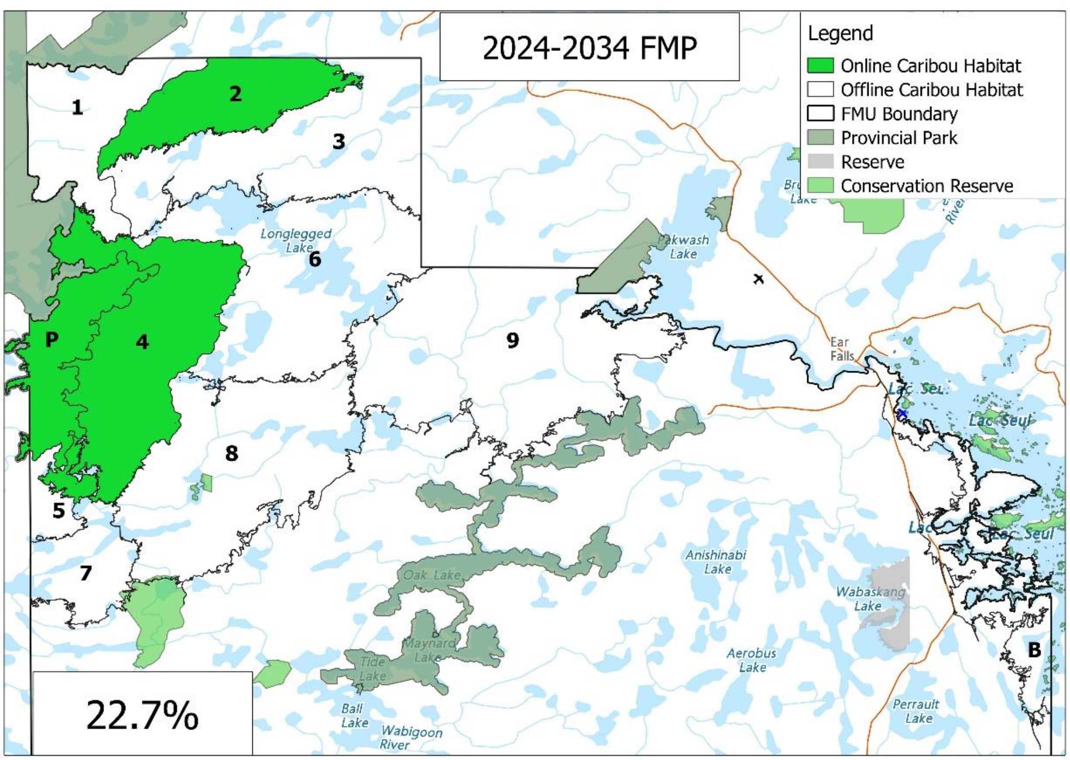


Figure 4 Boreal woodland caribou habitat online during Whiskey Jack 2024 – 2034 FMP

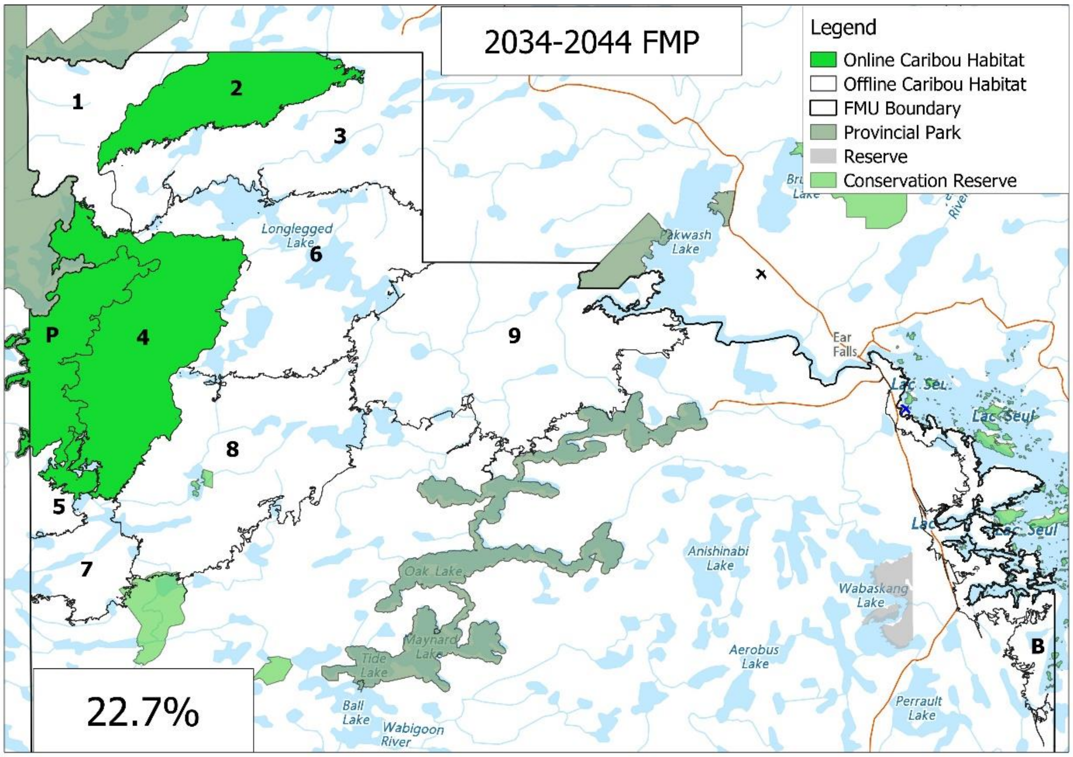


Figure 5 Boreal woodland caribou habitat online during Whiskey Jack 2034 – 2044 FMP

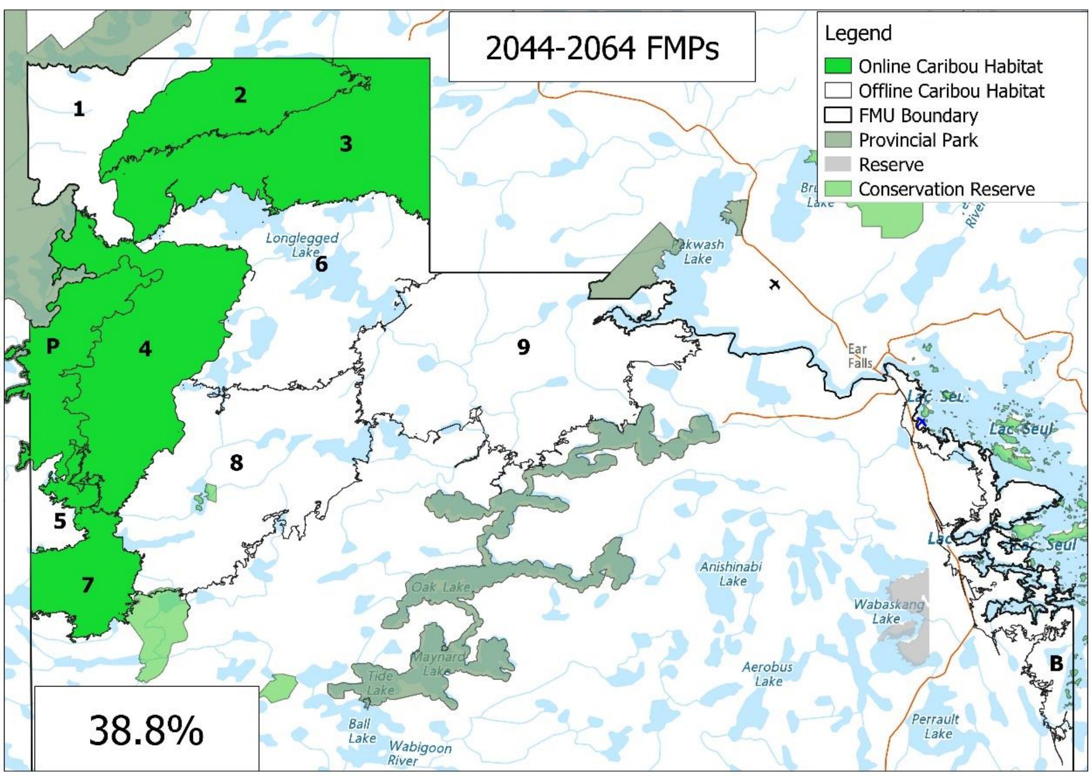


Figure 6 Boreal woodland caribou habitat online during Whiskey Jack 2044 – 2064 FMP

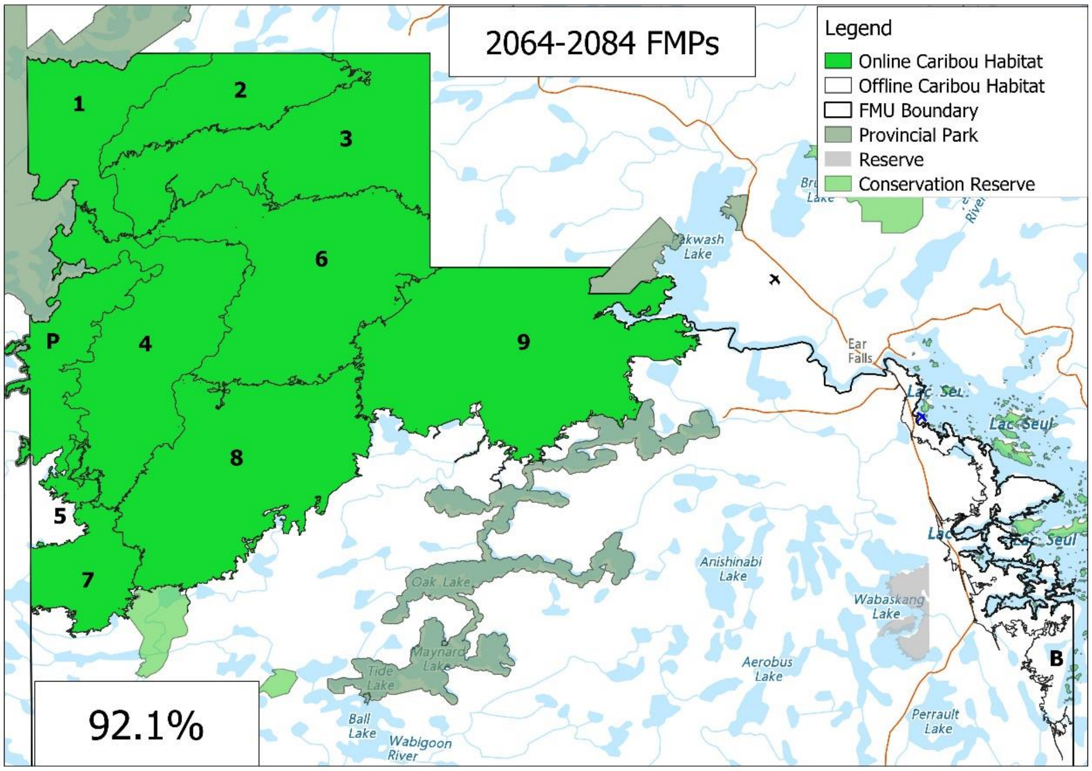


Figure 7 Boreal woodland caribou habitat online during Whiskey Jack 2064 – 2084 FMPs

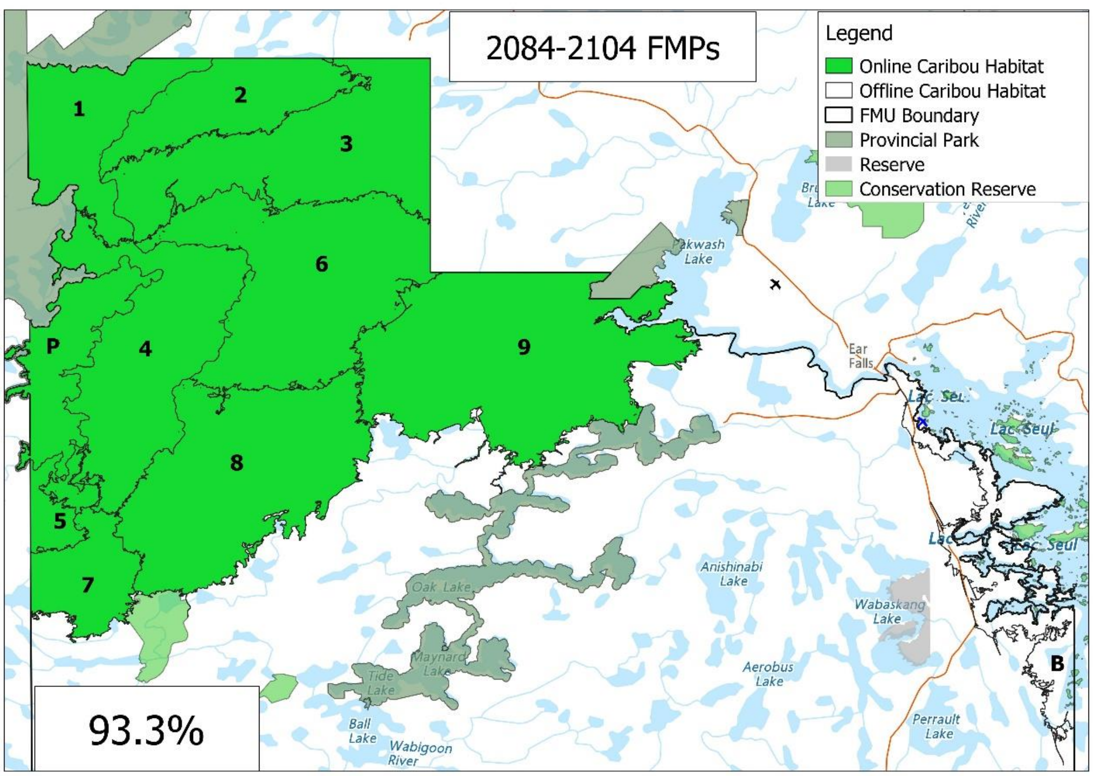


Figure 8 Boreal woodland caribou habitat online during Whiskey Jack 2084 – 2104 FMPs

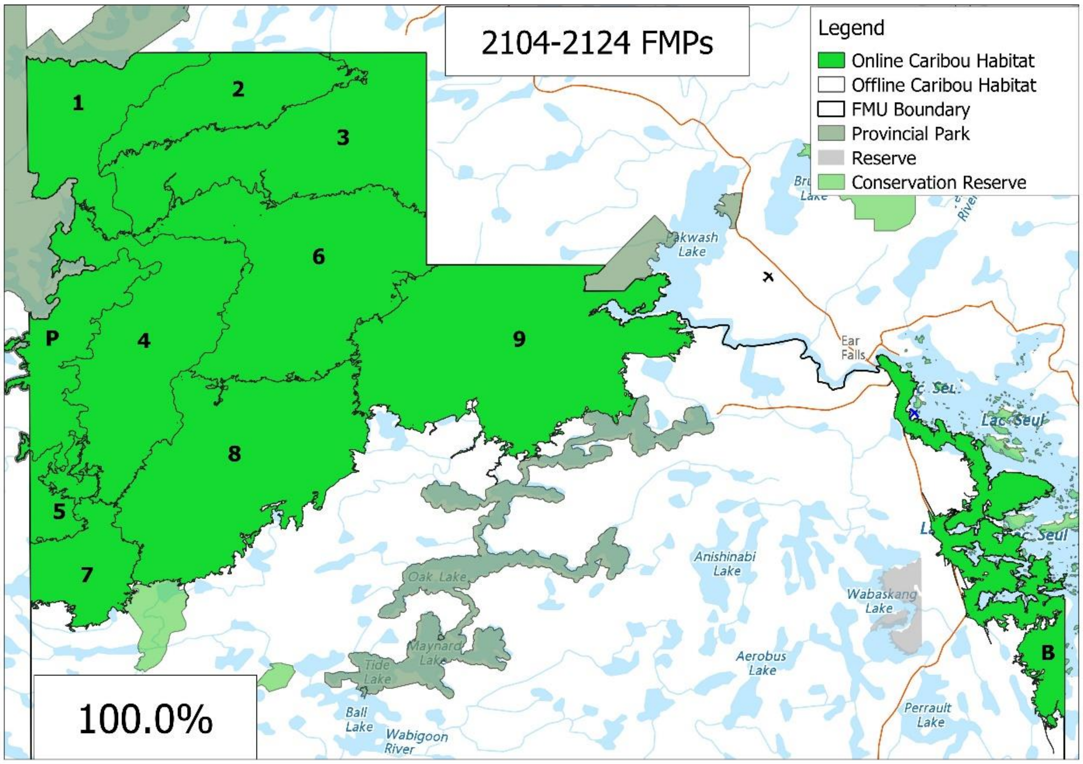


Figure 9 Boreal woodland caribou habitat online during Whiskey Jack 2104 – 2124 FMPs

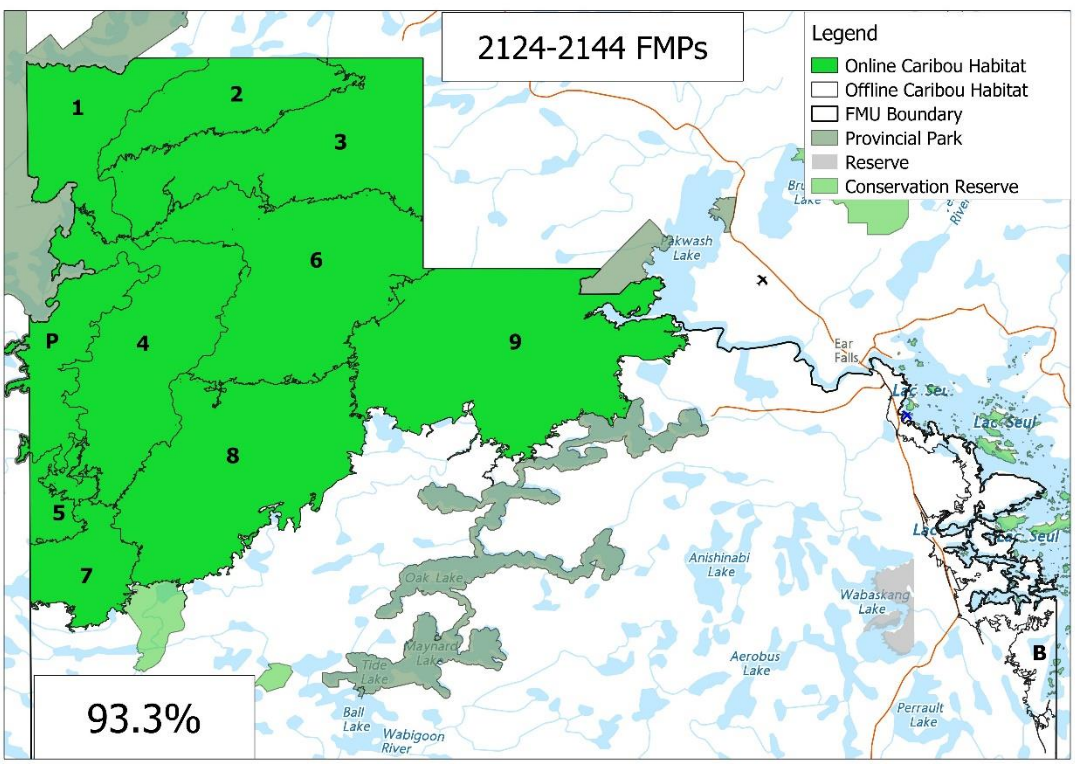


Figure 10 Boreal woodland caribou habitat online during Whiskey Jack 2124 – 2144 FMPs

Appendix 2

Moose Emphasis Area Documentation

For the 2024 Whiskey Jack Forest FMP

Whiskey Jack Forest 2024-2034 Forest Management Plan
Moose Emphasis Area Documentation

CONTENTS

1.0 Introduction

Habitat management for cervids (members of the deer family) in Ontario's forested ecosystems is primarily conducted through the forest management planning process (OMNR, 2009a, OMNR, 2009b). Forest Management Plans (FMPs) attempt to emulate natural landscape patterns, composition, and structure in attempt to provide adequate habitat for various cervids, including moose. Moose habitat may be emphasized in select Large Landscape Patches termed 'Moose Emphasis Areas' (MEA) to support progress towards provincial and regional moose management objectives (OMNR, 2010).

"The goal of Ontario's moose management program is to ensure sustainable moose populations and the ecosystems on which they rely, for the continuous provision of ecological, cultural, economic and social benefits for the people of Ontario" (OMNR, 2009b). For Wildlife Management Units (WMUs) that overlap the Whiskey Jack Forest Management Unit (WMUs 2, 3, 5, 6, 7B, 8; Figure 1), moose populations are currently below/within target moose population ranges for each WMU (Table 1). Forest management in MEAs may be finely tuned in attempt to support moose population growth into the desired population ranges (in combination with efforts from other MNRF program areas).

This document briefly reviews the MEA previously established in the 2012-2022 Whiskey Jack FMP (Section 2.0), describes criteria and indicators used to select MEAs for the current 2024-2034 FMP (Section 3.0), describes the final selected MEAs (Section 4.0), and outlines management objectives, targets, and strategies for each selected MEA (Section 5.0). The Whiskey Jack Forest Long-Term Management Direction (LTMD) Task Team led MEA selection and documentation efforts with input, support, and direction from the Planning Team.

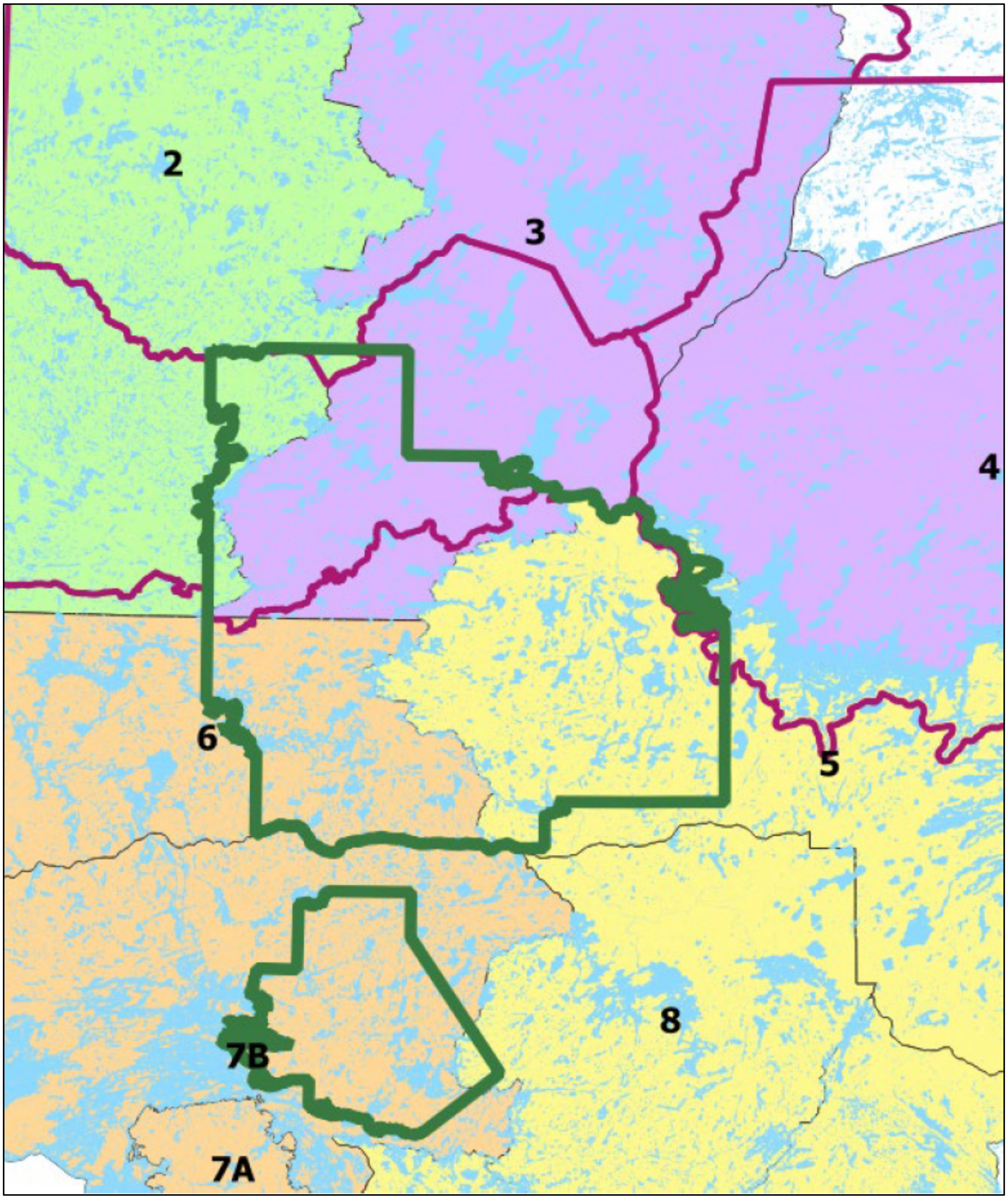


Figure 1. Ontario Ministry of Natural Resources and Forestry Wildlife Management Units overlapping the Whiskey Jack Forest. Cervid Ecological Zones (CEZs) are also delineated in green (CEZ A), purple (CEZ B), yellow (CEZ C), and beige (CEZ D).

Table 1. Moose population objectives and current estimates for Wildlife Management Units overlapping the Whiskey Jack Forest

Cervid Ecological Zone	Wildlife Management Unit (WMU)	% of Whiskey Jack Forest overlapping WMU	2030 Moose Population Objective	Latest Moose Population Estimate
A	2	6.6	900-1200	1268
B	3	22.3	1900-2500	2202
C1	5	34.6	3300-3900	2996
D1	6	19.5	500-1400	199
D1	7B	16.2	400-1100	212
C1	8	0.8	950-2400	692

2.0 2012-2022 Moose Emphasis Area

The previous 2012-2022 Whiskey Jack FMP MEA is described primarily in the 2012-2022 Plan Text (Sections 2.1.2.3, 2.1.2.4.2, 4.2.2.2 and Figure 23). As illustrated in Figure 23 of the 2012-2022 Plan Text, the single MEA was situated in the northern portion of the forest management unit and was fully overlapped by the area now referred to as Strategic Management Zone (SMZ) SMZA. No forest harvest occurred in this MEA between 2012-2022

3.0 2024-2034 Moose Emphasis Area Selection Criteria

The Whiskey Jack Forest 2024-2034 Planning Team considered 9 criteria when selecting candidate MEAs. The selection criteria and desirable values of measurable indicators associated with each criterion are listed in Table 2. Criteria outlined in the Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales (OMNR, 2010) were assigned greatest priority (Criteria 3.1 – 3.6), although additional criteria were also considered (Criteria 3.7 – 3.9). Relevant background information and analyses for each criteria is detailed in Sections 3.1 to 3.9 below.

For the current plan, MEA placement was not considered within SMZA as this area was not available for harvest for the duration of the 2024-2034 Forest Management Plan.

Table 2. Moose Emphasis Area (MEA) Selection Criteria and Desirable Indicator Values used to support MEA delineation in the 2024-2034 Whiskey Jack FMP.

MEA Selection Criterion	Desirable Indicator Values
3.1 Total Area	a. > 2000 ha is acceptable, >10,000 ha is preferred b. 10-15% of the Crown forested landscape identified as candidate MEAs
3.2 Wetland Area	5-10% of the area is comprised of wetlands, including moose aquatic feeding areas
3.3 Nutrients	Sites rich and moderate in nutrients are proportionately high relative to the broader Forest Management Unit
3.4 Productive Forest	Potential to manage: a. 5-30% of the forest area as browse-producing habitat b. 15-35% of the forest area as mature conifer-dominated c. 20-55% of the forest area is hardwood dominated or mixedwood at least 35 years old and 10 m tall
3.5 Forest Texture	Young forest patch sizes in the range of 10-500 ha
3.6 Moose Density	High probability of achieving moderately high moose densities
3.7 Other Management Objectives	MEA aligns with objectives of overlapping or adjacent management zones
3.8 Land Use Compatibility	MEA, including desired road use management strategy, is compatible with existing land uses
3.9 Harvest Feasibility	Existing road networks and/or reasonable access options support conducting forest operations in the MEA

3.1 Total Area

MEAs will be >2000 ha and, preferably, >10,000 ha (OMNR, 2010) and candidate areas will cover 10-15% of the Crown forested landscape (Northwest Region Direction on Moose Emphasis Areas, 2017). In the Whiskey Jack Forest, this total area requirement did not place major constraints on the delineation of candidate MEAs in either the northern or southern portions of the forest management unit. Crown forested area that could be managed with forestry operations within SMZB in the northern portion of the unit was contiguous along the eastern portion of the forest management unit and totaled 124,106 ha.

The total area of each moose emphasis area was determined by summing the area of all 'POLYTYPE' within the Whiskey Jack Forest Base Model Inventory (BMI hereafter). Net Area of each MEA was determined by summing the area of 'WAT' (water), 'UCL' (unclassified), 'ISL' (island), 'BSH' (brush and alder), 'OMS' (open wetland), 'TMS' (treed wetland), 'RCK' (rock), 'GRS' (grassland) and 'FOR' (forest).

3.2 Wetland Area

For the purposes of MEAs, wetlands were defined as POLYTYPE BSH or OMS within the 2024 Whiskey Jack Forest BMI. This definition is consistent with that utilized in the aquatic feeding habitat indicator of the Ontario Wildlife Habitat Assessment Model (OWHAM; model further described in Section 3.6.1). For each moose emphasis area, the percent of wetlands was determined by dividing the total wetland area by the Net Area and multiplying by 100. For reference, the percentage of BSH and OMS polytypes across the Whiskey Jack Forest was 1.2% and 4.6% respectively.

Moose aquatic feeding areas (MAFAs) within candidate MEAs were also reviewed. MAFAs have been identified in some parts of the Whiskey Jack Forest following the methods of Ranta (1997); however, there are many gaps in survey coverage across the forest management unit. MAFAs are illustrated with BSH and OMS polytypes on wetland maps in section 4.0.

3.3 Nutrients

Habitat areas that have the greatest potential for use by moose are those with nutrient rich soils. Nutrient rich soils provide conditions that can lead to the growth of plant species that are of high forage quality and allows populations to expand and reach higher population densities if mortality from other sources is low.

In ArcGIS, queries on the BMI were used to classify stands as being of 'poor,' 'moderate,' or 'rich' productivity. These queries followed those that are used across NW Region for the assessment of productivity as it relates to describing MEAs. See Sub-Appendix 1 for a complete listing of ecosites used in assessing and delineating productivity.

For each MEA, the percent of forested polygons classified as 'poor', 'moderate', or 'rich' was determined by dividing the total area of each class by the productive forest (FOR) area (and multiplying by 100). For reference, the percentage of nutrient poor, moderate and rich ecosites across the entire Whiskey Jack Forest was 6.0%, 75.5%, and 18.5% respectively.

3.4 Productive Forest

Within MEAs, there should be the potential to manage productive forests such that:

- 5-30% of the forest area is browse-producing habitat
- 15-35% of the forest is mature, conifer-dominated forest
- 20-55% of the forest is hardwood dominated or mixedwood at least 35 years old and 10 meters tall (OMNR, 2010)

Definitions of each of these three productive forest habitat classes are provided as ArcGIS queries in Sub-Appendix 1. These queries followed those used consistently across the Northwest Region for the purposes of describing MEAs.

Plan start and plan end (10 years without harvest) values for each productive forest habitat class were calculated. Plan end values provided an indication of whether constraints on forest harvesting were likely for any given MEA. Example: If percent mature conifer forest is <15% of forested polygons and not expected to reach the minimum 15% target by plan end, then there is no opportunity to harvest mature conifer in the 10-yr period.

3.5 Forest Texture

Given that MEAs have objectives and targets associated with the achievement of a relatively fine textured landscape and a range of young forest patch sizes (see Section 5.0), the status of young forest patch sizes at plan start was examined for each candidate MEA. The distribution of young forest patches at plan start was generated for each candidate MEA using Ontario's Landscape Tool.

3.6 Moose Density

Modeled moose densities in the Whiskey Jack Forest informed the placement of MEAs. Within Ontario's Landscape Tool, the OWHAM and Boreal Bioclimatic Moose Model use forest unit and age information to model suitable moose habitat and assess carrying capacity.

3.6.1 Ontario Wildlife Habitat Assessment Model (OWHAM)

The OWHAM moose model reports calculated habitat values for dormant season, growing season, and aquatic feeding. This model also generated estimates of total carrying capacity of moose across the Whiskey Jack Forest (Figure 2).

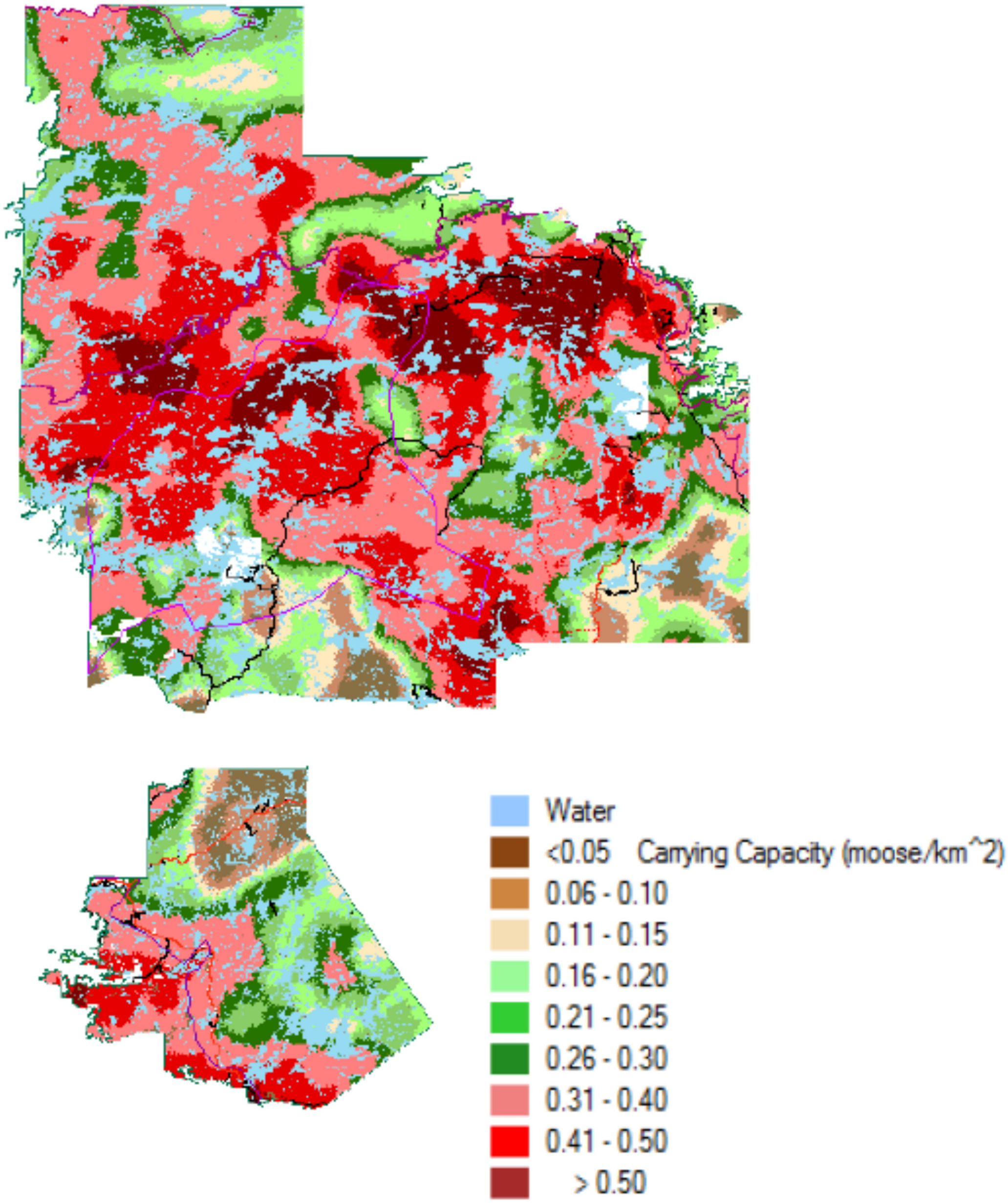


Figure 2. Ontario Wildlife Habitat Assessment Model-predicted moose carrying capacity for the Whiskey Jack Forest at Plan Start (2024).

3.6.2 Boreal Bioclimatic Moose Model

Habitat Suitability Index modelling indicated quantities of winter browse (i.e., young forest), winter cover (i.e., mature conifer forest), and food and cover (i.e., hardwood/mixedwood forest) available for moose. Bioclimatic-predicted moose carrying capacity across the Whiskey Jack Forest is illustrated in Figure 3.

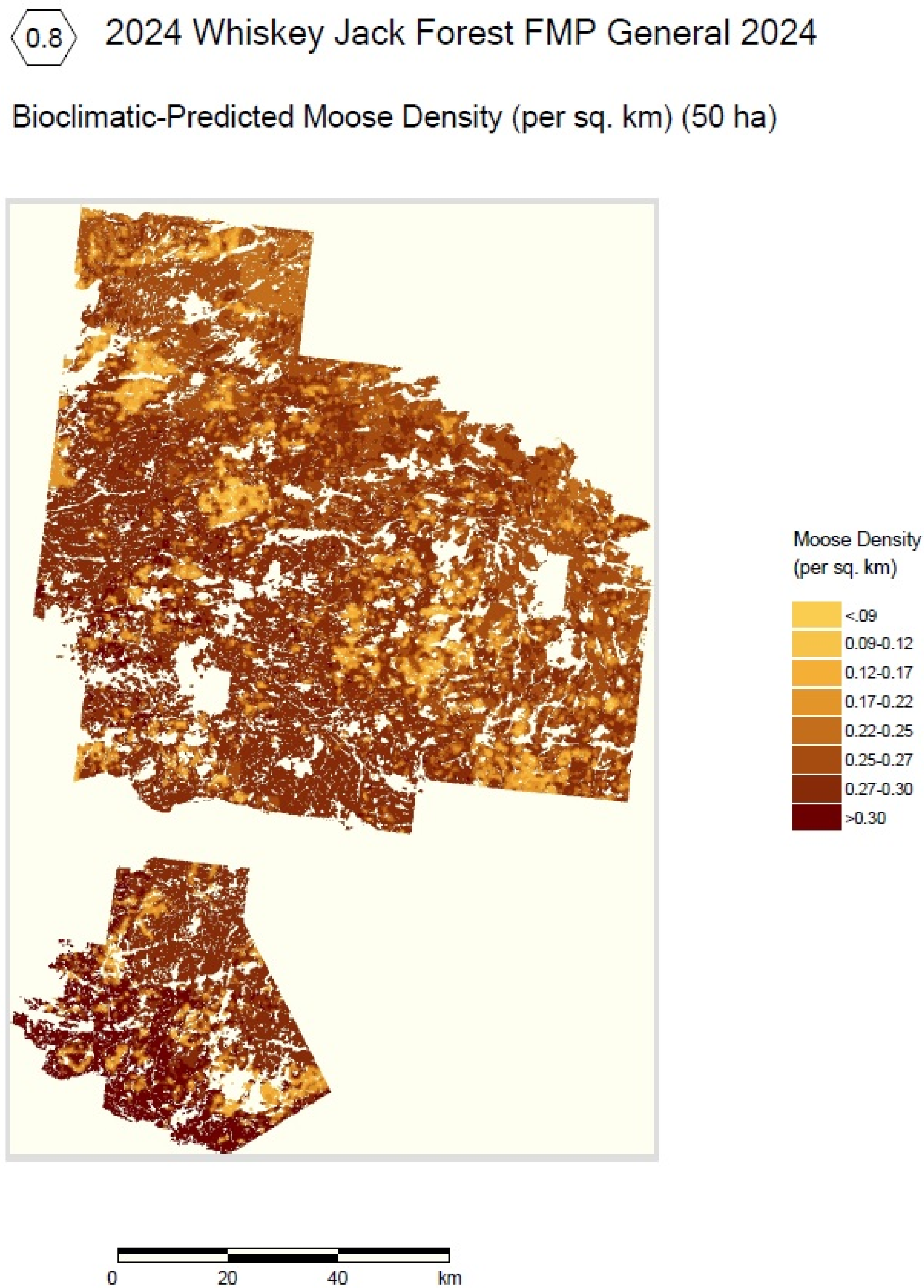


Figure 3. Boreal Bioclimatic Model-predicted moose carrying capacity for the Whiskey Jack Forest at Plan Start (2024).

3.7 Other Management Objectives

Ontario’s Cervid Ecological Framework (OMNR, 2009a) provides broad guidance for cervid (moose, deer, caribou) habitat management. The northern portion of the Whiskey Jack Forest eligible for harvest is overlapped by Cervid Ecological Zone (CEZ) C, while the southern portion of the Whiskey Jack Forest is primarily overlapped by CEZ D (and small portion of CEZ C; Figure 1). Moose habitat is emphasized in CEZ C, while both moose and deer habitat management is emphasized in CEZ D (OMNR, 2009a). The Whiskey Jack Forest Landscape Task Team further considered that overlapping deer and moose emphasis areas may be counterproductive, as deer are known to transmit *Parelaphostrongylus tenuis* (brainworm) to moose which can negatively impact moose populations.

Additionally, consistency with the objectives of other large landscape patches on the Whiskey Jack and adjacent forests was considered. Old and mature large landscape patches (O&M LLPs) identified for creating large, even-aged mature stands were deemed incompatible with the fine forest texture objectives of MEAs, so overlap of these areas was avoided. The presence of MEAs on forests immediately adjacent to the Whiskey Jack Forest, particularly Kenora and Wabigoon Forests; Figure 4) also informed the selection of candidate MEAs.

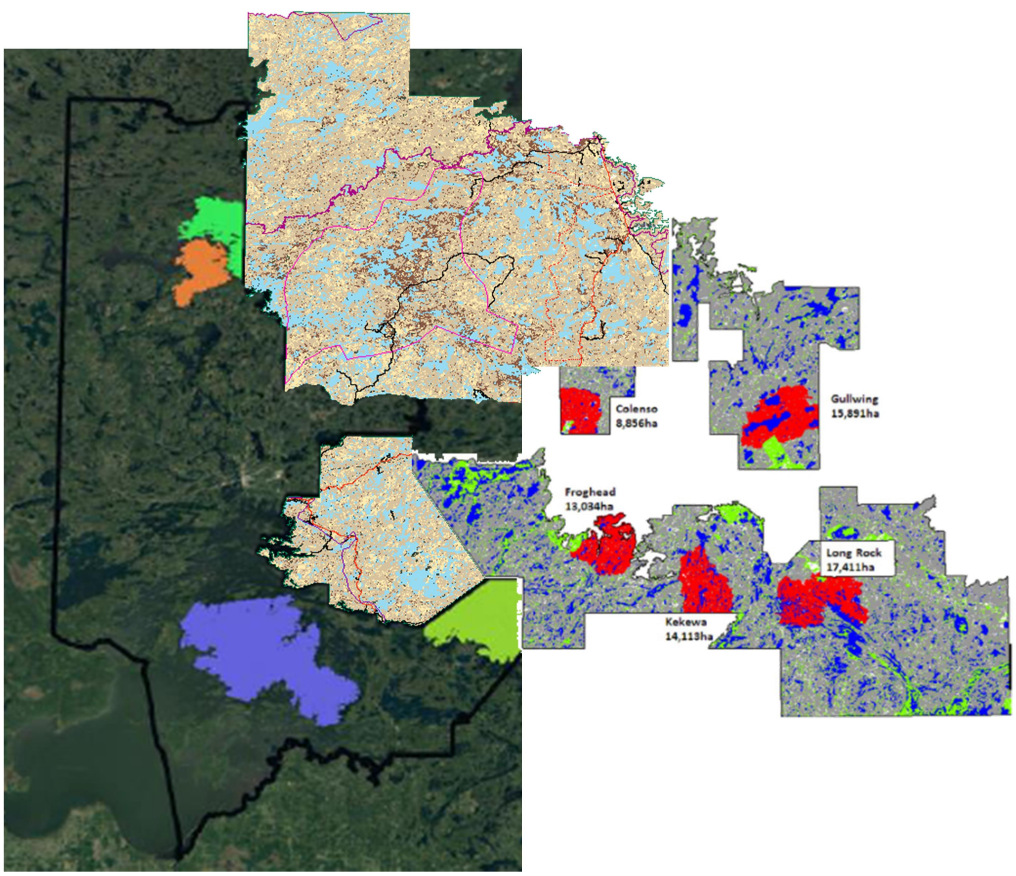


Figure 4. Location of Moose Emphasis Areas on forests adjacent to the Whiskey Jack Forest illustrated as solid red polygons (Wabigoon Forest) or green, orange, and blue polygons (Kenora Forest).

3.8 Land Use Compatibility

The compatibility of MEA objectives with existing land uses was an important consideration during the selection of candidate areas. In particular, MEA road use management strategies will emphasize the decommissioning and abandonment of roads where operationally feasible. These actions are expected to limit human access to various portions of each MEA. MEAs therefore may not be appropriate in locations where Indigenous community members, recreational property-owners, trappers, and other stakeholders have come to rely on existing branch and operational roads for travel and access. MEAs may also be less suitable in locations where other large-scale resource development is anticipated (e.g., advanced mineral exploration or mine development).

3.9 Harvest Feasibility

Lastly, the feasibility of forest harvest was evaluated when identifying candidate MEAs. Section 2.0 above identified limitations on managing MEA habitat classes within SMZ A.

Good forest access and established road networks generally facilitates the management of productive forest habitat classes (Section 3.5), although may also require greater efforts in the future to decommission roads. The desirability of forest stands (quantity and quality of wood fibre) also helped to determine harvest feasibility.

4.0 Final Selected Moose Emphasis Areas

Initially, five candidate MEAs were delineated across the Whiskey Jack Forest. Two of the candidates situated adjacent to each other were combined to form a single MEA (now MEA2).

Of the four candidate MEAs, three were selected and formalized during development of the Long-Term Management Direction. The fourth MEA (MEA4), situated immediately southwest of Ear Falls, Ontario, was rejected primarily due to its proximity to a human settlement and incompatibility with existing land uses of the area. The total area of the four candidate MEAs was 44,751 hectares (ha), representing 14.9% of SMZ B of the Whiskey Jack Forest (4.8% of the entire Whiskey Jack Forest). Table 3 documents characteristics of the three selected MEAs and one rejected MEA.

This remainder of this section describes the three final selected MEAs and the degree to which they met the nine MEA selection criteria. See Figure 5 for an overview map of the three selected MEAs.

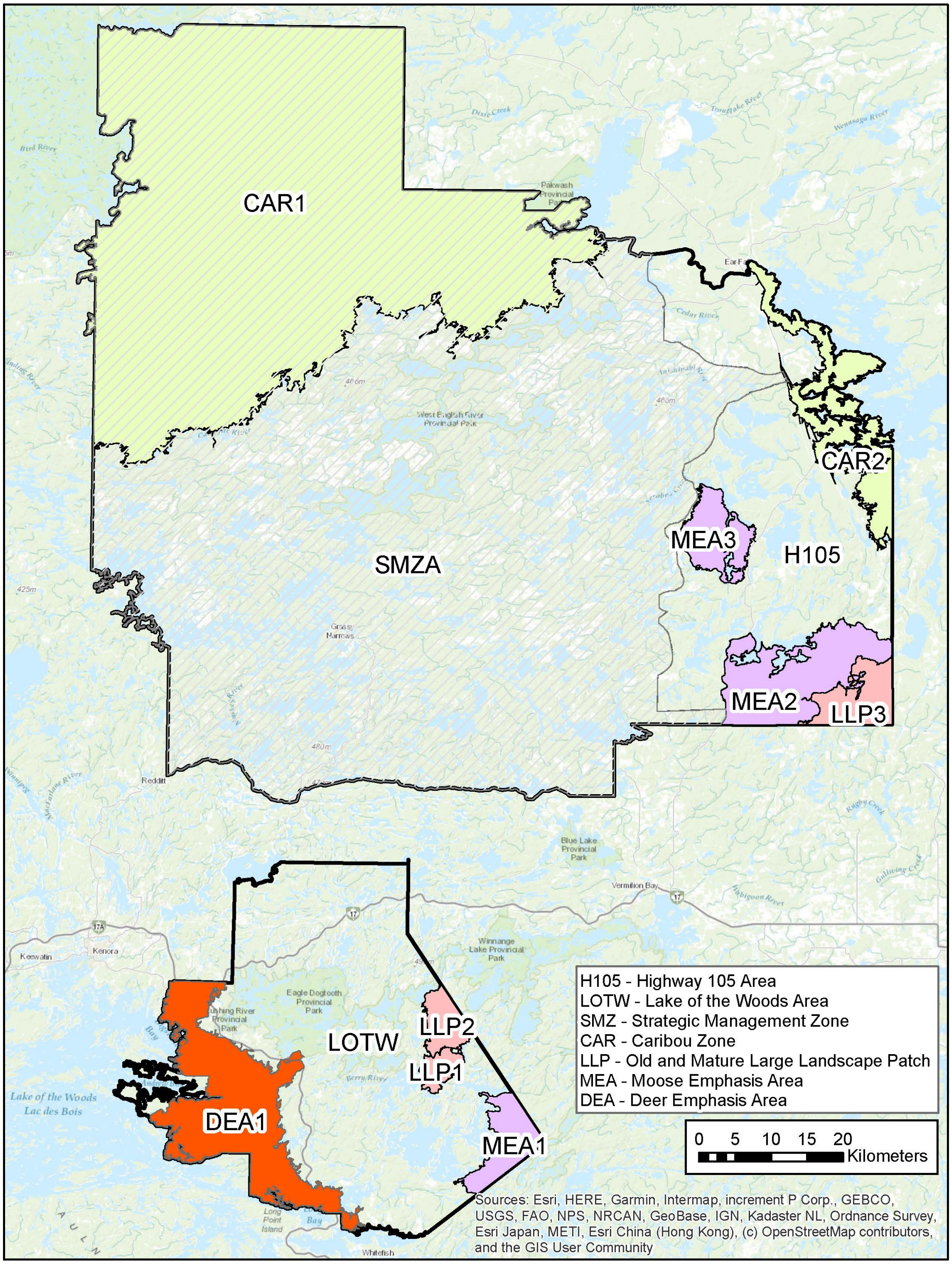


Figure 5. Location of Moose Emphasis Areas and other sub-units within the 2024-2034 Whiskey Jack Forest Management Plan.

4.1 Moose Emphasis Area 1

Moose emphasis area 1 (MEA1), also referred to as the Dryberry Lake MEA, is 7,080 ha in size and located in the southern portion of the Whiskey Jack Forest. This MEA reaches the eastern boundary of the Whiskey Jack Forest and borders the Kenora Forest.

The percentage of wetlands in MEA1 approached the lower limit of the 5-10% target (Table 3). Moose aquatic feeding areas were also distributed throughout MEA 1 (Figure 6).

Of the three selected MEAs, MEA1 was the least nutrient-rich, with only 10 ha of nutrient rich forest present. Moderate nutrient conditions were widespread (Figure 7).

With 0% of the productive forest area currently browse-producing, there is opportunity through harvest to move the browse habitat class into the desired range of 5-30% of forested area. The hardwood-mixedwood habitat class at plan start is within the desired range, while the percentage of mature conifer exceeds the desired range (Table 3). Percentages of mature conifer and hardwood-mixedwood at plan end suggest limited restrictions on forest harvest opportunities within MEA1. The distribution of moose habitat classes in MEA1 is illustrated in Figure 8.

Because there were no forest patches less than or equal to 35 years of age in MEA1 there is no distribution of young forest patch sizes to illustrate. MEA1 provides a new opportunity to generate young forest patch sizes < 500 ha consistent with the MEA forest texture objective.

Across MEA1, modeled moose densities ranged from 0.15 – 0.40 moose/km^2 (Figures 2 and 3).

An O&M LLP was initially situated to the southwest of MEA1. Given old and mature forest targets were being achieved using other areas of the forest, the Whiskey Jack Forest Landscape Task Team decided to reject this O&M LLP but merge its area with MEA1 to expand the total area of this MEA. MEA1 is also expected to work synergistically with the Kenora Forest MEA immediately adjacent to the east (Figure 4). There is clear separation between MEA1 and DEA1 which are located approximately 13 km apart.

MEA1 is currently remote with little road or trail access. In clearly communicating the long-term moose management objective for this area to Indigenous communities, trappers, and stakeholders, it is hoped that support is received to decommission and abandon roads following forestry operations.

While there is currently limited road access to MEA1 (Figure 6), no substantial obstacles to road building and/or forest harvest were identified in this area.

Table 3. Characteristics of the 2024-2034 Whiskey Jack Forest Moose Emphasis Areas.

MEA	Total area (ha), all polytypes	Net Area (ha) of BSH+OMS+TMS+RCK+FOR+GRS polytypes (no WAT, UCL, or ISL), and % of Total	Polytype (ha) & (% of Net Area)						Productivity/Nutrient Regime (ha) & (% of FOR area)			General Habitat Category Plan Start (ha) & (% of FOR Area)				General Habitat Category Plan End No-Harvest (ha) & (% of FOR Area)			
			BSH	OMS	TMS	RCK	FOR	GRS	RICH	MODERATE	POOR	BROWSE (target 5-30%)	HARD-MIXED WOOD (target 20-55%)	MATURE CONIFER (target 15-35%)	IMMATURE (young) CONIFER	BROWSE (target 5-30%)	HARD-MIXED WOOD (target 20-55%)	MATURE CONIFER (target 15-35%)	IMMATURE (young) CONIFER
MEA1	**7080**	**6183**	**17**	**252**	**12**	**1**	**5902**	**0**	**10**	**4761**	**1129**	**0**	**1746**	**3653**	**502**	**0**	**1746**	**3680**	**475**
		87.3%	**0.3%**	**4.1%**	**0.2%**	**0.0%**	**95.5%**	**0.0%**	**0.2%**	**80.7%**	**19.1%**	**0.0%**	**29.6%**	**61.9%**	**8.5%**	**0.0%**	**29.6%**	**62.4%**	**8.0%**
MEA2	**19824**	**17240**	**295**	**577**	**68**	**0**	**16300**	**5**	**737**	**12937**	**2626**	**2122**	**4565**	**9198**	**310**	**1715**	**4729**	**9479**	**376**
		87.0%	**1.7%**	**3.3%**	**0.4%**	**0.0%**	**94.5%**	**0.0%**	**4.5%**	**79.4%**	**16.1%**	**13.0%**	**28.0%**	**56.4%**	**1.9%**	**10.5%**	**29.0%**	**58.2%**	**2.3%**
MEA3	**8004**	**7256**	**59**	**255**	**25**	**0**	**6917**	**0**	**413**	**5458**	**1046**	**1454**	**2153**	**2814**	**495**	**1065**	**2384**	**3018**	**449**
		90.7%	**0.8%**	**3.5%**	**0.3%**	**0.0%**	**95.3%**	**0.0%**	**6.0%**	**78.9%**	**15.1%**	**21.0%**	**31.1%**	**40.7%**	**7.2%**	**15.4%**	**34.5%**	**43.6%**	**6.5%**
MEA4	9843	9528	76	441	30	0	8980	0	249	6438	2294	3081	1600	2724	1562	2001	1854	2749	2375
		96.8%	0.8%	4.6%	0.3%	0.0%	94.2%	0.0%	2.8%	71.7%	25.5%	34.3%	17.8%	30.3%	17.4%	22.3%	20.6%	30.6%	26.4%

* Moose Emphasis Areas in **bold font** were selected for implementation during the 2024-2034 Whiskey Jack Forest Forest Management Plan. MEA4 did not make the final selection and is included in the table for documentation purposes.
** Polytypes included in the wetland indicator, including their percentages, are highlighted by green font.

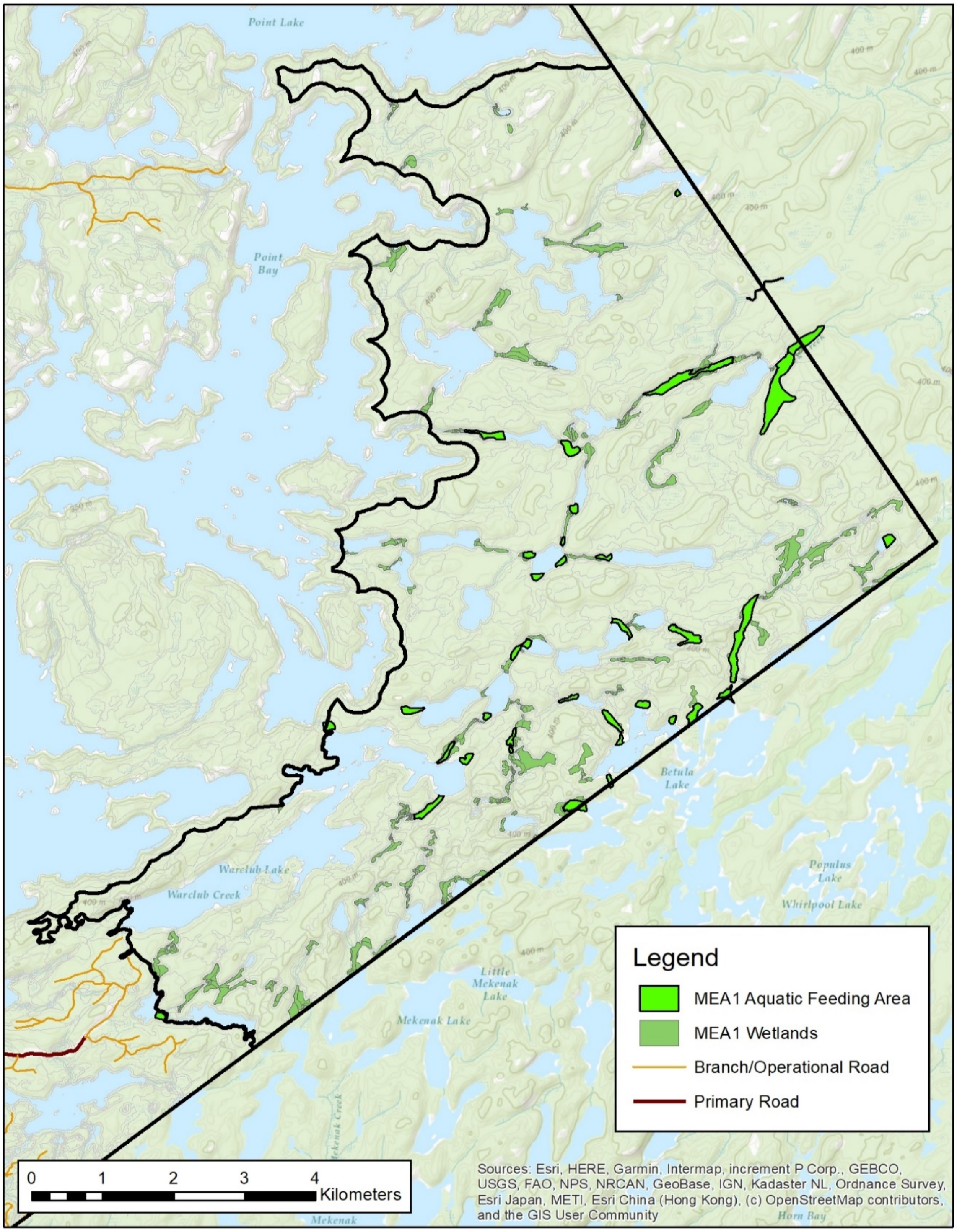


Figure 6. Wetlands, including moose aquatic feeding areas, and existing roads in Moose Emphasis Area 1 (Dryberry Lake Moose Emphasis Area) in the Whiskey Jack Forest at Plan Start (2024).

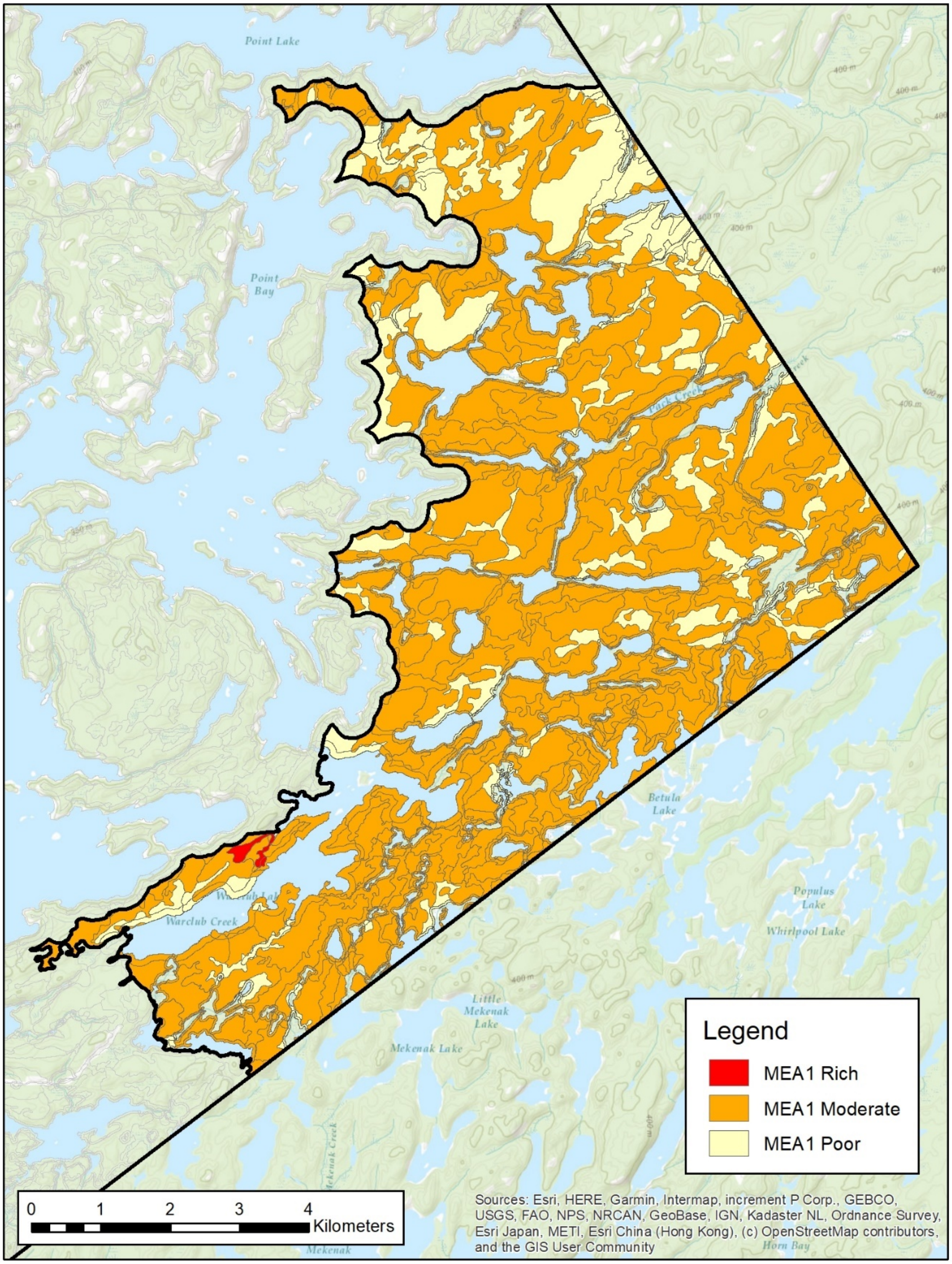


Figure 7. Nutrient regime of productive forest stands in Moose Emphasis Area 1 (Dryberry Lake Moose Emphasis Area) in the Whiskey Jack Forest at Plan Start (2024).

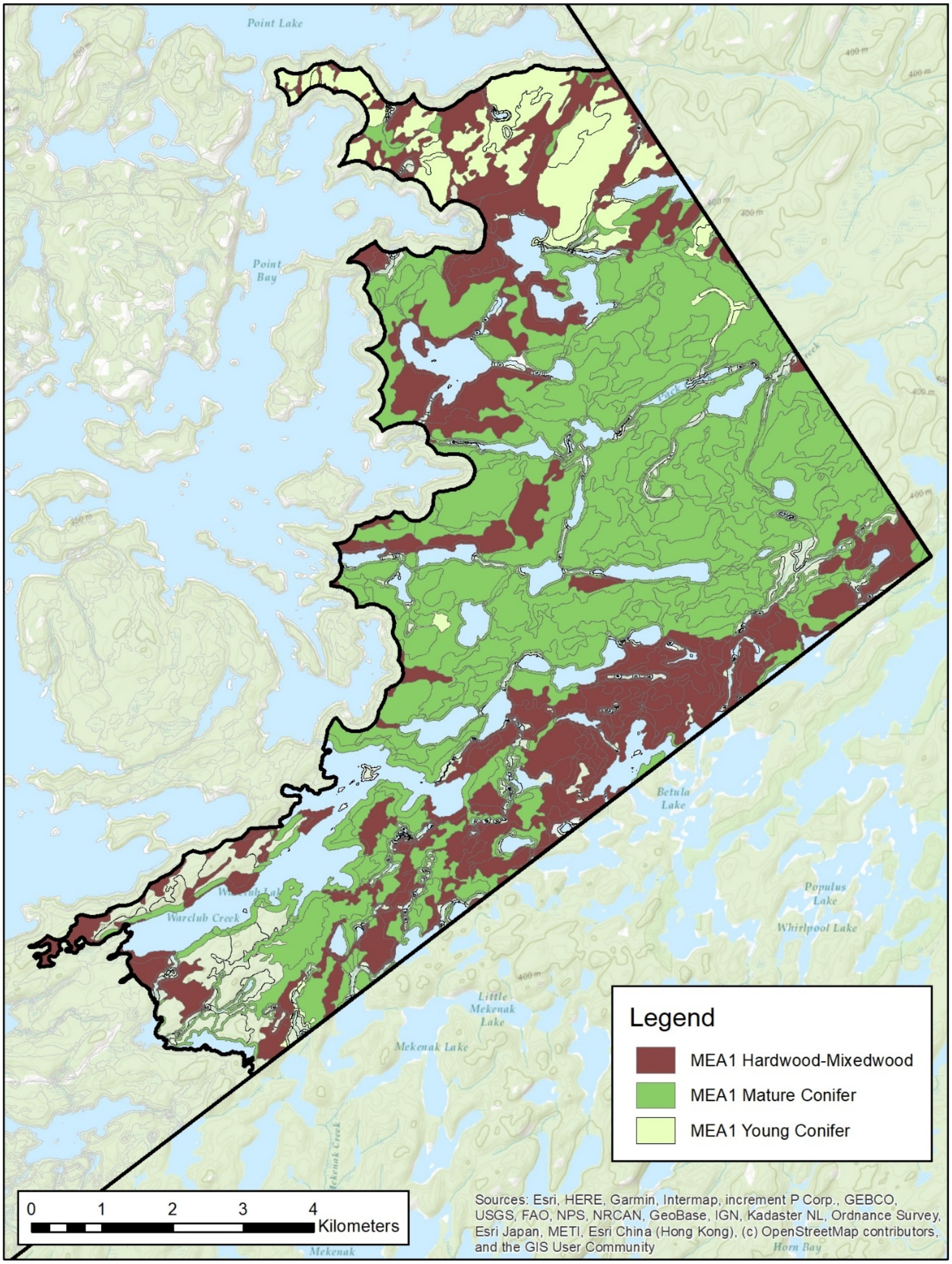


Figure 8. Productive forest moose habitat classes for Moose Emphasis Area 1 (Dryberry Lake Moose Emphasis Area) in the Whiskey Jack Forest at Plan Start (2024).

4.2 MEA-2

Moose emphasis area 2 (MEA2), also referred to as the Cedar Lake MEA, is 19,824 ha in size. Within the northern portion of the Whiskey Jack Forest, this MEA touches southern and eastern boundaries and borders the Wabigoon Forest. The western edge of MEA2 is defined by Highway 105.

The percentage of wetlands in MEA2 reaches the lower limit of the 5-10% target (Table 3). Moose aquatic feeding areas included some relatively large wetlands and were well-distributed throughout MEA2 (Figure 9).

MEA2 includes a greater percentage of nutrient-rich forests than MEA1, although moderate nutrient conditions still dominated (Table 3; Figure 10). Leading species at nutrient-rich sites tended to be trembling aspen, white birch, and black ash.

For MEA2, plan start amounts of browse and hardwood-mixedwood are within target ranges, while mature conifer exceeds the target range (Table 3). Opportunities are available for harvesting mature conifer and hardwood-mixedwood stands within MEA2. The distribution of moose habitat classes in MEA2 is illustrated in Figure 11.

Spatially, young forest is primarily distributed across MEA2 in patches less than 500 ha in size; however, under some iterations, Ontario's Landscape Tool generates a single young forest patch of more than 500 ha in this MEA (Figure 12). The largest young forest patch sizes are located in the north-south corridor between Cedar and Ord Lakes (Figure 13).

Across MEA2, modeled moose densities ranged from 0 – 0.30 moose/km^2 (Figures 2 and 3).

MEA2 lies adjacent to, but does not overlap with, LLP3, and is approximately 10 kilometers south of the caribou zone associated with Lac Seul (CAR2). MEA2 is also situated approximately 7 km north of the Wabigoon Forest Colenso MEA (Figure 4). South of the Highway 105 and Deer Lake Rd. intersection, a finger of SMZ A touches the western extent of this MEA. The objectives of this MEA therefore do not conflict with those of other large landscape patches or strategic management zones on the Whiskey Jack Forest.

MEA2 is currently covered by a network of primary, branch, and operational forest access roads. One main-base lodge and small number of other private land parcels are present within the MEA. Engagement with Indigenous communities and local resource users will be necessary to inform appropriate road use management strategies for MEA2. Forest harvest was generally considered feasible across the area.

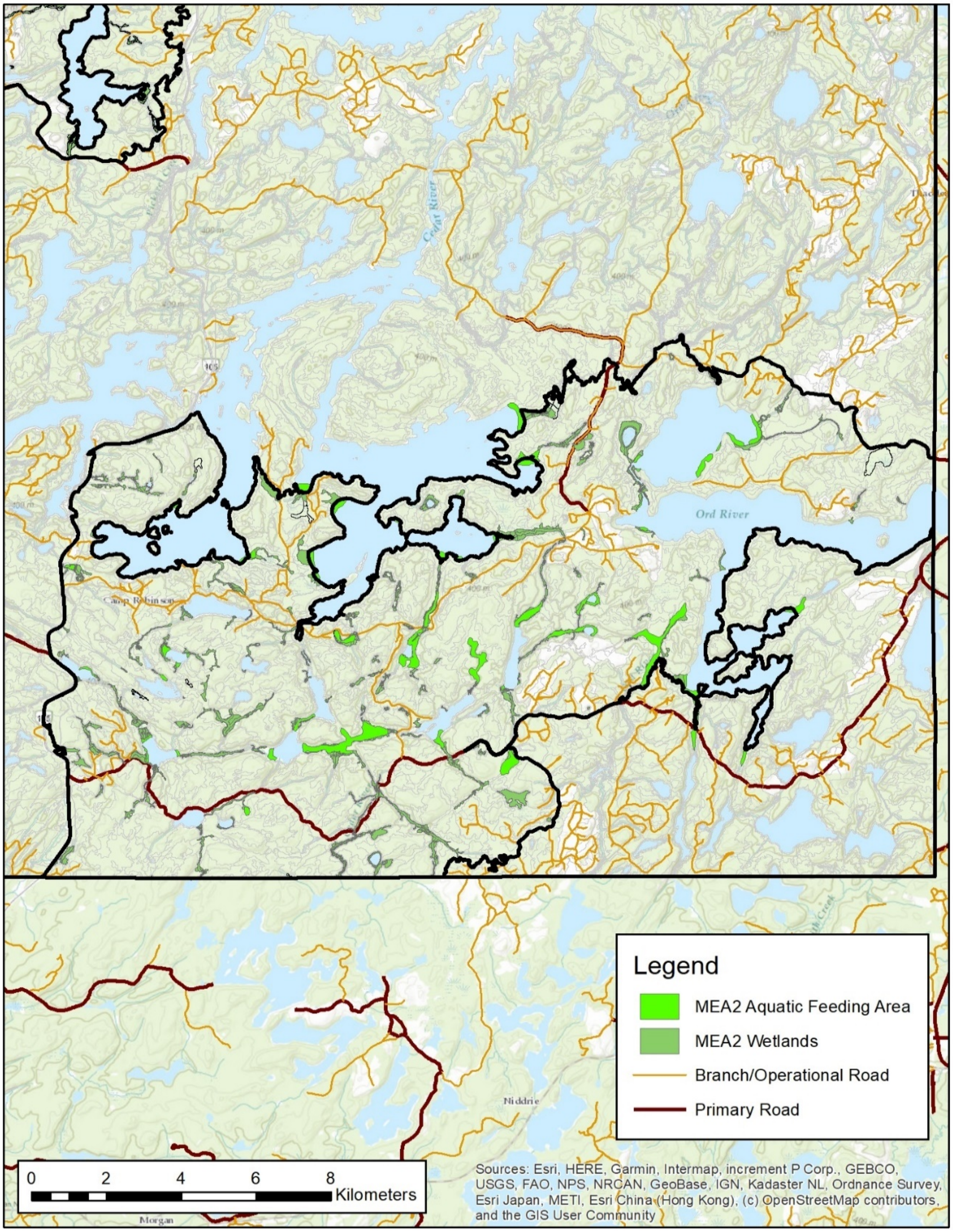


Figure 9. Wetlands, including moose aquatic feeding areas, and existing roads in Moose Emphasis Area 2 (Cedar Lake Moose Emphasis Area) in the Whiskey Jack Forest at Plan Start (2024).

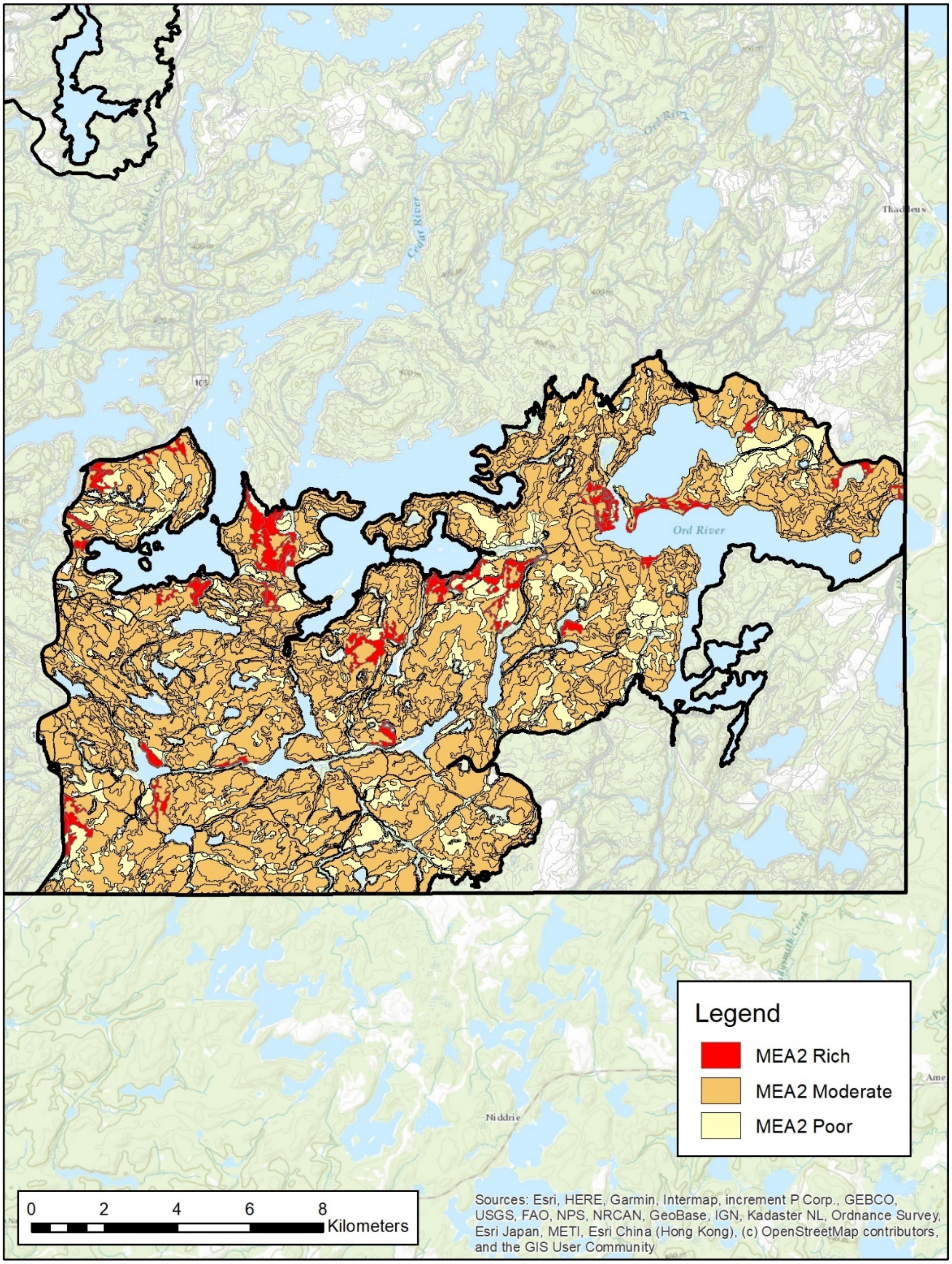


Figure 10. Nutrient regime of productive forest stands in Moose Emphasis Area 2 (Cedar Lake Moose Emphasis Area) in the Whiskey Jack Forest at Plan Start (2024).

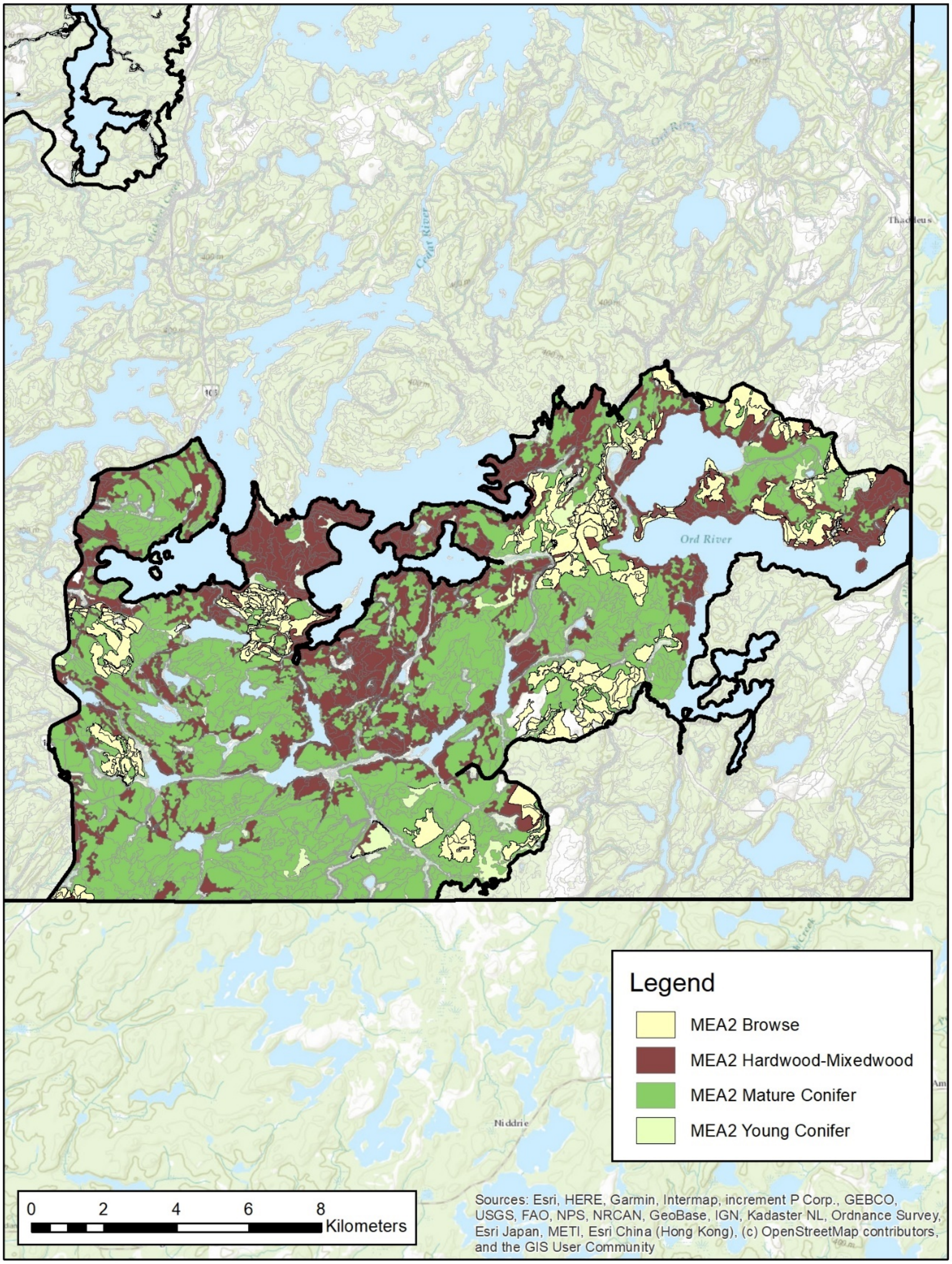
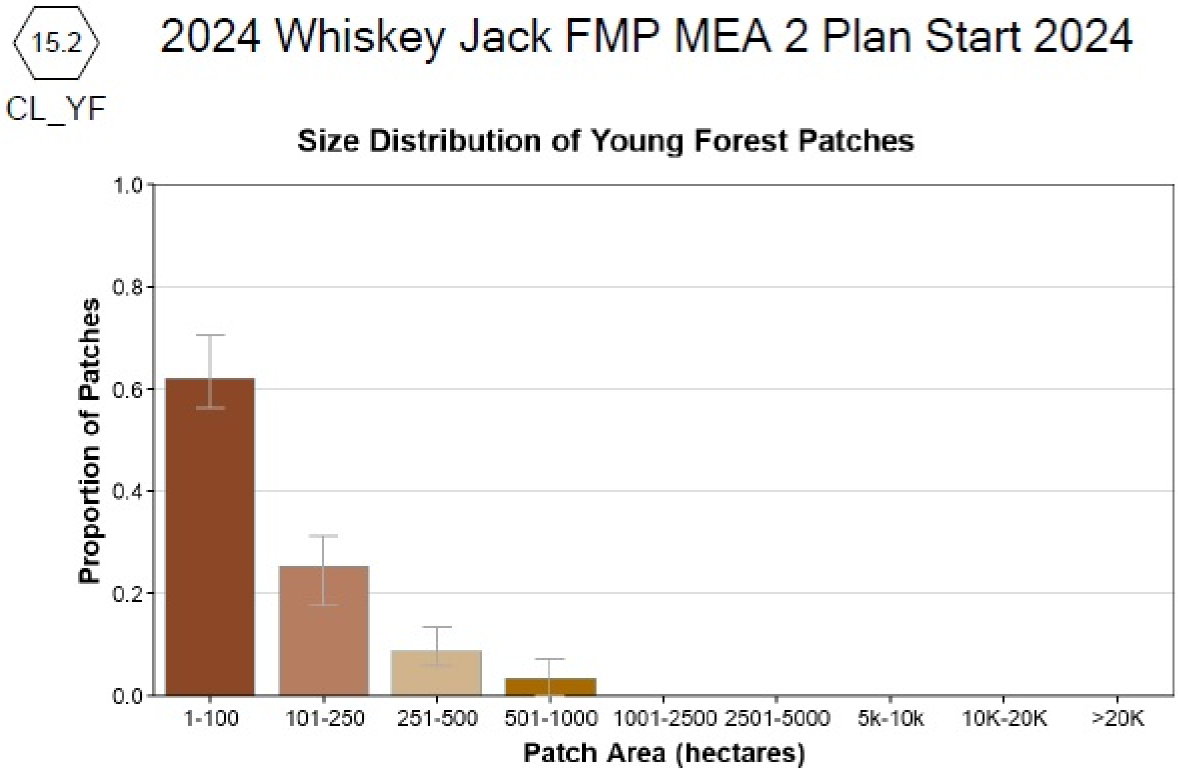


Figure 11. Productive forest moose habitat classes for Moose Emphasis Area 2 (Cedar Lake Moose Emphasis Area) in the Whiskey Jack Forest at Plan Start (2024).



	Case
	1
#Offsets	9 of 9
N	16.2
Mean	122
StdDev	133

Bar	Case
	1
1-100	.622
101-250	.254
251-500	.089
501-1000	.035
1001-2500	.000
2501-5000	.000
5k-10k	.000
10K-20K	.000
>20K	.000

Figure 12. Size distribution of young forest (<35 years old) patches in Moose Emphasis Area 2 (Cedar Lake Moose Emphasis Area) in the Whiskey Jack Forest at Plan Start (2024).

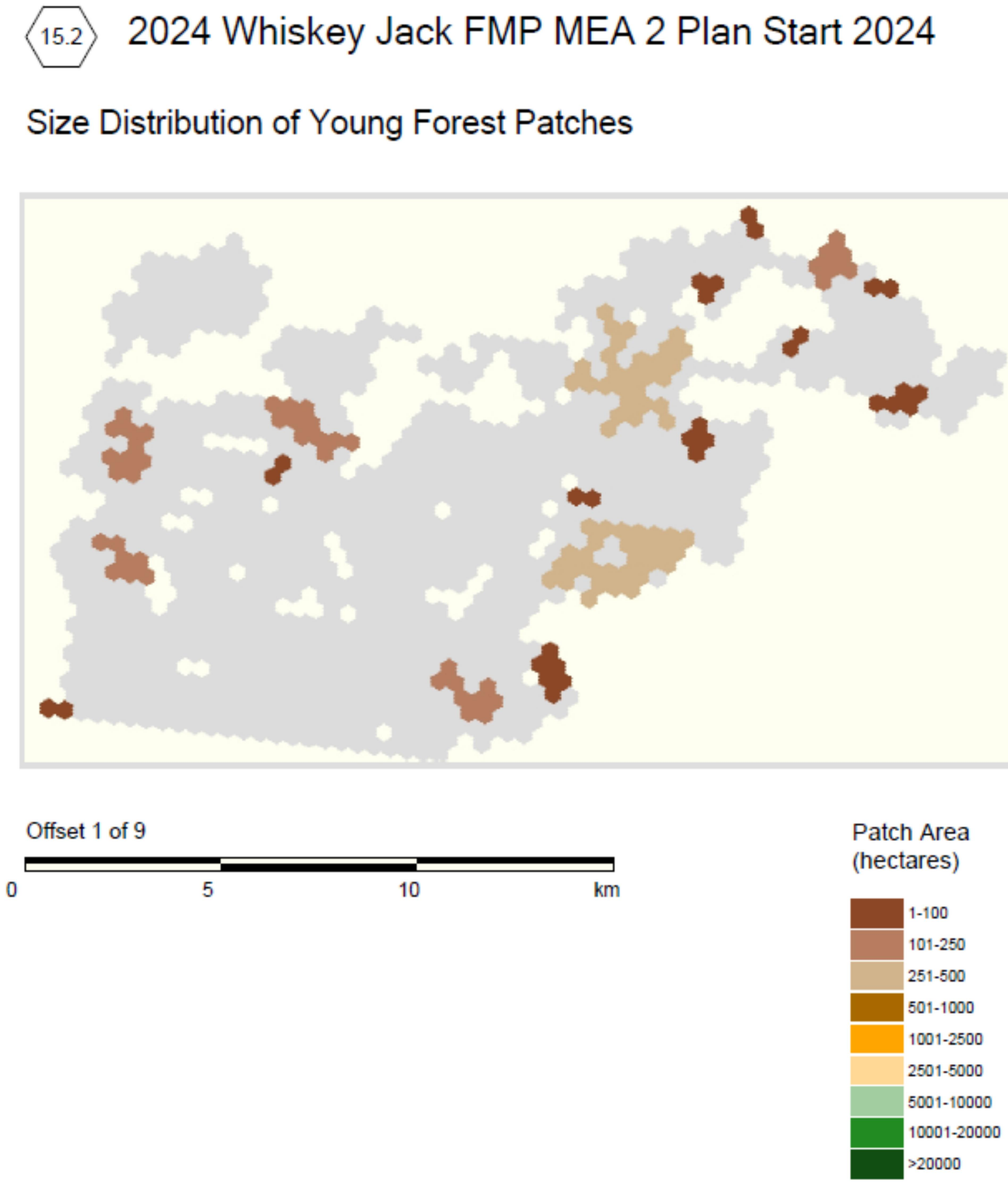


Figure 13. Spatial distribution of young forest (<35 years old) patches in Moose Emphasis Area 2 (Cedar Lake Moose Emphasis Area) in the Whiskey Jack Forest at Plan Start (2024).

4.3 MEA-3

Moose emphasis area 3 (MEA3), also referred to as the Keynote Lake MEA, is 7,256 ha in size. Within the northern portion of the Whiskey Jack Forest, this MEA is defined by Aerobus Road on the western and southern extents and by Wabauskang Lake to the north.

The percentage of wetlands in MEA3 approaches the lower limit of the 5-10% target (Table 3). MAFAs in MEA3 tended to be located within or adjacent larger stream and river systems (Figure 14).

Of all the MEAs, MEA3 includes the greatest percentage of nutrient-rich forests (Table 3). These nutrient-rich sites were concentrated near the southern end of Keynote Lake (Figure 15). Moderate nutrient conditions dominated this MEA overall.

For MEA3, plan start amounts of browse and hardwood-mixedwood are within target ranges, while mature conifer exceeds the target range (Table 3). Opportunities are available for harvesting mature conifer and hardwood-mixedwood stands within MEA3. The distribution of moose habitat classes in MEA3 is illustrated in Figure 16.

Ninety-one percent of young forest is distributed across MEA3 in patches less than 500 ha in size (Figure 17) while one young forest patch larger than 500 ha occurs just west of Keynote Lake (Figure 18).

Across MEA3, modeled moose densities ranged from 0.1 – 0.5 moose/km^2, with both models predicting density to be relatively higher in the southeastern portion (Figures 2 and 3).

MEA3 is distant from continuous caribou distribution, lying approximately 12 km southwest Lac Seul Caribou Zone (CAR2) and 32 km south of the Sydney/Berens Range. The northern portion of this MEA is adjacent to SMZ A. MEA3 is not adjacent to any O&M LLPs. The objectives of this MEA therefore do not conflict with those of other large landscape patches or strategic management zones on the Whiskey Jack Forest.

There is currently good road and trail access to most portions of MEA3. Private land ownership is very limited within this MEA. Engagement with Indigenous communities and local resource users will be necessary to inform appropriate road use management strategies for MEA3. Forest harvest was generally considered feasible across the area.

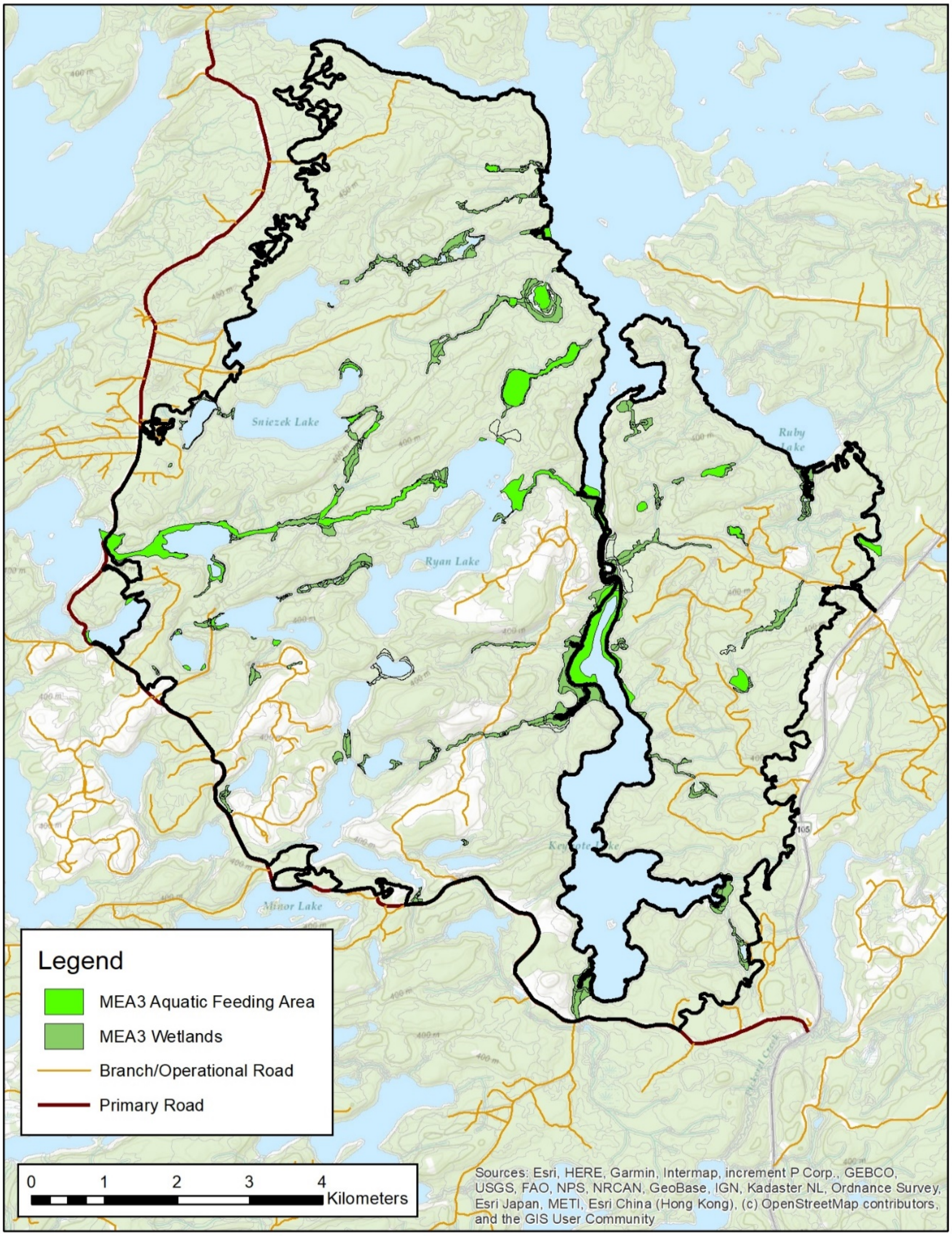


Figure 14. Wetlands, including moose aquatic feeding areas, and existing roads in Moose Emphasis Area 3 (Keynote Lake Moose Emphasis Area) in the Whiskey Jack Forest at Plan Start (2024).

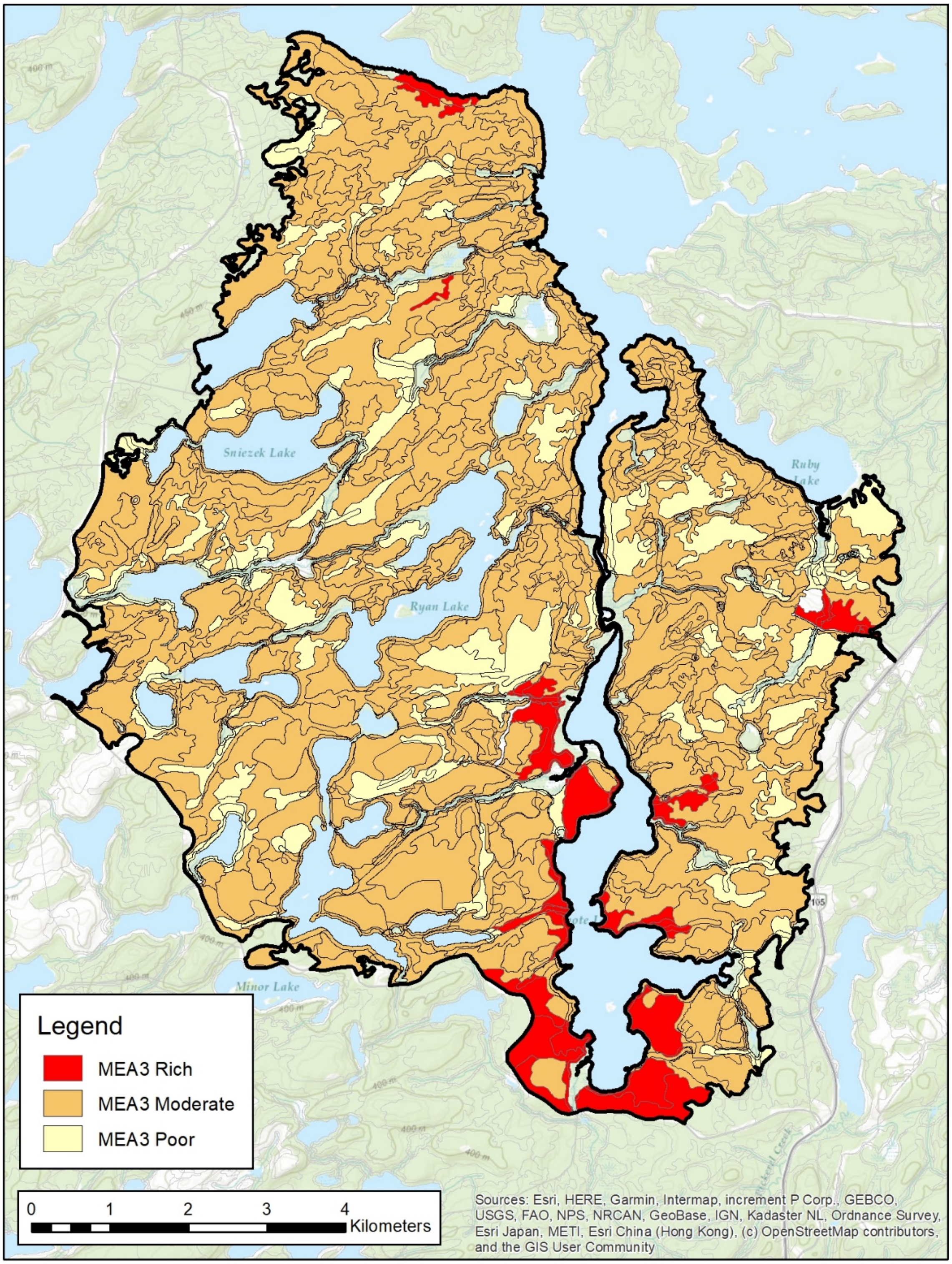


Figure 15. Nutrient regime of productive forest stands in Moose Emphasis Area 3 (Keynote Lake Moose Emphasis Area) in the Whiskey Jack Forest at Plan Start (2024).

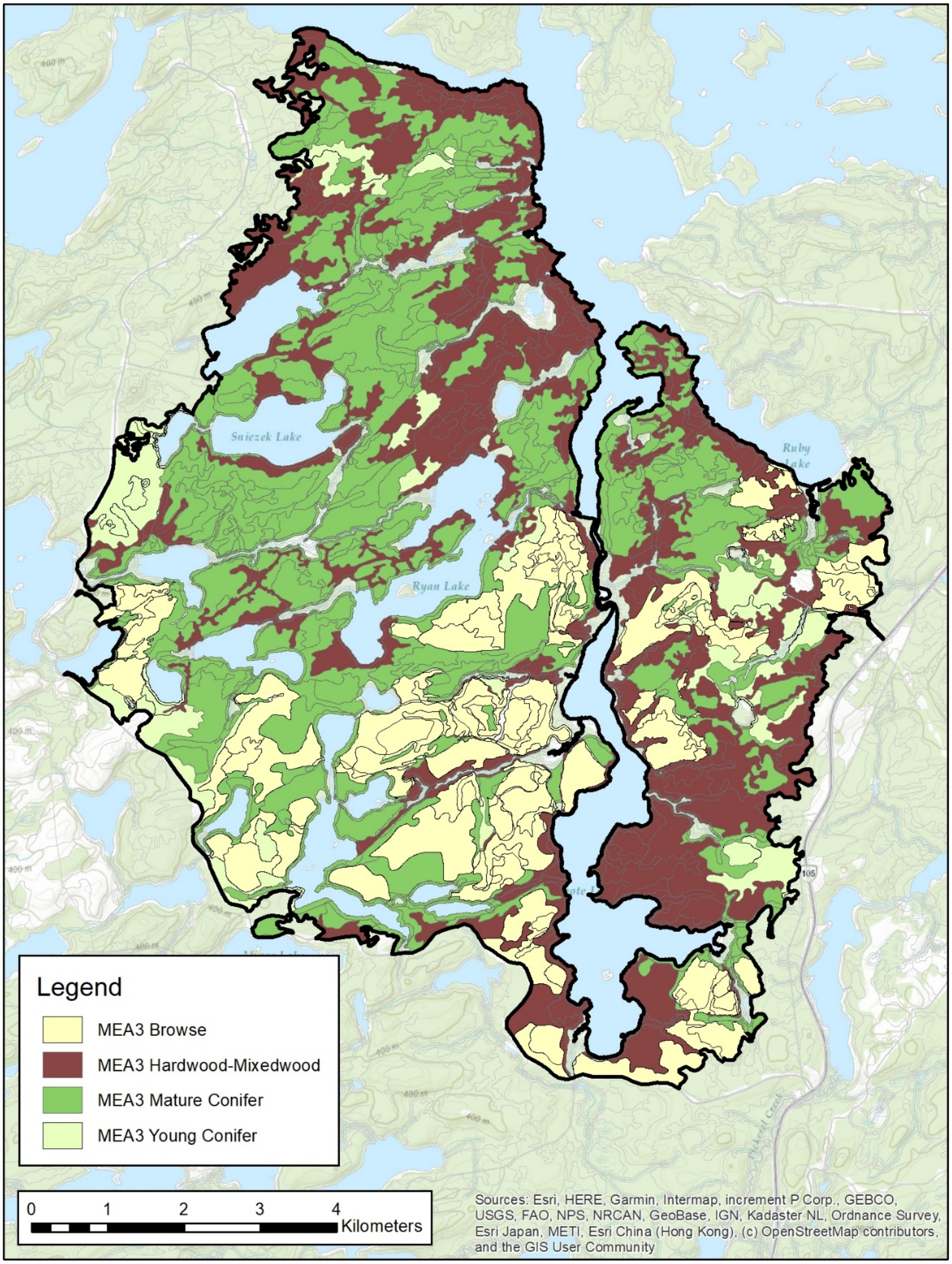
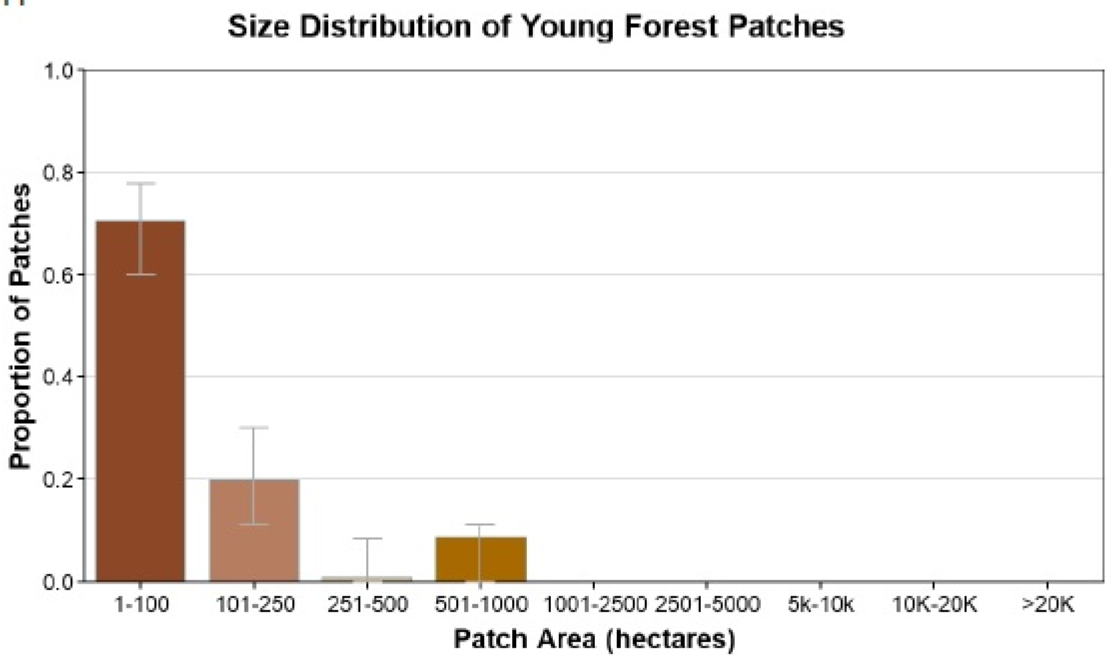


Figure 16. Productive forest moose habitat classes for Moose Emphasis Area 3 (Keynote Lake Moose Emphasis Area) in the Whiskey Jack Forest at Plan Start (2024).

15.2

CL_YF

2024 Whiskey Jack FMP MEA 3 Plan Start 2024



	Case
	1
#Offsets	9 of 9
N	10.6
Mean	126
StdDev	155

Bar	Case
	1
1-100	.706
101-250	.199
251-500	.009
501-1000	.086
1001-2500	.000
2501-5000	.000
5k-10k	.000
10K-20K	.000
>20K	.000

Figure 17. Size distribution of young forest (<35 years old) patches in Moose Emphasis Area 3 (Keynote Lake Moose Emphasis Area) in the Whiskey Jack Forest at Plan Start (2024).

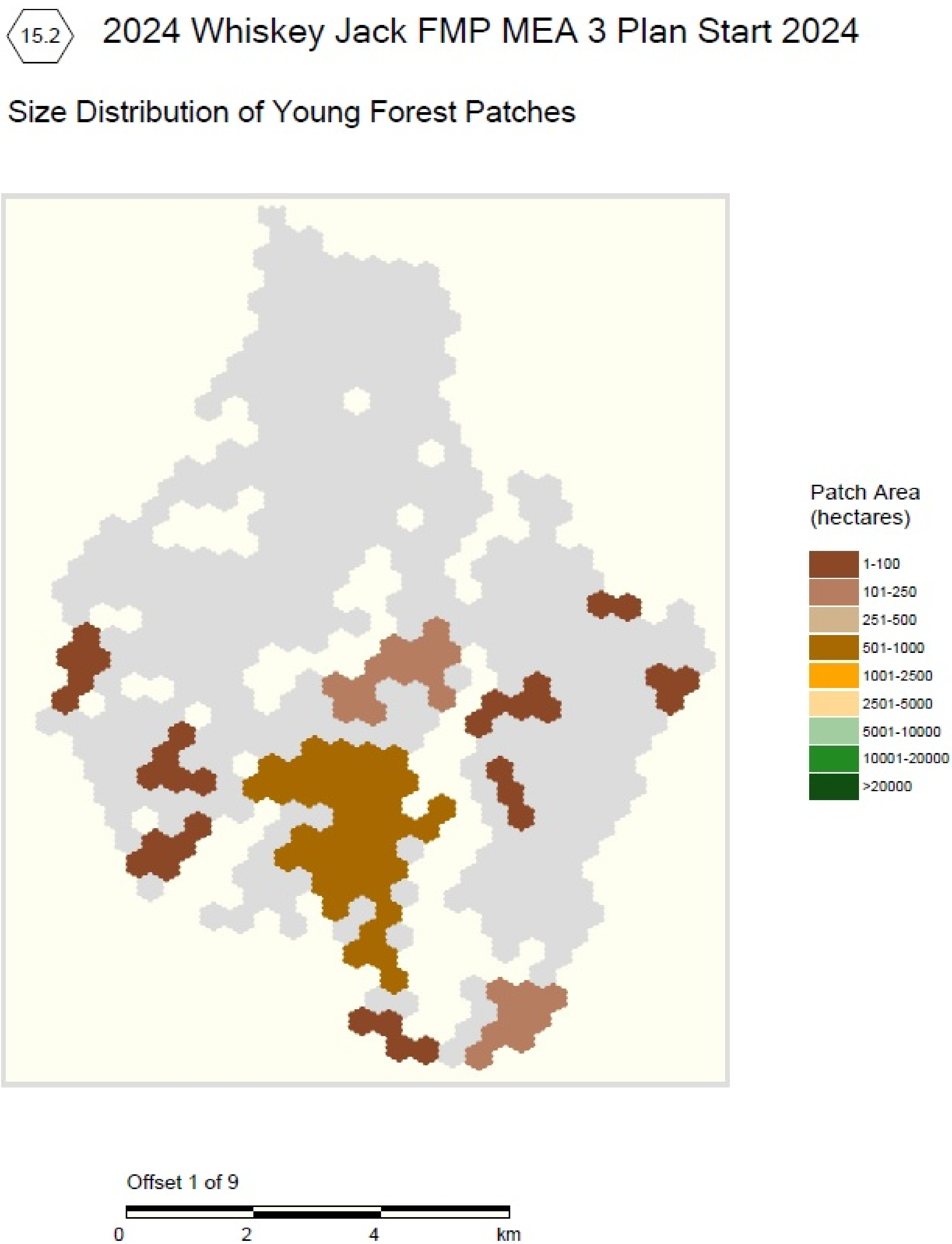


Figure 18. Spatial distribution of young forest (<35 years old) patches in Moose Emphasis Area 3 (Keynote Lake Moose Emphasis Area) in the Whiskey Jack Forest at Plan Start (2024).

5.0 Moose Emphasis Area Objectives, Targets and Strategies

MEA objectives are as follows:

a) A relatively fine-textured landscape (young forest interspersed with older forest at the 50-500 ha scales);

b) A range of young forest patch sizes; and

c) A relatively high proportion of the area managed as mixedwoods (OMNR 2010).

For objectives a) and b), the target is:

- Representation of all young forest patch sizes under 500 ha (1-100, 101-250, and 251-500 ha) and no young forest patches >500 ha as measured with OLT's young forest patch size indicator.

For objective c), targets include:

- 20-55% of productive forest in a hardwood-dominated or mixedwood forest condition;

- 5-30% of productive forest in browse-producing condition; and

- 15-35% of productive forest in mature conifer-dominated condition (OMNR 2010).

For each MEA, the following strategies will be used to achieve the above targets:

MEA1

- Plan forest harvest to maintain hardwood-mixedwood forest within desired range; and

- Plan forest harvest to create browse-producing habitat in patches less than 500 ha in size that comprise 5-30% of the productive forest area

MEA2

- Plan forest harvest to maintain hardwood-mixedwood forest within desired range; and

- Allow young forests within the current 500 ha + patch size to age; avoid consolidating additional forest harvest with existing 251-500 or 501-1000 ha patches

MEA3

- Plan forest harvest to maintain hardwood-mixedwood forest within desired range; and
- Allow young forests within the current 500 ha + patch size to age; avoid consolidating additional forest harvest with the existing 501-1000 ha patch west of Keynote Lake.

6.0 References

Ontario Ministry of Natural Resources (OMNR). 2009a. Cervid Ecological Framework. Available online: https://www.ontario.ca/page/cervid-ecological-framework

Ontario Ministry of Natural Resources (OMNR). 2009b. Moose Management Policy. Available online: https://www.ontario.ca/page/moose-management-policy#:~:text=The%20goal%20of%20Ontario%27s%20moose,for%20the%20people%20of%20Ontario.

Ontario Ministry of Natural Resources (OMNR) 2010. Forest management guide for conserving biodiversity at the stand and site scales. OMNR, Queen's Printer for Ontario, Toronto, ON.

Ranta, W. B. 1997. Selected wildlife and habitat features: Inventory manual for use in forest management planning. Version 1. OMNR, Queen's Printer for Ontario, Peterborough, ON.

Sub-Appendix 1 – Structured Query Language for Productivity, Wetlands, and Productive Forest Habitat Classes for Moose Emphasis Areas of the Northwest Region

Productivity

Poor Productivity Rating

"ecopri" IN ('B011', 'B012', 'B013', 'B014', 'B015', 'B016', 'B017', 'B018', 'B019', 'B024', 'B033', 'B034', 'B039', 'B054', 'B062', 'B064', 'B065', 'B067', 'B068', 'B095', 'B126', 'B127', 'B128', 'B136', 'B137', 'B138', 'B139', 'B140', 'B146', 'B147', 'B148', 'B223') AND "POLYTYPE" = 'FOR'

Moderate Productivity Rating

"ecopri" IN ('B035', 'B036', 'B037', 'B040', 'B041', 'B042', 'B043', 'B048', 'B049', 'B050', 'B051', 'B052', 'B053', 'B055', 'B056', 'B057', 'B058', 'B059', 'B066', 'B069', 'B070', 'B071', 'B073', 'B074', 'B076', 'B081', 'B082','B083', 'B084', 'B085', 'B086', 'B087', 'B097','B098', 'B099', 'B100', 'B101', 'B102','B103', 'B110', 'B113', 'B114', 'B115', 'B116', 'B117', 'B129','B141', 'B222', 'B224') AND "POLYTYPE" = 'FOR'

Rich Productivity Rating

"ecopri" IN ('B088', 'B089','B091', 'B092', 'B104', 'B105', 'B106','B107', 'B108', 'B118', 'B119', 'B120','B122', 'B125', 'B130', 'B131', 'B133', 'B134','B135', 'B142', 'B144') AND "POLYTYPE" = 'FOR'

Wetlands

"POLYTYPE" IN ('BSH', 'OMS')

Habitat Class – Plan Start

Browse plan start = "browse":

"AGE" <35 AND "HT" <10 AND "POLYTYPE" = 'FOR'

Hardwood mixedwood plan start = "hrdmix":

("nwsfu" = 'PoSha' AND "AGE" >= 35) OR ("nwsfu" = 'PoSha' AND "HT" >= 10) OR ("nwsfu" = 'PoDee' AND "AGE" >= 35) OR ("nwsfu" = 'PoDee' AND "HT" >= 10) OR ("nwsfu" = 'BwSha' AND "AGE" >= 35) OR ("nwsfu" = 'BwSha' AND "HT" >= 10) OR ("nwsfu" = 'BwDee' AND "AGE" >= 35) OR ("nwsfu" = 'BwDee' AND "HT" >= 10) OR ("nwsfu" = 'OthHd' AND "AGE" >= 35) OR ("nwsfu" = 'OthHd' AND "HT" >= 10) OR ("nwsfu" = 'HrDom' AND "AGE" >= 35) OR ("nwsfu" = 'HrDom' AND "HT" >= 10) OR ("nwsfu" = 'HrdMw' AND "AGE" >= 35) OR ("nwsfu" = 'HrdMw' AND "HT" >= 10) OR ("nwsfu" = 'ConMx' AND "AGE" >= 35) OR ("nwsfu" = 'ConMx' AND "HT" >= 10)

Mature conifer plan start = "matcon":

("nwsfu" = 'UplCe' AND "AGE" >= 70) OR ("nwsfu" = 'OCLow' AND "AGE" >= 70) OR ("nwsfu" = 'SbLow' AND "AGE" >= 70) OR ("nwsfu" = 'SbSha' AND "AGE" >= 70) OR ("nwsfu" = 'SbDee' AND "AGE" >= 70) OR ("nwsfu" = 'PjSha' AND "AGE" >= 70) OR ("nwsfu" = 'PjDee' AND "AGE" >= 70) OR ("nwsfu" = 'SbMx1' AND "AGE" >= 70) OR ("nwsfu" = 'PjMx1' AND "AGE" >= 70) OR ("nwsfu" = 'BfPur' AND "AGE"

>= 60) OR ("nwsfu" = 'BfMx1' AND "AGE" >= 60) OR ("nwsfu" = 'PwDom' AND "AGE" >= 80) OR ("nwsfu" = 'PrwMx' AND "AGE" >= 80) OR ("nwsfu" = 'PrDom' AND "AGE" >= 80)

Young conifer plan start = "youngcon":

("nwsfu" = 'UplCe' AND "AGE" <70 AND "AGE" >=35) OR ("nwsfu" = 'OCLow' AND "AGE" <70 AND "AGE" >=35) OR ("nwsfu" = 'SbLow' AND "AGE" <70 AND "AGE" >=35) OR ("nwsfu" = 'SbSha' AND "AGE" <70 AND "AGE" >=35) OR ("nwsfu" = 'SbDee' AND "AGE" <70 AND "AGE" >=35) OR ("nwsfu" = 'PjSha' AND "AGE" <70 AND "AGE" >=35) OR ("nwsfu" = 'PjDee' AND "AGE" <70 AND "AGE" >=35) OR ("nwsfu" = 'SbMx1' AND "AGE" <70 AND "AGE" >=35) OR ("nwsfu" = 'PjMx1' AND "AGE" <70 AND "AGE" >=35) OR ("nwsfu" = 'BfMx1' AND "AGE" <60 AND "AGE" >=35) OR ("nwsfu" = 'BfPur' AND "AGE" <60 AND "AGE" >=35) OR ("nwsfu" = 'PwDom' AND "AGE" <80 AND "AGE" >=35) OR ("nwsfu" = 'PrwMx' AND "AGE" <80 AND "AGE" >=35) OR ("nwsfu" = 'PrDom' AND "AGE" <80 AND "AGE" >=35)

<u>Habitat Class – Plan End</u>

Browse plan END = “browse”:

"AGE" <25 AND "HT" <10 AND "POLYTYPE" = 'FOR'

Hardwood mixedwood plan END = “hrdmix”:

("nwsfu" = 'PoSha' AND "AGE" >= 25) OR ("nwsfu" = 'PoDee' AND "AGE" >= 25) OR ("nwsfu" = 'BwSha' AND "AGE" >= 25) OR ("nwsfu" = 'BwDee' AND "AGE" >= 25) OR ("nwsfu" = 'OthHd' AND "AGE" >= 25) OR ("nwsfu" = 'HrDom' AND "AGE" >= 25) OR ("nwsfu" = 'HrdMw' AND "AGE" >= 25) OR ("nwsfu" = 'ConMx' AND "AGE" >= 25)

Mature conifer plan END = “matcon”:

("nwsfu" = 'UplCe' AND "AGE" >= 60) OR ("nwsfu" = 'OCLow' AND "AGE" >= 60) OR ("nwsfu" = 'SbLow' AND "AGE" >= 60) OR ("nwsfu" = 'SbSha' AND "AGE" >= 60) OR ("nwsfu" = 'SbDee' AND "AGE" >= 60) OR ("nwsfu" = 'PjSha' AND "AGE" >= 60) OR ("nwsfu" = 'PjDee' AND "AGE" >= 60) OR ("nwsfu" = 'SbMx1' AND "AGE" >= 60) OR ("nwsfu" = 'PjMx1' AND "AGE" >= 60) OR ("nwsfu" = 'BfPur' AND "AGE" >= 50) OR ("nwsfu" = 'BfMx1' AND "AGE" >= 50) OR ("nwsfu" = 'PwDom' AND "AGE" >= 70) OR ("nwsfu" = 'PrwMx' AND "AGE" >= 70) OR ("nwsfu" = 'PrDom' AND "AGE" >= 70)

Young conifer plan END = “youngcon”:

("nwsfu" = 'UplCe' AND "AGE" <60 AND "AGE" >=25) OR("nwsfu" = 'OCLow' AND "AGE" <60 AND "AGE" >=25) OR ("nwsfu" = 'SbLow' AND "AGE" <60 AND "AGE" >=25) OR("nwsfu" = 'SbSha' AND "AGE" <60 AND "AGE" >=25) OR ("nwsfu" = 'SbDee' AND "AGE" <60 AND "AGE" >=25) OR ("nwsfu" = 'PjSha' AND "AGE" <60 AND "AGE" >=25) OR ("nwsfu" = 'PjDee' AND "AGE" <60 AND "AGE" >=25) OR ("nwsfu" = 'SbMx1' AND "AGE" <60 AND "AGE" >=25) OR ("nwsfu" = 'PjMx1' AND "AGE" <60 AND "AGE" >=25) OR ("nwsfu" = 'BfMx1' AND "AGE" <50 AND "AGE" >=25) OR ("nwsfu" = 'BfPur' AND "AGE" <50 AND "AGE" >=25) OR ("nwsfu" = 'PwDom' AND "AGE" <70 AND "AGE" >=25) OR ("nwsfu" = 'PrwMx' AND "AGE" <70 AND "AGE" >=25) OR ("nwsfu" = 'PrDom' AND "AGE" <70 AND "AGE" >=25)

Sub-Appendix 2 – Calculated Habitat Quantities for Moose Emphasis Areas at 20, 40 and 60 Years Based on the Final Strategic Forest Management Model (SFMM) Run for the 2024 Whiskey Jack Forest FMP

Classification of FU into MEA Habitat Indicators based on SFMM Outputs

FU	Browse	HRDMIX	MATCON
BFM_	A5+A15+A25+A35/2	nil	A65+A75+A85+A95+A105…+A255
CMX_	A5+A15+A25+A35/2	A35/2+A45+A55+A65+A75+A85…+A255	nil
CMXC	A5+A15+A25+A35/2	A35/2+A45+A55+A65+A75+A85…+A255	nil
HMX_	A5+A15+A25+A35/2	A35/2+A45+A55+A65+A75+A85…+A255	nil
HRDA	A5+A15+A25+A35/2	A35/2+A45+A55+A65+A75+A85…+A255	nil
HRDB	A5+A15+A25+A35/2	A35/2+A45+A55+A65+A75+A85…+A255	nil
HRD_	A5+A15+A25+A35/2	A35/2+A45+A55+A65+A75+A85…+A255	nil
PJDD	A5+A15+A25+A35/2	nil	A75+A85+A95+A105+A115…+A255
PJDS	A5+A15+A25+A35/2	nil	A75+A85+A95+A105+A115…+A255
PJM_	A5+A15+A25+A35/2	nil	A75+A85+A95+A105+A115…+A255
POD_	A5+A15+A25+A35/2	A35/2+A45+A55+A65+A75+A85…+A255	nil
PRWR	A5+A15+A25+A35/2	nil	A85+A95+A105+A115+A125…+A255
PRWW	A5+A15+A25+A35/2	nil	A85+A95+A105+A115+A125…+A255
SBD_	A5+A15+A25+A35/2	nil	A75+A85+A95+A105+A115…+A255
SBL_	A5+A15+A25+A35/2	nil	A75+A85+A95+A105+A115…+A255
SBLC	A5+A15+A25+A35/2	nil	A75+A85+A95+A105+A115…+A255
SBM_	A5+A15+A25+A35/2	nil	A75+A85+A95+A105+A115…+A255

MEA1 Calculated area (ha) of habitat indicators based on term and plan start date. Grey shading indicates years reported in FMP-10 Table

Term	T1	T2	T3	T4	T5	T6	T7
Year	2024	2034	2044	2054	2064	2074	2084
Browse	0	766	1311	2727	3336	3219	2687
HRDMIX	1769	1376	1056	847	932	927	1149
MATCON	3626	3255	3170	2313	1476	1301	983

MEA1 Calculated percent (%) of habitat indicators based on term and plan start date. Grey shading indicates years reported in FMP-10 Table. Values do not add to 100% based on portion of calculation belong to young conifer stands (not shown)

Term	T1	T2	T3	T4	T5	T6	T7
Year	2024	2034	2044	2054	2064	2074	2084
Browse	0	13	22	46	57	55	46
HRDMIX	30	23	18	14	16	16	19
MATCON	61	55	54	39	25	22	17

MEA2 Calculated area (ha) of habitat indicators based on term and plan start date. Grey shading indicates years reported in FMP-10 Table

Term	T1	T2	T3	T4	T5	T6	T7
Year	2024	2034	2044	2054	2064	2074	2084
Browse	2175	2908	3672	4445	4737	6196	6901
HRDMIX	4487	3591	2766	2516	2870	3131	3516
MATCON	9102	9322	9026	8159	7462	5752	4405

MEA2 Calculated percent (%) of habitat indicators based on term and plan start date. Grey shading indicates years reported in FMP-10 Table. Values do not add to 100% based on portion of calculation belong to young conifer stands (not shown)

Term	T1	T2	T3	T4	T5	T6	T7
Year	2024	2034	2044	2054	2064	2074	2084
Browse	13	18	23	27	29	38	42
HRDMIX	28	22	17	15	18	19	22
MATCON	56	57	55	50	46	35	27

MEA3 Calculated area (ha) of habitat indicators based on term and plan start date. Grey shading indicates years reported in FMP-10 Table

Term	T1	T2	T3	T4	T5	T6	T7
Year	2024	2034	2044	2054	2064	2074	2084
Browse	1464	1560	1697	2144	2152	2663	3025
HRDMIX	2147	1993	1802	1270	1354	1412	1570
MATCON	2814	2940	3008	2919	2677	2251	1652

MEA3 Calculated percent (%) of habitat indicators based on term and plan start date. Grey shading indicates years reported in FMP-10 Table. Values do not add to 100% based on portion of calculation belong to young conifer stands (not shown)

Term	T1	T2	T3	T4	T5	T6	T7
Year	2024	2034	2044	2054	2064	2074	2084
Browse	21	23	25	31	31	39	44
HRDMIX	31	29	26	18	20	20	23
MATCON	41	43	43	42	39	33	24

Appendix 3

Deer Emphasis Area Delineation

and Identification of Critical Thermal Cover

Deer Emphasis Area Delineation and Identification of Critical Thermal Cover for the 2024 Whiskey Jack Forest FMP

June 13, 2023

Deer Emphasis Area Delineation and Identification of Critical Thermal Cover for the 2024 Whiskey Jack Forest FMP

1.0 Introduction

The identification of Deer Emphasis Areas in Forest Management Planning is based on existing policy documents in place at the time a 10-year Forest Management Plan (FMP) is produced. This report describes the creation and development of the Deer Emphasis Area (DEA) for the 2024 Whiskey Jack Forest FMP.

Key consideration for setting habitat objectives related to DEAs is available in the Forest Management Guide for the Provision of Biodiversity at the Stand and Site Scales (S&SG) as well as in the Cervid Ecological Framework (CEF). The DEA in place for the 2024 Whiskey Jack Forest FMP is based on field work activities where high-density deer areas were identified and closely mirrors the DEA used for the 2012 Whiskey Jack Forest FMP. To this extent, the geographic boundaries of the Whiskey Jack Forest DEA are based on survey results which followed those protocols for the "Identification and Delineation of White-Tailed Deer Winter Habitat" available in the Selected Wildlife and Habitat Features: Inventory Manual (1998).

Field work protocols for the identification of deer winter habitat are based on recorded deer track densities where a helicopter is used to survey large geographic areas with varying amounts of deer activity. Those forested areas, typically mature conifer, that have higher deer activity in the winter months are important in providing a canopy that reduces snow depths on the ground and promotes forage availability. Winter cover is particularly important during severe winter weather conditions where increased snow depths occur and have the potential to reduce deer populations. As such the maintenance of winter cover helps maintain deer populations during winters that are considered severe based on snow depth index measurements recorded by the Ministry of Natural Resources and Forestry (MNRF). In locations where deer populations are currently depressed, it is expected that retaining sufficient critical thermal cover will aid in deer population recovery as per those objectives identified in the CEF at the Wildlife Management Unit (WMU) and Cervid Ecological Zone (CEZ) levels.

1.1 Background: Cervid Ecological Framework Overarching Habitat Guidance

Guidance for the management of cervid species in Ontario occurs through the direction of the CEF. The CEF outlines population and habitat direction for cervid species through five different CEZs in Ontario (Figure 1).

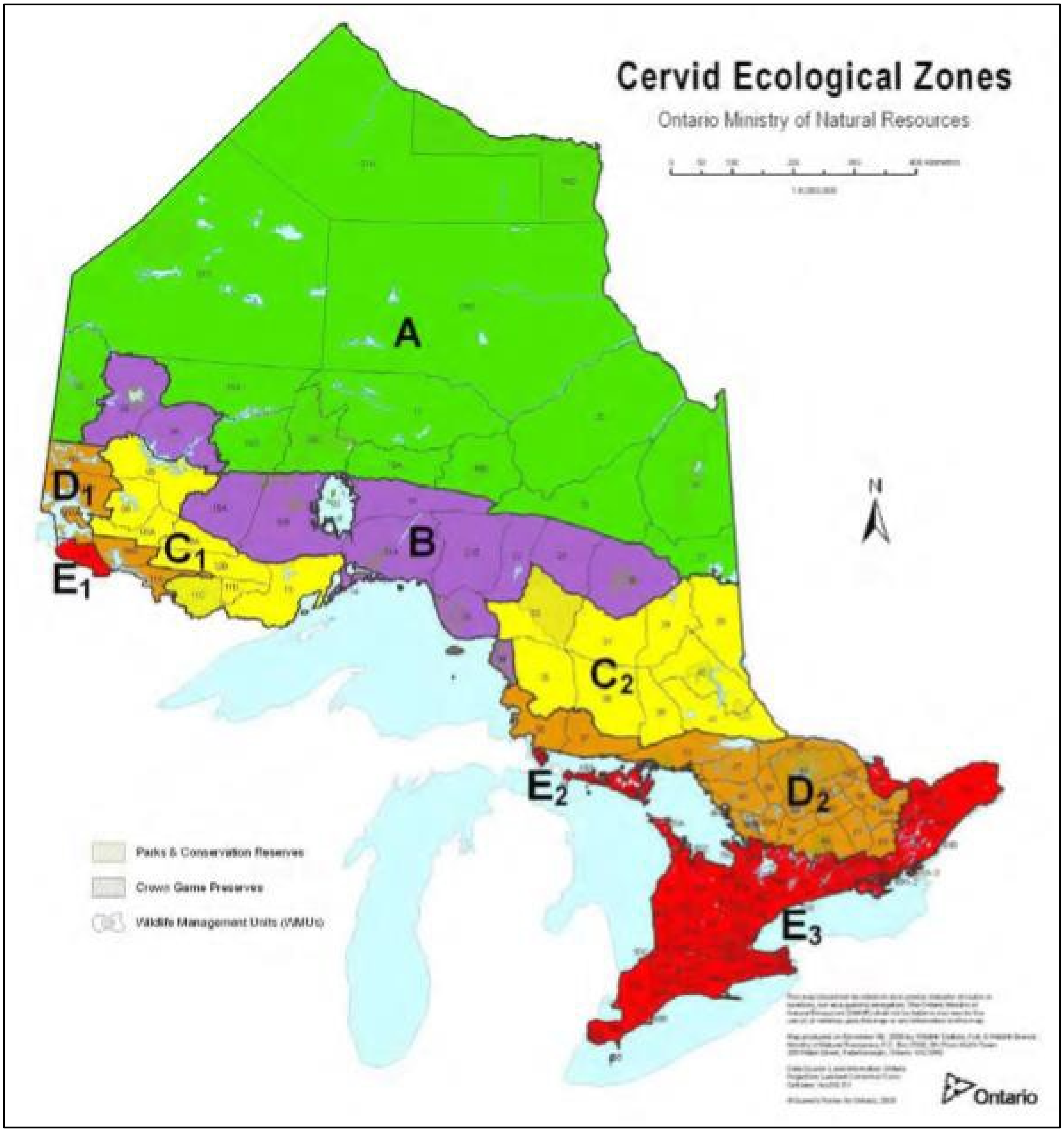


Figure 1. Cervid Ecological Zones and Wildlife Management Units in Ontario.

The CEF indicates that population management of cervid species is to occur through the allocation of big game hunting opportunities and habitat management is to occur through 'land and resource planning practices.' Notably, the CEF indicates:

"Habitat Management guidance within this Framework replaces previous policy direction for cervids as outlined in Policy 6.04.01 Management of Timber for Featured Wildlife Species (OMNR 1990). Management guidance within this Framework (6.0 Broad Cervid Management Guidance) may be used to inform the application of emphasizing species-specific cervid habitat direction (e.g. moose) contained in Forest Management Guides."

There are four unique CEZs overlapping the Whiskey Jack Forest which identify varying population and habitat management considerations (Figure 2). Each CEZ is made up of WMUs which is the spatial scale at which deer and moose are managed through Ontario's big-game harvest licensing system.

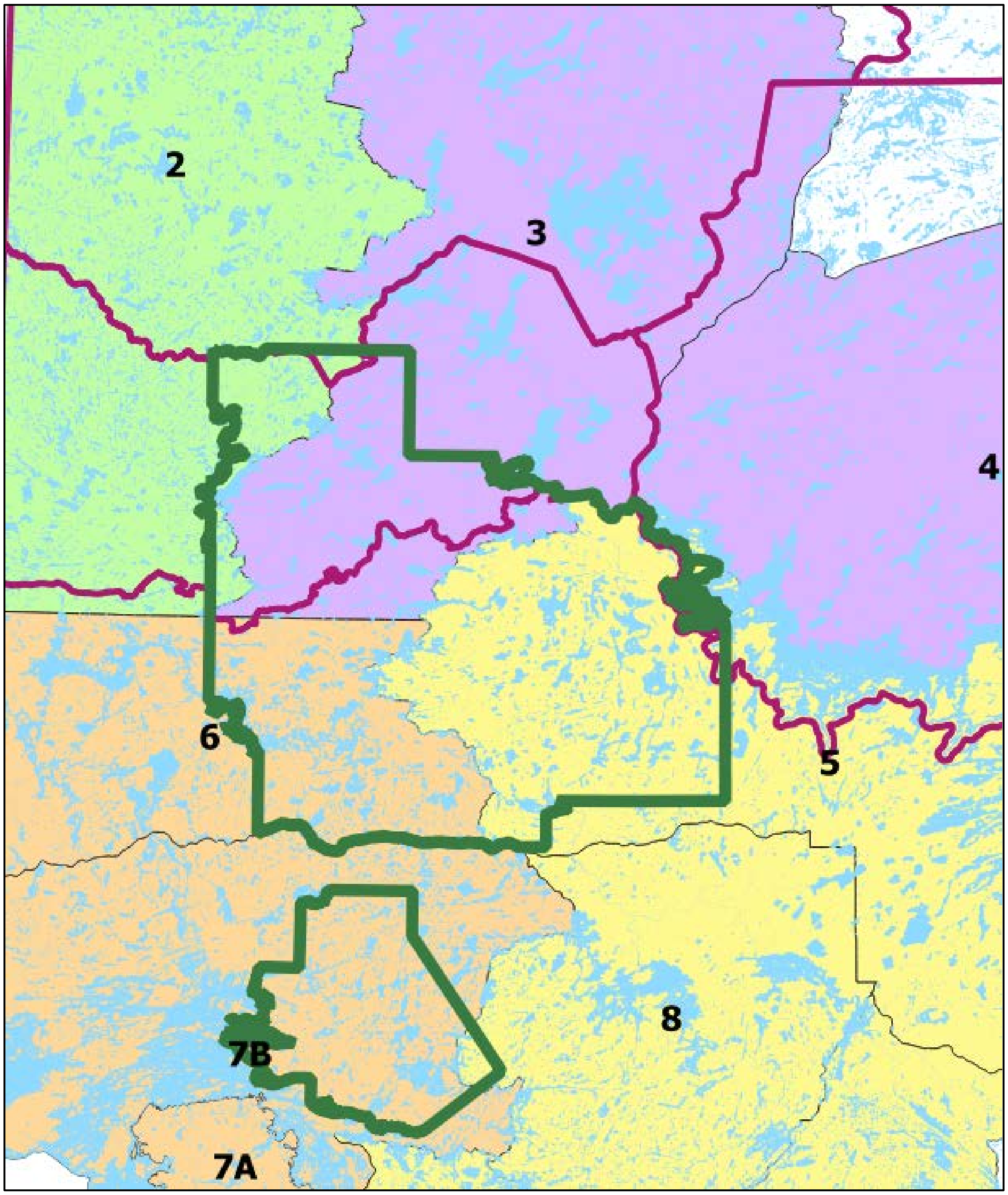


Figure 2. Cervid Ecological Zones and Wildlife Management Units overlapping the Whiskey Jack Forest.

The habitat direction provided for CEZs A, B, C1 and D1 in the CEF indicates how deer habitat should be considered in forest management planning. For CEZs A, B and C1, deer habitat management should not be emphasized. This includes the portions of the Whiskey Jack Forest overlapping WMUs 2, 3, 5 and 8. The direction for CEZ D1 alternately indicates 'deer habitat management should be emphasized, particularly provisions of winter deer concentration habitat in the most western portions of the Zone.' This direction would apply to those portions of WMUs 6 and 7B that overlap the Whiskey Jack Forest.

1.2 Cervid Ecological Framework Overarching Population Guidance and Wildlife Management Unit Specific Population Densities and Objectives

Cervid Ecological Framework Overarching Population Guidance: Target deer densities vary by CEZ and are based on considering habitat areas alternately available to moose, caribou, deer, and elk and consider historical and current distributions of these species.

Table 1. Target deer population densities for WMUs overlapping the Whiskey Jack Forest.

WMU	CEZ	Target deer density	CEF Deer Habitat Management Guidance
2	A	Low	Not emphasized
3	B	Low	Not emphasized
5	C1	Low	Not emphasized
6	D1	Moderate	Emphasize
7B	D1	Moderate	Emphasize
8	C1	Low	Not emphasized

Based on CEF direction that only certain CEZs should have deer habitat management emphasized, only WMUs from CEZ D1 were considered for DEAs in the Whiskey Jack Forest 2024 FMP.

Deer seen per hunter day estimates from WMUs 6 and 7B inform how habitat management, through forestry, should be considered in meeting population objectives. Trends in deer seen per hunter day indicate that population levels are below the moderate level with these WMUs becoming progressively limited for harvest opportunities through the licensed harvest system. Reduced deer numbers in WMUs 6 and 7B have been evident based on hunter postcard data received since 2013 where, at least back to 1999, population levels were mainly within the population objective range or above. This reduction in the deer population since 2013, for both WMUs 6 and 7B, is based on severe winters which served to reduce deer numbers in these WMUs. Additional severe winters in 2017-2018 and 2021-2022 served to upset the potential for population recovery resulting in a continuation of low deer numbers.

2.0 Deer Population and Habitat Considerations on the Whiskey Jack Forest

Annual deer seen per hunter day estimates provide information on deer population numbers. The evaluation of deer winter habitat includes the use of aerial survey techniques to identify deer winter habitat and the use of annual snow depth indices to assess winter severity. Past direction regarding the DEA from the 2012 Whiskey Jack Forest FMP is also considered.

2.1 Deer Winter Habitat Surveys

Specific deer winter habitat survey protocols were used in identifying deer winter habitat. Those winter habitat areas which have the highest deer densities are Stratum 1 areas, or ‘deer yards’ whereas areas which see consistent deer use but at lower densities are Stratum 2. Based on completed deer winter habitat surveys, a substantial area of the Whiskey Jack Forest has been surveyed and assigned into strata (Figure 3).

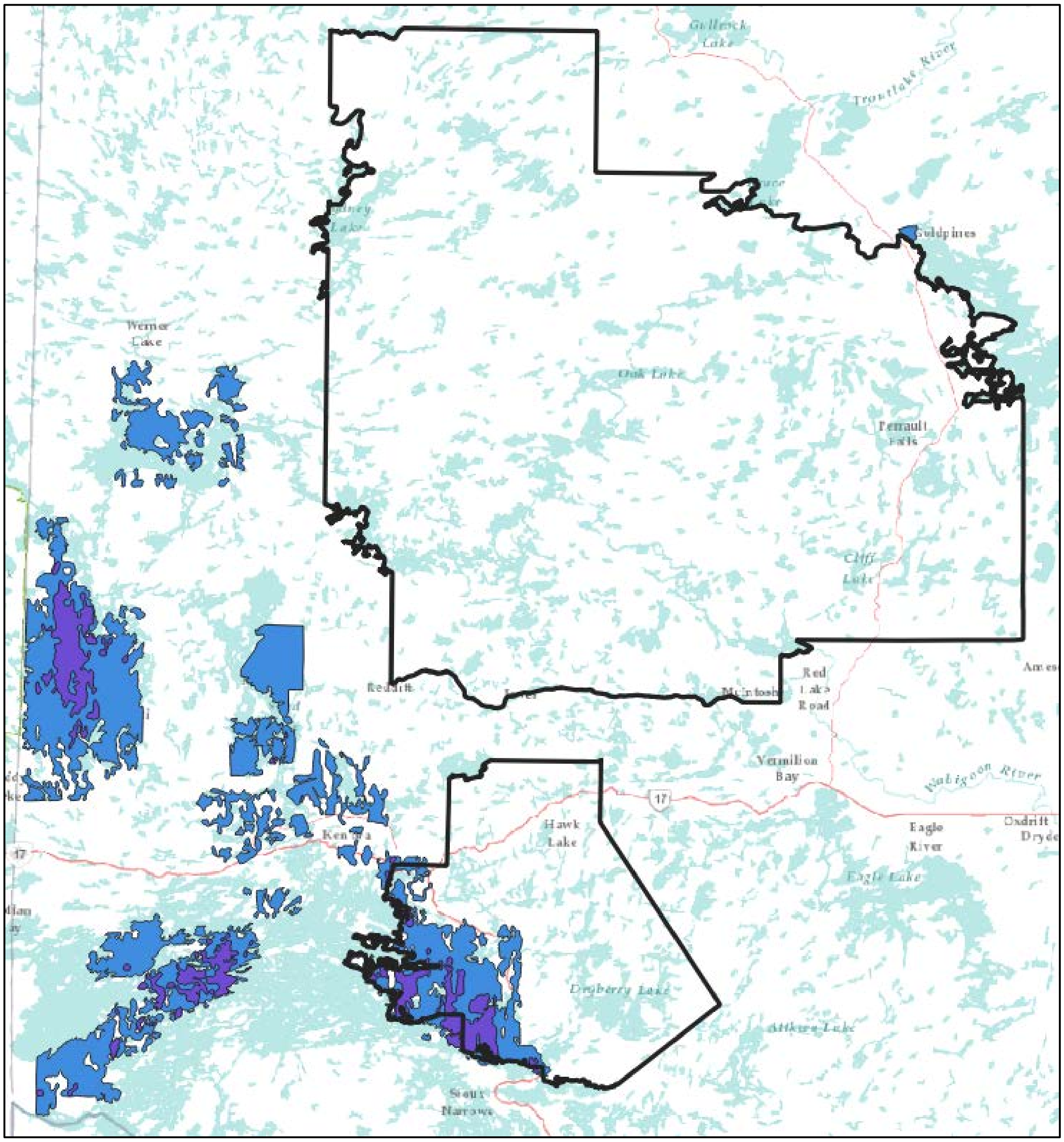


Figure 3. Identified deer winter areas in the Whiskey Jack Forest. Purple shading indicates areas that are Stratum 1 habitat areas and blue shading indicates Stratum 2 habitat areas.

Based on deer winter habitat surveys, those sections of WMU 7B which overlap the Whiskey Jack Forest are more prevalent for deer wintering areas in comparison to the portions of WMU 6 which overlap (and where no deer wintering areas were recorded).

2.2 Snow Depth Index Readings

The Snow Depth Index (SDI) provides a measure of how ably white-tailed deer can move about in the winter months to find food. The SDI provides a cumulative annual total of snow accumulation occurring at set monitoring locations. These totals are frequently compared between years to assess trends in deer populations where mean calf-cow ratio and the percentage of twins among calf-cow groups in winter are inversely proportional to snow-depths the previous winter (MNRF 1997a).

Based on measured annual SDI totals, winters are classified into three categories based on snow depth:

SDI < 590 = mild winter

SDI between 591 – 760 = moderate winter

SDI > 760 = severe winter

Over the past 20 years, SDI readings from WMU 7B indicate fluctuations in winter severity. Those winters where calculated SDI was over 760 are associated with deer population declines relative to winters where only moderate to mild snow depths are encountered. The winter of 2022-2023 was considered moderate at the time this report was produced (May 18, 2023). This was a welcome change from the winter of 2021-2022 where snow depths ranked as severe and Kenora District undertook an emergency deer feed program which targeted Stratum 1 and Stratum 2 areas in the Whiskey Jack Forest, as well as identified locations in the Kenora Forest.

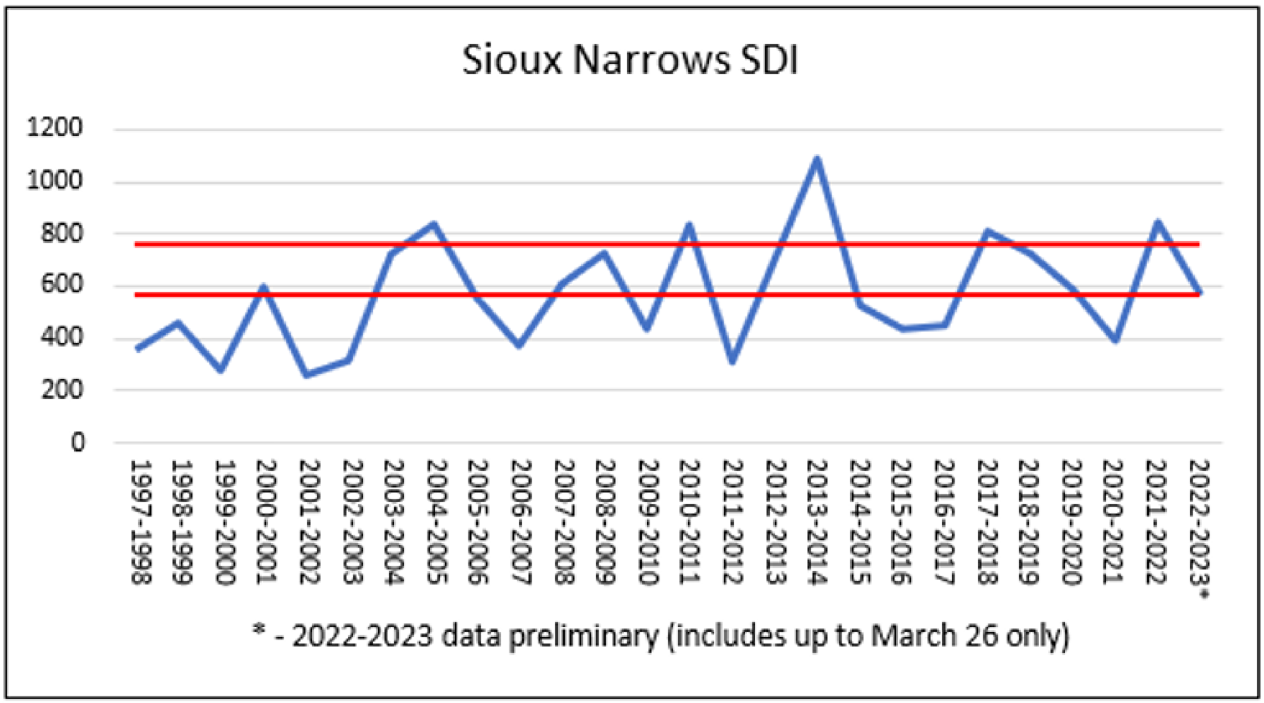


Figure 4. Snow Depth Index range for WMU 7B from 1997/1998 to 2022/2023 based on measurements taken at the Sioux Narrows snow station.

2.3 Deer Emphasis Area in place for 2012 Whiskey Jack Forest Management Plan

Completed deer winter habitat surveys in the Whiskey Jack Forest indicate a localized deer concentration area east of Lake of the Woods and west of Highway 71. The identification of Stratum 1 and Stratum 2 habitat formed the basis for the 2012 Whiskey Jack Forest FMP DEA and is the basis for the 2024 Whiskey Jack Forest FMP DEA also.

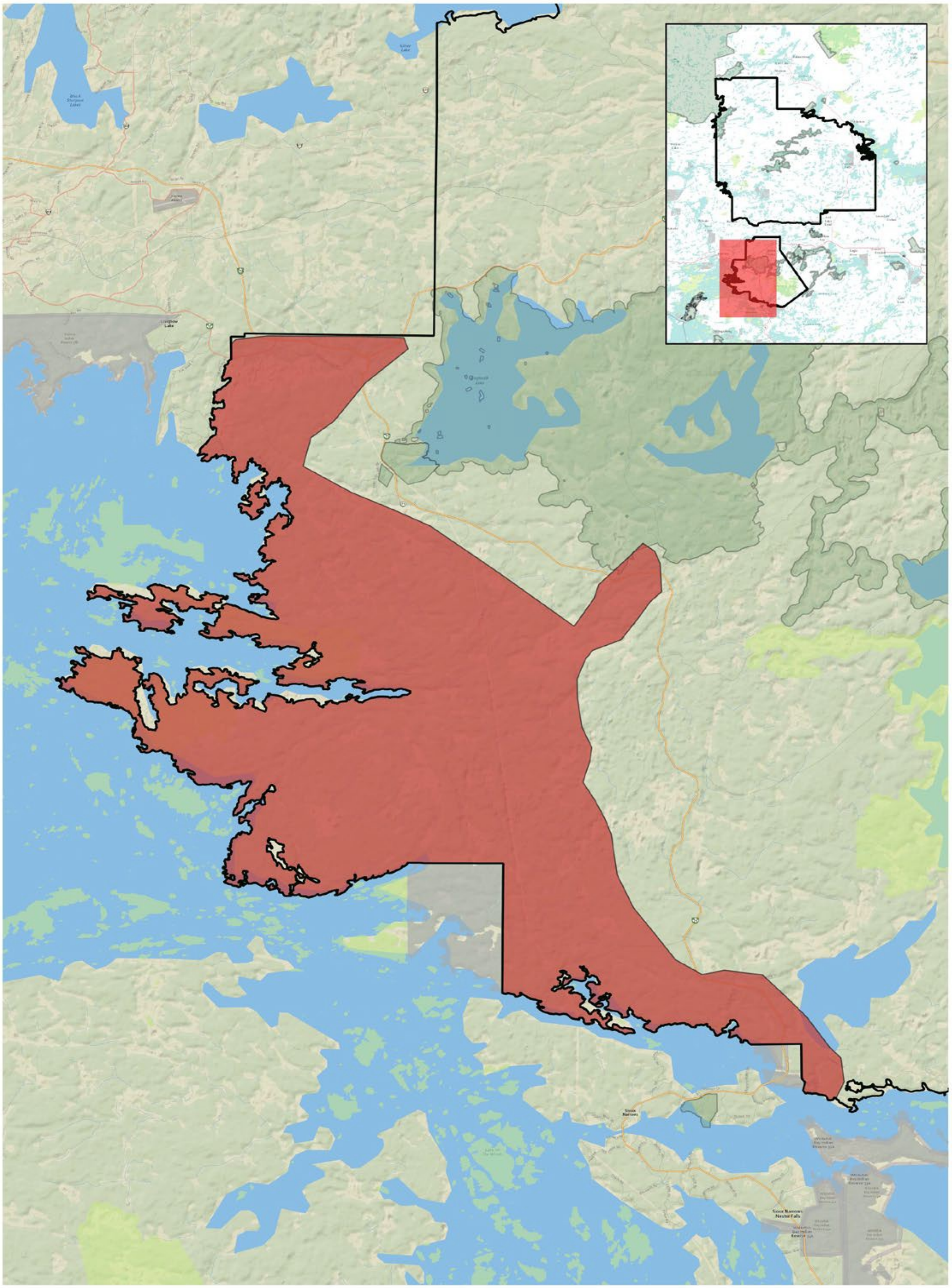


Figure 5. Delineated Deer Emphasis Area used in the 2012 Whiskey Jack FMP.

3.0 Assessment of Critical Thermal Cover in the Whiskey Jack Forest 2024 Deer Emphasis Area

As per direction provided in the S&SG, an evaluation of Critical Thermal Cover (CTC) was evaluated within Stratum 1 habitat. This calculation was done to delineate which stands would be maintained as CTC during the 2024-2034 plan period.

3.1 Whiskey Jack Forest 2024 Deer Emphasis Area

The delineation of the 2024 DEA in the Whiskey Jack Forest is based on the area of overlap between identified Stratum 1 and 2 habitat and digital forest stand boundaries present in the Whiskey Jack Forest planning inventory (Figure 6).

3.2 Calculation of Critical Thermal Cover

Critical thermal cover estimates are based on direction provided in the S&SG to maintain 10 - 30% of Stratum 1 area based on a target associated with deer habitat management strategies for an area in question i.e., overlapping WMU and CEZ objectives. The queries identified in Table 3 were used to identify stands categorized as Stratum 1 as being of varying quality as deer winter cover. The queries prioritize mature conifer stands with heights > 10 m and dense stocking. In this model, those conifer-dominated stands selected for most strongly by deer were balsam fir, cedar and white spruce followed by black spruce and white pine and lastly red pine and jack pine.

Forest stands within the DEA were ranked on a scale of one to ten based on their quality as CTC. Those stands assessed as a 'one' were identified as 'Access Cover,' stands scored as two through four were considered 'Moderate Cover' and stands assigned five through ten were considered 'Severe Cover' (Figure 7). A score of zero is also possible based on stands occurring within the DEA but not screening into the calculation of CTC e.g., stands below 10 m tall.

Table 3. Queries used in the identification of Critical Thermal Cover (CTC) in Stratum 1 habitat for the 2024 Whiskey Jack Forest Deer Emphasis Area.

Critical Thermal Cover calculated based on stands over 10 m tall with portions of conifer stands within each forest unit considered in assessing access (class 1), moderate (class 2-4) and sever (class 5-10) winter cover
Grp1 = ("stkg" * "bf") + ("stkg" * "sw") + ("stkg" * "cw") Grp2 = Grp1 + ("stkg" * "sb") + ("stkg" * "pw") Grp3 = Grp1 + Grp 2 + ("stkg" * "pr") + ("stkg" * "pj")
CovRank 1 = "Ht" >= 10.0 And Grp3 >= 0 CovRank 2 = "Ht" >= 10.0 And Grp3 >= 30 CovRank 3 = "Ht" >= 10.0 And Grp2 >= 30 CovRank 4 = "Ht" >= 10.0 And Grp1 >= 30 CovRank 5 = "Ht" >= 10.0 And Grp3 >= 60 CovRank 6 = "Ht" >= 10.0 And Grp3 >= 60 And Grp2 >= 30 CovRank 7 = "Ht" >= 10.0 And Grp3 >= 60 And Grp2 >= 60 CovRank 8 = "Ht" >= 10.0 And Grp3 >= 60 And Grp2 >= 30 And Grp1 >= 30 CovRank 9 = "Ht" >= 10.0 And Grp3 >= 60 And Grp2 >= 60 And Grp1 >= 30 CovRank 10 = "Ht" >= 10.0 And Grp3 >= 60 And Grp2 >= 60 And Grp1 >= 60

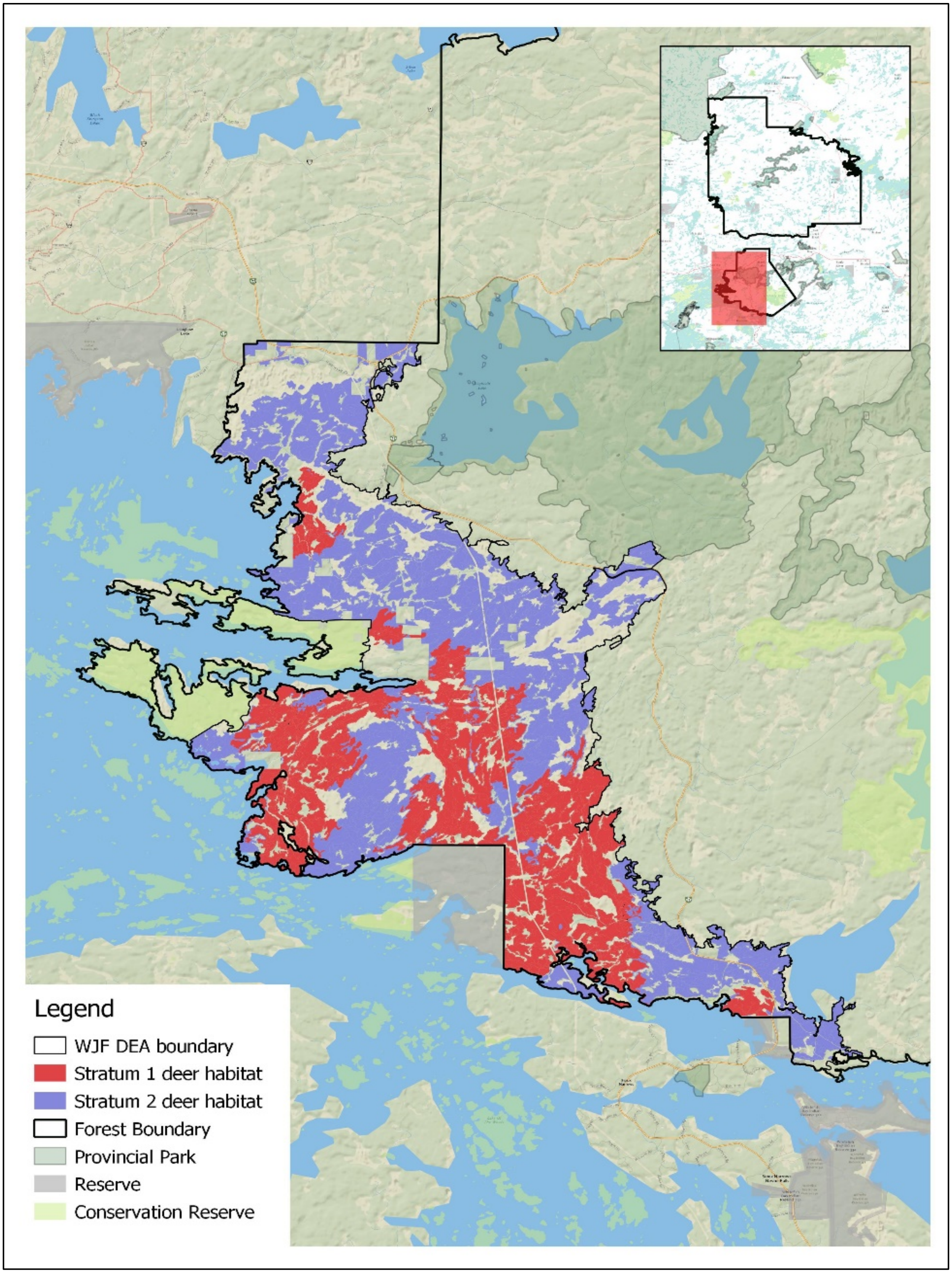


Figure 6. Forest stands of Crown Ownership inside the 2024 Whiskey Jack Forest Deer Emphasis Area.

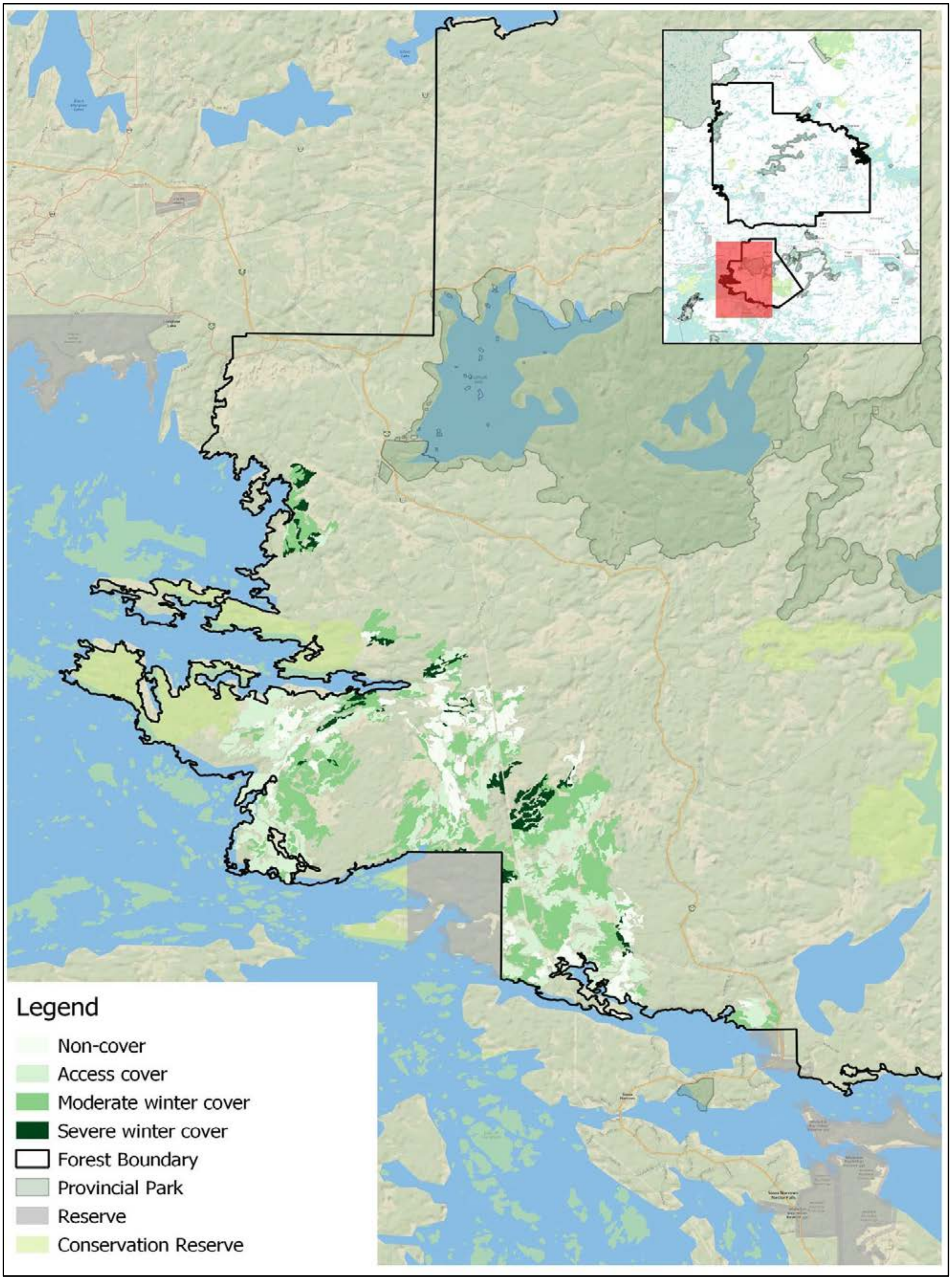


Figure 7. Critical Thermal Cover in Stratum 1 areas of 2024 Whiskey Jack FMP Deer Emphasis Area.

Calculation of CTC by class indicated 5004 ha, or 49.4% of Stratum 1 area, as CTC of Class 2-10 (Table 4). This amount is more than the maximum amount that is to be retained based on the S&SG (30%). Consideration of moderate CTC is based on those stands falling into classes 2-4 and makes up 4311 ha, or 42.5%, of forested stands in Stratum 1. Severe CTC, based on classes 5-10, amounts to 693 ha or 6.8% of forested stands in Stratum 1. The preference is for maintaining severe CTC which provides better canopy closure or is otherwise preferred by deer for use as thermal cover.

Table 4. Calculated Critical Thermal Cover in the 2024 Whiskey Jack Forest Deer Emphasis Area. Critical Thermal Cover calculated based queries used to apportion conifer-dominated stands over 10m tall as providing winter habitat using a zero-to-ten scale.

Cover Category	**Cover Class**	**# of stands**		**Area of stands (ha)**	
		Number	%	Area	%
0	Non	434	15.5	1597	15.8
1	Access	1269	45.2	3535	34.9
2	Moderate	426	15.2	1780	17.6
3	Moderate	469	16.7	2126	21.0
4	Moderate	90	3.2	405	4.0
5	Severe	53	1.9	389	3.8
6	Severe	2	0.1	18	0.2
7	Severe	25	0.9	59	0.6
8	Severe	6	0.2	34	0.3
9	Severe	5	0.2	19	0.2
10	Severe	30	1.1	174	1.7
TOTAL		2809	100.0	10136	100.0
Class 2-4	Moderate	985	35.1	4311	42.5
Class 5-10	Severe	121	4.3	693	6.8
Class 2-10	Various	1106	39.5	5004	49.4

3.3 Identification of Critical Thermal Cover Stands

Based on deer habitat management strategies applicable to WMU 7B, it was agreed by the Whiskey Jack Forest Planning Team on April 27, 2023 that 10-30% of Stratum 1 CTC (Classes 3-10) is the desirable level for this indicator for the 2024-2034 Whiskey Jack Forest FMP. The upper range of 30% amounts to 2977 ha of modelled moderate and severe CTC (CTC Classes 3-10). The preferred areas of CTC to be retained (Classes 3-10, greater forest cover) are as identified in Figure 8. The areas of severe CTC (Classes 5-10, 693 ha at Plan Start) are the highest priority for retention. Additional discussions during Stage 3: Operational Planning may refine those stands considered as CTC but the amount of moderate or severe cover retained is expected to be maintained at approximately 30% (CTC Classes 3-10). Operational planning to refine proposed harvest areas and planned road access in the DEA will consider location of preferred CTC stands and mitigate impact on preferred CTC where operationally feasible.

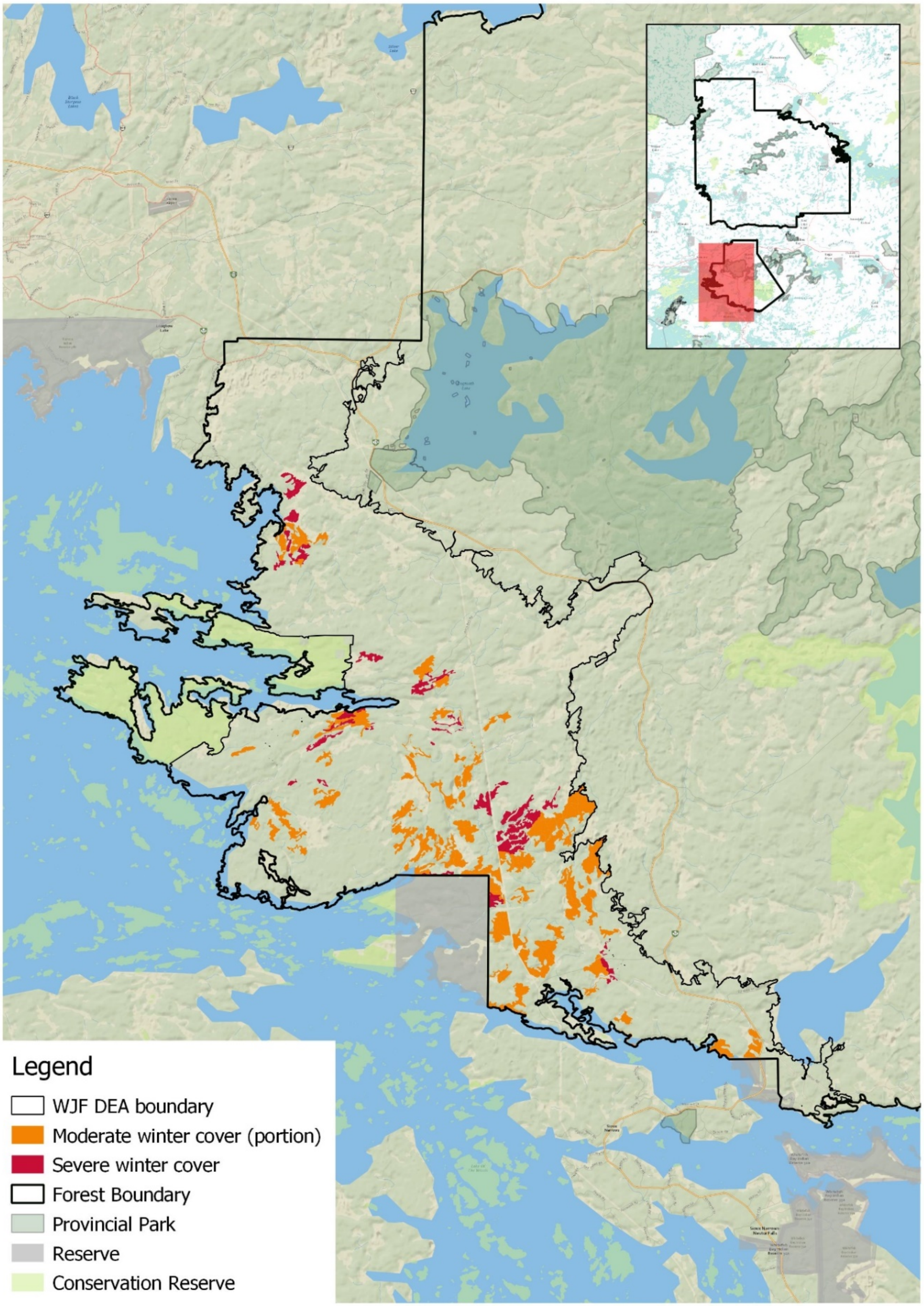


Figure 8. Preferred Critical Thermal Cover for retention in Whiskey Jack Forest 2024 FMP.

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Appendix 4

Large Landscape Patches for Mature and Old Forest

For the 2024 Whiskey Jack Forest FMP

Whiskey Jack Forest 2024-2034 FMP: Large Landscape Patches for Mature and Old Forest

Final May 11th, 2023

Introduction

Ontario applies a nested coarse and fine filter approach for managing Ontario's forests to meet wildlife habitat needs and to reflect society's ecological, social, and economic expectations. The coarse filter component creates a diversity of ecosystem conditions through space and time, in turn providing habitat for the majority of species. The texture of mature and old forest is a mandatory coarse filter indicator in the Forest Management Guide for Boreal Landscapes (BLG) used to characterize landscape pattern. Of the eight biodiversity indicator groups required for the Whiskey Jack Forest, texture of mature and old forest is fourth in the recommended order of application. Forest texture can influence species use of habitat at multiple scales, with some species preferring large patches with higher concentrations of mature and old forest and other species preferring patches with a low or moderate concentration of mature and old forest.

The texture of mature and old forest within a forest management unit is largely the result of past forest disturbances, including natural disturbance events and management activities such as harvesting in large or small contiguous areas. Texture of mature and old forest is evaluated at both the 500 ha and 5000 ha scale. These scales were chosen based on sizes of observed and simulated natural disturbances and their ability to capture the character of and describe the landscape.

Application of the Boreal Landscape Guide includes the following steps:

1. Measure the current forest condition using Landscape Guide indicators.

2. Use the inter-quartile-range (IQR) of the simulated range of natural variation (SRNV) as the forest management plan desirable levels for area-based indicators and the mean SRNV of texture classes for pattern-based indicators.

3. Develop targets for the Landscape Guide indicators that are consistent with movement within or towards the IQR.

4. Identify large landscape patches (LLPs) when required to meet targets for landscape pattern or habitat indicators.

Texture of mature and old forest is measured in Ontario's Landscape Tool (OLT) by using the Landscape Scripting Language (LSL) to build and overlay hexagons at the appropriate scales of measure. The tool reviews each hexagon and determines if it is forested (i.e., 50% or greater of the hexagon contains forest) and, if so, the proportion of the forested area that is mature or old. Ontario's Landscape Tool then generates a histogram of the hexagons, including several offsets, to represent the frequency of hexagons by 20% proportion classes of mature and old forest.

Forest management models currently approved for use in Ontario, including the Strategic Forest Management Model (SFMM), do not assess texture of mature and old forest in a comparable way to the SRNV. As a result, these models cannot balance progress toward the desirable levels of this indicator in the same way other plan indicators are balanced. The LLPs described in this section are tools used to address the texture of mature and old forest by exploring the strategic placement of harvest in some areas and deferral of harvest within selected areas of dense concentrations of mature and old forest.

The fourth step in the BLG application listed above is further elaborated on in the following mandatory guideline:

Planning teams will identify any large landscape patches (LLPs), using a strategic landscape map, that may be required to meet targets created for Landscape Guide pattern or habitat indicators (e.g., texture of the mature and old forest matrix, young forest patch size, woodland caribou habitat), and allow for the efficient implementation of other guides (e.g., Stand and Site Guide) (guideline).

Large landscape patches were considered for use by the forest management planning team to achieve various landscape objectives across the forest, including the amount and arrangement of mature/old forest, habitat emphasis for various species, and ensuring a sustainable mix of age classes and forest units across the landscape. This was in recognition of the harvesting constraints already existing on the land base including the No Harvest Area, 2 large Protected Areas, and a Deer and 3 Moose Emphasis Areas. In the continuous caribou distribution, the Dynamic Caribou Habitat Schedule (DCHS) serves as a contiguous set of large landscape patches for the area that addresses caribou habitat texture as well as the texture of mature and old forest (see section 5.2 of the analysis package, and Appendix 1c). South of the continuous caribou distribution, large landscape patches were identified where feasible to address the texture of mature and old forest. These large landscape patches also have potential to address the young forest patch size indicator.

Current Status of Texture of Mature and Old Forest

As recorded in Table FMP-10, and discussed in text section 3.6.2, the texture of mature and old forest at plan start (2024) is above the mean of the SRNV for the 81-100% concentration class as well as for the 61-80% concentration class at both the 500 ha and 5000 ha scales. The 1-20% concentration classes are below the SRNV mean and the 41-60% concentration classes are above the SRNV mean at both scales. Movement toward the mean of the SRNV would be beneficial for the 1-20% and 41-60% concentration classes, while maintaining the achievement of the 61-100% concentration classes.

The LTMD Task Team acknowledged that application of LLPs in the FMP could help to address the achievement of the texture of mature and old forest indicator through time. The LTMD Task Team first identified candidate areas for mature and old forest, with a focus on identifying areas that contribute to the 61-100% concentration classes in the short to medium-terms. Areas were also identified with considerations for the potential to create patches that would contribute to the 1-20% concentration class. However, the young forest patch size indicator is expected to be addressed primarily through operational planning.

Scoping of Candidate Large Landscape Patches

To identify areas contributing to the >60% concentration classes for texture of mature and old forest over the short and medium terms, OLT was used to evaluate the management unit at both the 500 ha and 5000 ha scales for plan start (2024), plan end (2034) as well as 20 years (2044) and 30 years (2054) into the future, assuming no harvest/disturbance and without applying succession rules (i.e., only aging the inventory). These results assisted in identifying the location of the various texture classes within the management unit. In addition, they provide a visualization of areas that contribute to the densest mature and old forest texture classes (>60%) over the short to medium terms. See Figure 1 for an illustration of some of the results examined.

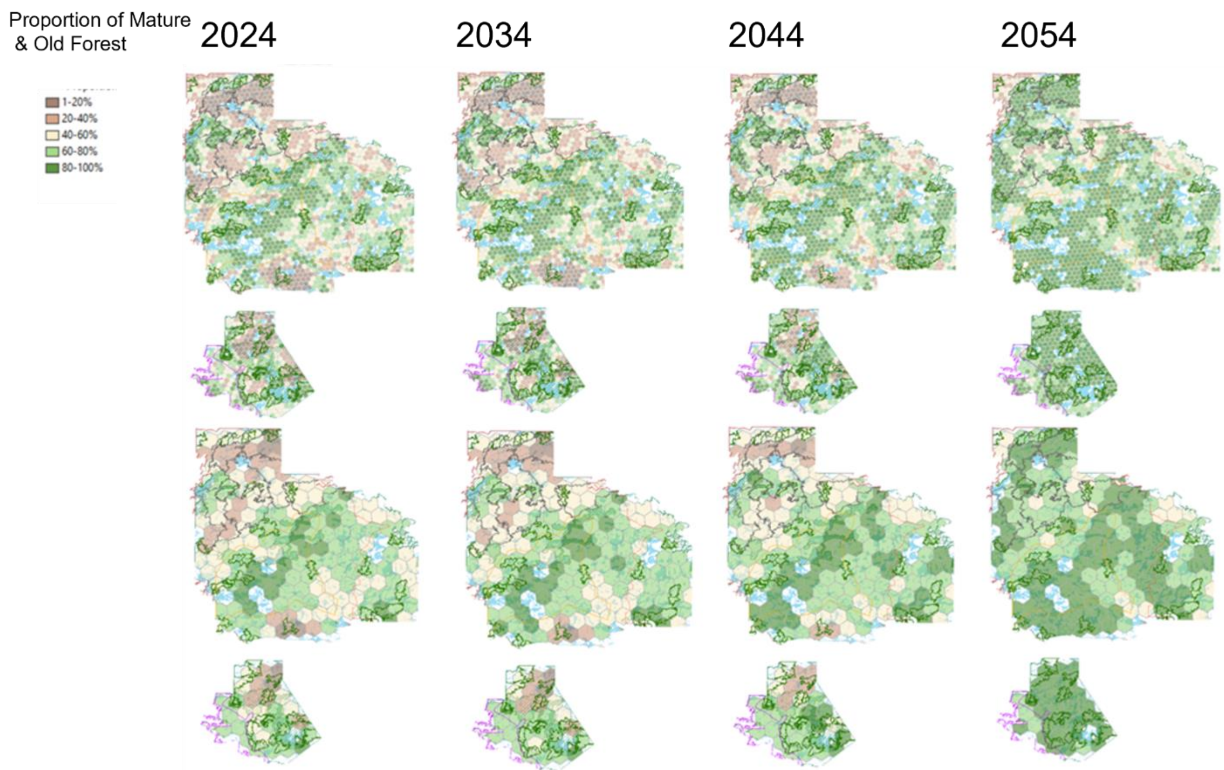


Figure 1: Exported hexagon shapefiles from Ontario’s landscape tool using a draft Base Model Inventory for the 2024 Whiskey Jack Forest Management Plan, assuming no harvest or succession rules applied to 2034-2054 projections.

Outputs of Ontario's Landscape Tool are usually sufficient to identify the various texture concentration classes, however, the hexagon or isopleth outputs from OLT are too coarse to use for fine-scale delineation of LLPs. To attain a better product to base the delineation of LLPs on, individual stands were identified by their landscape class, as defined in the Boreal Landscape Guide. The stands that were classified as mature and late landscape classes could quickly be identified separately from the immature and presapling/sapling landscape classes. In addition to identifying which stands are currently mature, stands which were currently immature but within 20 years of the age of maturity were highlighted for the delineation exercise. Identifying stands by their individual landscape class allowed for the easy identification of potential LLPs to address the texture of mature and old forest (see example in Figure 2, and full map in Appendix 1). Because the texture of mature and old forest is measured at the 500 and 5,000 ha scales, LLPs used to address mature and old forest were also delineated to at least 500 to 5,000 ha or greater in size.

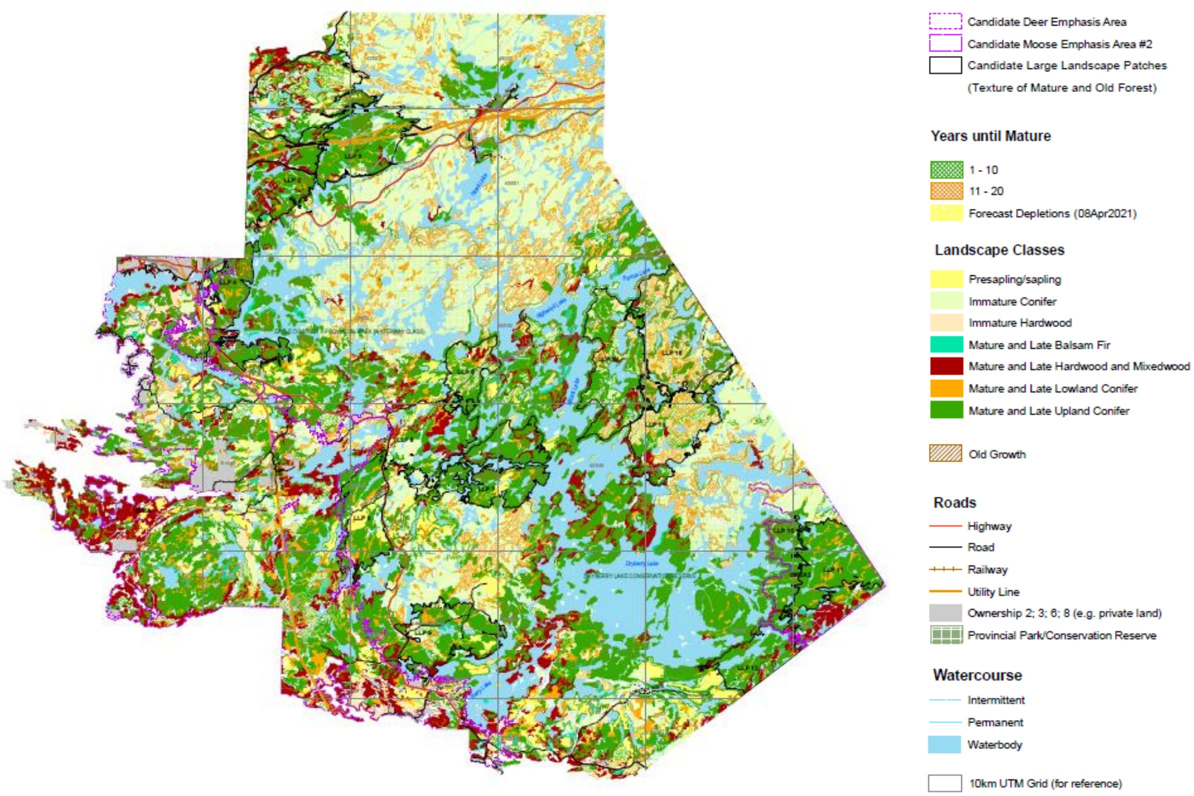


Figure 2: Landscape classes in the southern portion of the Whiskey Jack Forest, overlaid with draft candidate LLPs

Using the approach described, forty (40) candidate LLPs were identified and delineated across the Whiskey Jack Forest (Figure 4). As a result of the pause in LTMD in 2021, a full scoping of these candidate LLPs for mature and old forest was never completed in its entirety by the LTMD Task Team, and it was essentially viewed as a maximum scenario that was never fully reviewed, supported, or endorsed by the LTMD Task Team or Planning Team.

As well, an earlier, more descriptive version of this document, developed prior to the pause in planning, presented two scoping scenarios with timing that included all candidate LLPs in the southern portion of the Whiskey Jack Forest (Figure 3). These two scenarios were intended to be used in scoping once a working base model was obtained. As well, additional scenarios were expected to be explored and it was thought that these would inform the final selection of LLPs based on the balance of objective achievement.

Since that time, following the long pause in planning as a result of the No Harvest Area boundaries being revisited, a much different approach was needed to be taken by the LTMD Task Team, that involved quickly and confidently selecting only a few of the candidate LLPs to contribute to the mature and old forest indicator prior to modeling and adjusting following base model runs if indicator achievement was not being met. With numerous harvesting constraints already existing on the Forest (e.g., No Harvest Area, DCHS, 2 large Protected Areas), and many of these already contributing significantly to the old and mature forest indicator, the task team agreed that only a few LLPs strategically placed on the Forest were needed to obtain achievement of the old and mature forest indicator, and to aid in good spatial distribution of old and mature forest across the Forest. This would also allow for a balance of available harvesting area on the Whiskey Jack Forest to remain unconstrained and not specifically tied up in deferrals.

For this reason, this document is a downsized version of the original that includes a more realistic scoping scenario agreed to by the entire LTMD Task Team, and of which would be included in the base model runs for indicator achievement.

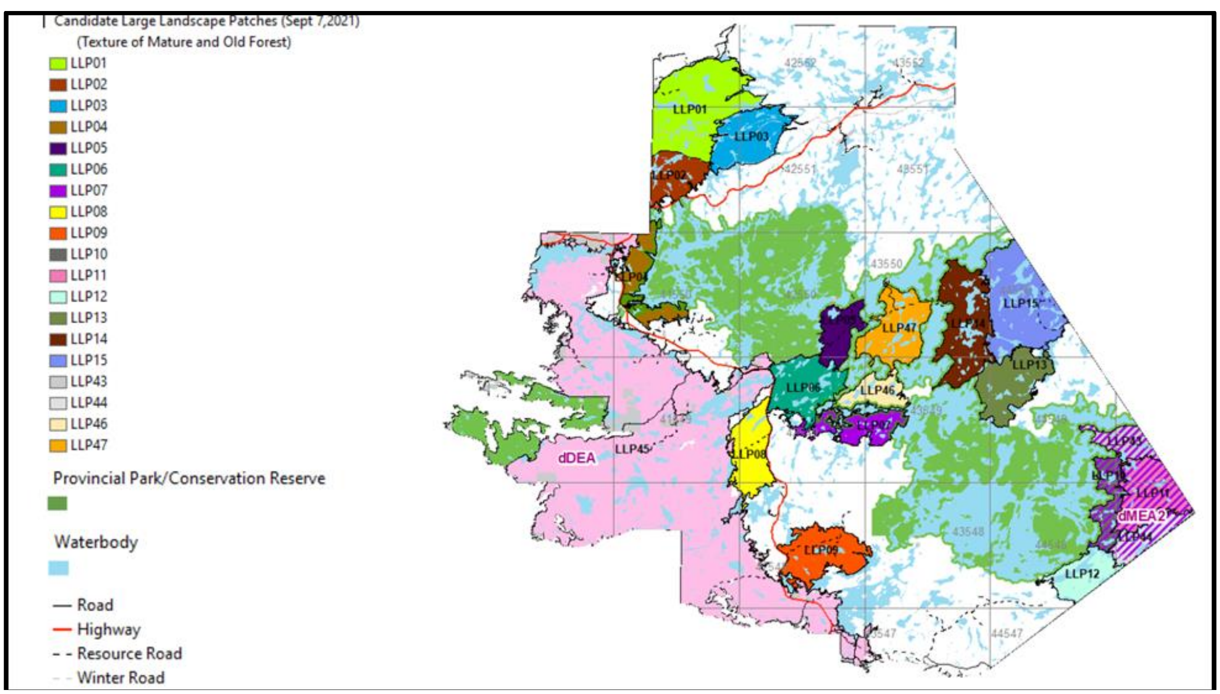


Figure 3. Candidate large landscape patches for the southern part of the Whiskey Jack Forest (2024-2034 Forest Management Plan).

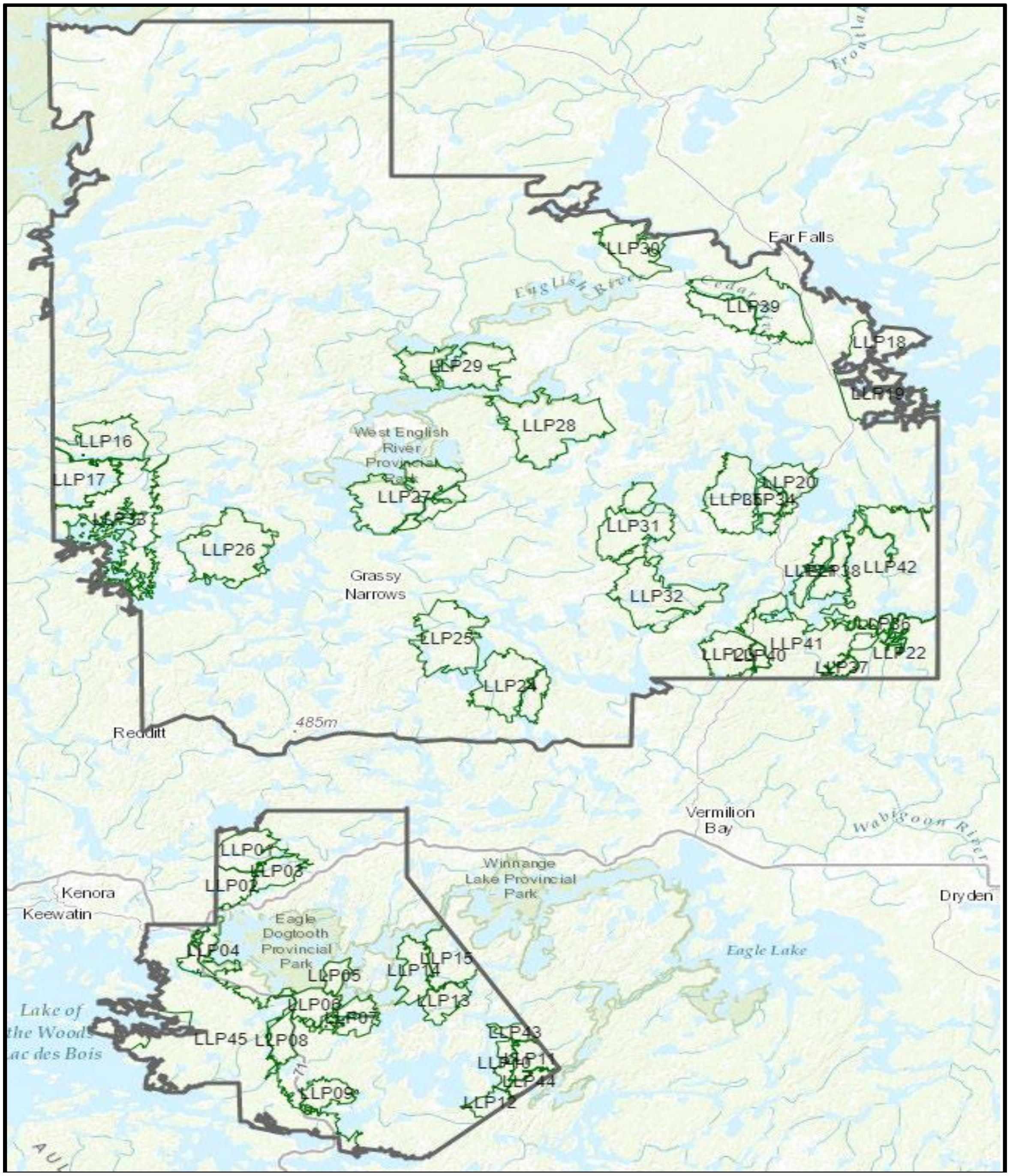


Figure 4. Map of the forty candidate large landscape patches for mature and old forest for the 2024-2034 Whiskey Jack Forest Management Plan.

Selection of Old/Mature Large Landscape Patches for the 2024 Whiskey Jack FMP

Once planning for the Whiskey Jack Forest resumed following the approximately 1.5 year pause, the Long Term Management Direction Task Team reconvened and the work done previously to identify candidate LLPs was reviewed. Recognizing that the No Harvest Area covered a significant proportion of the landbase in the northern portion of the Forest, the Task Team agreed they would limit their recommendation to a minimum number of LLPs given both the No Harvest Area and DCHS would contribute significantly over the short and long terms to acheivement of the old and mature forest indicator. Only one LLP from the northern portion of the Forest was chosen and was advanced in modeling. Prior to the pause in planning, this LLP was numbered '22', but is now known as LLP 3.

LLP 3 is situated at the very southeastern-most corner of the northern portion of the Whiskey Jack Forest and is approximately 6,723 ha in size when all polytypes are included (i.e., Forest, Bush, Open Muskeg, and Water). Almost 60% of the LLP has been harvested in the last 10 to 20 years, and the remainder of the merchantable wood is planned for harvest during the first 10 years of the 2024 Whiskey Jack FMP. Following the ten-year plan, the LLP will be left to grow for a minimum of 6 terms, and it is expected that the LLP will be reasonably even-aged as it grows into one large intact patch over those terms. It is expected that LLP 3 will provide a large and intact patch of old and mature forest for those wildlife species dependent upon it in about 5 or 6 terms.

In the southern portion of the Whiskey Jack Forest, a similar scoping exercise took place to determine a realistic and feasible number of LLPs that could be advanced in modeling to contribute to the old and mature forest indicator. The LTMD Task Team reviewed the placement of the approximately 15 candidate LLPs in the southern portion of the Forest and discussed the feasibility and limitations of each of these being advanced in the modeling. Although the advancement of every candidate LLP on the Forest was considered, there were circumstances present which prevented them from realistically being able to be formalized and maintained as old and mature LLPs.

For example, there are tourist outpost camps or other existing incompatible land uses located within some of these LLPs which made them unsuitable for long-term defferal as intact blocks, mainly due to social and socioeconomic reasons. The task team felt that maintaining other candidates as old and mature LLPs did not make sense given their proximity to high development and/or activity and potentially lessened value to wildlife. Lastly, it was not realistic to advance all LLPs into modeling and formalize these as this could sacrifice the acheivement of wood volume and other economic-based objectives. In addition to this, a large proportion of the available wood in the southern portion of the Whiskey Jack Forest is secured in 2 large Protected Areas (i.e., Rushing River Provincial Park and Dryberry Lake Conservation Reserve) or is constrained to a certain extent in Deer and Moose Emphasis Areas. As a result, the task team carefully and thoughtfully chose only two LLPs in the south to contribute to the mature and old forest indicator and advance these through modeling.

LLP 1, previously known as LLP '13', and LLP 2, previously known as LLP '15' were the two LLPs chosen in the south to strategically contribute to the mature and old forest indicator. Both of these LLPs are located along the central-eastern boundary of the southern Whiskey Jack Forest, just north of the Dryberry Lake Conservation Reserve and east of Rushing River Provinical Park. LLP 1 is just under 2,300 ha in size when all polytypes are included. About 65% of the forested area in LLP 1 is still in an immature state and requires time to develop into mature and old forest. Therefore, the task team agreed to defer harvesting in this LLP for two full terms to facilitate this area being harvested all at once in the third term to then be left to mature once again as a large, intact, even-aged patch.

Similarly, LLP 2, just over 4,000 ha in size, has approximately 65% of its forested area in an immature condition. The task team recognized the benefit of deffering harvest in this patch for two terms as well, to bring the immature portion to a mature and old condition similar to the remaining forest in this patch. Again, once this patch has harvest initiated and completed in about three terms, it will be left to matrue as a large, intact even-aged patch, too.

These scenarios identify the management intent for each LLP, and are intended to be used in scoping once a working base model is obtained. The task team remains open to exploring additional scenarios if needed to inform the final selection of LLPs based on the balance of objective achievement. The number of terms without harvest in LLPs was assigned in accordance with the composition and age of the LLP and included operational considerations. Figure 5 shows the location of the three selected mature and old LLPs in relation to the other strategic and operational management zones on the Whiskey Jack Forest. Appendix 1 shows the Whiskey Jack Forest Inventory by Landscape Class, in relation to the use of this mapping in assisting with the delineation of large landscape classes. Appendix 2 contains the fact sheets with landscape class composition and time to maturity specifications for each of the three selected LLPs for the 2024 Whiskey Jack FMP.

Table 1. Deferral scenario for each of the 3 selected LLPs for the 2024 Whiskey Jack FMP.

Large Landscape Patch	Deferral	Harvest
LLP1	T1, T2	T3
LLP2	T1, T2	T3
LLP3	T2, T3, T4, T5, T6, T7	T1, T8

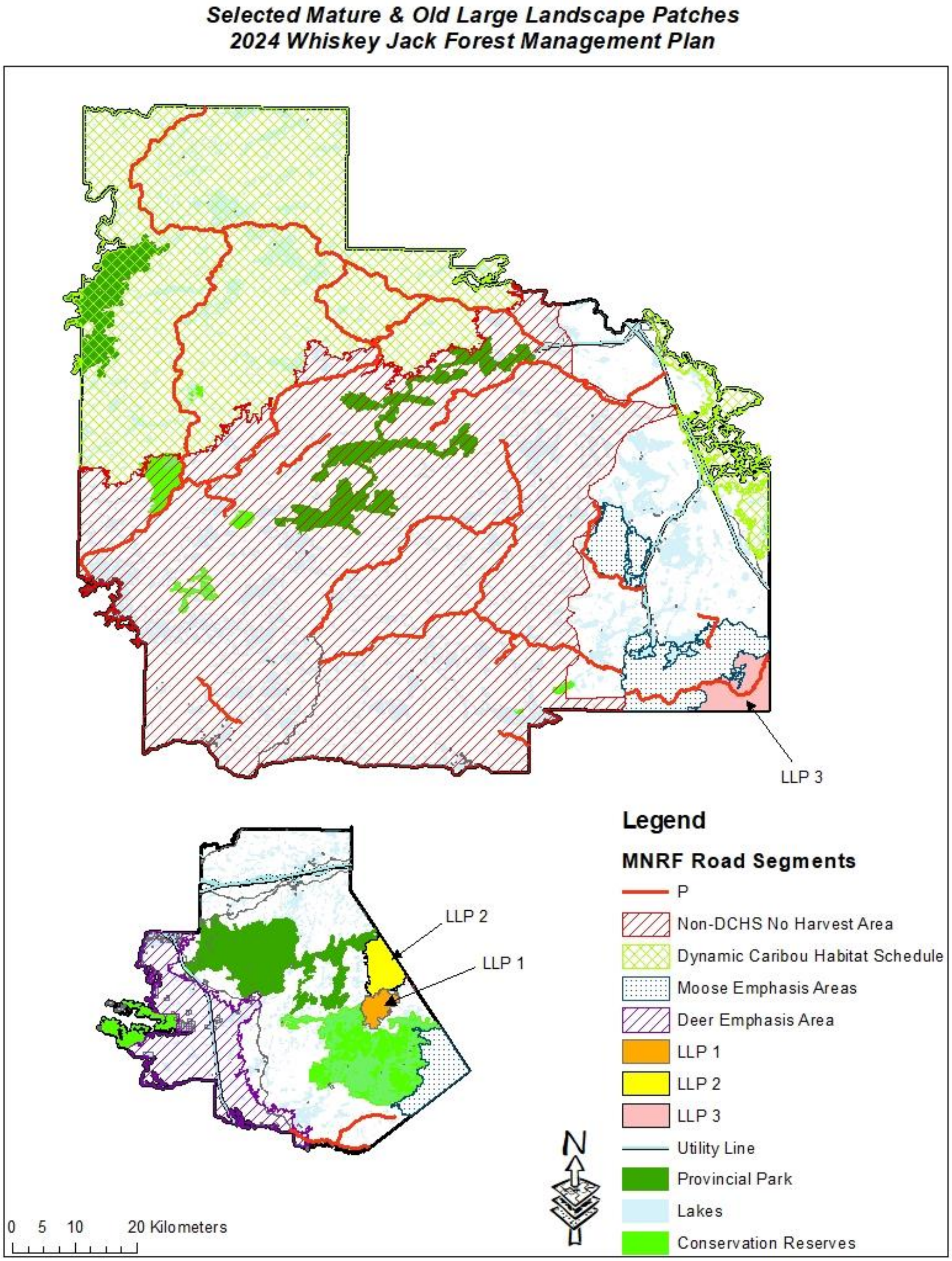
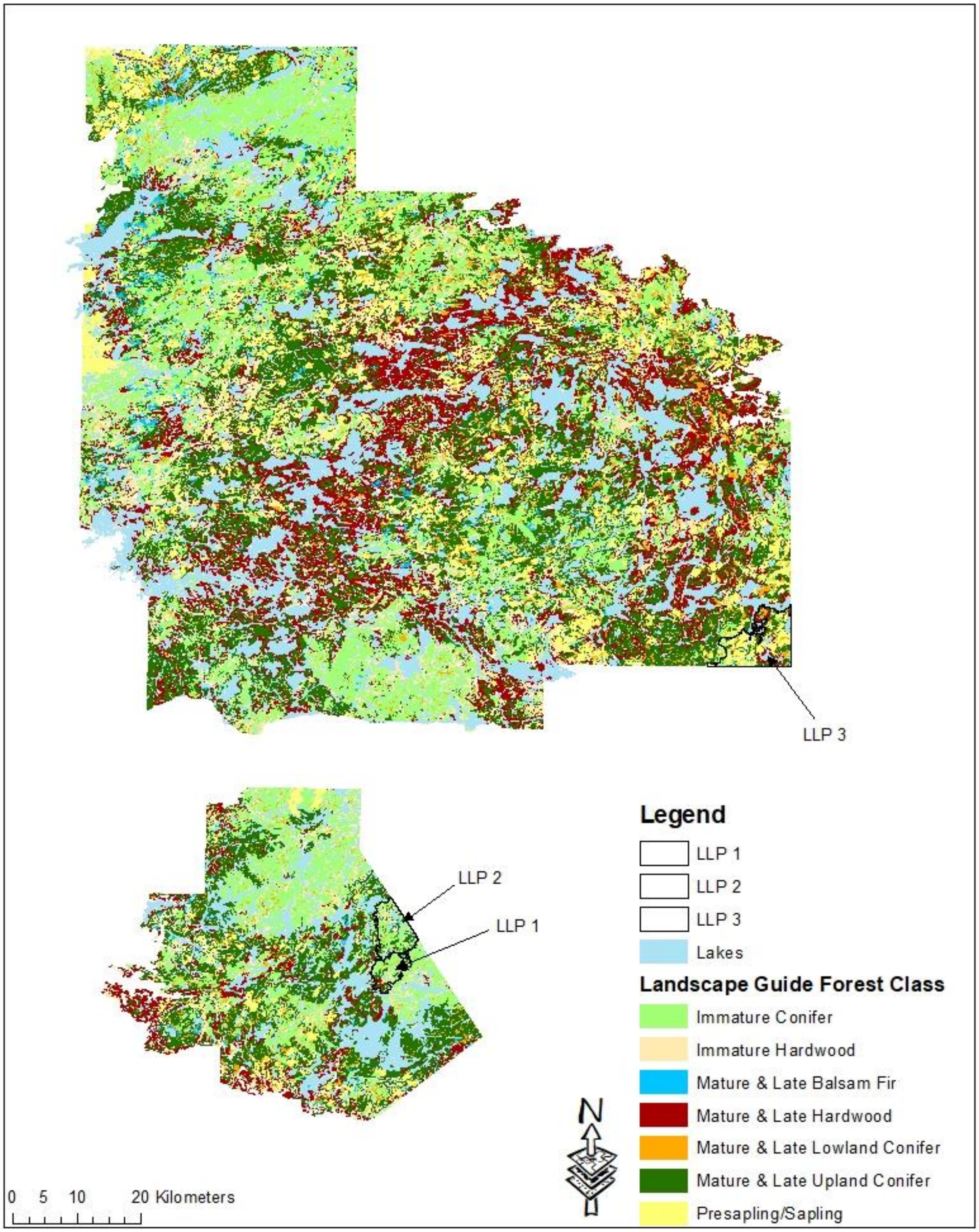
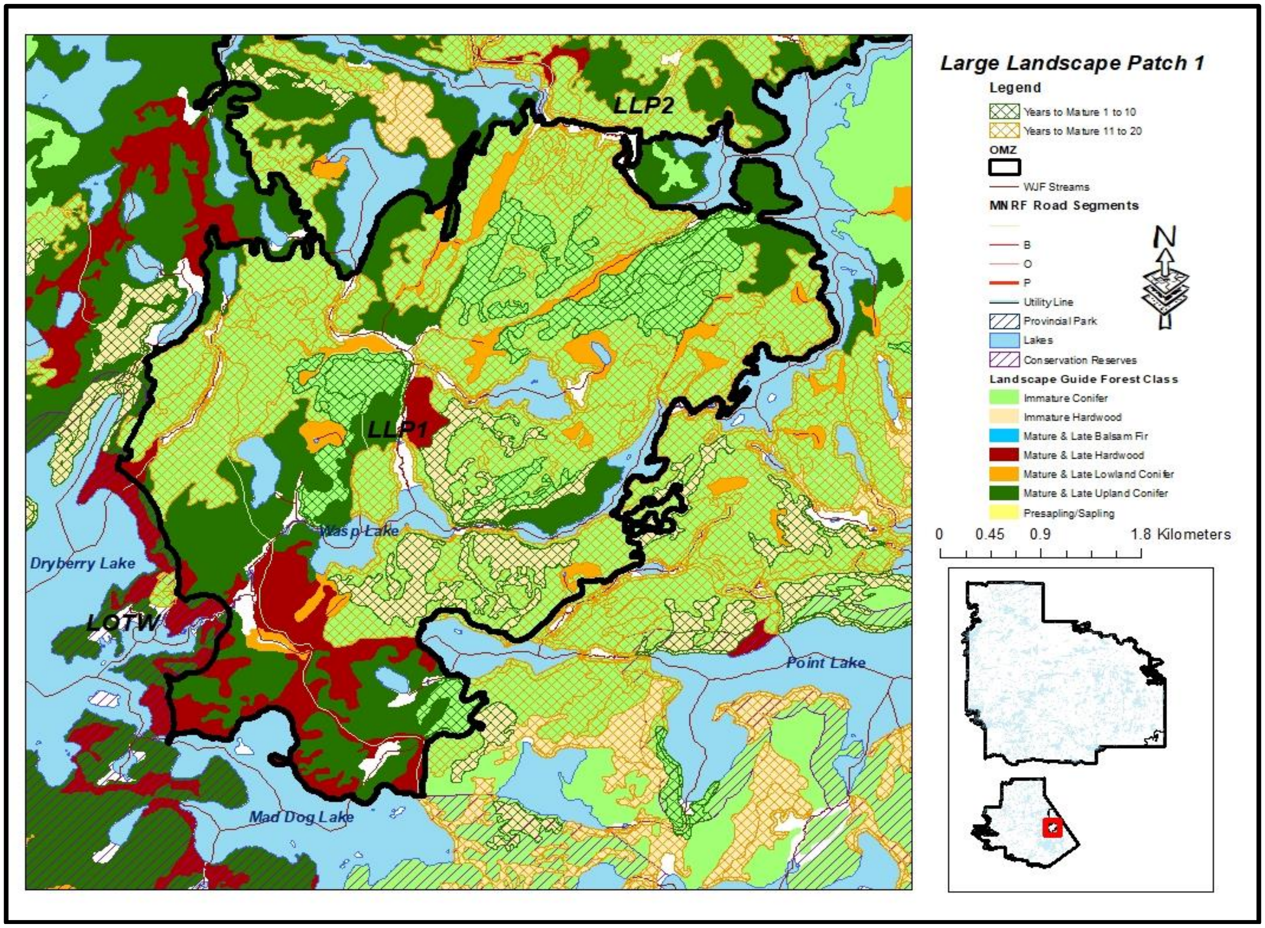


Figure 5. The location of the 3 selected mature and old LLPs on the Whiskey Jack Forest for the 2024 FMP.

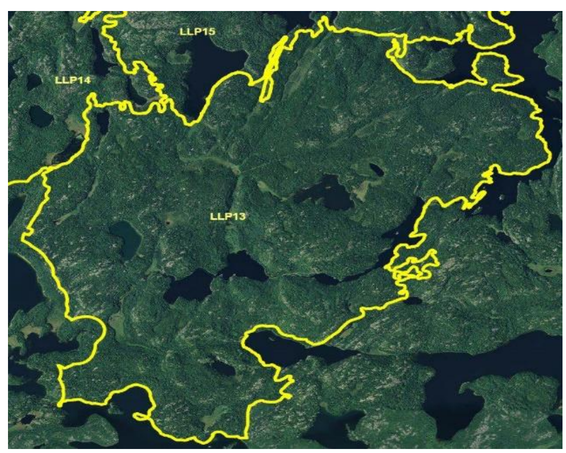
Appendix 1: Whiskey Jack Forest Inventory by Landscape Class



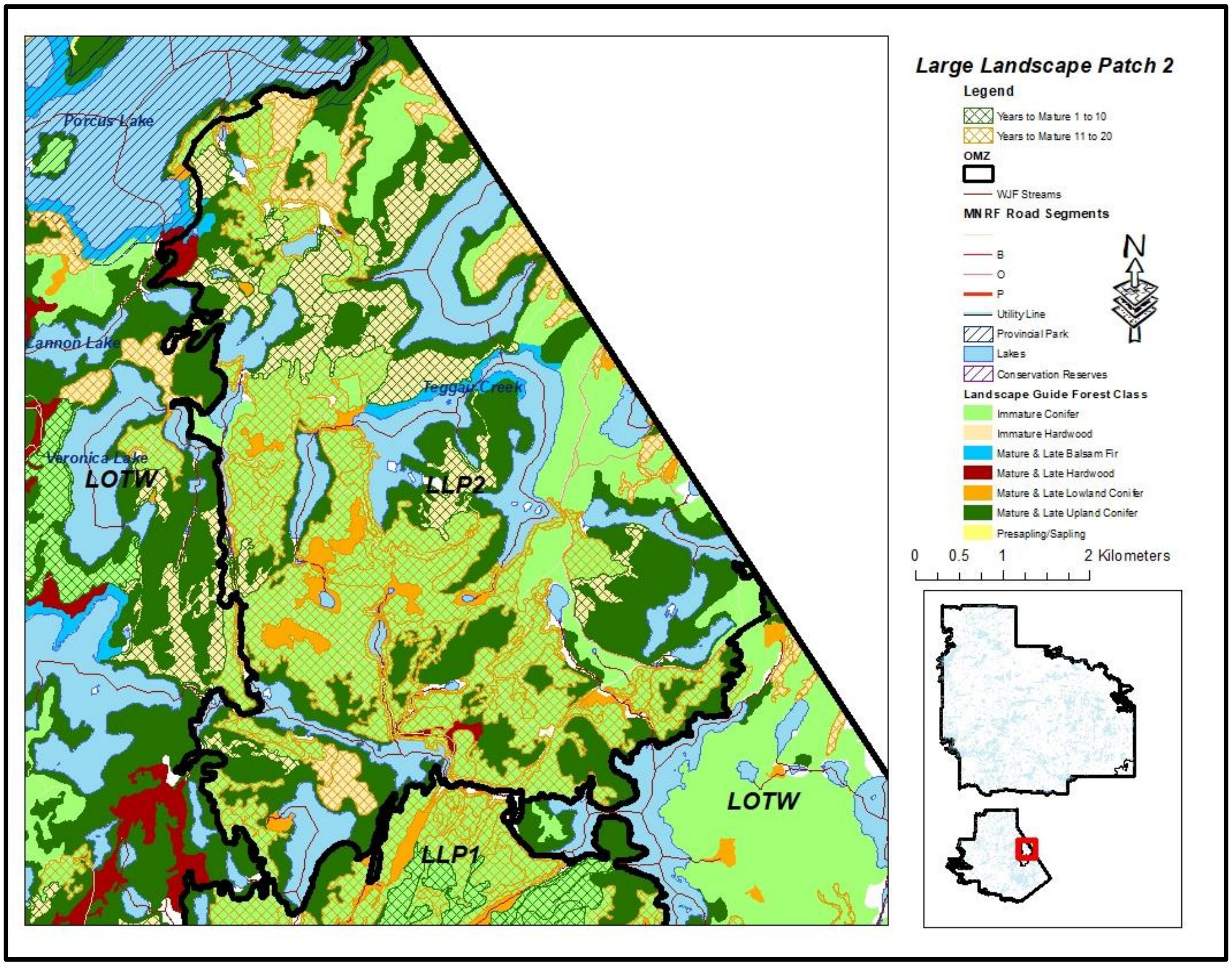
Appendix 2: Fact sheets for candidate large landscape patches for the texture of mature and old forest (2024-2034 Whiskey Jack Forest Management Plan)



Landscape Guide Class	Area (ha)	Area (%)
presapling/sapling	0	0.0
immature conifer	1242	59.8
immature hardwood	127	6.1
mature and late balsam fir	0	0.0
mature and late lowland conifer	106	5.1
mature and late hardwood and hardwood mixedwood	180	8.7
mature and late upland conifer and conifer mixedwood	422	20.3
Total	**2077**	**100.0**

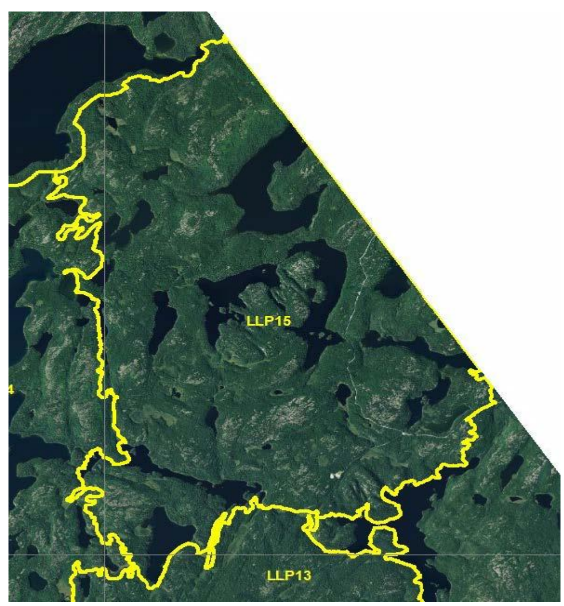


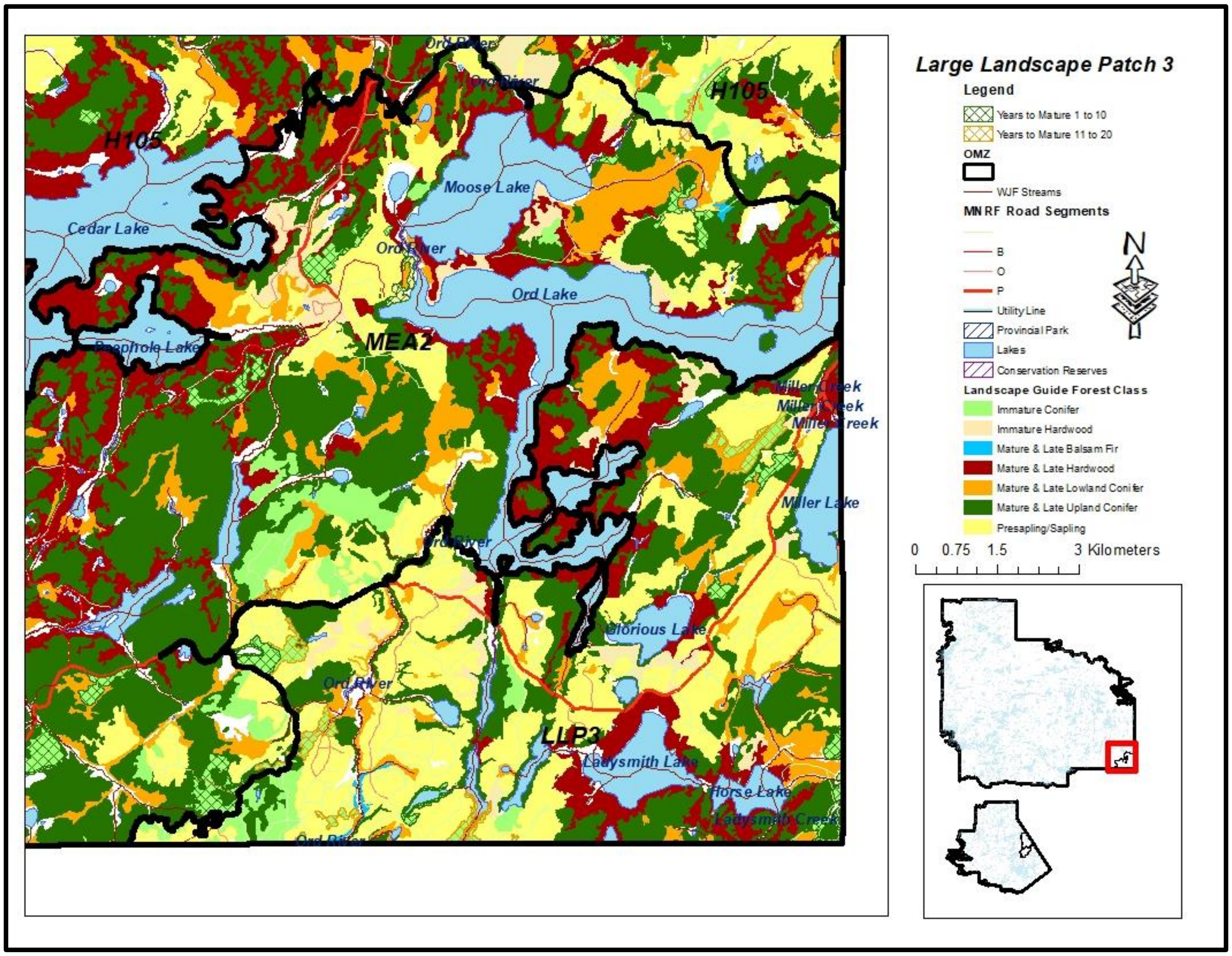
Years to Mature	Area (ha)	Area (%)
1 to 10 years to mature	397	19.1
11 to 20 years to mature	972	46.8
N/A	708	34.1
Total	**2077**	**100.0**



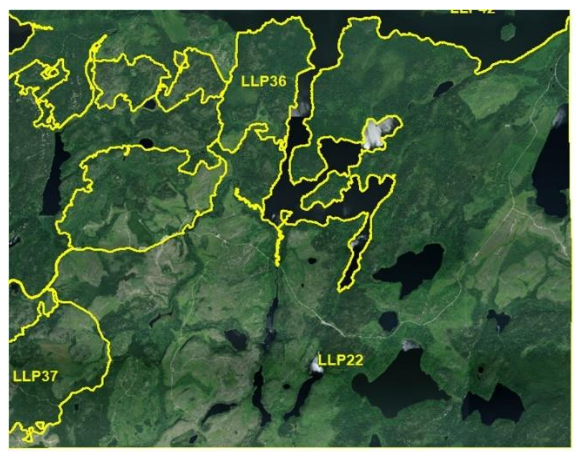
Landscape Guide Class	Area (ha)	Area (%)
presapling/sapling	0	0.0
immature conifer	1539	46.2
immature hardwood	600	18.0
mature and late balsam fir	36	1.1
mature and late lowland conifer	88	2.6
mature and late hardwood and hardwood mixedwood	26	0.8
mature and late upland conifer and conifer mixedwood	1039	31.2
Total	**3328**	**100.0**

Years to Mature	Area (ha)	Area (%)
1 to 10 years to mature	408	12.2
11 to 20 years to mature	1330	40.0
N/A	1590	47.8
Total	**3328**	**100.0**





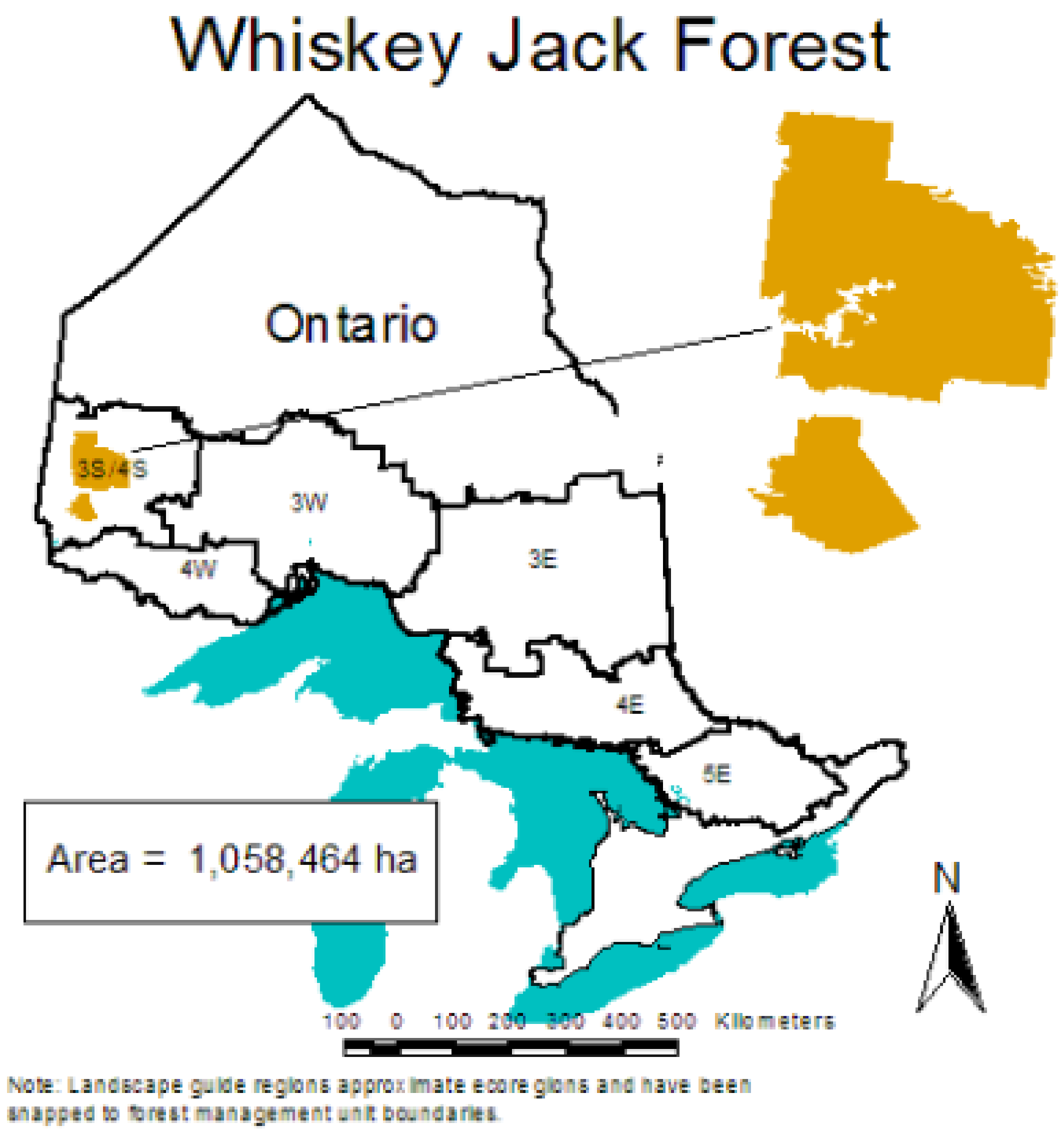
Landscape Guide Class	Area (ha)	Area (%)
presapling/sapling	2638	45.4
immature conifer	369	6.4
immature hardwood	257	4.4
mature and late balsam fir	18	0.3
mature and late lowland conifer	447	7.7
mature and late hardwood and hardwood mixedwood	632	10.9
mature and late upland conifer and conifer mixedwood	1446	24.9
Total	**5807**	**100.0**



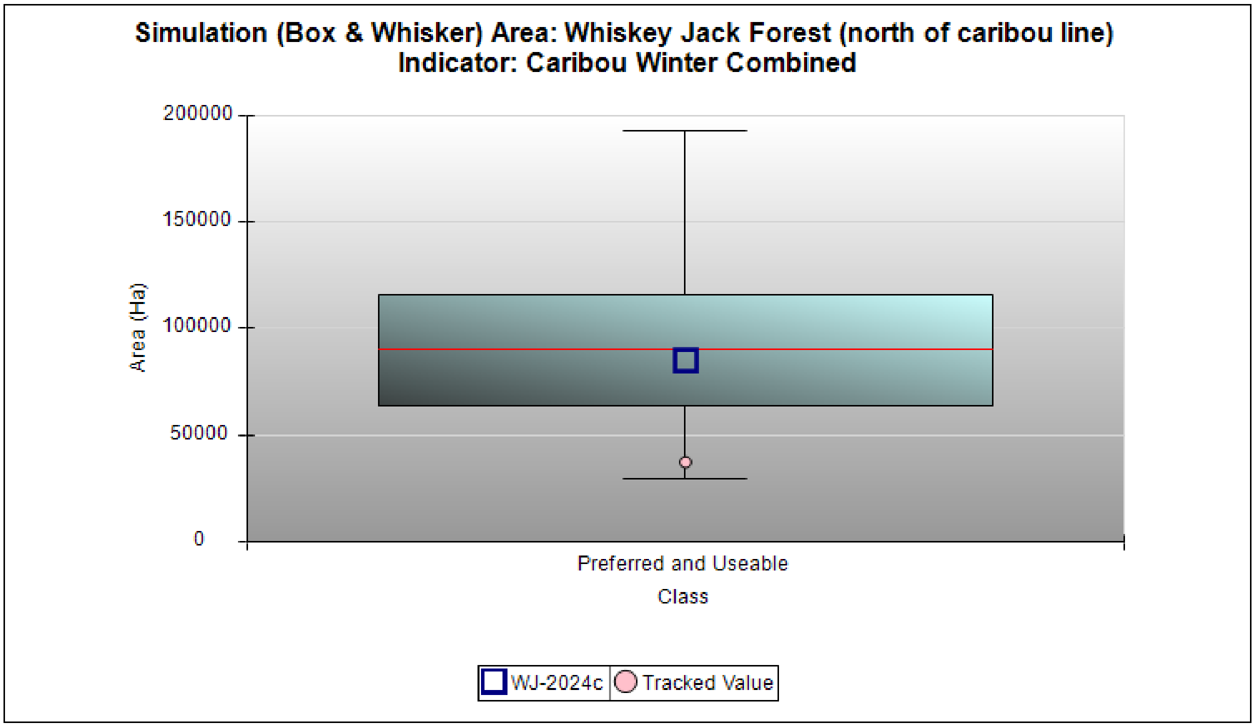
Years to Mature	Area (ha)	Area (%)
1 to 10 years to mature	114	1.8
11 to 20 years to mature	125	1.9
N/A	6235	96.3
Total	**6474**	**100.0**

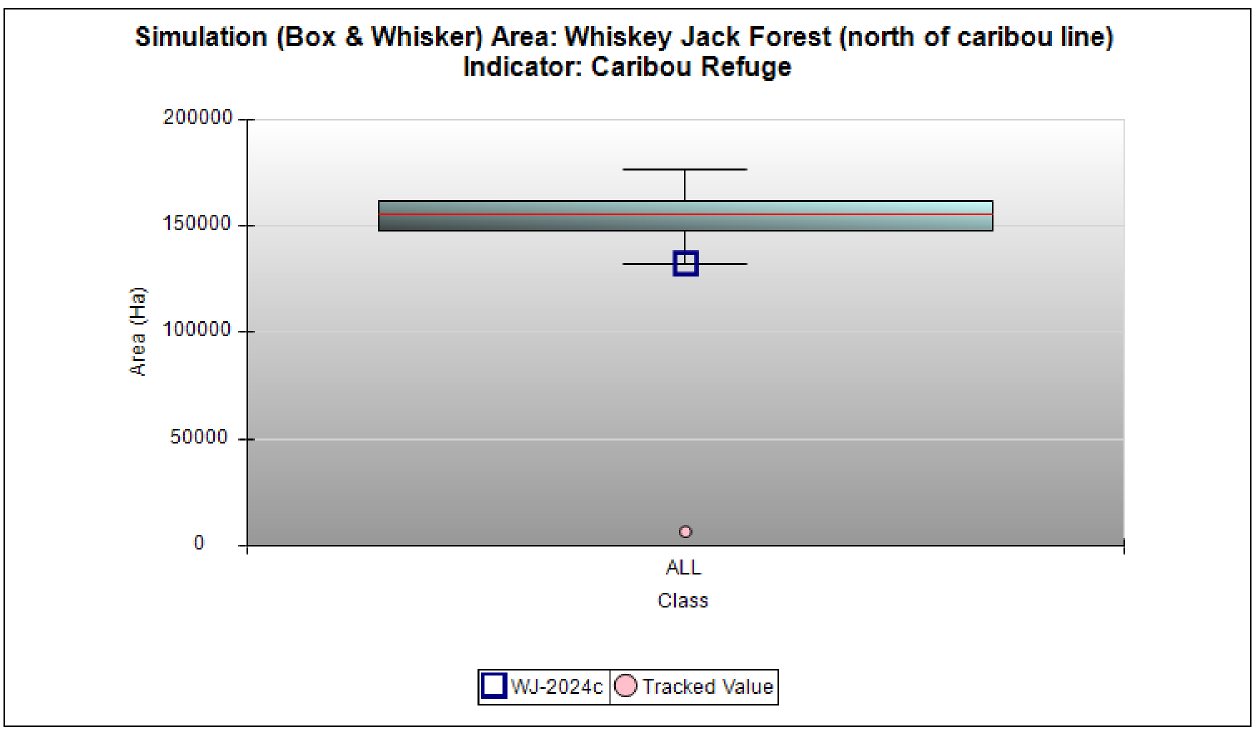
Appendix 5

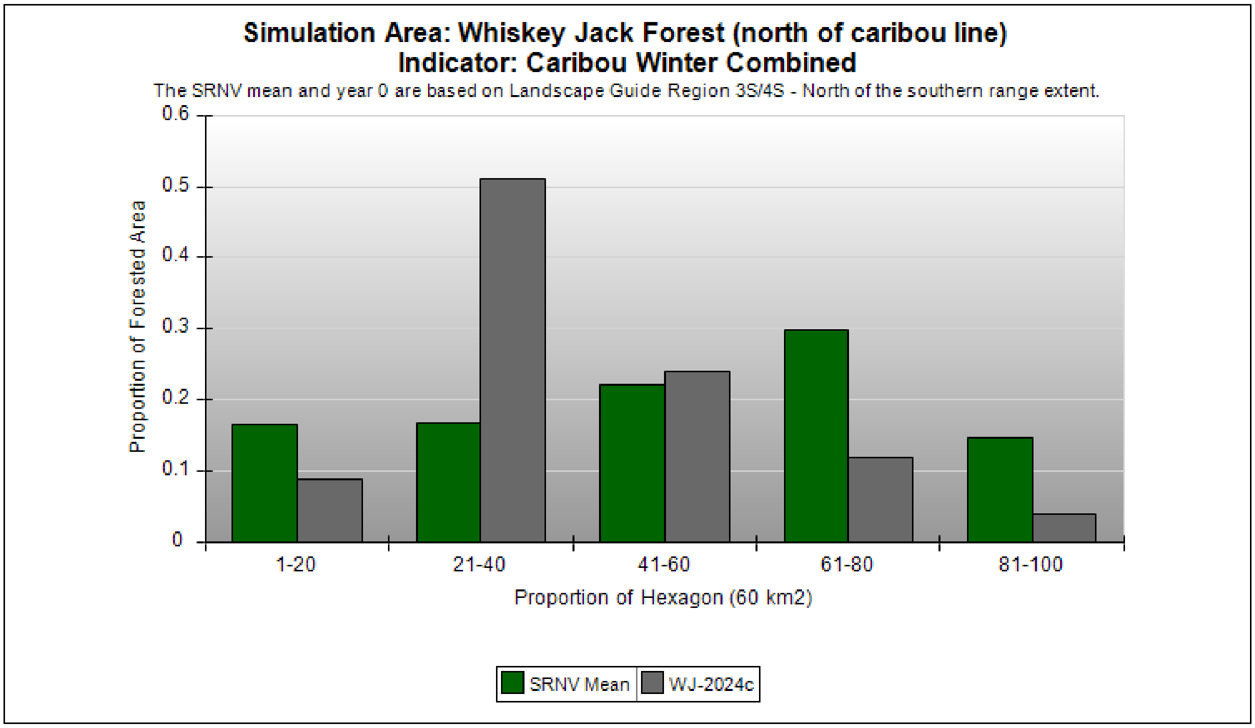
Boreal Landscape Guide Indicator Analyses



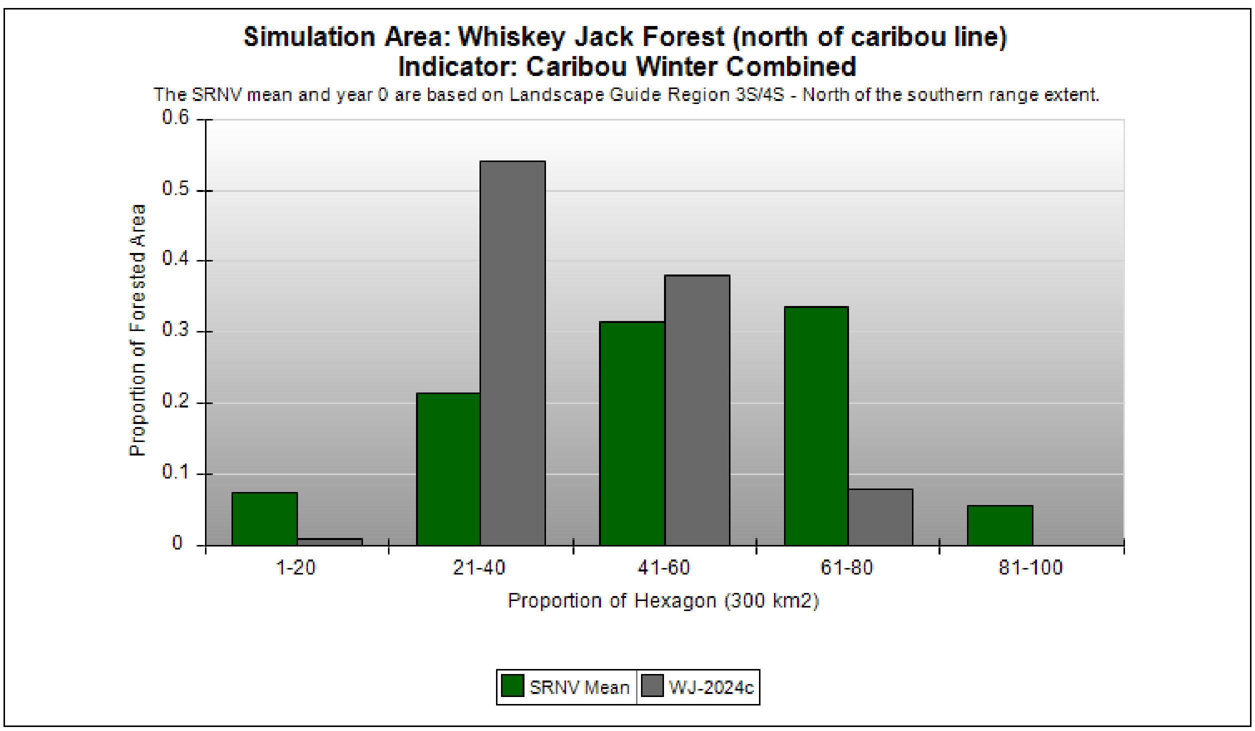
Base Model Inventory OLT Analyses – Plan Start 2024



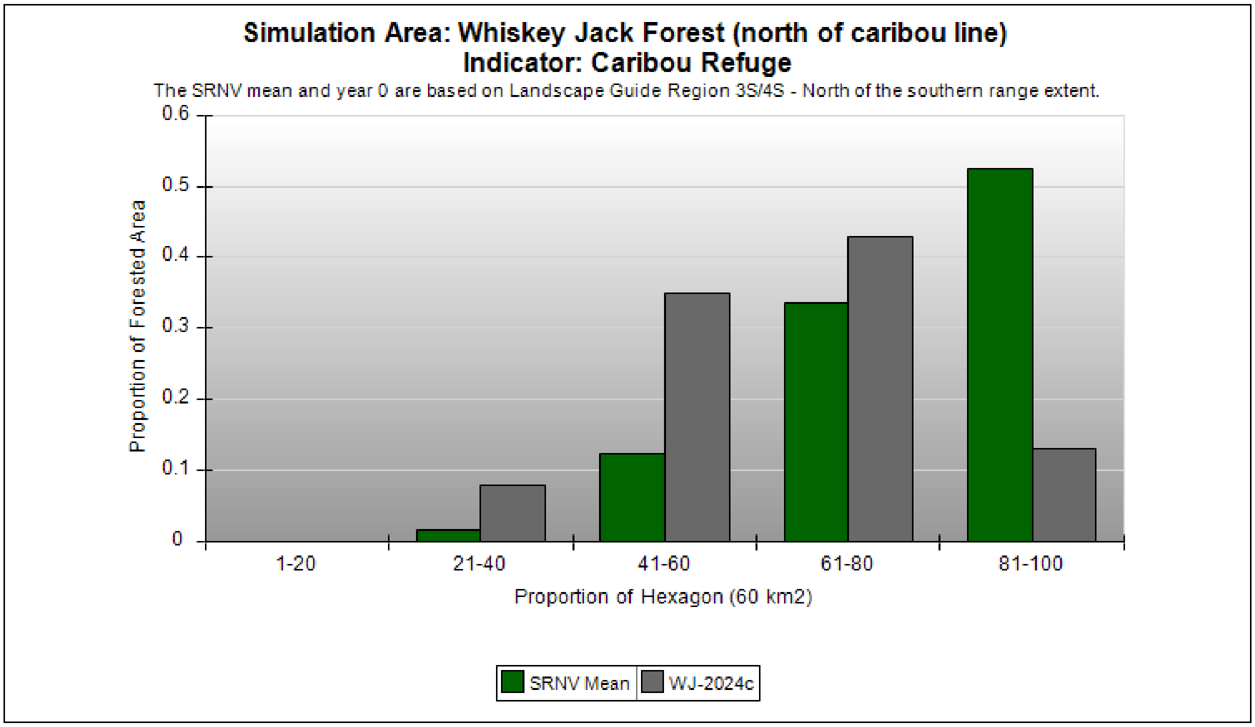




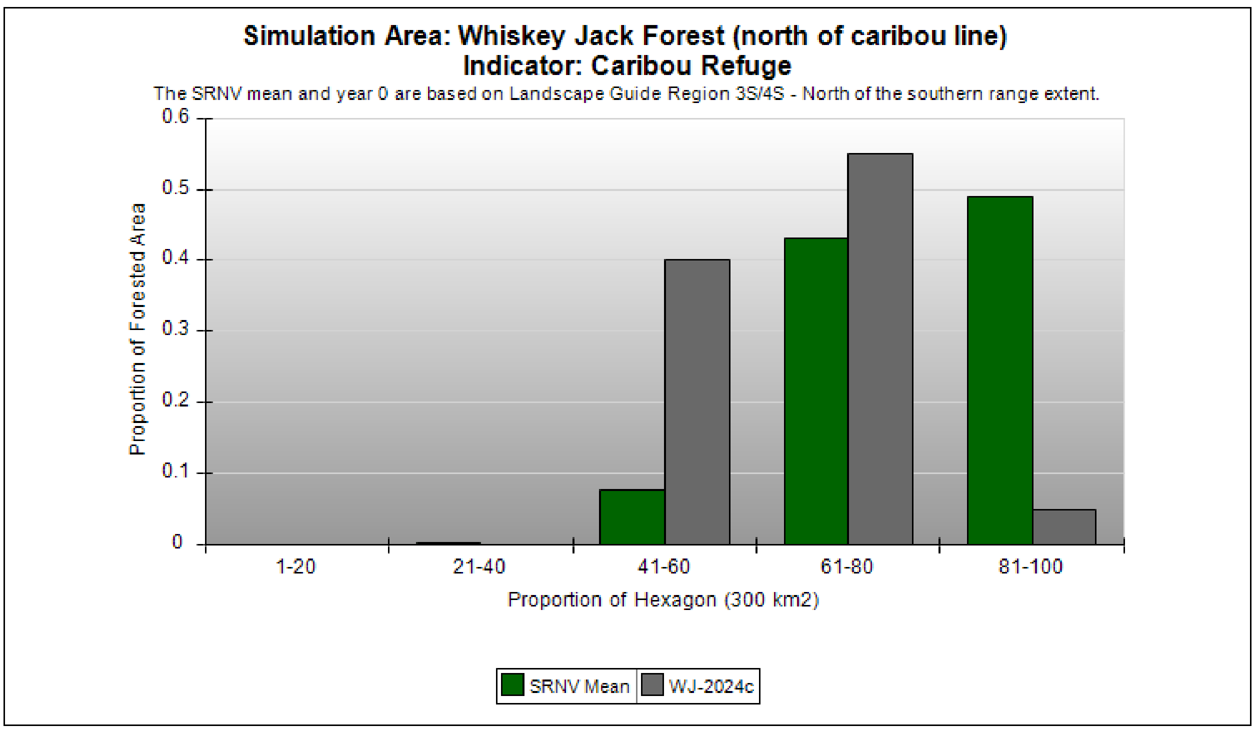
Simulation Area: Whiskey Jack Forest (north of caribou line)
Indicator: Caribou Winter Combined
The SRNV mean and year 0 are based on Landscape Guide Region 3S/4S - North of the southern range extent.
Proportion of Forested Area
0.6
0.5
0.4
0.3
0.2
0.1
0
1-20
21-40
41-60
61-80
81-100
Proportion of Hexagon (60 km2)
SRNV Mean
WJ-2024c



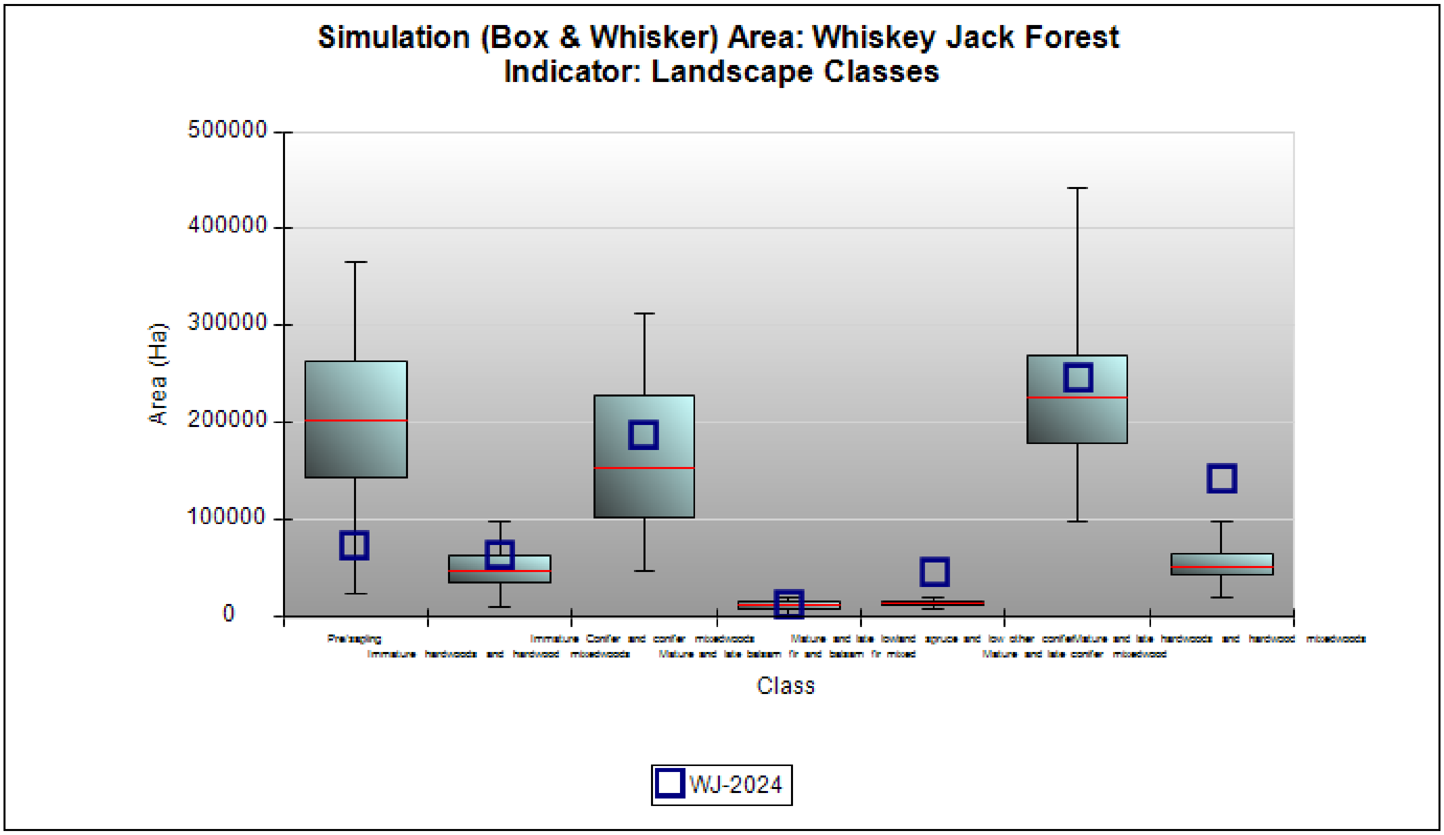
Simulation Area: Whiskey Jack Forest (north of caribou line)
Indicator: Caribou Winter Combined
The SRNV mean and year 0 are based on Landscape Guide Region 3S/4S - North of the southern range extent.
Proportion of Forested Area
0.6
0.5
0.4
0.3
0.2
0.1
0
1-20
21-40
41-60
61-80
81-100
Proportion of Hexagon (300 km2)
SRNV Mean
WJ-2024c

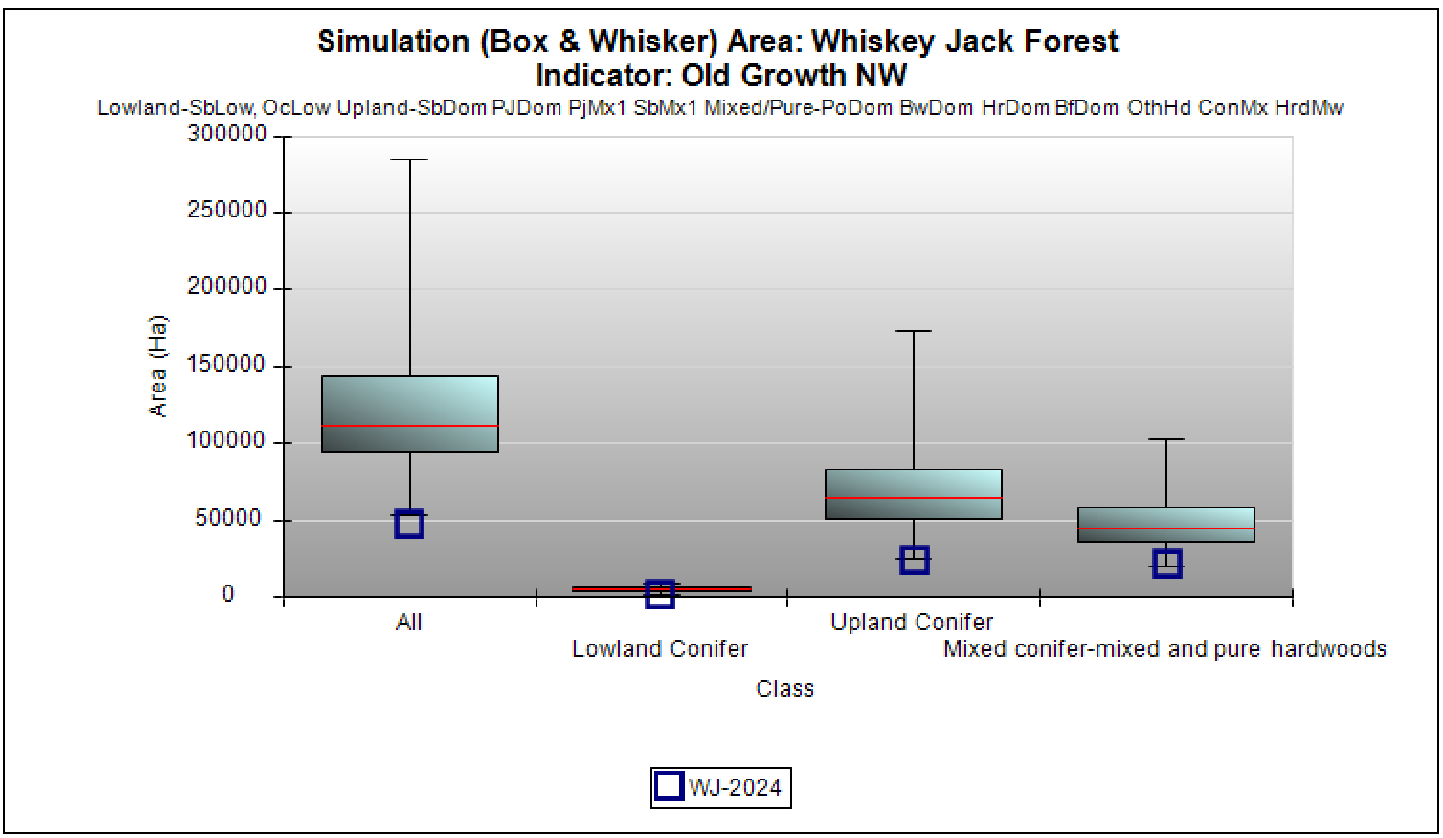


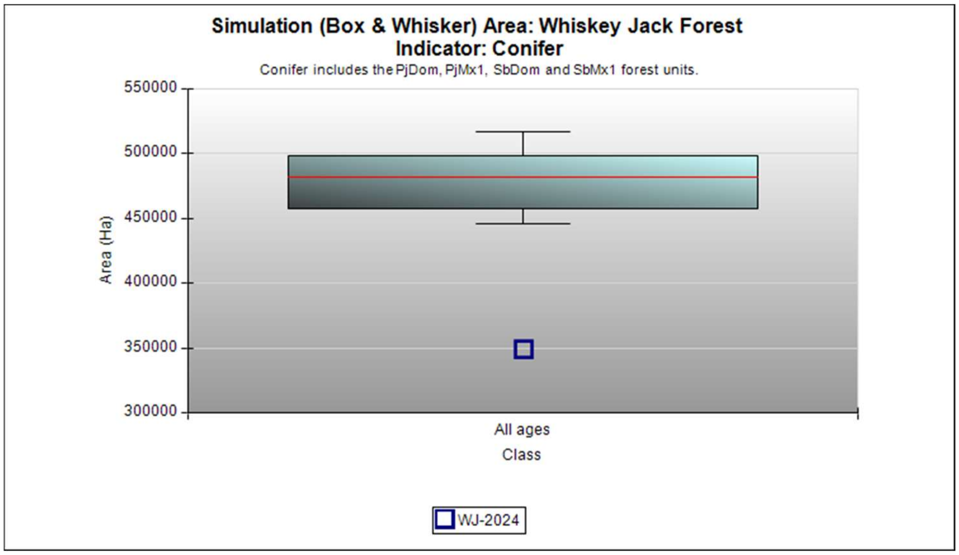
Simulation Area: Whiskey Jack Forest (north of caribou line)
Indicator: Caribou Refuge
The SRNV mean and year 0 are based on Landscape Guide Region 3S/4S - North of the southern range extent.
Proportion of Forested Area
0.6
0.5
0.4
0.3
0.2
0.1
0
1-20
21-40
41-60
61-80
81-100
Proportion of Hexagon (60 km2)
SRNV Mean
WJ-2024c

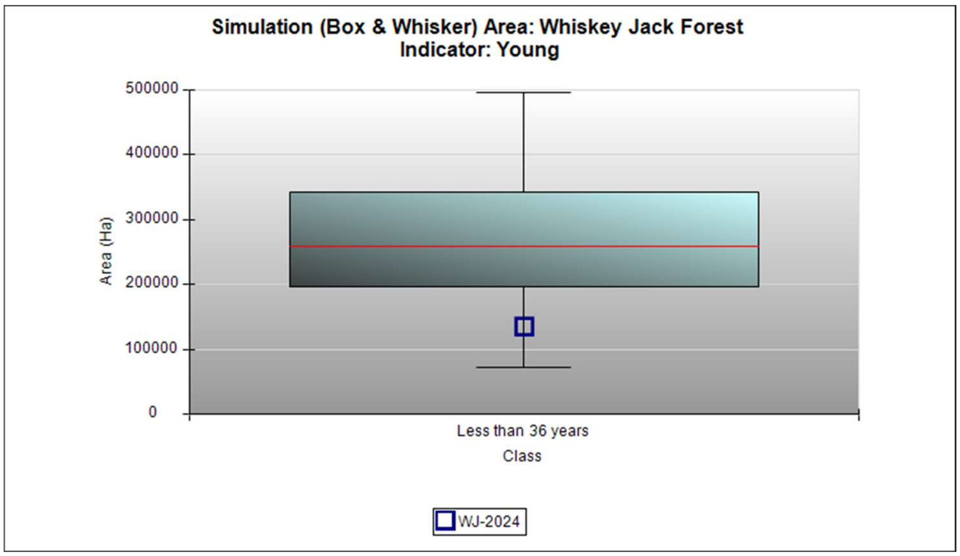


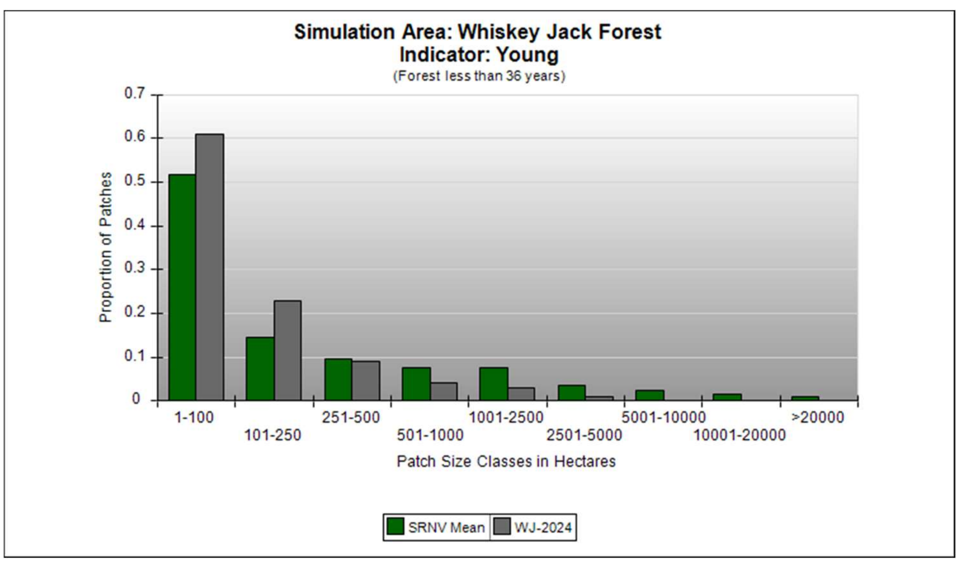
Simulation Area: Whiskey Jack Forest (north of caribou line)
Indicator: Caribou Refuge
The SRNV mean and year 0 are based on Landscape Guide Region 3S/4S - North of the southern range extent.
Proportion of Forested Area
0.6
0.5
0.4
0.3
0.2
0.1
0
1-20
21-40
41-60
61-80
81-100
Proportion of Hexagon (300 km2)
SRNV Mean
WJ-2024c


Simulation (Box & Whisker) Area: Whiskey Jack Forest
Indicator: Landscape Classes
Area (Ha)
500000
400000
300000
200000
100000
0
Pre-sapling
Immature hardwoods and hardwood mixedwoods
Immature Conifer and conifer mixedwoods
Mature and late balsam fir and balsam fir mixed
Mature and late lowland spruce and low other conife
Mature and late conifer mixedwood
Mature and late hardwoods and hardwood mixedwoods
Class
WJ-2024

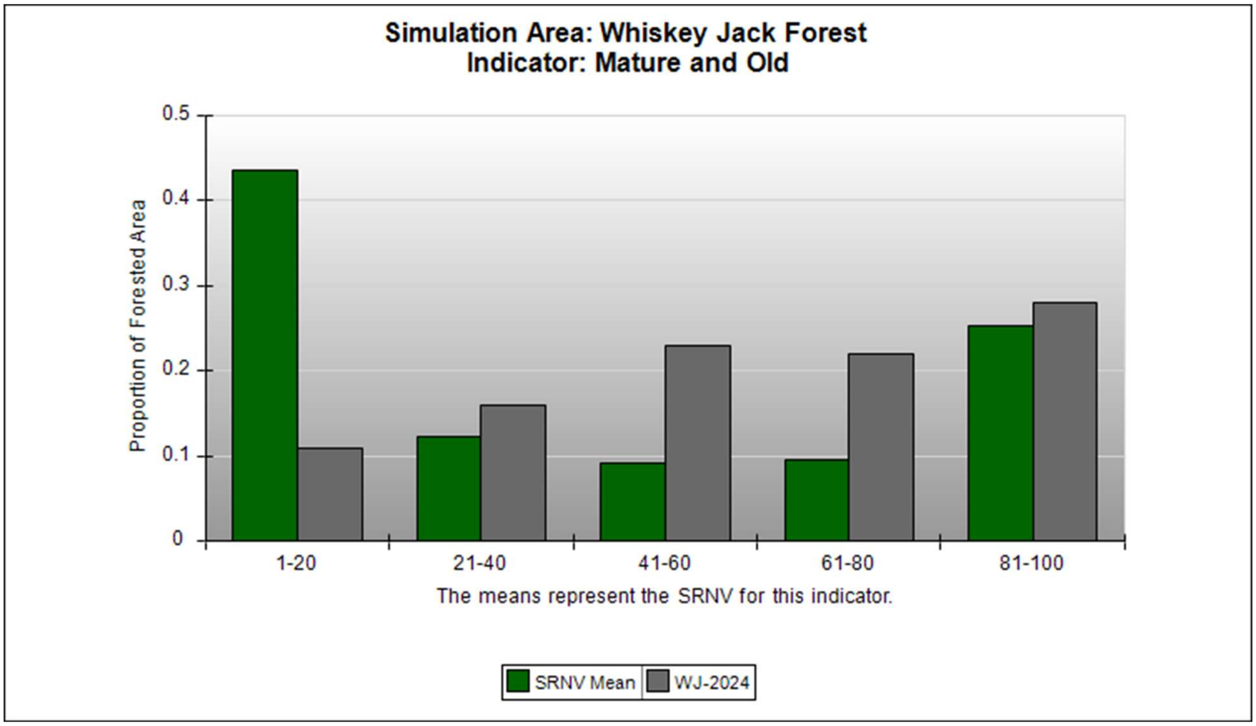

Simulation (Box & Whisker) Area: Whiskey Jack Forest
Indicator: Old Growth NW
Lowland-SbLow, OcLow Upland-SbDom PJDom PjMx1 SbMx1 Mixed/Pure-PoDom BwDom HrDom BfDom OthHd ConMx HrdMw
Area (Ha)
300000
250000
200000
150000
100000
50000
0
All
Lowland Conifer
Upland Conifer
Mixed conifer-mixed and pure hardwoods
Class
WJ-2024


Simulation (Box & Whisker) Area: Whiskey Jack Forest
Indicator: Conifer
Conifer includes the PjDom, PjMx1, SbDom and SbMx1 forest units.
550000
500000
450000
400000
350000
300000
Area (Ha)
All ages
Class
WJ-2024

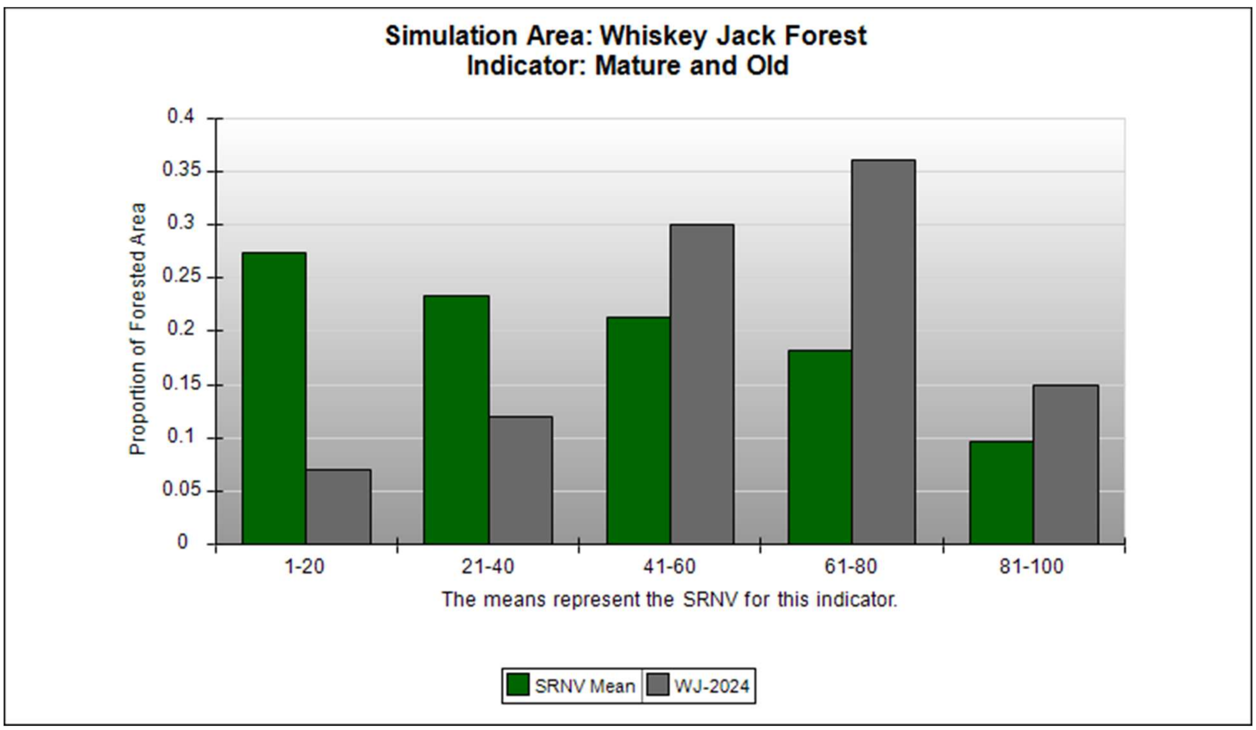

Simulation (Box & Whisker) Area: Whiskey Jack Forest
Indicator: Young
500000
400000
300000
200000
100000
0
Area (Ha)
Less than 36 years
Class
WJ-2024


Simulation Area: Whiskey Jack Forest
Indicator: Young
(Forest less than 36 years)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Proportion of Patches
1-100
101-250
251-500
501-1000
1001-2500
2501-5000
5001-10000
10001-20000
>20000
Patch Size Classes in Hectares
SRNV Mean
WJ-2024

Scale: 500 ha



Scale: 5,000 ha



Appendix 6

Yield Curves

Yield Curves

Final yield curves for the Whiskey Jack Forest 2024 FMP strategic modelling are illustrated in this appendix. Development of the NAT (natural) yield curves and the managed (LOW, MED, HIGH yield) yield curves are detailed in Section 6.2.2.4.

For each forest unit, a graph is included showing the relative yields for the final yield curves for that forest unit, followed by a data table of total net merchantable volume per hectare for the yield curves.

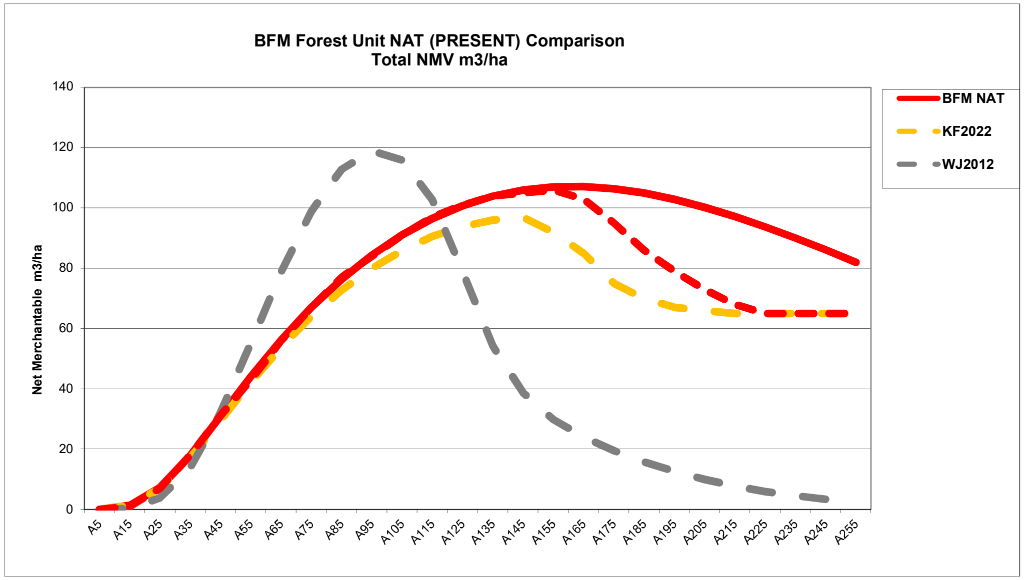
Next, the total net merchantable volume for the MIST derived yield curves are illustrated along with the revised yield curve in which the tail end was adjusted (if applicable) to show the adjustment in volumes done during the reconciliation with natural succession inputs (discussed in Section 6.2.2.1). A comparison to the first graph highlights the change in curve “tails”. If a “Prior to YC Tail Adjustment” curve is not included for a forest unit, then the tails were not adjusted form the MIST generated yield curves.

Finally, for each forest unit-yield combination (silvicultural stratum), the yield curve and data table is supplied in SFMM (per hectare by tree species for net merchantable volume, total “U” for undersized, total “D” for defect volumes).

2024 FMP Forest Units:

	PLANFU
1	BFM
2	CMX
3	HMX
4	HRD
5	PJD
6	PJM
7	POD
8	PRW
9	SBD
10	SBL
11	SBM

Whiskey Jack Forest 2024 FMP - NAT Yield Curve development



				Tail Adjust
AGE:	BFM NAT	KF2022	WJ2012	BFM NAT Adj
A5	0	0	0	0
A15	1	1	0	1
A25	7	7	4	7
A35	18	17	14	18
A45	31	30	32	31
A55	44	42	55	43
A65	56	54	79	56
A75	67	64	99	67
A85	76	73	113	77
A95	84	80	119	84
A105	91	86	116	91
A115	97	91	103	97
A125	101	94	79	101
A135	104	96	54	104
A145	106	97	39	105
A155	107	92	30	106
A165	107	85	24	103
A175	106	75	19	95
A185	105	70	16	86
A195	103	67	13	79
A205	100	66	10	73
A215	97	65	8	68
A225	94	65	6	65
A235	90	65	4	65
A245	86	65	3	65
A255	82	65	2	65

Rationale:

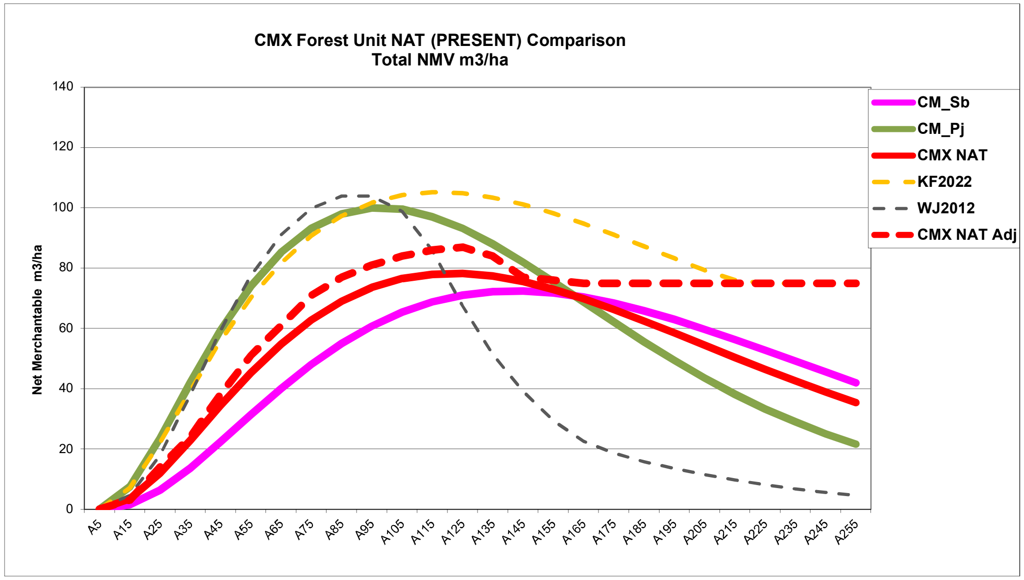
Used MIST with management unit data and variable stocking profile

Regional consensus that current MIST version is better than 2012 WJ volume generator

WJ2012 is BFM curve.

BFM NAT curve was reasonable when compared to Kenora Forest MIST.

RED curve chosen NAT volumes - tail end was later adjusted for natural succesion



	67%	33%	CMX Blended			Tail Adjust
AGE:	CM_Sb	CM_Pj	CMX NAT	KF2022	WJ2012	CMX NAT Adj
A5	0	0	0	0	0	0
A15	2	8	4	7	5	3
A25	6	24	12	22	18	14
A35	14	42	23	39	38	24
A45	22	59	34	56	59	38
A55	31	74	45	70	78	51
A65	40	85	55	82	91	61
A75	48	93	63	91	100	71
A85	55	98	69	97	104	77
A95	61	100	74	102	104	81
A105	65	100	77	104	99	84
A115	69	97	78	105	86	86
A125	71	93	78	105	67	87
A135	72	88	77	103	51	84
A145	72	82	76	101	39	77
A155	72	76	73	98	29	76
A165	70	69	70	95	23	75
A175	68	62	66	91	19	75
A185	66	56	63	87	16	75
A195	63	49	59	83	14	75
A205	60	44	55	79	12	75
A215	56	38	50	76	10	75
A225	53	33	46	75	8	75
A235	49	29	43	75	7	75
A245	46	25	39	75	6	75
A255	42	22	35	75	5	75

Rationale:

Used MIST with management unit data and variable stocking profile

Regional consensus that current MIST version is better than 2012 WJ volume generator

WJ2012 is CMX curve.

2 curves generated for Spruce-leading and Jack Pine-leading CMX

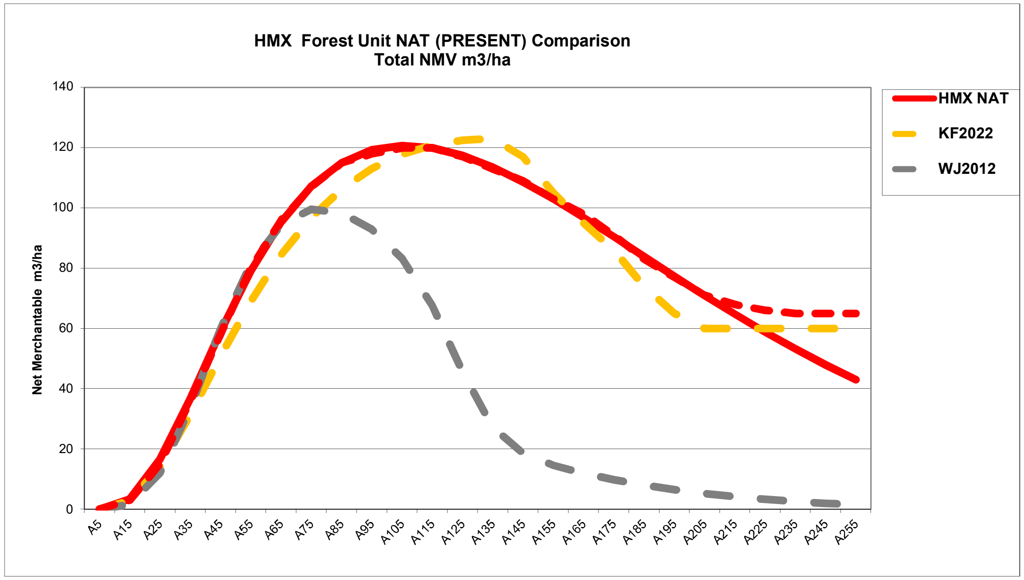
CM_sb curve used adjusted age range 35-125 for slightly better fit for stocking profile.

Curves blended based on occurrence of leading species (67% spruce, Pj 33%)

CMX NAT curve calculated (can only have 1 NAT curve with 1 analysis unit)

KF is CMX Pj leading and better stocking, hence curve is higher volume.

RED curve chosen NAT volumes - tail end was later adjusted for natural succesion



AGE:	HMX NAT	KF2022	WJ2012	Tail Adjust HMX NAT Adj
A5	0	0	0	0
A15	3	3	2	3
A25	17	14	12	15
A35	37	31	34	36
A45	59	51	60	58
A55	79	69	81	80
A65	95	85	95	96
A75	107	97	100	107
A85	115	106	98	115
A95	119	113	93	118
A105	121	118	83	120
A115	120	121	68	120
A125	117	122	46	117
A135	114	123	27	113
A145	109	117	19	109
A155	103	105	15	103
A165	97	95	12	98
A175	90	86	10	91
A185	84	74	8	83
A195	77	65	7	77
A205	71	60	5	71
A215	65	60	4	68
A225	59	60	3	66
A235	53	60	3	65
A245	48	60	2	65
A255	43	60	2	65

Rationale:

Used MIST with management unit data and variable stocking profile

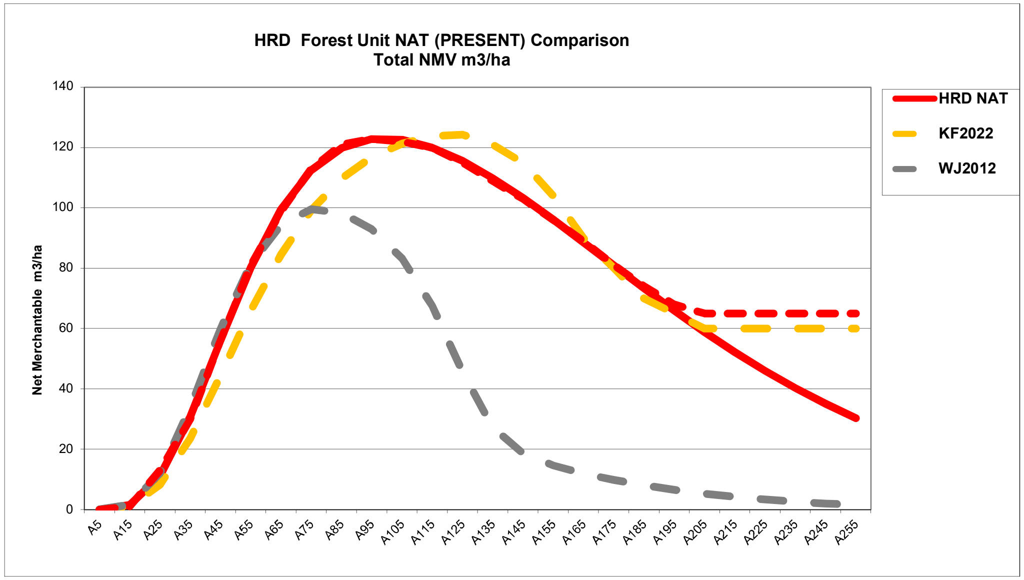
Regional consensus that current MIST version is better than 2012 WJ volume generator

WJ2012 is HMX curve.

HMX NAT curve was reasonable when compared to Kenora Forest MIST.

Greater HMX volume than 2012 FMP estimated

RED curve chosen NAT volumes - tail end was later adjusted for natural succesion



Tail Adjust

AGE:	HRD NAT	KF2022	WJ2012	HRD NAT Adj
A5	0	0	0	0
A15	2	1	2	1
A25	11	8	12	13
A35	31	24	34	30
A45	56	44	60	56
A55	80	66	81	81
A65	100	85	95	99
A75	113	99	100	113
A85	120	110	98	121
A95	123	117	93	123
A105	123	121	83	122
A115	120	124	68	120
A125	116	124	46	115
A135	110	121	27	109
A145	103	115	19	103
A155	96	104	15	96
A165	89	90	12	89
A175	81	80	10	81
A185	73	70	8	74
A195	66	65	7	68
A205	59	60	5	65
A215	52	60	4	65
A225	46	60	3	65
A235	40	60	3	65
A245	35	60	2	65
A255	30	60	2	65

Rationale:

Used MIST with management unit data and variable stocking profile

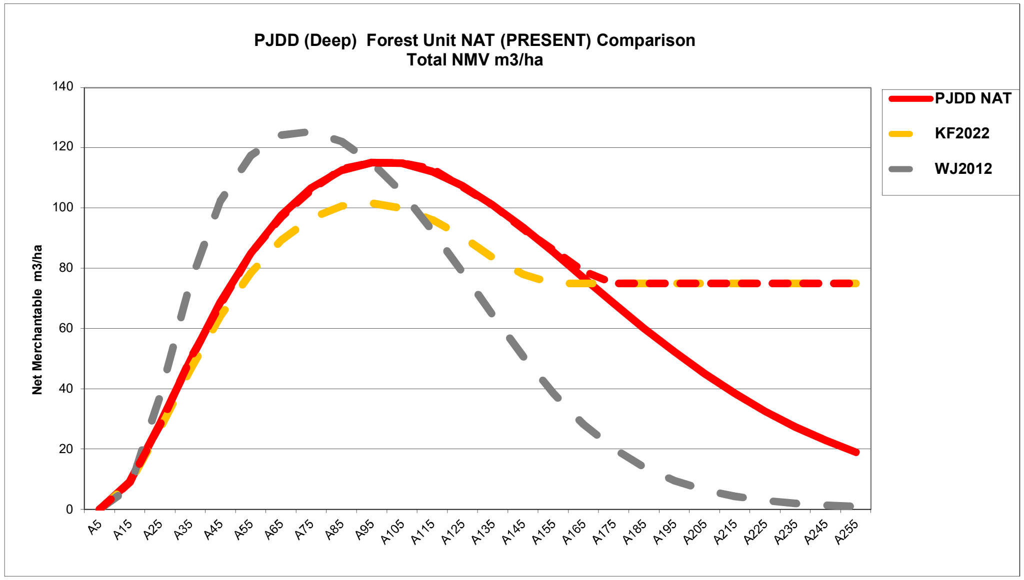
Regional consensus that current MIST version is better than 2012 WJ volume generator

WJ2012 is HMX curve, as they were combined into 1 PLANFU.

HRD NAT curve was reasonable when compared to Kenora Forest MIST.

Greater HRD volume than 2012 FMP estimated

RED curve chosen NAT volumes - tail end was later adjusted for natural succesion



AGE:	PJDD NAT	KF2022	WJ2012	Tail Adjust PJDD NAT Adj
A5	0	0	0	0
A15	9	9	7	9
A25	28	27	37	28
A35	49	46	75	50
A45	69	64	102	68
A55	85	79	117	85
A65	98	89	124	97
A75	107	97	125	106
A85	113	101	122	113
A95	115	102	115	115
A105	115	100	105	115
A115	112	96	93	113
A125	107	90	79	107
A135	101	84	64	101
A145	94	78	51	93
A155	85	75	39	86
A165	77	75	28	79
A175	68	75	20	75
A185	60	75	14	75
A195	52	75	10	75
A205	45	75	6	75
A215	38	75	4	75
A225	33	75	3	75
A235	27	75	2	75
A245	23	75	1	75
A255	19	75	1	75

Rationale:

Used MIST with management unit data and variable stocking profile

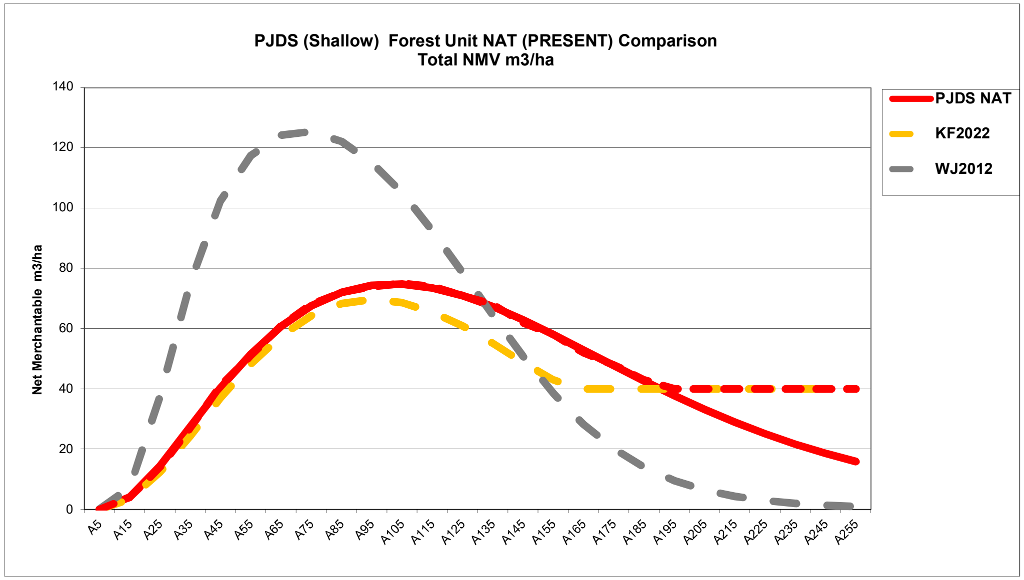
Regional consensus that current MIST version is better than 2012 WJ volume generator

WJ2012 is PJD curve, as shallow and deep components were combined into 1 AU (and PLANFU).

PJDD NAT curve was reasonable when compared to Kenora Forest MIST.

Slightly less PJD volume than 2012 FMP estimated, Better than Kenora

RED curve chosen NAT volumes - tail end was later adjusted for natural succesion



Tail Adjust

AGE:	PJDS NAT	KF2022	WJ2012	PJDS NAT Adj
A5	0	0	0	0
A15	4	3	7	4
A25	14	12	37	14
A35	27	24	75	27
A45	40	37	102	41
A55	52	48	117	51
A65	61	58	124	61
A75	68	64	125	68
A85	72	68	122	72
A95	74	70	115	74
A105	75	69	105	75
A115	74	66	93	74
A125	71	61	79	71
A135	67	55	64	68
A145	63	49	51	62
A155	58	43	39	58
A165	53	40	28	52
A175	48	40	20	48
A185	43	40	14	43
A195	38	40	10	40
A205	33	40	6	40
A215	29	40	4	40
A225	25	40	3	40
A235	22	40	2	40
A245	19	40	1	40
A255	16	40	1	40

Rationale:

Used MIST with management unit data and variable stocking profile

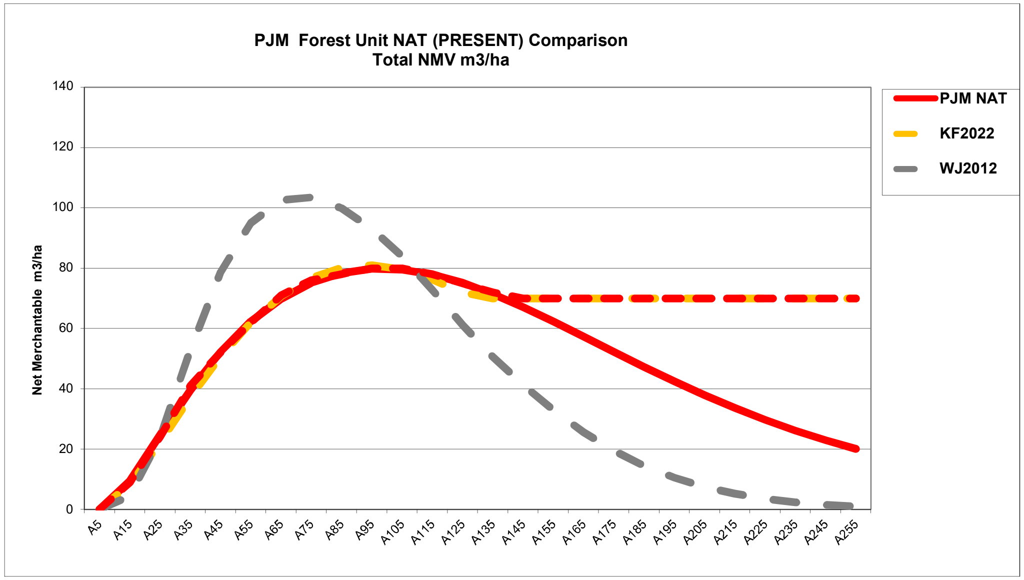
Regional consensus that current MIST version is better than 2012 WJ volume generator

WJ2012 is PJD curve, as shallow and deep components were combined into 1 AU (and PLANFU).

PJDS NAT curve was reasonable when compared to Kenora Forest MIST.

Significanlty less than 2012 FMP estimated, now based on shallow sites only.

RED curve chosen NAT volumes - tail end was later adjusted for natural succesion



Tail Adjust

AGE:	PJM NAT	KF2022	WJ2012	PJM NAT Adj
A5	0	0	0	0
A15	10	8	4	9
A25	25	22	24	24
A35	40	37	53	41
A45	52	51	79	52
A55	62	62	95	62
A65	70	71	103	71
A75	75	77	104	76
A85	78	80	100	78
A95	80	81	93	80
A105	80	80	84	80
A115	78	76	73	78
A125	75	72	61	75
A135	71	70	51	72
A145	67	70	41	70
A155	62	70	33	70
A165	57	70	26	70
A175	52	70	20	70
A185	47	70	15	70
A195	42	70	11	70
A205	38	70	7	70
A215	34	70	5	70
A225	30	70	4	70
A235	26	70	2	70
A245	23	70	2	70
A255	20	70	1	70

Rationale:

Used MIST with management unit data and variable stocking profile

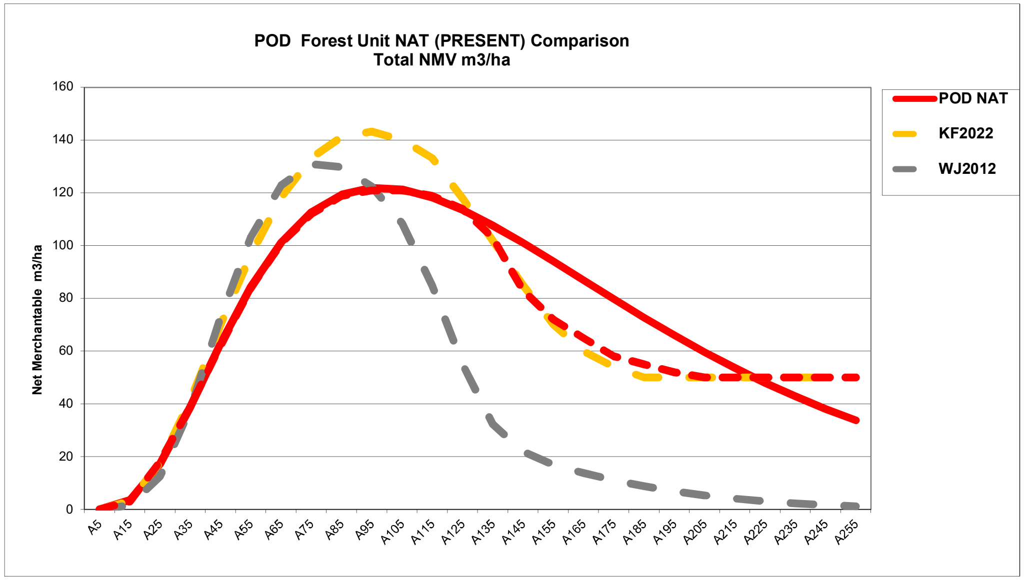
Regional consensus that current MIST version is better than 2012 WJ volume generator

WJ2012 is PJM curve.

PJM NAT curve was comparable to the Kenora Forest MIST.

Significanlty less than 2012 FMP estimated, but 2023 considered reliable.

RED curve chosen NAT volumes - tail end was later adjusted for natural succesion



Tail Adjust

AGE:	POD NAT	KF2022	WJ2012	POD NAT Adj
A5	0	0	0	0
A15	3	3	2	3
A25	17	18	12	18
A35	39	42	38	39
A45	63	70	73	62
A55	84	97	103	84
A65	101	118	123	101
A75	113	133	131	112
A85	119	141	130	119
A95	122	143	122	121
A105	121	140	108	121
A115	118	133	85	119
A125	114	118	55	114
A135	108	102	32	103
A145	101	85	22	83
A155	94	70	17	72
A165	87	60	14	65
A175	80	54	11	58
A185	73	50	9	55
A195	66	50	7	52
A205	60	50	5	50
A215	54	50	4	50
A225	48	50	3	50
A235	43	50	2	50
A245	38	50	2	50
A255	34	50	1	50

Rationale:

Used MIST with regional data and variable stocking profile

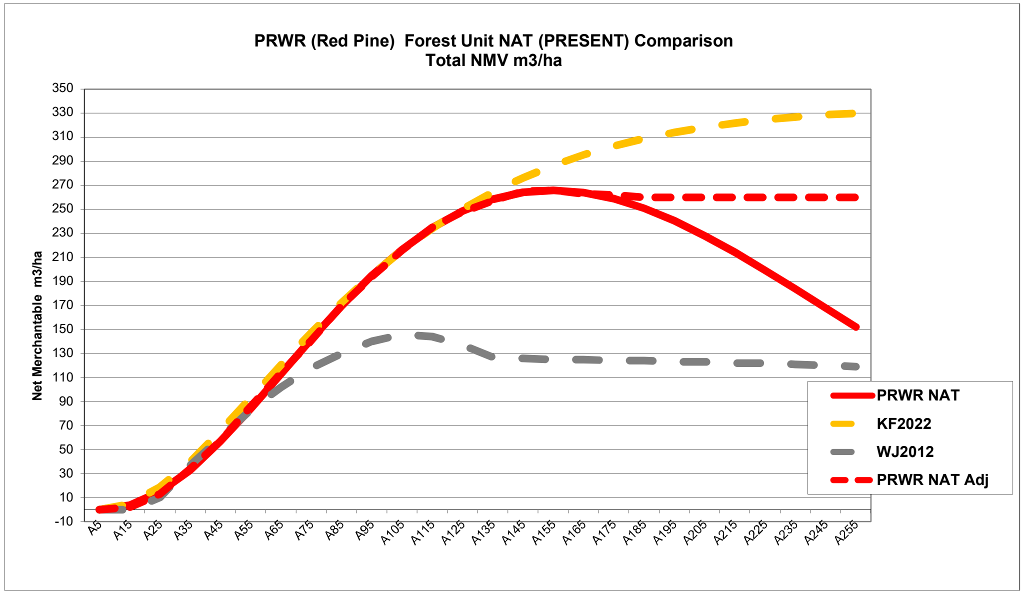
Regional consensus that current MIST version is better than 2012 WJ volume generator

WJ2012 is POD curve.

POD NAT curve was slightly lower than Kenora Forest MIST (KF higher stkg).

Comparable to 2012 FMP estimate, but 2023 considered reliable (later peak).

RED curve chosen NAT volumes - tail end was later adjusted for natural succesion



AGE:	PRWR NAT	KF2022	WJ2012	Tail Adjust PRWR NAT Adj
A5	0	0	0	0
A15	4	5	0	2
A25	15	19	10	13
A35	33	40	37	34
A45	57	65	60	57
A55	84	93	83	86
A65	113	121	102	114
A75	142	147	118	141
A85	170	172	130	170
A95	195	195	140	194
A105	217	216	146	216
A115	235	234	144	235
A125	249	250	137	248
A135	258	264	127	257
A145	264	276	126	265
A155	266	287	125	266
A165	264	295	125	263
A175	259	303	124	262
A185	251	309	124	260
A195	241	314	123	260
A205	228	318	123	260
A215	214	322	122	260
A225	199	325	122	260
A235	184	327	121	260
A245	168	329	120	260
A255	152	330	119	260

Rationale:

Used MIST with regional data and variable stocking profile

Regional consensus that current MIST version is better than 2012 WJ volume generator

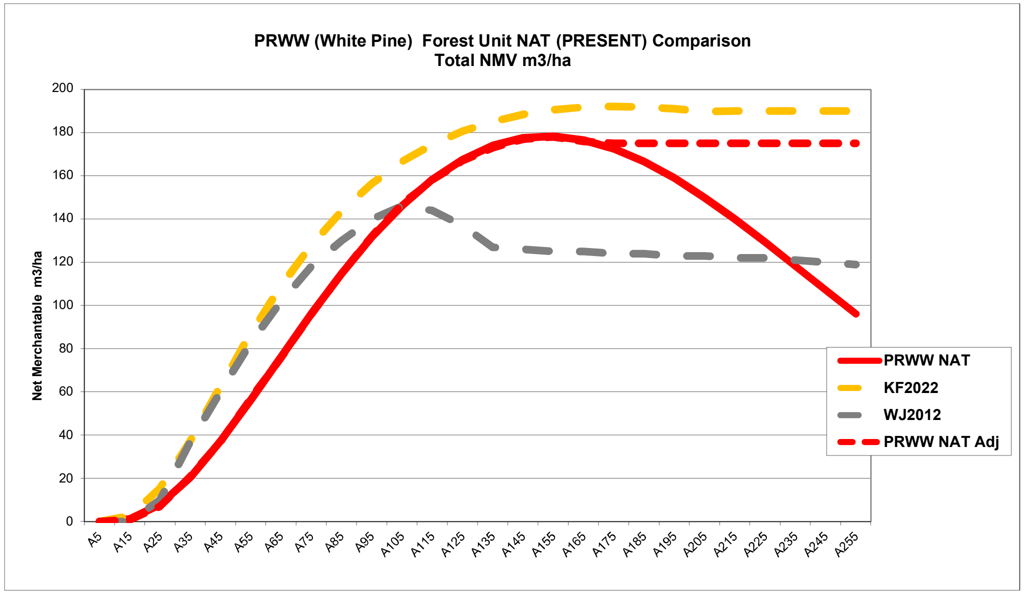
WJ2012 is PRW curve, as red pine and white pine components were combined into 1 AU (and PLANFU).

PRWR NAT curve was lower than Kenora Forest MIST, but tail may be raised.

Current MIST dataset includes all PRW SFUs (not just Pr)

2012 FMP estimate significantly lower, but 2023 considered reliable (later peak).

RED curve chosen NAT volumes - tail end was later adjusted for natural succesion



				Tail Adjust
AGE:	PRWW NAT	KF2022	WJ2012	PRWW NAT Adj
A5	0	0	0	0
A15	1	3	0	1
A25	8	16	10	7
A35	21	37	37	21
A45	37	63	60	37
A55	56	87	83	57
A65	76	109	102	76
A75	96	128	118	96
A85	115	144	130	115
A95	132	156	140	132
A105	146	167	146	147
A115	158	175	144	158
A125	168	181	137	167
A135	174	185	127	173
A145	178	188	126	177
A155	178	191	125	178
A165	177	192	125	176
A175	173	192	124	175
A185	167	192	124	175
A195	159	191	123	175
A205	150	190	123	175
A215	140	190	122	175
A225	129	190	122	175
A235	118	190	121	175
A245	107	190	120	175
A255	96	190	119	175

Rationale:

Used MIST with regional data and variable stocking profile

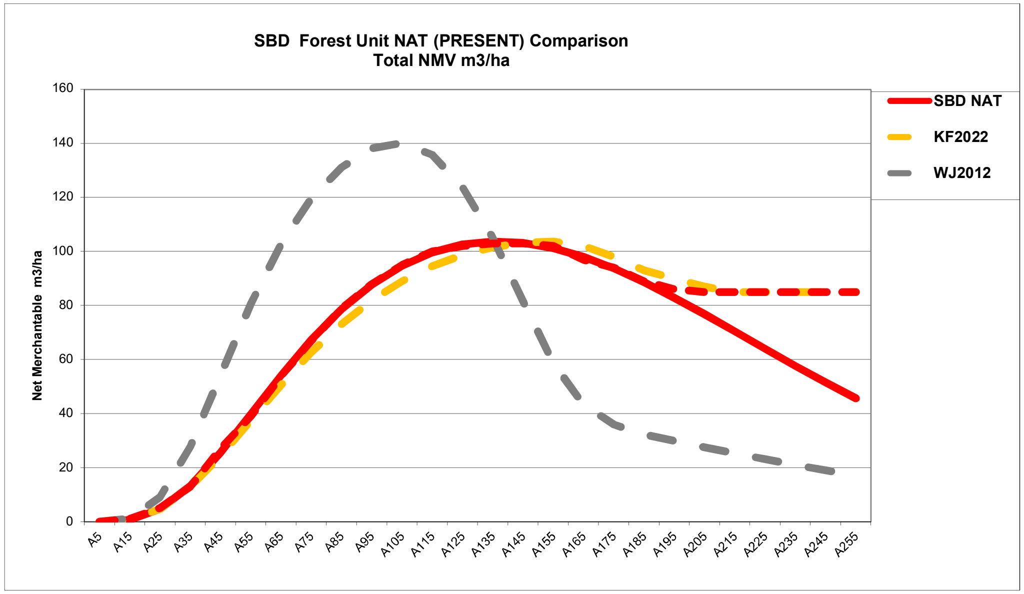
Regional consensus that current MIST version is better than 2012 WJ volume generator

WJ2012 is PRW curve, as red pine and white pine components were combined into 1 AU (and PLANFU).

PRWW NAT curve slightly lower than Kenora Forest MIST (higher stocking), but tail may be raised.

2012 FMP estimate significantly lower, but 2023 considered reliable (later peak).

RED curve chosen NAT volumes - tail end was later adjusted for natural succesion



AGE:	SBD NAT	KF2022	WJ2012	Tail Adjust SBD NAT Adj
A5	0	0	0	0
A15	1	1	1	1
A25	5	5	9	5
A35	13	13	28	13
A45	26	24	54	27
A55	40	38	81	39
A65	54	51	103	54
A75	67	63	120	67
A85	79	73	131	79
A95	88	82	138	88
A105	95	89	140	95
A115	100	95	136	100
A125	103	99	124	102
A135	104	102	105	103
A145	103	103	82	103
A155	101	104	59	102
A165	98	102	43	97
A175	94	98	36	94
A185	89	93	32	89
A195	83	90	30	86
A205	77	87	28	85
A215	70	85	25	85
A225	64	85	23	85
A235	58	85	21	85
A245	52	85	19	85
A255	46	85	17	85

Rationale:

Used MIST with management unit data and variable stocking profile

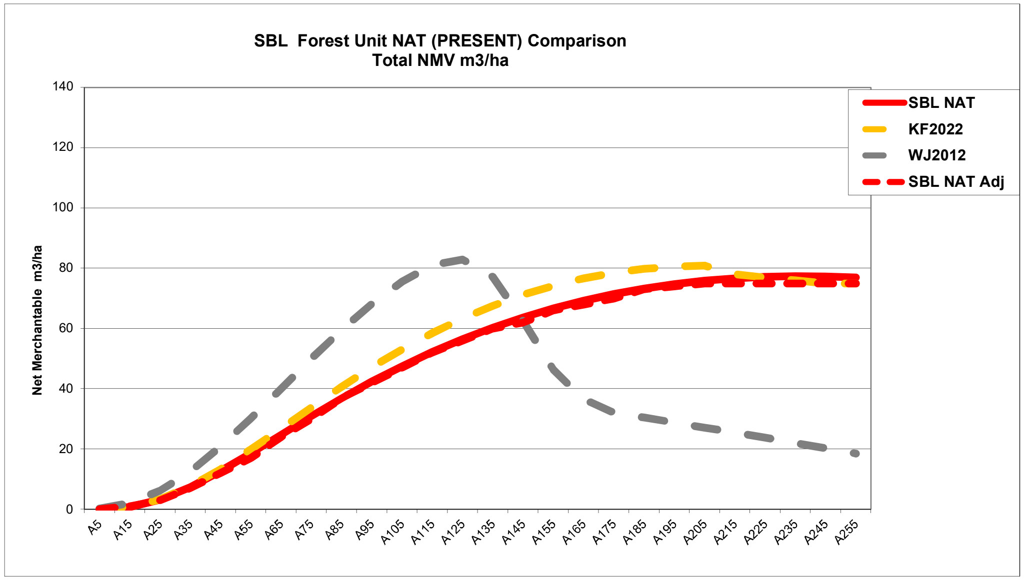
Regional consensus that current MIST version is better than 2012 WJ volume generator

WJ2012 is SPD curve.

SBD curve is comparable to the Kenora Forest MIST.

2012 FMP estimate significantly higher, but 2023 considered reliable (later peak).

RED curve chosen NAT volumes - tail end was later adjusted for natural succesion



AGE:	SBL NAT	KF2022	WJ2012	Tail Adjust SBL NAT Adj
A5	0	0	0	0
A15	1	1	2	1
A25	3	3	6	3
A35	7	8	13	7
A45	13	13	21	12
A55	19	20	30	17
A65	25	27	40	24
A75	31	34	50	30
A85	37	41	60	37
A95	42	47	68	42
A105	48	53	76	47
A115	52	59	81	52
A125	56	63	83	56
A135	60	68	77	60
A145	64	71	63	62
A155	67	74	46	66
A165	69	77	37	68
A175	71	78	32	70
A185	73	80	30	73
A195	75	81	29	74
A205	76	81	27	75
A215	77	78	25	75
A225	77	77	24	75
A235	77	76	22	75
A245	77	75	20	75
A255	77	75	19	75

Rationale:

Used MIST with management unit data and variable stocking profile

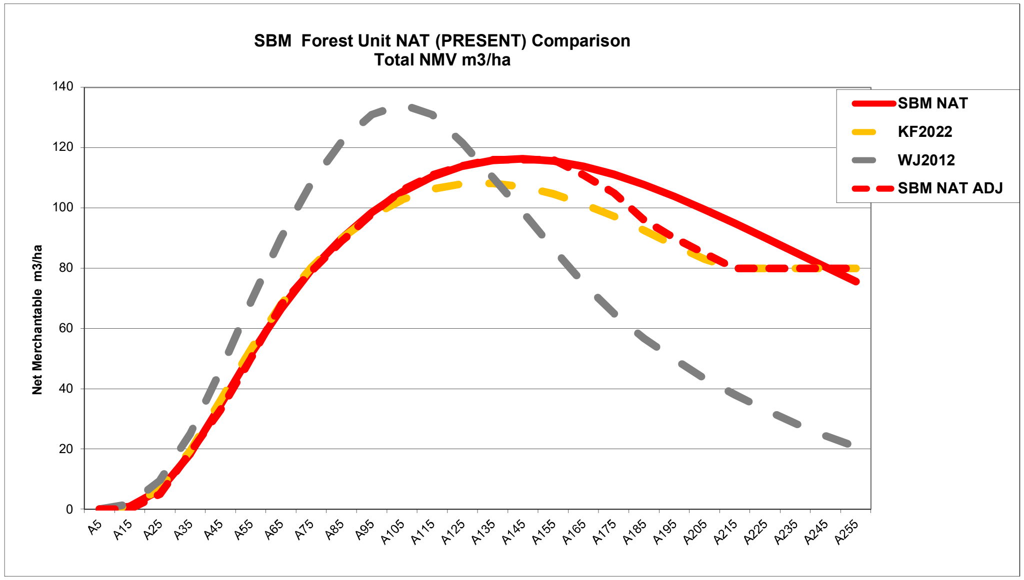
Regional consensus that current MIST version is better than 2012 WJ volume generator

WJ2012 is SBL curve.

SBL curve is comparable to the Kenora Forest MIST.

2012 FMP estimate slightly higher, but 2023 considered reliable (later peak).

RED curve chosen NAT volumes - tail end was later adjusted for natural succesion



AGE:	SBM NAT	KF2022	WJ2012	Tail Adjust SBM NAT ADJ
A5	0	0	0	0
A15	1	1	2	0
A25	6	7	10	5
A35	18	19	25	19
A45	35	36	46	33
A55	51	53	69	50
A65	67	68	90	68
A75	79	80	108	79
A85	90	90	122	89
A95	99	97	131	98
A105	105	103	134	106
A115	110	106	131	111
A125	114	108	122	114
A135	116	108	110	116
A145	116	107	99	116
A155	116	105	86	116
A165	114	101	75	111
A175	111	97	65	105
A185	108	93	57	96
A195	104	88	50	90
A205	99	83	43	85
A215	95	80	38	80
A225	90	80	33	80
A235	85	80	28	80
A245	80	80	24	80
A255	76	80	21	80

Rationale:

Used MIST with management unit data and variable stocking profile

Regional consensus that current MIST version is better than 2012 WJ volume generator

WJ2012 is SPM curve.

SBM curve slightly higher than the Kenora Forest MIST.

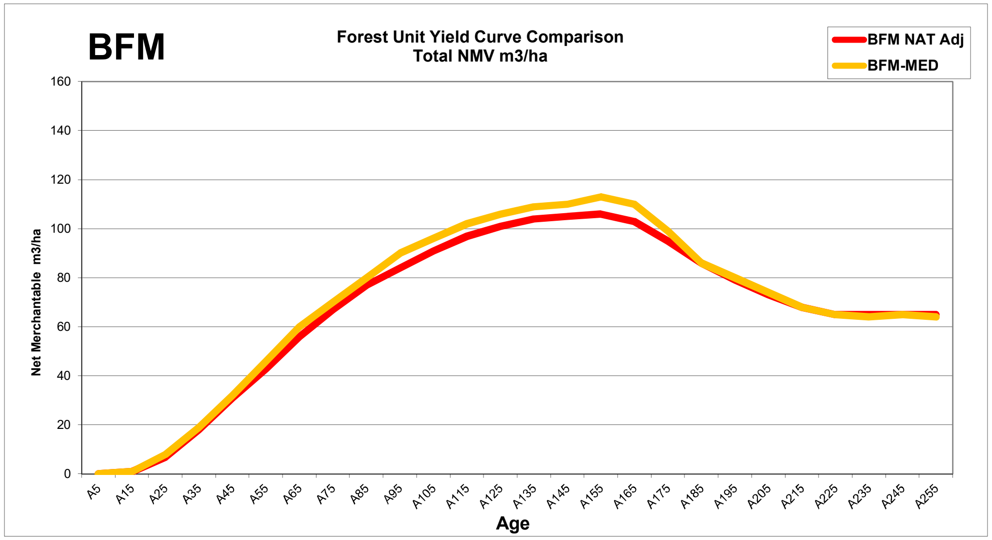
2012 FMP estimate is higher, but 2023 considered reliable (later peak).

RED curve chosen NAT volumes - tail end was later adjusted for natural succesion

Whiskey Jack Forest 2023 FMP - Managed Yield Curve Comparison

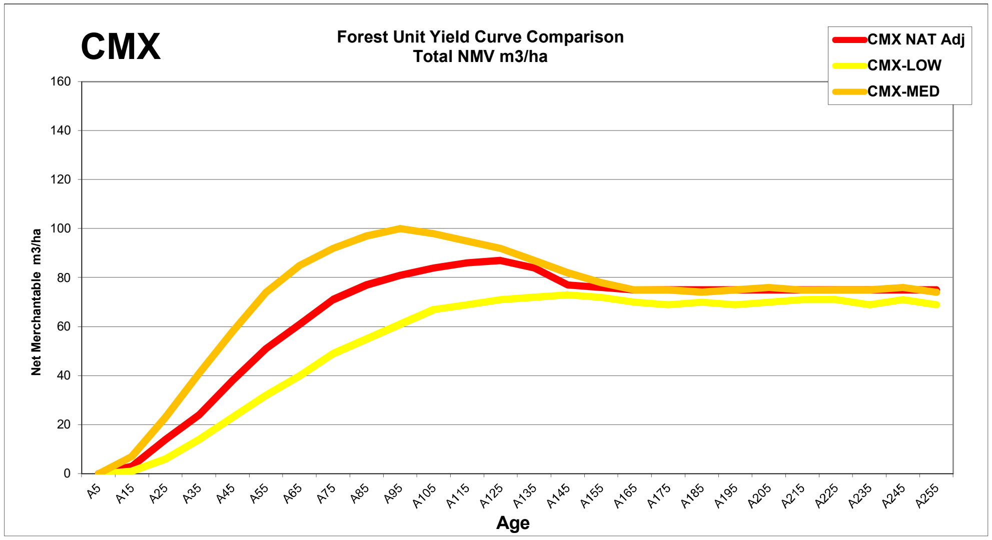
BFM

AGE:	BFM NAT Adj		LOW	MED: BFM-MED	HIGH
A5	0			0	
A15	1			1	
A25	7			8	
A35	18			19	
A45	31			32	
A55	43			46	
A65	56			60	
A75	67			70	
A85	77			80	
A95	84			90	
A105	91			96	
A115	97			102	
A125	101			106	
A135	104			109	
A145	105			110	
A155	106			113	
A165	103			110	
A175	95			99	
A185	86			86	
A195	79			80	
A205	73			74	
A215	68			68	
A225	65			65	
A235	65			64	
A245	65			65	
A255	65			64	



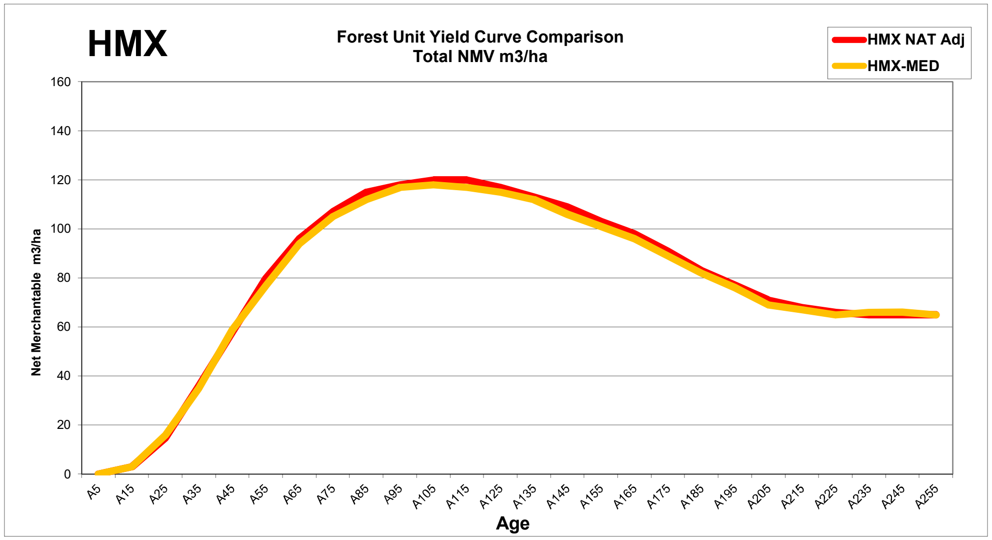
CMX Blended

AGE:	CMX NAT Adj		CMX-LOW	CMX-MED	
A5	0		0	0	
A15	3		1	7	
A25	14		6	23	
A35	24		14	41	
A45	38		23	58	
A55	51		32	74	
A65	61		40	85	
A75	71		49	92	
A85	77		55	97	
A95	81		61	100	
A105	84		67	98	
A115	86		69	95	
A125	87		71	92	
A135	84		72	87	
A145	77		73	82	
A155	76		72	78	
A165	75		70	75	
A175	75		69	75	
A185	75		70	74	
A195	75		69	75	
A205	75		70	76	
A215	75		71	75	
A225	75		71	75	
A235	75		69	75	
A245	75		71	76	
A255	75		69	74	



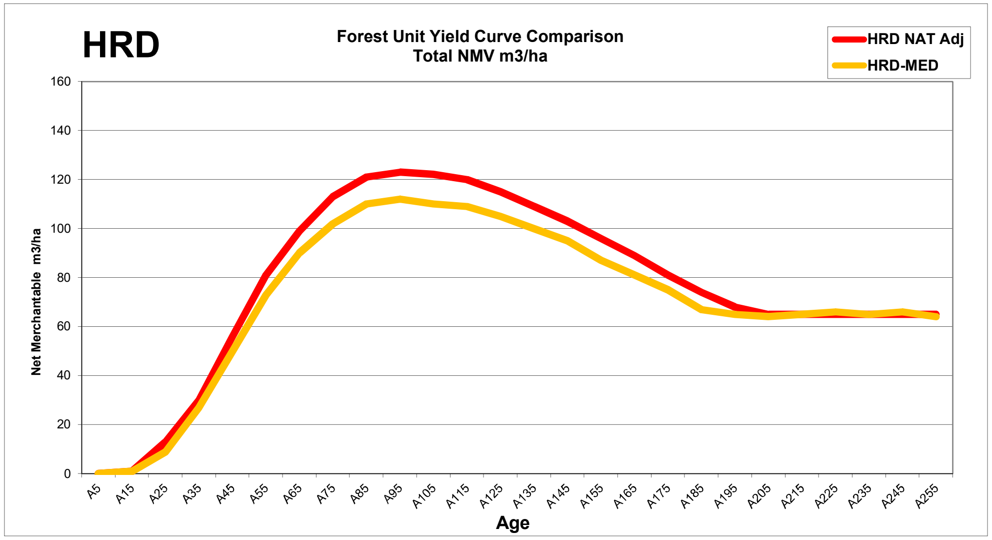
HMX

AGE:	HMX NAT Adj			HMX-MED	
A5	0			0	
A15	3			3	
A25	15			16	
A35	36			35	
A45	58			59	
A55	80			77	
A65	96			94	
A75	107			105	
A85	115			112	
A95	118			117	
A105	120			118	
A115	120			117	
A125	117			115	
A135	113			112	
A145	109			106	
A155	103			101	
A165	98			96	
A175	91			89	
A185	83			82	
A195	77			76	
A205	71			69	
A215	68			67	
A225	66			65	
A235	65			66	
A245	65			66	
A255	65			65	



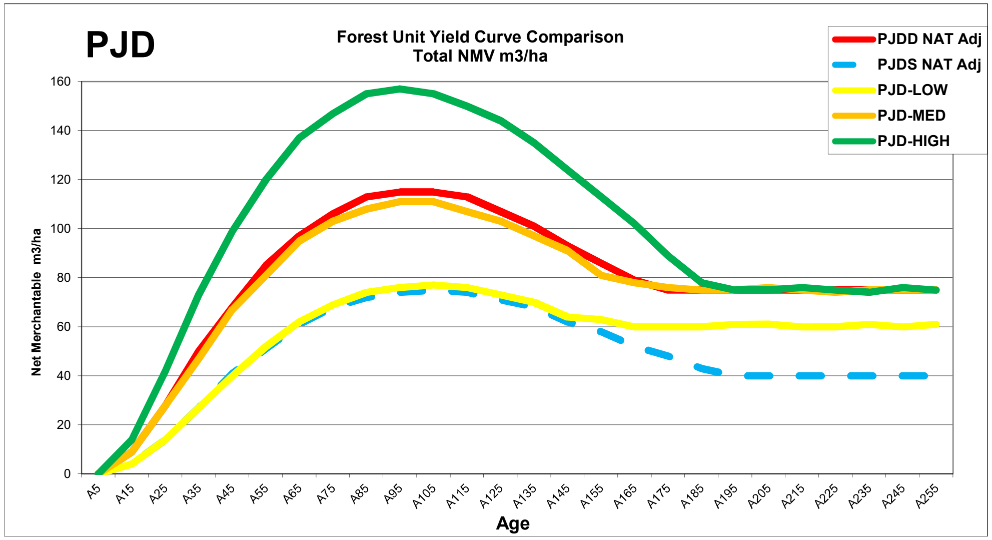
HRD

AGE:	HRD NAT Adj			HRD-MED	
A5	0			0	
A15	1			1	
A25	13			9	
A35	30			27	
A45	56			50	
A55	81			73	
A65	99			90	
A75	113			102	
A85	121			110	
A95	123			112	
A105	122			110	
A115	120			109	
A125	115			105	
A135	109			100	
A145	103			95	
A155	96			87	
A165	89			81	
A175	81			75	
A185	74			67	
A195	68			65	
A205	65			64	
A215	65			65	
A225	65			66	
A235	65			65	
A245	65			66	
A255	65			64	



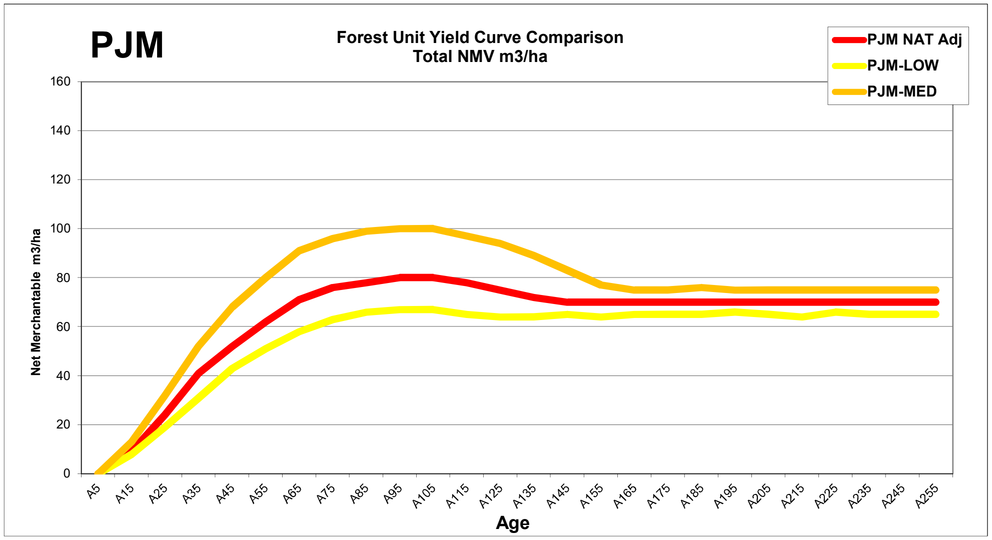
PJD

AGE:	PJDD NAT Adj	PJDS NAT Adj	(shallow) PJD-LOW	(deep) PJD-MED	(deep) PJD-HIGH
A5	0	0	0	0	0
A15	9	4	4	9	14
A25	28	14	14	28	42
A35	50	27	27	47	73
A45	68	41	40	67	99
A55	85	51	52	81	120
A65	97	61	62	95	137
A75	106	68	69	103	147
A85	113	72	74	108	155
A95	115	74	76	111	157
A105	115	75	77	111	155
A115	113	74	76	107	150
A125	107	71	73	103	144
A135	101	68	70	97	135
A145	93	62	64	91	124
A155	86	58	63	81	113
A165	79	52	60	78	102
A175	75	48	60	76	89
A185	75	43	60	75	78
A195	75	40	61	75	75
A205	75	40	61	76	75
A215	75	40	60	75	76
A225	75	40	60	74	75
A235	75	40	61	75	74
A245	75	40	60	75	76
A255	75	40	61	75	75



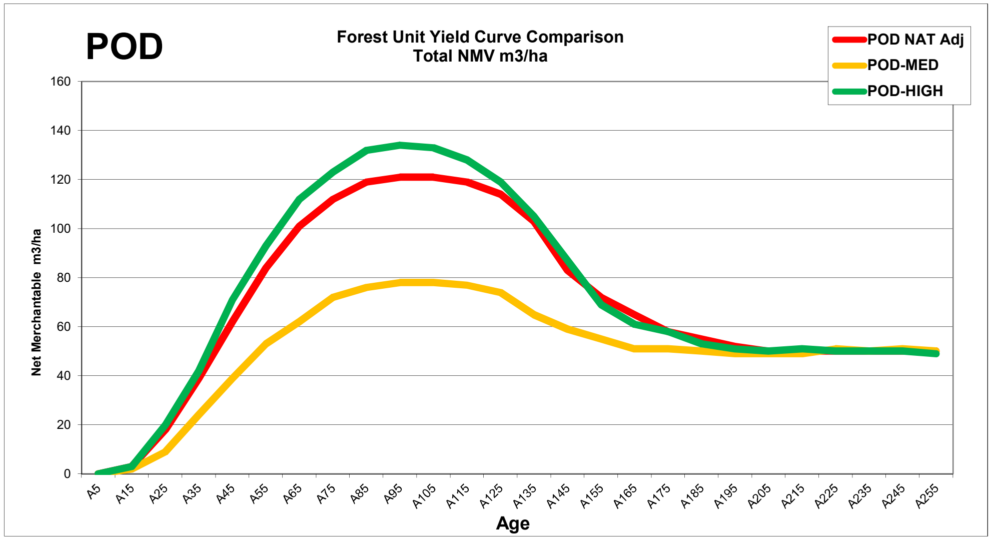
PJM

AGE:	PJM NAT Adj		PJM-LOW	PJM-MED	
A5	0		0	0	
A15	9		8	13	
A25	24		19	32	
A35	41		31	52	
A45	52		43	68	
A55	62		51	80	
A65	71		58	91	
A75	76		63	96	
A85	78		66	99	
A95	80		67	100	
A105	80		67	100	
A115	78		65	97	
A125	75		64	94	
A135	72		64	89	
A145	70		65	83	
A155	70		64	77	
A165	70		65	75	
A175	70		65	75	
A185	70		65	76	
A195	70		66	75	
A205	70		65	75	
A215	70		64	75	
A225	70		66	75	
A235	70		65	75	
A245	70		65	75	
A255	70		65	75	



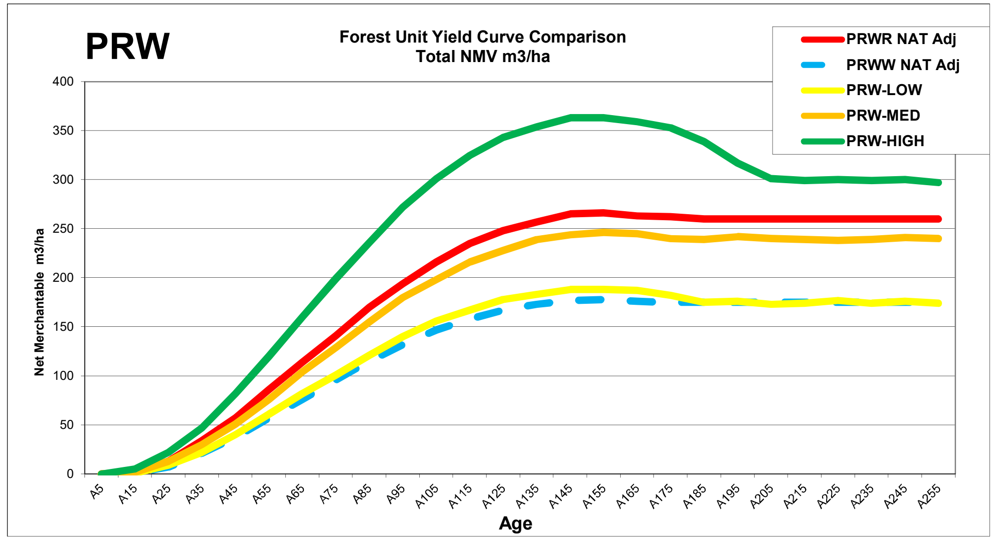
POD

AGE:	POD NAT Adj			POD-MED	POD-HIGH
A5	0			0	0
A15	3			2	3
A25	18			9	20
A35	39			24	42
A45	62			39	71
A55	84			53	93
A65	101			62	112
A75	112			72	123
A85	119			76	132
A95	121			78	134
A105	121			78	133
A115	119			77	128
A125	114			74	119
A135	103			65	105
A145	83			59	87
A155	72			55	69
A165	65			51	61
A175	58			51	58
A185	55			50	53
A195	52			49	51
A205	50			49	50
A215	50			49	51
A225	50			51	50
A235	50			50	50
A245	50			51	50
A255	50			50	49



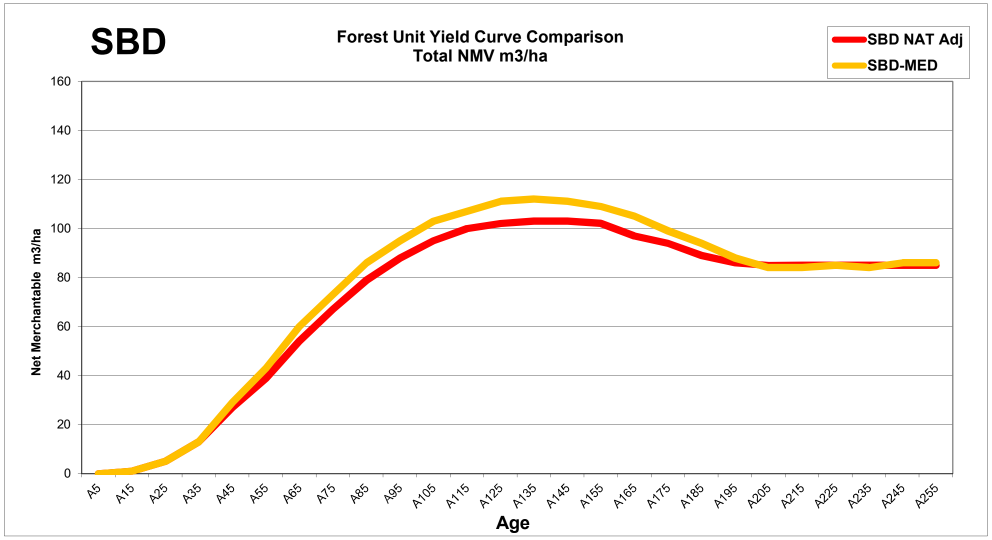
PRW

AGE:	PRWR NAT Adj	PRWW NAT Adj	PRW-LOW (White Pine)	PRW-MED (Red Pine)	PRW-HIGH (Red Pine)
A5	0	0	0	0	0
A15	2	1	1	2	5
A25	13	7	9	13	22
A35	34	21	22	30	47
A45	57	37	40	51	82
A55	86	57	61	76	120
A65	114	76	82	104	160
A75	141	96	101	129	199
A85	170	115	121	155	236
A95	194	132	140	180	272
A105	216	147	156	198	301
A115	235	158	167	216	325
A125	248	167	178	228	343
A135	257	173	183	239	354
A145	265	177	188	244	363
A155	266	178	188	246	363
A165	263	176	187	245	359
A175	262	175	182	240	353
A185	260	175	175	239	339
A195	260	175	176	242	317
A205	260	175	173	240	301
A215	260	175	174	239	299
A225	260	175	177	238	300
A235	260	175	174	239	299
A245	260	175	176	241	300
A255	260	175	174	240	297



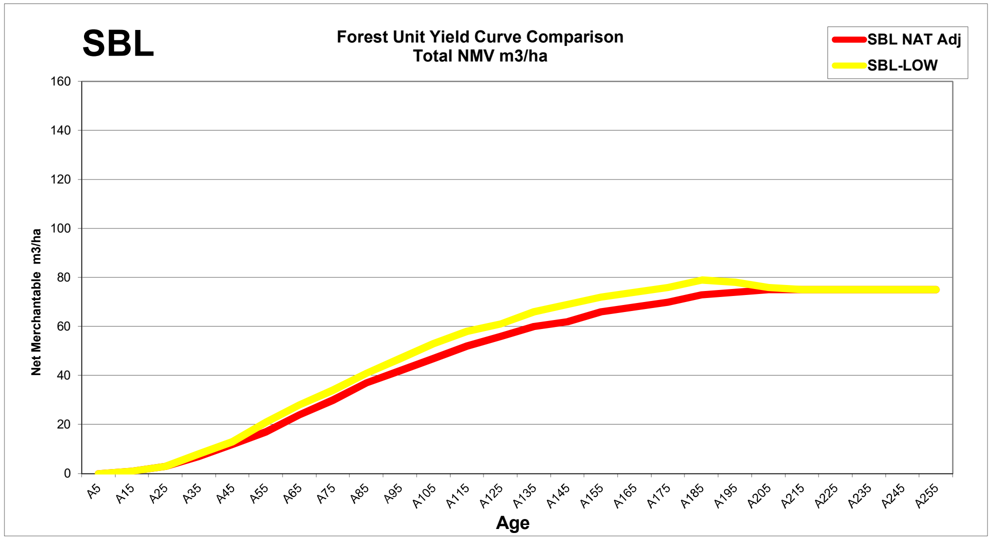
SBD

AGE:	SBD NAT Adj			SBD-MED	
A5	0			0	
A15	1			1	
A25	5			5	
A35	13			13	
A45	27			29	
A55	39			43	
A65	54			60	
A75	67			73	
A85	79			86	
A95	88			95	
A105	95			103	
A115	100			107	
A125	102			111	
A135	103			112	
A145	103			111	
A155	102			109	
A165	97			105	
A175	94			99	
A185	89			94	
A195	86			88	
A205	85			84	
A215	85			84	
A225	85			85	
A235	85			84	
A245	85			86	
A255	85			86	



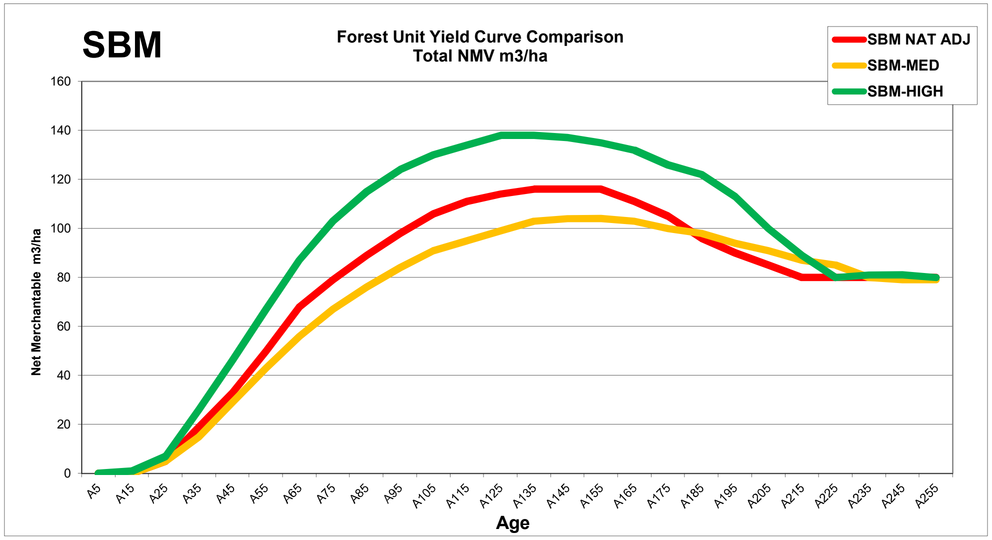
SBL

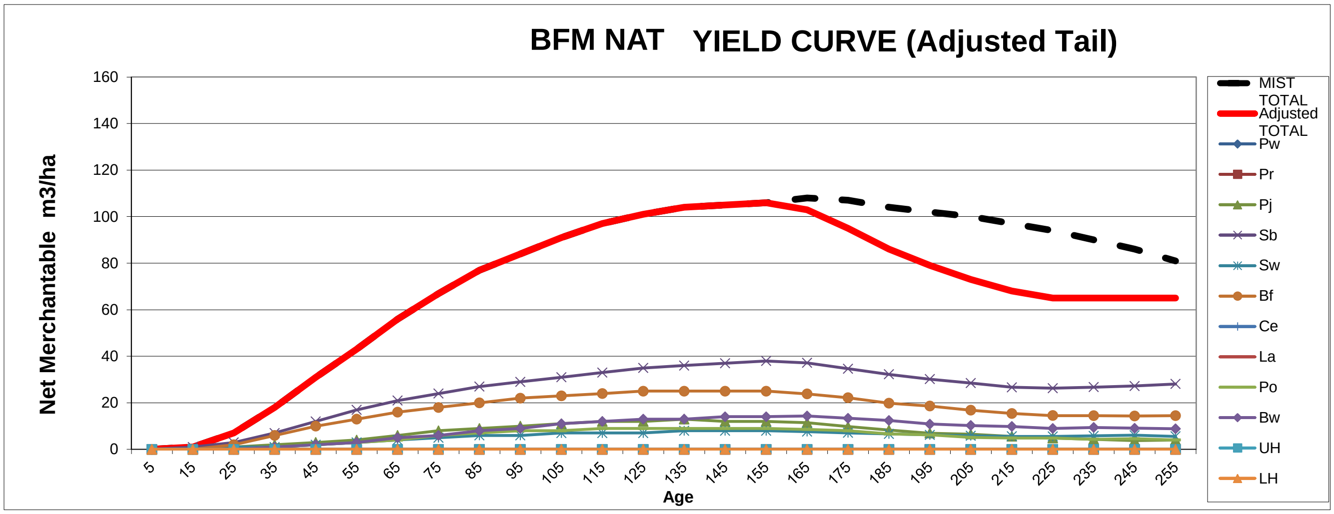
AGE:	SBL NAT Adj		SBL-LOW		
A5	0		0		
A15	1		1		
A25	3		3		
A35	7		8		
A45	12		13		
A55	17		21		
A65	24		28		
A75	30		34		
A85	37		41		
A95	42		47		
A105	47		53		
A115	52		58		
A125	56		61		
A135	60		66		
A145	62		69		
A155	66		72		
A165	68		74		
A175	70		76		
A185	73		79		
A195	74		78		
A205	75		76		
A215	75		75		
A225	75		75		
A235	75		75		
A245	75		75		
A255	75		75		



SBM

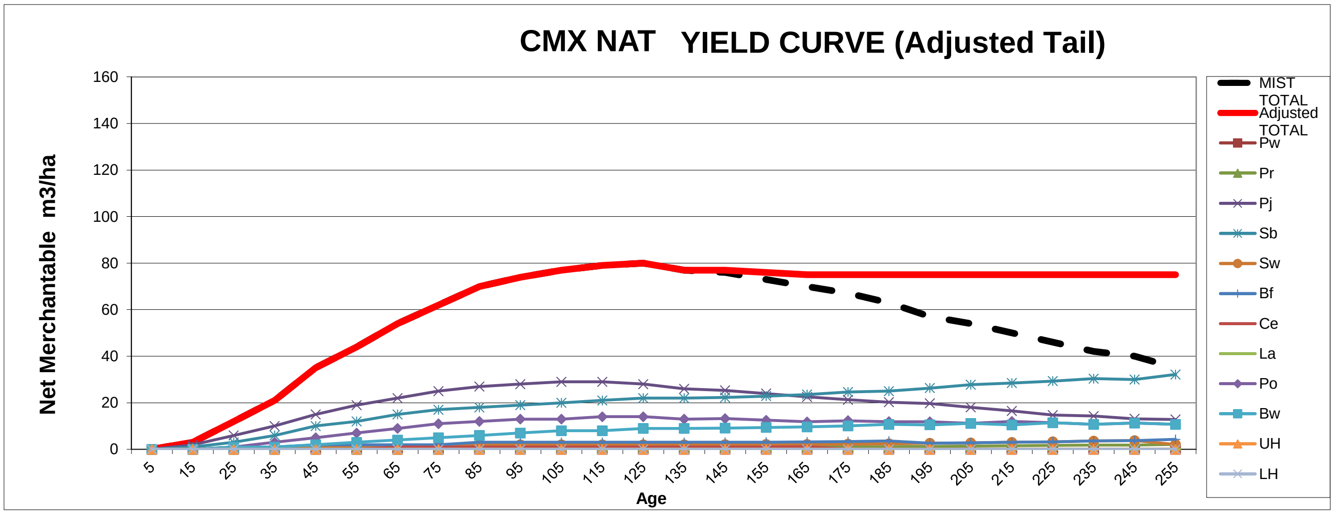
AGE:	SBM NAT ADJ			SBM-MED	SBM-HIGH
A5	0			0	0
A15	0			0	1
A25	5			5	7
A35	19			15	26
A45	33			29	46
A55	50			43	67
A65	68			56	87
A75	79			67	103
A85	89			76	115
A95	98			84	124
A105	106			91	130
A115	111			95	134
A125	114			99	138
A135	116			103	138
A145	116			104	137
A155	116			104	135
A165	111			103	132
A175	105			100	126
A185	96			98	122
A195	90			94	113
A205	85			91	100
A215	80			87	89
A225	80			85	80
A235	80			80	81
A245	80			79	81
A255	80			79	80





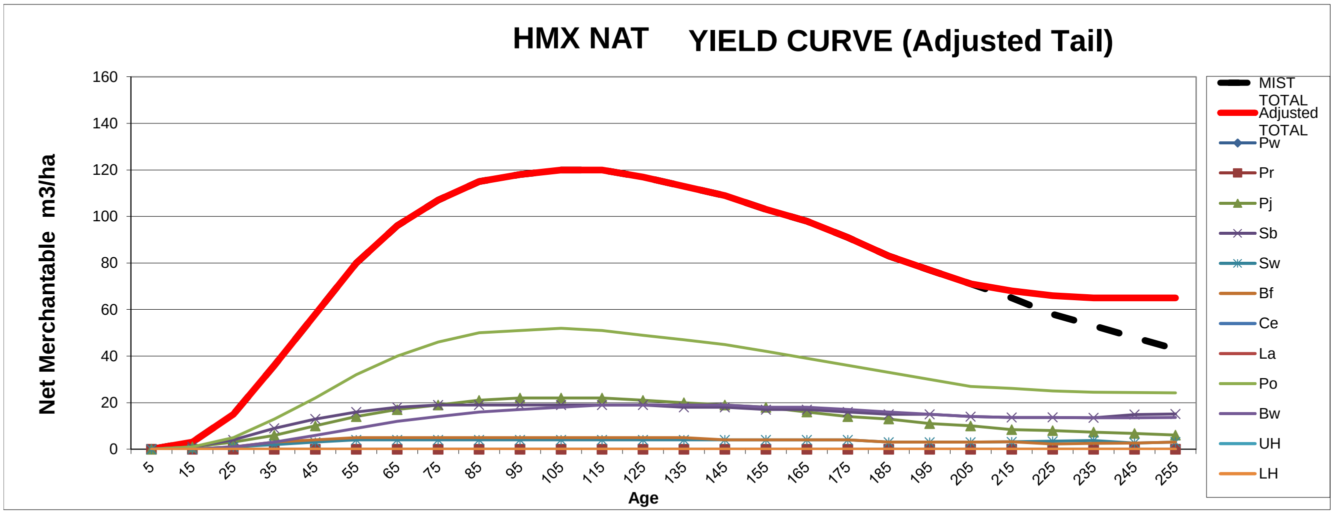
FU	AC10	MIST TOTAL	Adjusted TOTA	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
BFM NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BFM NAT	15	1	1	0	0	0	1	0	0	0	0	0	0	0	0
BFM NAT	25	7	7	0	0	1	3	1	2	0	0	0	0	0	0
BFM NAT	35	18	18	0	0	2	7	1	6	0	0	1	1	0	0
BFM NAT	45	31	31	0	0	3	12	2	10	0	0	2	2	0	0
BFM NAT	55	43	43	0	0	4	17	3	13	0	0	3	3	0	0
BFM NAT	65	56	56	0	0	6	21	4	16	0	0	4	5	0	0
BFM NAT	75	67	67	0	0	8	24	5	18	0	0	6	6	0	0
BFM NAT	85	77	77	0	0	9	27	6	20	0	0	7	8	0	0
BFM NAT	95	84	84	0	0	10	29	6	22	0	0	8	9	0	0
BFM NAT	105	91	91	0	0	11	31	7	23	0	0	8	11	0	0
BFM NAT	115	97	97	0	0	12	33	7	24	0	0	9	12	0	0
BFM NAT	125	101	101	0	0	12	35	7	25	0	0	9	13	0	0
BFM NAT	135	104	104	0	0	13	36	8	25	0	0	9	13	0	0
BFM NAT	145	105	105	0	0	12	37	8	25	0	0	9	14	0	0
BFM NAT	155	106	106	0	0	12	38	8	25	0	0	9	14	0	0
BFM NAT	165	108	103	0	0	11	37	8	24	0	0	9	14	0	0
BFM NAT	175	107	95	0	0	10	35	7	22	0	0	8	13	0	0
BFM NAT	185	104	86	0	0	8	32	7	20	0	0	7	12	0	0
BFM NAT	195	102	79	0	0	7	30	6	19	0	0	6	11	0	0
BFM NAT	205	100	73	0	0	7	28	6	17	0	0	5	10	0	0
BFM NAT	215	97	68	0	0	6	27	6	15	0	0	5	10	0	0
BFM NAT	225	94	65	0	0	5	26	6	15	0	0	5	9	0	0
BFM NAT	235	90	65	0	0	4	27	6	14	0	0	4	9	0	0
BFM NAT	245	86	65	0	0	4	27	6	14	0	0	5	9	0	0
BFM NAT	255	81	65	0	0	4	28	6	14	0	0	4	9	0	0

Total net merchantable volume peak of yield curve



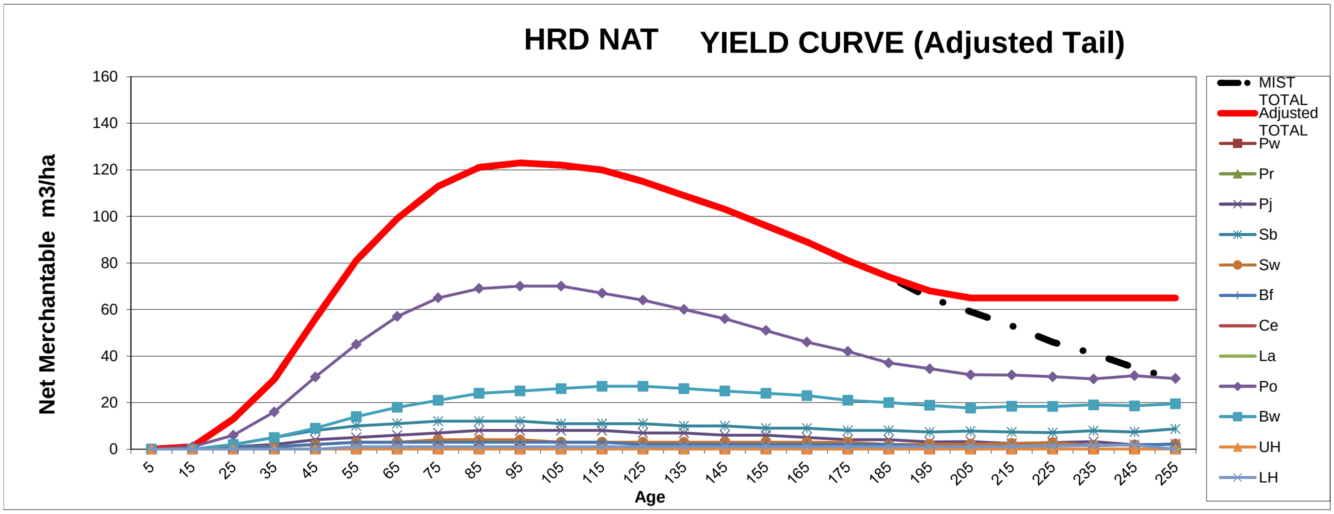
FU	AC10	MIST TOTAL	Adjusted TOTA	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
CMX NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CMX NAT	15	3	3	0	0	2	1	0	0	0	0	0	0	0	0
CMX NAT	25	12	12	0	0	6	3	0	1	0	0	1	1	0	0
CMX NAT	35	21	21	0	0	10	6	0	1	0	0	3	1	0	0
CMX NAT	45	35	35	0	0	15	10	1	2	0	0	5	2	0	0
CMX NAT	55	44	44	0	0	19	12	1	2	0	0	7	3	0	0
CMX NAT	65	54	54	0	0	22	15	1	2	1	0	9	4	0	0
CMX NAT	75	62	62	0	0	25	17	1	2	1	0	11	5	0	0
CMX NAT	85	70	70	0	1	27	18	2	3	1	0	12	6	0	0
CMX NAT	95	74	74	0	1	28	19	2	3	1	0	13	7	0	0
CMX NAT	105	77	77	0	1	29	20	2	3	1	0	13	8	0	0
CMX NAT	115	79	79	0	1	29	21	2	3	1	0	14	8	0	0
CMX NAT	125	80	80	0	1	28	22	2	3	1	0	14	9	0	0
CMX NAT	135	77	77	0	1	26	22	2	3	1	0	13	9	0	0
CMX NAT	145	76	77	0	1	25	22	2	3	1	0	13	9	0	0
CMX NAT	155	73	76	0	1	24	23	2	3	1	0	12	9	0	0
CMX NAT	165	70	75	0	1	23	24	2	3	1	0	12	10	0	0
CMX NAT	175	67	75	0	1	21	25	2	3	0	0	12	10	0	0
CMX NAT	185	63	75	0	1	20	25	2	4	0	0	12	11	0	0
CMX NAT	195	57	75	0	1	20	26	3	3	0	0	12	11	0	0
CMX NAT	205	54	75	0	1	18	28	3	3	0	0	11	11	0	0
CMX NAT	215	50	75	0	2	17	29	3	3	0	0	12	11	0	0
CMX NAT	225	46	75	0	2	15	29	3	3	0	0	11	11	0	0
CMX NAT	235	42	75	0	2	14	30	4	4	0	0	11	11	0	0
CMX NAT	245	40	75	0	2	13	30	4	4	0	0	11	11	0	0
CMX NAT	255	35	75	0	2	13	32	2	4	0	0	11	11	0	0

Total net merchantable volume peak of yield curve



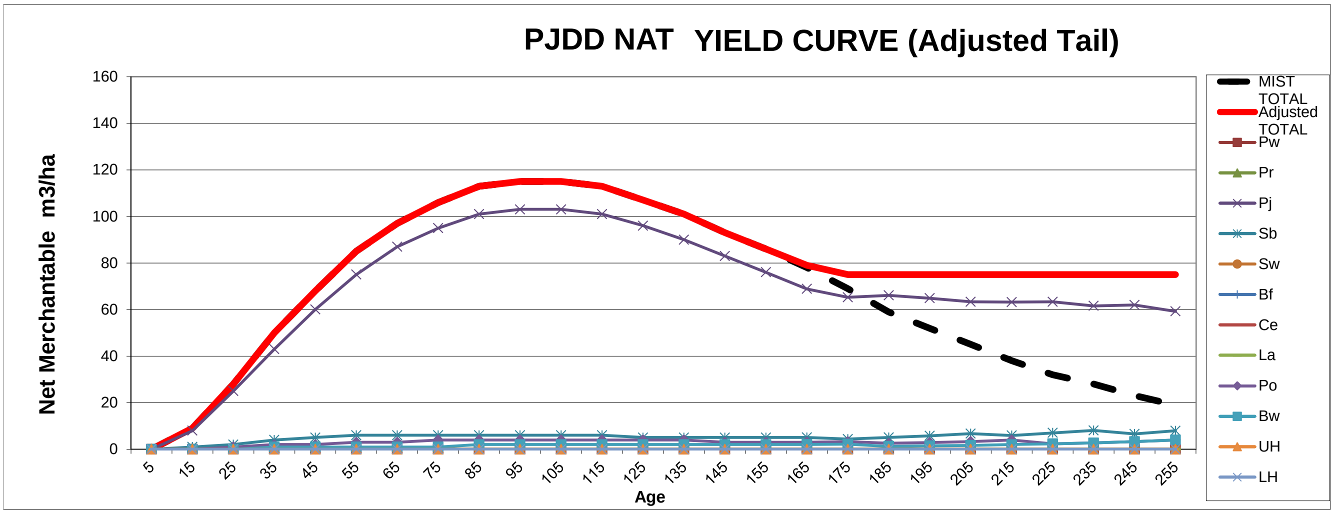
FU	AC10	MIST TOTAL	Adjusted TOTA	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
HMX NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMX NAT	15	3	3	0	0	1	1	0	0	0	0	1	0	0	0
HMX NAT	25	15	15	0	0	3	4	1	1	0	0	5	1	0	0
HMX NAT	35	36	36	0	0	6	9	2	3	0	0	13	3	0	0
HMX NAT	45	58	58	0	0	10	13	3	4	0	0	22	6	0	0
HMX NAT	55	80	80	0	0	14	16	4	5	0	0	32	9	0	0
HMX NAT	65	96	96	0	0	17	18	4	5	0	0	40	12	0	0
HMX NAT	75	107	107	0	0	19	19	4	5	0	0	46	14	0	0
HMX NAT	85	115	115	0	0	21	19	4	5	0	0	50	16	0	0
HMX NAT	95	118	118	0	0	22	19	4	5	0	0	51	17	0	0
HMX NAT	105	120	120	0	0	22	19	4	5	0	0	52	18	0	0
HMX NAT	115	120	120	0	0	22	19	4	5	0	0	51	19	0	0
HMX NAT	125	117	117	0	0	21	19	4	5	0	0	49	19	0	0
HMX NAT	135	113	113	0	0	20	18	4	5	0	0	47	19	0	0
HMX NAT	145	109	109	0	0	19	18	4	4	0	0	45	19	0	0
HMX NAT	155	103	103	0	0	18	17	4	4	0	0	42	18	0	0
HMX NAT	165	98	98	0	0	16	17	4	4	0	0	39	18	0	0
HMX NAT	175	91	91	0	0	14	16	4	4	0	0	36	17	0	0
HMX NAT	185	83	83	0	0	13	15	3	3	0	0	33	16	0	0
HMX NAT	195	77	77	0	0	11	15	3	3	0	0	30	15	0	0
HMX NAT	205	71	71	0	0	10	14	3	3	0	0	27	14	0	0
HMX NAT	215	65	68	0	0	8	14	3	3	0	0	26	14	0	0
HMX NAT	225	58	66	0	0	8	14	3	2	0	0	25	14	0	0
HMX NAT	235	53	65	0	0	7	13	4	2	0	0	25	13	0	0
HMX NAT	245	48	65	0	0	7	15	3	3	0	0	24	14	0	0
HMX NAT	255	43	65	0	0	6	15	3	3	0	0	24	14	0	0

Total net merchantable volume peak of yield curve



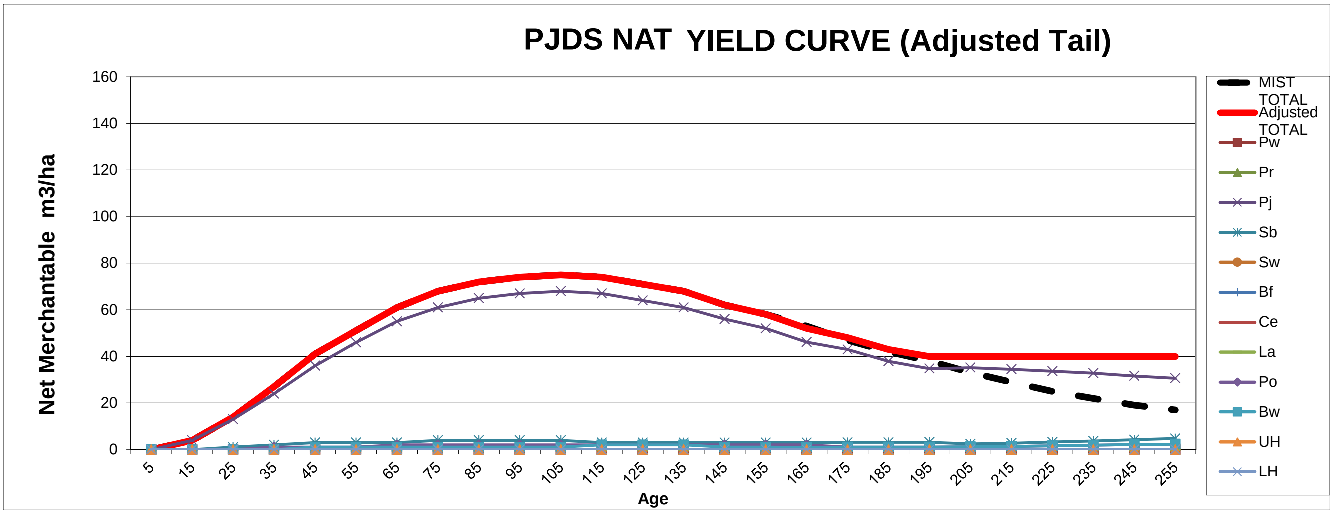
FU	AC10	MIST TOTAL	Adjusted TOTA	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
HRD NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HRD NAT	15	1	1	0	0	0	0	0	0	0	0	1	0	0	0
HRD NAT	25	13	13	0	0	1	2	1	1	0	0	6	2	0	0
HRD NAT	35	30	30	0	0	2	5	1	1	0	0	16	5	0	0
HRD NAT	45	56	56	0	0	4	8	2	2	0	0	31	9	0	0
HRD NAT	55	81	81	0	0	5	10	3	3	0	0	45	14	0	1
HRD NAT	65	99	99	0	0	6	11	3	3	0	0	57	18	0	1
HRD NAT	75	113	113	0	0	7	12	4	3	0	0	65	21	0	1
HRD NAT	85	121	121	0	0	8	12	4	3	0	0	69	24	0	1
HRD NAT	95	123	123	0	0	8	12	4	3	0	0	70	25	0	1
HRD NAT	105	122	122	0	0	8	11	3	3	0	0	70	26	0	1
HRD NAT	115	120	120	0	0	8	11	3	3	0	0	67	27	0	1
HRD NAT	125	115	115	0	0	7	11	3	2	0	0	64	27	0	1
HRD NAT	135	109	109	0	0	7	10	3	2	0	0	60	26	0	1
HRD NAT	145	103	103	0	0	6	10	3	2	0	0	56	25	0	1
HRD NAT	155	96	96	0	0	6	9	3	2	0	0	51	24	0	1
HRD NAT	165	89	89	0	0	5	9	3	2	0	0	46	23	0	1
HRD NAT	175	81	81	0	0	4	8	3	2	0	0	42	21	0	1
HRD NAT	185	74	74	0	0	4	8	2	2	0	0	37	20	0	1
HRD NAT	195	65	68	0	0	3	7	2	1	0	0	35	19	0	1
HRD NAT	205	59	65	0	0	3	8	2	1	0	0	32	18	0	1
HRD NAT	215	53	65	0	0	2	7	2	1	0	0	32	18	0	1
HRD NAT	225	46	65	0	0	3	7	3	1	0	0	31	18	0	1
HRD NAT	235	41	65	0	0	3	8	2	2	0	0	30	19	0	2
HRD NAT	245	35	65	0	0	2	7	2	2	0	0	32	19	0	2
HRD NAT	255	30	65	0	0	2	9	2	2	0	0	30	20	0	0

Total net merchantable volume peak of yield curve



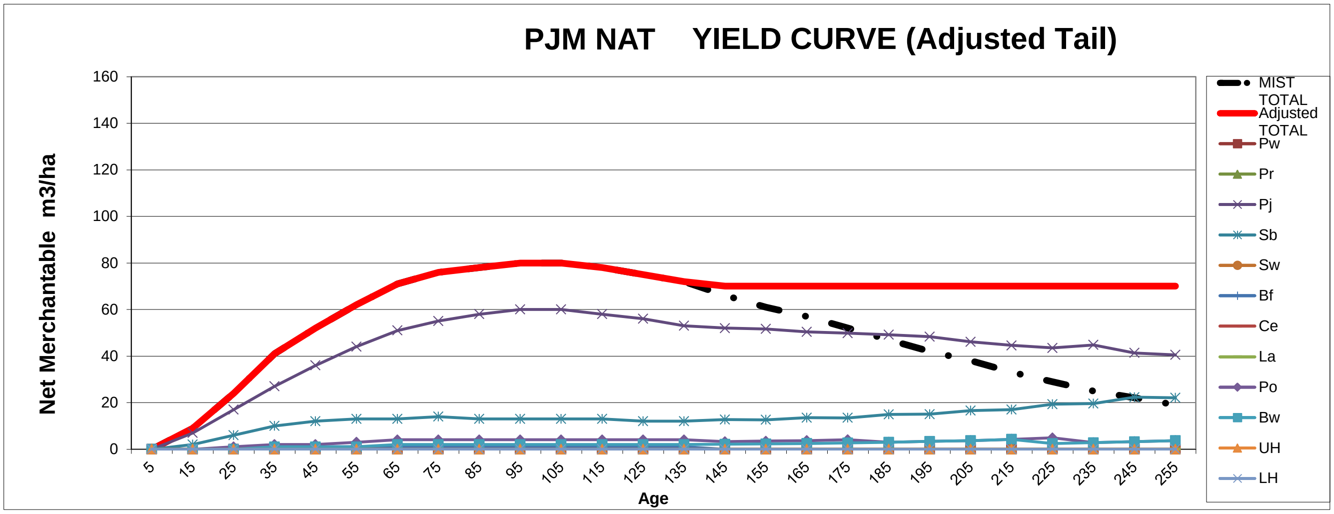
FU	AC10	MIST TOTAL	Adjusted TOTA	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PJDD NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PJDD NAT	15	9	9	0	0	8	1	0	0	0	0	0	0	0	0
PJDD NAT	25	28	28	0	0	25	2	0	0	0	0	1	0	0	0
PJDD NAT	35	50	50	0	0	43	4	0	0	0	0	2	1	0	0
PJDD NAT	45	68	68	0	0	60	5	0	0	0	0	2	1	0	0
PJDD NAT	55	85	85	0	0	75	6	0	0	0	0	3	1	0	0
PJDD NAT	65	97	97	0	0	87	6	0	0	0	0	3	1	0	0
PJDD NAT	75	106	106	0	0	95	6	0	0	0	0	4	1	0	0
PJDD NAT	85	113	113	0	0	101	6	0	0	0	0	4	2	0	0
PJDD NAT	95	115	115	0	0	103	6	0	0	0	0	4	2	0	0
PJDD NAT	105	115	115	0	0	103	6	0	0	0	0	4	2	0	0
PJDD NAT	115	113	113	0	0	101	6	0	0	0	0	4	2	0	0
PJDD NAT	125	107	107	0	0	96	5	0	0	0	0	4	2	0	0
PJDD NAT	135	101	101	0	0	90	5	0	0	0	0	4	2	0	0
PJDD NAT	145	93	93	0	0	83	5	0	0	0	0	3	2	0	0
PJDD NAT	155	86	86	0	0	76	5	0	0	0	0	3	2	0	0
PJDD NAT	165	78	79	0	0	69	5	0	0	0	0	3	2	0	0
PJDD NAT	175	69	75	0	0	65	4	0	0	0	0	3	2	0	0
PJDD NAT	185	59	75	0	0	66	5	0	0	0	0	3	1	0	0
PJDD NAT	195	52	75	0	0	65	6	0	0	0	0	3	1	0	0
PJDD NAT	205	45	75	0	0	63	7	0	0	0	0	3	2	0	0
PJDD NAT	215	38	75	0	0	63	6	0	0	0	0	4	2	0	0
PJDD NAT	225	32	75	0	0	63	7	0	0	0	0	2	2	0	0
PJDD NAT	235	28	75	0	0	62	8	0	0	0	0	3	3	0	0
PJDD NAT	245	23	75	0	0	62	7	0	0	0	0	3	3	0	0
PJDD NAT	255	19	75	0	0	59	8	0	0	0	0	4	4	0	0

Total net merchantable volume peak of yield curve



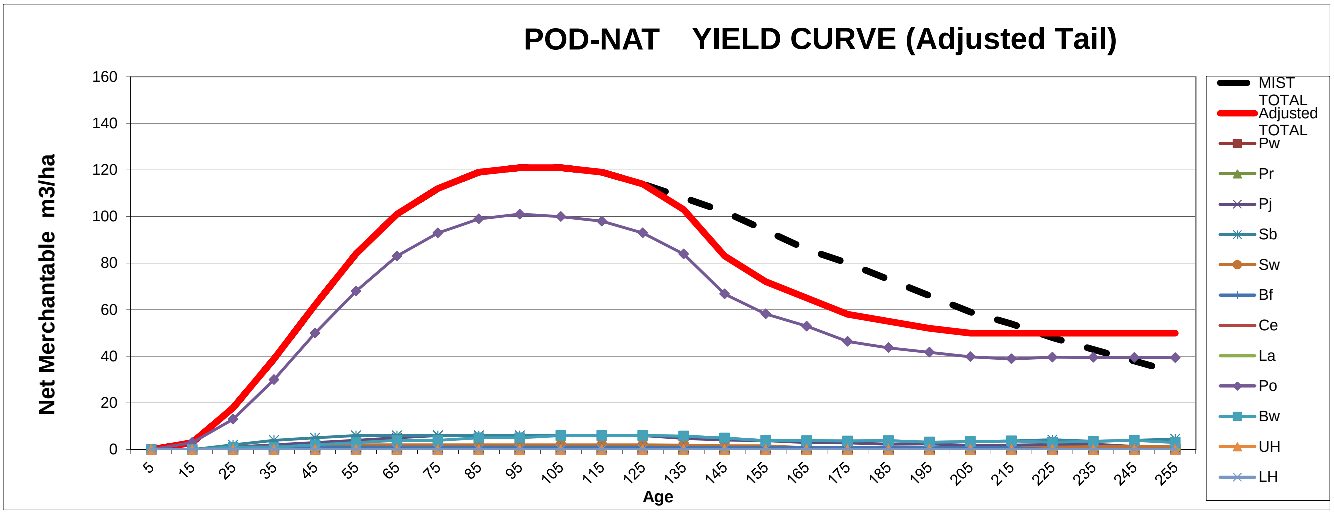
FU	AC10	MIST TOTAL	Adjusted TOTA	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PJDS NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PJDS NAT	15	4	4	0	0	4	0	0	0	0	0	0	0	0	0
PJDS NAT	25	14	14	0	0	13	1	0	0	0	0	0	0	0	0
PJDS NAT	35	27	27	0	0	24	2	0	0	0	0	1	0	0	0
PJDS NAT	45	41	41	0	0	36	3	0	0	0	0	1	1	0	0
PJDS NAT	55	51	51	0	0	46	3	0	0	0	0	1	1	0	0
PJDS NAT	65	61	61	0	0	55	3	0	0	0	0	2	1	0	0
PJDS NAT	75	68	68	0	0	61	4	0	0	0	0	2	1	0	0
PJDS NAT	85	72	72	0	0	65	4	0	0	0	0	2	1	0	0
PJDS NAT	95	74	74	0	0	67	4	0	0	0	0	2	1	0	0
PJDS NAT	105	75	75	0	0	68	4	0	0	0	0	2	1	0	0
PJDS NAT	115	74	74	0	0	67	3	0	0	0	0	2	2	0	0
PJDS NAT	125	71	71	0	0	64	3	0	0	0	0	2	2	0	0
PJDS NAT	135	68	68	0	0	61	3	0	0	0	0	2	2	0	0
PJDS NAT	145	62	62	0	0	56	3	0	0	0	0	2	1	0	0
PJDS NAT	155	58	58	0	0	52	3	0	0	0	0	2	1	0	0
PJDS NAT	165	53	52	0	0	46	3	0	0	0	0	2	1	0	0
PJDS NAT	175	47	48	0	0	43	3	0	0	0	0	1	1	0	0
PJDS NAT	185	42	43	0	0	38	3	0	0	0	0	1	1	0	0
PJDS NAT	195	38	40	0	0	35	3	0	0	0	0	1	1	0	0
PJDS NAT	205	33	40	0	0	35	2	0	0	0	0	1	1	0	0
PJDS NAT	215	29	40	0	0	34	3	0	0	0	0	1	1	0	0
PJDS NAT	225	25	40	0	0	34	3	0	0	0	0	2	2	0	0
PJDS NAT	235	22	40	0	0	33	4	0	0	0	0	2	2	0	0
PJDS NAT	245	19	40	0	0	32	4	0	0	0	0	2	2	0	0
PJDS NAT	255	17	40	0	0	31	5	0	0	0	0	2	2	0	0

Total net merchantable volume peak of yield curve



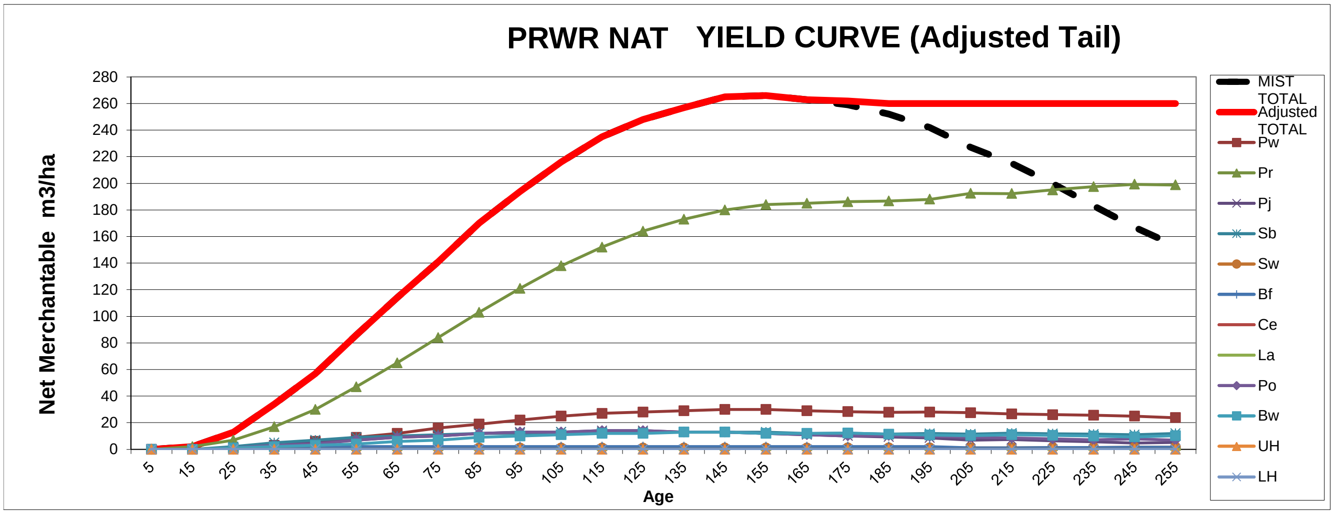
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PJM NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PJM NAT	15	9	9	0	0	7	2	0	0	0	0	0	0	0	0
PJM NAT	25	24	24	0	0	17	6	0	0	0	0	1	0	0	0
PJM NAT	35	41	41	0	0	27	10	0	1	0	0	2	1	0	0
PJM NAT	45	52	52	0	0	36	12	0	1	0	0	2	1	0	0
PJM NAT	55	62	62	0	0	44	13	0	1	0	0	3	1	0	0
PJM NAT	65	71	71	0	0	51	13	0	1	0	0	4	2	0	0
PJM NAT	75	76	76	0	0	55	14	0	1	0	0	4	2	0	0
PJM NAT	85	78	78	0	0	58	13	0	1	0	0	4	2	0	0
PJM NAT	95	80	80	0	0	60	13	0	1	0	0	4	2	0	0
PJM NAT	105	80	80	0	0	60	13	0	1	0	0	4	2	0	0
PJM NAT	115	78	78	0	0	58	13	0	1	0	0	4	2	0	0
PJM NAT	125	75	75	0	0	56	12	0	1	0	0	4	2	0	0
PJM NAT	135	72	72	0	0	53	12	0	1	0	0	4	2	0	0
PJM NAT	145	66	70	0	0	52	13	0	0	0	0	3	2	0	0
PJM NAT	155	61	70	0	0	52	13	0	0	0	0	3	2	0	0
PJM NAT	165	57	70	0	0	50	14	0	0	0	0	4	2	0	0
PJM NAT	175	52	70	0	0	50	13	0	0	0	0	4	3	0	0
PJM NAT	185	47	70	0	0	49	15	0	0	0	0	3	3	0	0
PJM NAT	195	42	70	0	0	48	15	0	0	0	0	3	3	0	0
PJM NAT	205	38	70	0	0	46	17	0	0	0	0	4	4	0	0
PJM NAT	215	33	70	0	0	45	17	0	0	0	0	4	4	0	0
PJM NAT	225	29	70	0	0	43	19	0	0	0	0	5	2	0	0
PJM NAT	235	25	70	0	0	45	20	0	0	0	0	3	3	0	0
PJM NAT	245	22	70	0	0	41	22	0	0	0	0	3	3	0	0
PJM NAT	255	19	70	0	0	41	22	0	0	0	0	4	4	0	0

Total net merchantable volume peak of yield curve



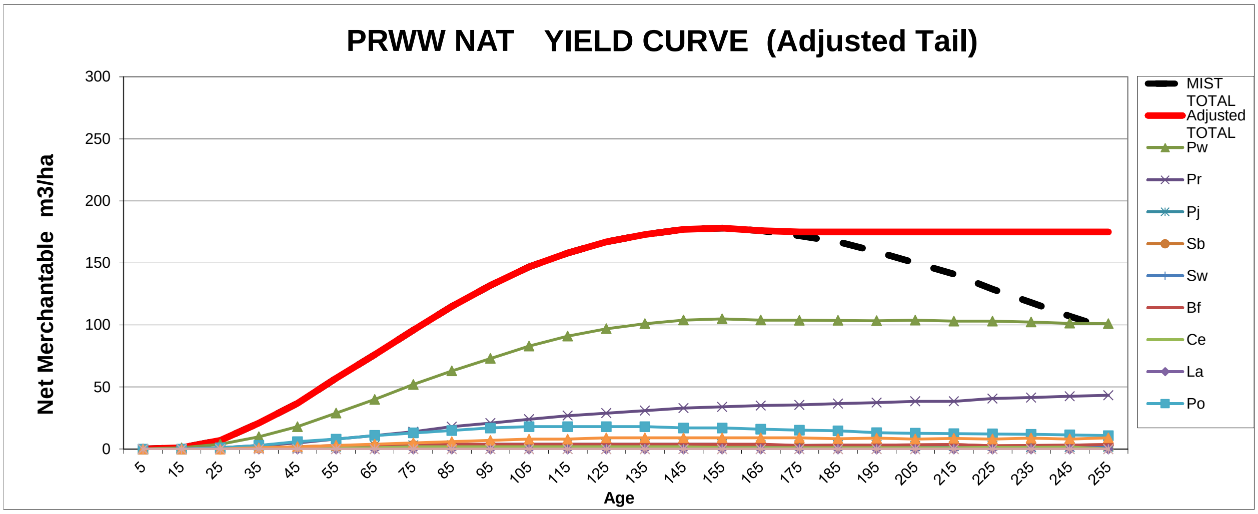
FU	AC10	MIST TOTAL	Adjusted TOTA	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
POD-NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
POD-NAT	15	3	3	0	0	0	0	0	0	0	0	3	0	0	0
POD-NAT	25	18	18	0	0	1	2	1	0	0	0	13	1	0	0
POD-NAT	35	39	39	0	0	2	4	1	1	0	0	30	1	0	0
POD-NAT	45	62	62	0	0	3	5	1	1	0	0	50	2	0	0
POD-NAT	55	84	84	0	0	4	6	2	1	0	0	68	3	0	0
POD-NAT	65	101	101	0	0	5	6	2	1	0	0	83	4	0	0
POD-NAT	75	112	112	0	0	6	6	2	1	0	0	93	4	0	0
POD-NAT	85	119	119	0	0	6	6	2	1	0	0	99	5	0	0
POD-NAT	95	121	121	0	0	6	6	2	1	0	0	101	5	0	0
POD-NAT	105	121	121	0	0	6	6	2	1	0	0	100	6	0	0
POD-NAT	115	119	119	0	0	6	6	2	1	0	0	98	6	0	0
POD-NAT	125	114	114	0	0	6	6	2	1	0	0	93	6	0	0
POD-NAT	135	108	103	0	0	5	6	2	1	0	0	84	6	0	0
POD-NAT	145	102	83	0	0	4	5	2	1	0	0	67	5	0	0
POD-NAT	155	94	72	0	0	4	4	2	1	0	0	58	4	0	0
POD-NAT	165	86	65	0	0	3	4	1	1	0	0	53	4	0	0
POD-NAT	175	80	58	0	0	3	4	1	1	0	0	46	4	0	0
POD-NAT	185	73	55	0	0	2	4	1	1	0	0	44	4	0	0
POD-NAT	195	66	52	0	0	2	3	1	1	0	0	42	3	0	0
POD-NAT	205	59	50	0	0	2	3	1	1	0	0	40	3	0	0
POD-NAT	215	54	50	0	0	2	4	1	1	0	0	39	4	0	0
POD-NAT	225	48	50	0	0	2	4	1	0	0	0	40	3	0	0
POD-NAT	235	43	50	0	0	2	3	1	0	0	0	40	3	0	0
POD-NAT	245	38	50	0	0	1	4	1	0	0	0	39	4	0	0
POD-NAT	255	33	50	0	0	2	5	2	0	0	0	39	3	0	0

Total net merchantable volume peak of yield curve



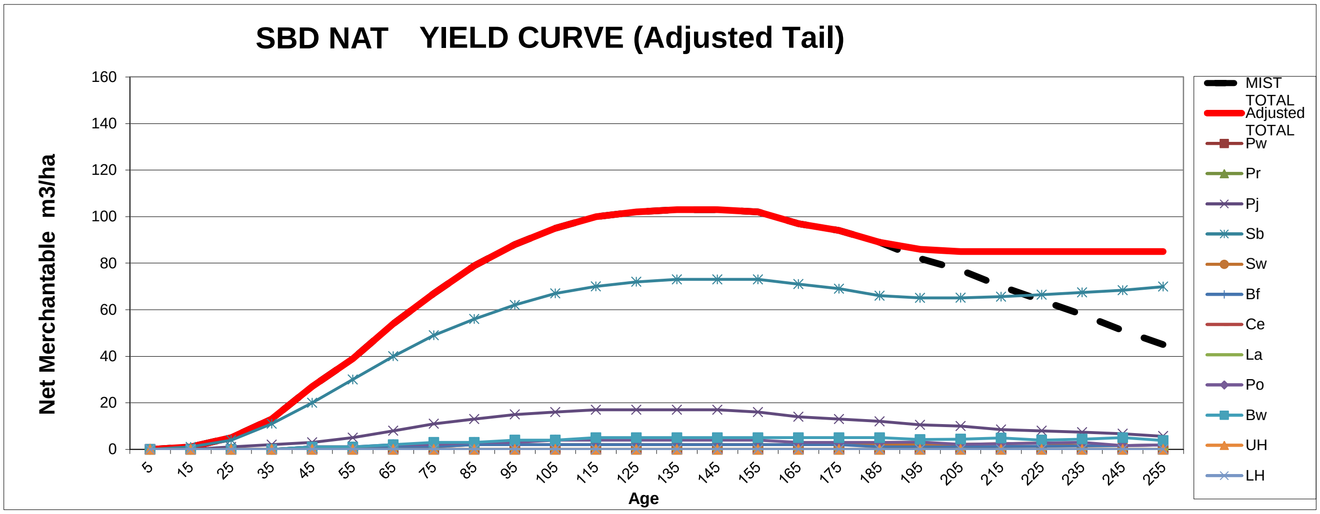
FU	AC10	MIST TOTAL	Adjusted TOTA	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PRWR NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PRWR NAT	15	2	2	0	2	0	0	0	0	0	0	0	0	0	0
PRWR NAT	25	13	13	1	7	1	2	0	0	0	0	1	1	0	0
PRWR NAT	35	34	34	3	17	3	5	0	1	0	0	3	2	0	0
PRWR NAT	45	57	57	6	30	5	7	1	1	0	0	4	3	0	0
PRWR NAT	55	86	86	9	47	7	9	1	2	0	0	7	4	0	0
PRWR NAT	65	114	114	12	65	9	10	1	2	0	0	9	6	0	0
PRWR NAT	75	141	141	16	84	10	11	1	2	0	0	10	7	0	0
PRWR NAT	85	170	170	19	103	12	12	1	2	0	0	12	9	0	0
PRWR NAT	95	194	194	22	121	13	12	1	2	0	0	13	10	0	0
PRWR NAT	105	216	216	25	138	13	13	1	2	0	0	13	11	0	0
PRWR NAT	115	235	235	27	152	14	13	1	2	0	0	14	12	0	0
PRWR NAT	125	248	248	28	164	14	13	1	2	0	0	14	12	0	0
PRWR NAT	135	257	257	29	173	13	13	1	2	0	0	13	13	0	0
PRWR NAT	145	265	265	30	180	13	13	1	2	0	0	13	13	0	0
PRWR NAT	155	266	266	30	184	12	13	1	2	0	0	12	12	0	0
PRWR NAT	165	263	263	29	185	11	12	1	2	0	0	11	12	0	0
PRWR NAT	175	259	262	28	186	10	12	1	2	0	0	10	12	0	0
PRWR NAT	185	252	260	28	187	9	11	1	2	0	0	10	11	0	0
PRWR NAT	195	242	260	28	188	9	12	1	2	0	0	10	11	0	0
PRWR NAT	205	227	260	27	192	7	11	1	1	0	0	9	10	0	0
PRWR NAT	215	215	260	27	192	7	12	1	1	0	0	8	11	0	0
PRWR NAT	225	200	260	26	195	7	12	1	1	0	0	8	10	0	0
PRWR NAT	235	183	260	26	197	6	11	1	1	0	0	7	10	0	0
PRWR NAT	245	167	260	25	199	5	11	2	2	0	0	8	9	0	0
PRWR NAT	255	153	260	24	199	5	12	2	2	0	0	7	10	0	0

Total net merchantable volume peak of yield curve



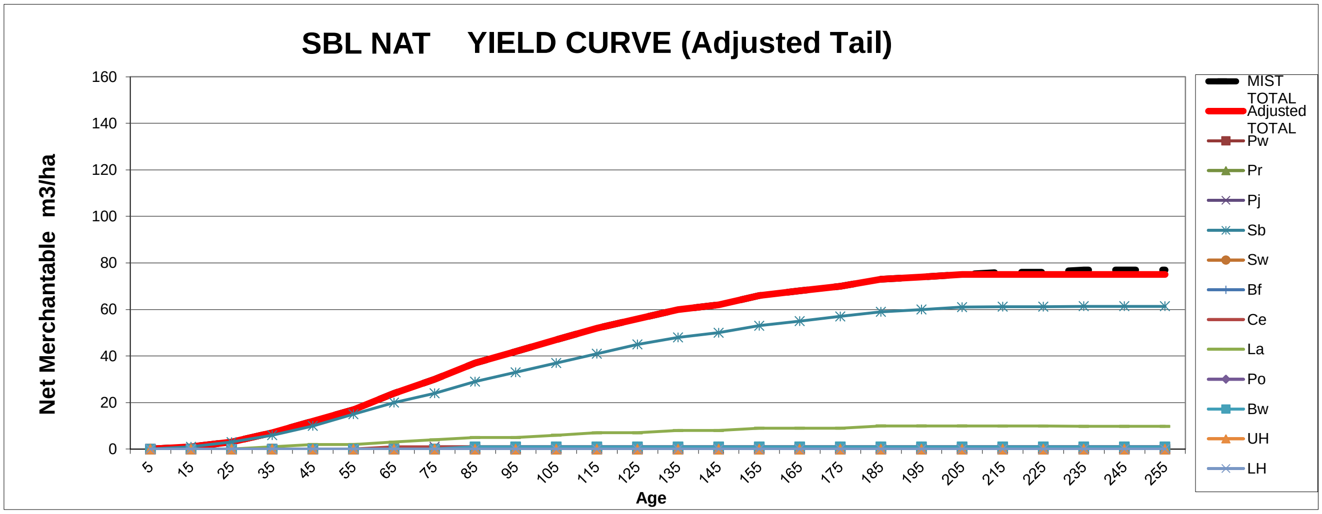
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PRWW NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PRWW NAT	15	1	1	1	0	0	0	0	0	0	0	0	0	0	0
PRWW NAT	25	7	7	4	1	0	0	0	1	0	0	1	0	0	0
PRWW NAT	35	21	21	10	3	1	1	0	1	1	0	3	1	0	0
PRWW NAT	45	37	37	18	5	1	2	0	2	1	0	6	2	0	0
PRWW NAT	55	57	57	29	8	2	2	1	3	1	0	8	3	0	0
PRWW NAT	65	76	76	40	11	3	2	1	3	1	0	11	4	0	0
PRWW NAT	75	96	96	52	14	3	3	1	3	2	0	13	5	0	0
PRWW NAT	85	115	115	63	18	3	3	1	4	2	0	15	6	0	0
PRWW NAT	95	132	132	73	21	4	3	1	4	2	0	17	7	0	0
PRWW NAT	105	147	147	83	24	4	3	1	4	2	0	18	8	0	0
PRWW NAT	115	158	158	91	27	4	3	1	4	2	0	18	8	0	0
PRWW NAT	125	167	167	97	29	4	3	1	4	2	0	18	9	0	0
PRWW NAT	135	173	173	101	31	4	3	1	4	2	0	18	9	0	0
PRWW NAT	145	177	177	104	33	4	3	1	4	2	0	17	9	0	0
PRWW NAT	155	178	178	105	34	4	3	1	4	1	0	17	9	0	0
PRWW NAT	165	176	176	104	35	3	3	1	4	1	0	16	9	0	0
PRWW NAT	175	172	175	104	36	3	3	1	3	1	0	15	9	0	0
PRWW NAT	185	167	175	104	37	3	3	1	3	1	0	15	8	0	0
PRWW NAT	195	159	175	103	37	3	3	1	3	1	0	13	9	0	0
PRWW NAT	205	150	175	104	39	2	4	1	4	1	0	13	8	0	0
PRWW NAT	215	141	175	103	38	2	4	1	4	1	0	12	9	0	0
PRWW NAT	225	129	175	103	41	3	3	1	3	1	0	12	8	0	0
PRWW NAT	235	118	175	102	42	1	3	1	3	1	0	12	9	0	0
PRWW NAT	245	107	175	101	43	2	3	2	3	2	0	11	8	0	0
PRWW NAT	255	97	175	101	43	2	4	2	4	0	0	11	9	0	0

Total net merchantable volume peak of yield curve



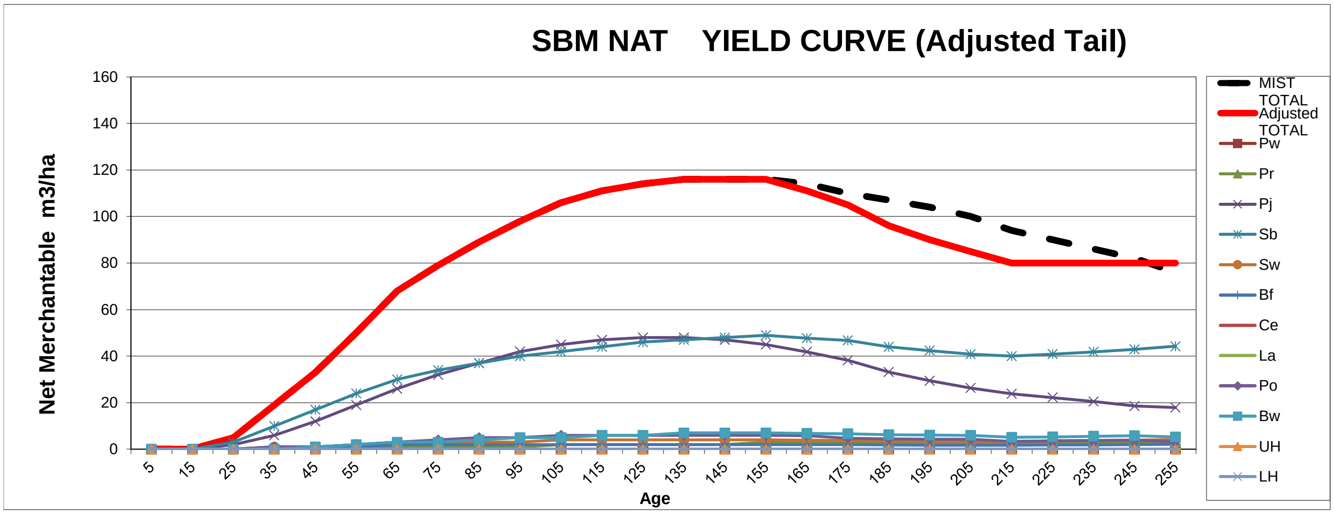
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
SBD NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBD NAT	15	1	1	0	0	0	1	0	0	0	0	0	0	0	0
SBD NAT	25	5	5	0	0	1	4	0	0	0	0	0	0	0	0
SBD NAT	35	13	13	0	0	2	11	0	0	0	0	0	0	0	0
SBD NAT	45	27	27	0	0	3	20	1	1	0	0	1	1	0	0
SBD NAT	55	39	39	0	0	5	30	1	1	0	0	1	1	0	0
SBD NAT	65	54	54	0	0	8	40	1	1	0	0	2	2	0	0
SBD NAT	75	67	67	0	0	11	49	1	1	0	0	2	3	0	0
SBD NAT	85	79	79	0	0	13	56	2	2	0	0	3	3	0	0
SBD NAT	95	88	88	0	0	15	62	2	2	0	0	3	4	0	0
SBD NAT	105	95	95	0	0	16	67	2	2	0	0	4	4	0	0
SBD NAT	115	100	100	0	0	17	70	2	2	0	0	4	5	0	0
SBD NAT	125	102	102	0	0	17	72	2	2	0	0	4	5	0	0
SBD NAT	135	103	103	0	0	17	73	2	2	0	0	4	5	0	0
SBD NAT	145	103	103	0	0	17	73	2	2	0	0	4	5	0	0
SBD NAT	155	102	102	0	0	16	73	2	2	0	0	4	5	0	0
SBD NAT	165	97	97	0	0	14	71	2	2	0	0	3	5	0	0
SBD NAT	175	94	94	0	0	13	69	2	2	0	0	3	5	0	0
SBD NAT	185	89	89	0	0	12	66	2	1	0	0	3	5	0	0
SBD NAT	195	82	86	0	0	10	65	2	1	0	0	3	4	0	0
SBD NAT	205	77	85	0	0	10	65	2	1	0	0	2	4	0	0
SBD NAT	215	70	85	0	0	9	66	2	1	0	0	2	5	0	0
SBD NAT	225	64	85	0	0	8	66	3	1	0	0	3	4	0	0
SBD NAT	235	58	85	0	0	7	67	1	1	0	0	3	4	0	0
SBD NAT	245	51	85	0	0	7	68	2	2	0	0	2	5	0	0
SBD NAT	255	45	85	0	0	6	70	2	2	0	0	2	4	0	0

Total net merchantable volume peak of yield curve



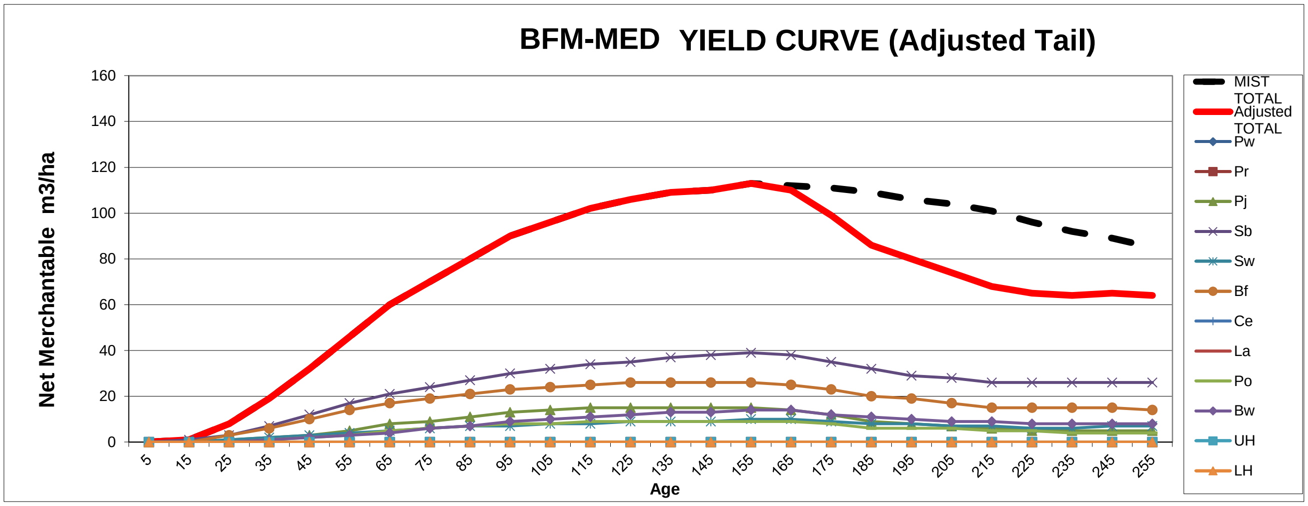
FU	AC10	MIST TOTAL	Adjusted TOTA	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
SBL NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBL NAT	15	1	1	0	0	0	1	0	0	0	0	0	0	0	0
SBL NAT	25	3	3	0	0	0	3	0	0	0	0	0	0	0	0
SBL NAT	35	7	7	0	0	0	6	0	0	0	1	0	0	0	0
SBL NAT	45	12	12	0	0	0	10	0	0	0	2	0	0	0	0
SBL NAT	55	17	17	0	0	0	15	0	0	0	2	0	0	0	0
SBL NAT	65	24	24	0	0	0	20	0	0	1	3	0	0	0	0
SBL NAT	75	30	30	0	0	1	24	0	0	1	4	0	0	0	0
SBL NAT	85	37	37	0	0	1	29	0	0	1	5	0	1	0	0
SBL NAT	95	42	42	0	0	1	33	0	0	1	5	1	1	0	0
SBL NAT	105	47	47	0	0	1	37	0	0	1	6	1	1	0	0
SBL NAT	115	52	52	0	0	1	41	0	0	1	7	1	1	0	0
SBL NAT	125	56	56	0	0	1	45	0	0	1	7	1	1	0	0
SBL NAT	135	60	60	0	0	1	48	0	0	1	8	1	1	0	0
SBL NAT	145	62	62	0	0	1	50	0	0	1	8	1	1	0	0
SBL NAT	155	66	66	0	0	1	53	0	0	1	9	1	1	0	0
SBL NAT	165	68	68	0	0	1	55	0	0	1	9	1	1	0	0
SBL NAT	175	70	70	0	0	1	57	0	0	1	9	1	1	0	0
SBL NAT	185	73	73	0	0	1	59	0	0	1	10	1	1	0	0
SBL NAT	195	74	74	0	0	1	60	0	0	1	10	1	1	0	0
SBL NAT	205	75	75	0	0	1	61	0	0	1	10	1	1	0	0
SBL NAT	215	76	75	0	0	1	61	0	0	1	10	1	1	0	0
SBL NAT	225	76	75	0	0	1	61	0	0	1	10	1	1	0	0
SBL NAT	235	77	75	0	0	1	61	0	0	1	10	1	1	0	0
SBL NAT	245	77	75	0	0	1	61	0	0	1	10	1	1	0	0
SBL NAT	255	77	75	0	0	1	61	0	0	1	10	1	1	0	0

Total net merchantable volume peak of yield curve



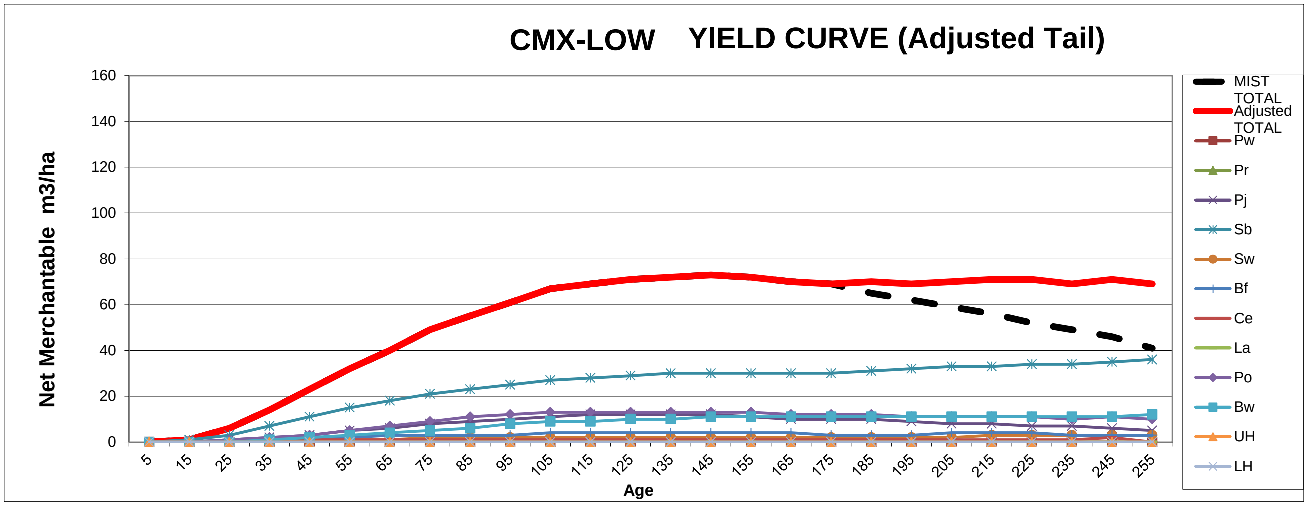
FU	AC10	MIST TOTAL	Adjusted TOTA	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
SBM NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBM NAT	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBM NAT	25	5	5	0	0	2	3	0	0	0	0	0	0	0	0
SBM NAT	35	19	19	0	0	6	10	1	1	0	0	1	0	0	0
SBM NAT	45	33	33	0	0	12	17	1	1	0	0	1	1	0	0
SBM NAT	55	50	50	0	0	19	24	2	1	0	0	2	2	0	0
SBM NAT	65	68	68	0	1	26	30	3	2	0	0	3	3	0	0
SBM NAT	75	79	79	0	1	32	34	3	2	0	0	4	3	0	0
SBM NAT	85	89	89	0	1	37	37	3	2	0	0	5	4	0	0
SBM NAT	95	98	98	0	1	42	40	3	2	0	0	5	5	0	0
SBM NAT	105	106	106	0	2	45	42	4	2	0	0	6	5	0	0
SBM NAT	115	111	111	0	2	47	44	4	2	0	0	6	6	0	0
SBM NAT	125	114	114	0	2	48	46	4	2	0	0	6	6	0	0
SBM NAT	135	116	116	0	2	48	47	4	2	0	0	6	7	0	0
SBM NAT	145	116	116	0	2	47	48	4	2	0	0	6	7	0	0
SBM NAT	155	116	116	0	3	45	49	4	2	0	0	6	7	0	0
SBM NAT	165	114	111	0	3	42	48	4	2	0	0	6	7	0	0
SBM NAT	175	110	105	0	3	38	47	4	2	0	0	5	7	0	0
SBM NAT	185	107	96	0	3	33	44	4	2	0	0	4	6	0	0
SBM NAT	195	104	90	0	3	29	42	3	2	0	0	4	6	0	0
SBM NAT	205	100	85	0	3	26	41	3	2	0	0	4	6	0	0
SBM NAT	215	94	80	0	3	24	40	3	2	0	0	3	5	0	0
SBM NAT	225	90	80	0	3	22	41	4	2	0	0	4	5	0	0
SBM NAT	235	86	80	0	3	20	42	4	2	0	0	4	6	0	0
SBM NAT	245	82	80	0	3	19	43	4	2	0	0	4	6	0	0
SBM NAT	255	76	80	0	3	18	44	4	2	0	0	3	5	0	0

Total net merchantable volume peak of yield curve



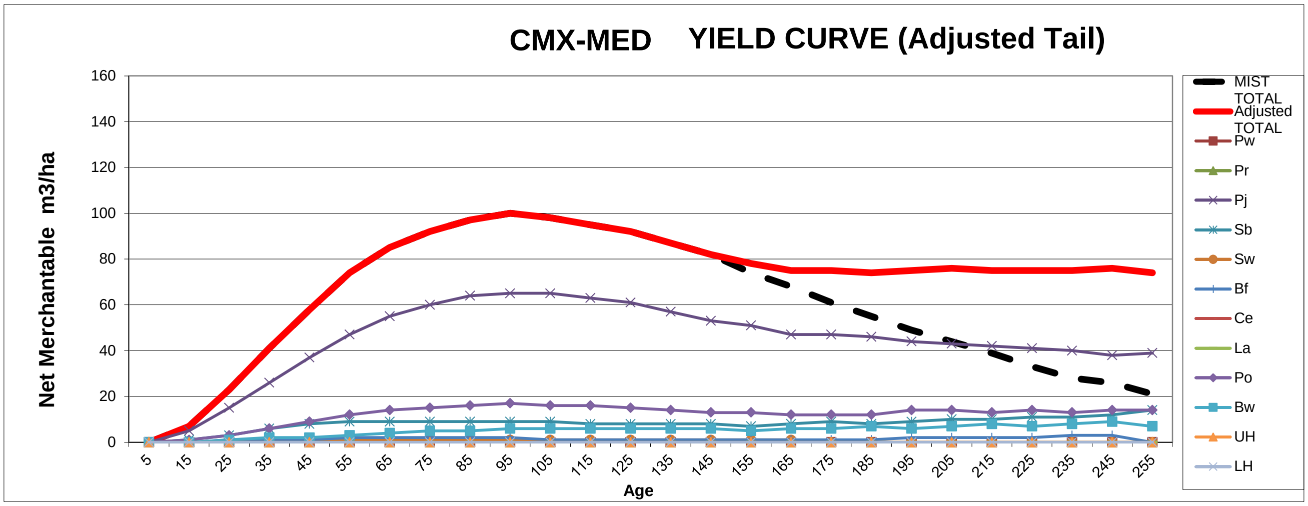
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
BFM-MED	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BFM-MED	15	1	1	0	0	0	1	0	0	0	0	0	0	0	0
BFM-MED	25	8	8	0	0	1	3	1	3	0	0	0	0	0	0
BFM-MED	35	19	19	0	0	2	7	2	6	0	0	1	1	0	0
BFM-MED	45	32	32	0	0	3	12	3	10	0	0	2	2	0	0
BFM-MED	55	46	46	0	0	5	17	4	14	0	0	3	3	0	0
BFM-MED	65	60	60	0	0	8	21	5	17	0	0	5	4	0	0
BFM-MED	75	70	70	0	0	9	24	6	19	0	0	6	6	0	0
BFM-MED	85	80	80	0	0	11	27	7	21	0	0	7	7	0	0
BFM-MED	95	90	90	0	0	13	30	7	23	0	0	8	9	0	0
BFM-MED	105	96	96	0	0	14	32	8	24	0	0	8	10	0	0
BFM-MED	115	102	102	0	0	15	34	8	25	0	0	9	11	0	0
BFM-MED	125	106	106	0	0	15	35	9	26	0	0	9	12	0	0
BFM-MED	135	109	109	0	0	15	37	9	26	0	0	9	13	0	0
BFM-MED	145	110	110	0	0	15	38	9	26	0	0	9	13	0	0
BFM-MED	155	113	113	0	0	15	39	10	26	0	0	9	14	0	0
BFM-MED	165	112	110	0	0	14	38	10	25	0	0	9	14	0	0
BFM-MED	175	111	99	0	0	12	35	9	23	0	0	8	12	0	0
BFM-MED	185	109	86	0	0	9	32	8	20	0	0	6	11	0	0
BFM-MED	195	106	80	0	0	8	29	8	19	0	0	6	10	0	0
BFM-MED	205	104	74	0	0	7	28	7	17	0	0	6	9	0	0
BFM-MED	215	101	68	0	0	6	26	7	15	0	0	5	9	0	0
BFM-MED	225	96	65	0	0	5	26	6	15	0	0	5	8	0	0
BFM-MED	235	92	64	0	0	5	26	6	15	0	0	4	8	0	0
BFM-MED	245	89	65	0	0	5	26	7	15	0	0	4	8	0	0
BFM-MED	255	85	64	0	0	5	26	7	14	0	0	4	8	0	0

Total net merchantable volume peak of yield curve



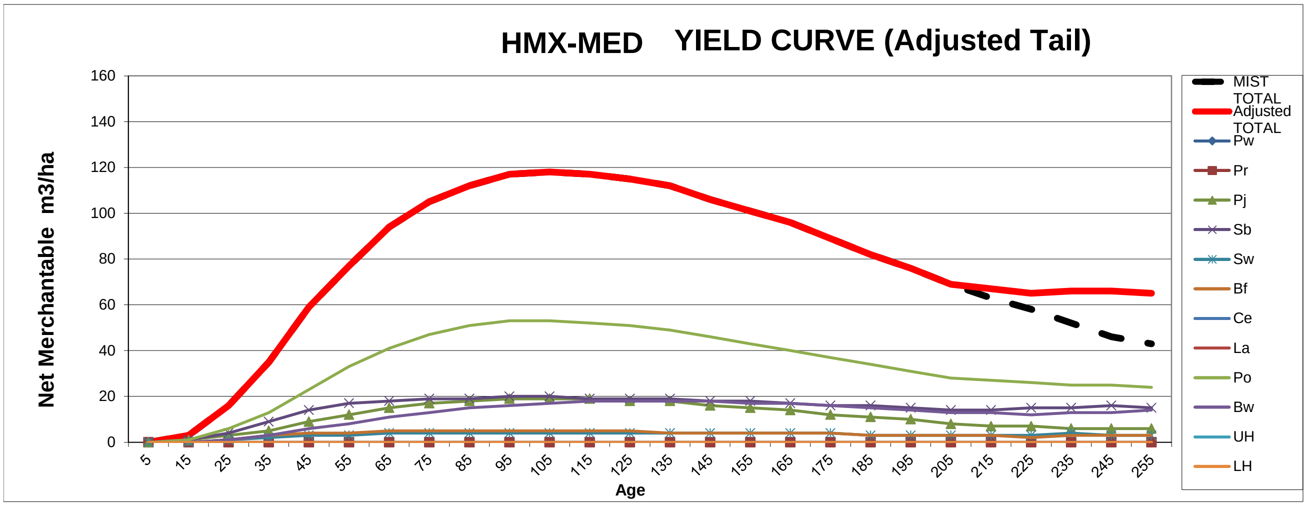
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
CMX-LOW	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CMX-LOW	15	1	1	0	0	0	1	0	0	0	0	0	0	0	0
CMX-LOW	25	6	6	0	0	1	3	0	1	0	0	1	0	0	0
CMX-LOW	35	14	14	0	0	2	7	1	1	0	0	2	1	0	0
CMX-LOW	45	23	23	0	0	3	11	1	2	1	0	3	2	0	0
CMX-LOW	55	32	32	0	0	5	15	1	2	1	0	5	3	0	0
CMX-LOW	65	40	40	0	0	6	18	1	3	1	0	7	4	0	0
CMX-LOW	75	49	49	0	0	8	21	2	3	1	0	9	5	0	0
CMX-LOW	85	55	55	0	0	9	23	2	3	1	0	11	6	0	0
CMX-LOW	95	61	61	0	0	10	25	2	3	1	0	12	8	0	0
CMX-LOW	105	67	67	0	0	11	27	2	4	1	0	13	9	0	0
CMX-LOW	115	69	69	0	0	12	28	2	4	1	0	13	9	0	0
CMX-LOW	125	71	71	0	0	12	29	2	4	1	0	13	10	0	0
CMX-LOW	135	72	72	0	0	12	30	2	4	1	0	13	10	0	0
CMX-LOW	145	73	73	0	0	12	30	2	4	1	0	13	11	0	0
CMX-LOW	155	72	72	0	0	11	30	2	4	1	0	13	11	0	0
CMX-LOW	165	70	70	0	0	10	30	2	4	1	0	12	11	0	0
CMX-LOW	175	69	69	0	0	10	30	2	3	1	0	12	11	0	0
CMX-LOW	185	65	70	0	0	10	31	2	3	1	0	12	11	0	0
CMX-LOW	195	62	69	0	0	9	32	2	3	1	0	11	11	0	0
CMX-LOW	205	59	70	0	0	8	33	2	4	1	0	11	11	0	0
CMX-LOW	215	56	71	0	0	8	33	3	4	1	0	11	11	0	0
CMX-LOW	225	52	71	0	0	7	34	3	4	1	0	11	11	0	0
CMX-LOW	235	49	69	0	0	7	34	3	3	1	0	10	11	0	0
CMX-LOW	245	46	71	0	0	6	35	3	3	2	0	11	11	0	0
CMX-LOW	255	41	69	0	0	5	36	3	3	0	0	10	12	0	0

Total net merchantable volume peak of yield curve



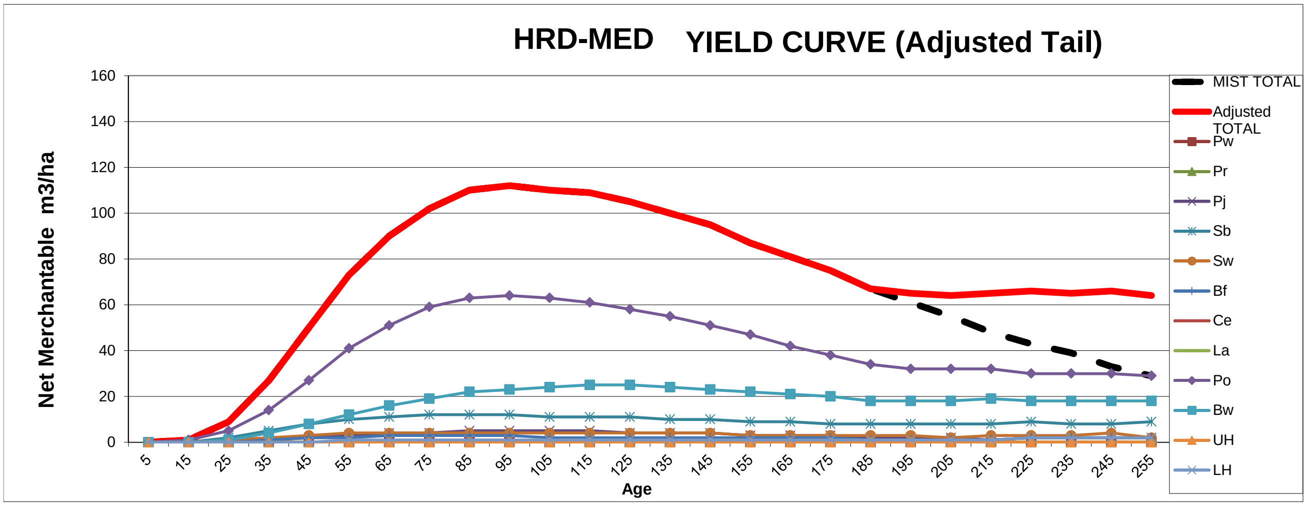
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
CMX-MED	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CMX-MED	15	7	7	0	0	5	1	0	0	0	0	1	0	0	0
CMX-MED	25	23	23	0	0	15	3	0	1	0	0	3	1	0	0
CMX-MED	35	41	41	0	0	26	6	0	1	0	0	6	2	0	0
CMX-MED	45	58	58	0	0	37	8	1	1	0	0	9	2	0	0
CMX-MED	55	74	74	0	0	47	9	1	2	0	0	12	3	0	0
CMX-MED	65	85	85	0	0	55	9	1	2	0	0	14	4	0	0
CMX-MED	75	92	92	0	0	60	9	1	2	0	0	15	5	0	0
CMX-MED	85	97	97	0	0	64	9	1	2	0	0	16	5	0	0
CMX-MED	95	100	100	0	0	65	9	1	2	0	0	17	6	0	0
CMX-MED	105	98	98	0	0	65	9	1	1	0	0	16	6	0	0
CMX-MED	115	95	95	0	0	63	8	1	1	0	0	16	6	0	0
CMX-MED	125	92	92	0	0	61	8	1	1	0	0	15	6	0	0
CMX-MED	135	87	87	0	0	57	8	1	1	0	0	14	6	0	0
CMX-MED	145	82	82	0	0	53	8	1	1	0	0	13	6	0	0
CMX-MED	155	74	78	0	0	51	7	1	1	0	0	13	5	0	0
CMX-MED	165	68	75	0	0	47	8	1	1	0	0	12	6	0	0
CMX-MED	175	61	75	0	0	47	9	0	1	0	0	12	6	0	0
CMX-MED	185	55	74	0	0	46	8	0	1	0	0	12	7	0	0
CMX-MED	195	49	75	0	0	44	9	0	2	0	0	14	6	0	0
CMX-MED	205	44	76	0	0	43	10	0	2	0	0	14	7	0	0
CMX-MED	215	39	75	0	0	42	10	0	2	0	0	13	8	0	0
CMX-MED	225	33	75	0	0	41	11	0	2	0	0	14	7	0	0
CMX-MED	235	28	75	0	0	40	11	0	3	0	0	13	8	0	0
CMX-MED	245	26	76	0	0	38	12	0	3	0	0	14	9	0	0
CMX-MED	255	21	74	0	0	39	14	0	0	0	0	14	7	0	0

Total net merchantable volume peak of yield curve



FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
HMX-MED	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMX-MED	15	3	3	0	0	1	1	0	0	0	0	1	0	0	0
HMX-MED	25	16	16	0	0	3	4	1	1	0	0	6	1	0	0
HMX-MED	35	35	35	0	0	5	9	2	3	0	0	13	3	0	0
HMX-MED	45	59	59	0	0	9	14	3	4	0	0	23	6	0	0
HMX-MED	55	77	77	0	0	12	17	3	4	0	0	33	8	0	0
HMX-MED	65	94	94	0	0	15	18	4	5	0	0	41	11	0	0
HMX-MED	75	105	105	0	0	17	19	4	5	0	0	47	13	0	0
HMX-MED	85	112	112	0	0	18	19	4	5	0	0	51	15	0	0
HMX-MED	95	117	117	0	0	19	20	4	5	0	0	53	16	0	0
HMX-MED	105	118	118	0	0	19	20	4	5	0	0	53	17	0	0
HMX-MED	115	117	117	0	0	19	19	4	5	0	0	52	18	0	0
HMX-MED	125	115	115	0	0	18	19	4	5	0	0	51	18	0	0
HMX-MED	135	112	112	0	0	18	19	4	4	0	0	49	18	0	0
HMX-MED	145	106	106	0	0	16	18	4	4	0	0	46	18	0	0
HMX-MED	155	101	101	0	0	15	18	4	4	0	0	43	17	0	0
HMX-MED	165	96	96	0	0	14	17	4	4	0	0	40	17	0	0
HMX-MED	175	89	89	0	0	12	16	4	4	0	0	37	16	0	0
HMX-MED	185	82	82	0	0	11	16	3	3	0	0	34	15	0	0
HMX-MED	195	76	76	0	0	10	15	3	3	0	0	31	14	0	0
HMX-MED	205	69	69	0	0	8	14	3	3	0	0	28	13	0	0
HMX-MED	215	63	67	0	0	7	14	3	3	0	0	27	13	0	0
HMX-MED	225	58	65	0	0	7	15	3	2	0	0	26	12	0	0
HMX-MED	235	52	66	0	0	6	15	4	3	0	0	25	13	0	0
HMX-MED	245	46	66	0	0	6	16	3	3	0	0	25	13	0	0
HMX-MED	255	43	65	0	0	6	15	3	3	0	0	24	14	0	0

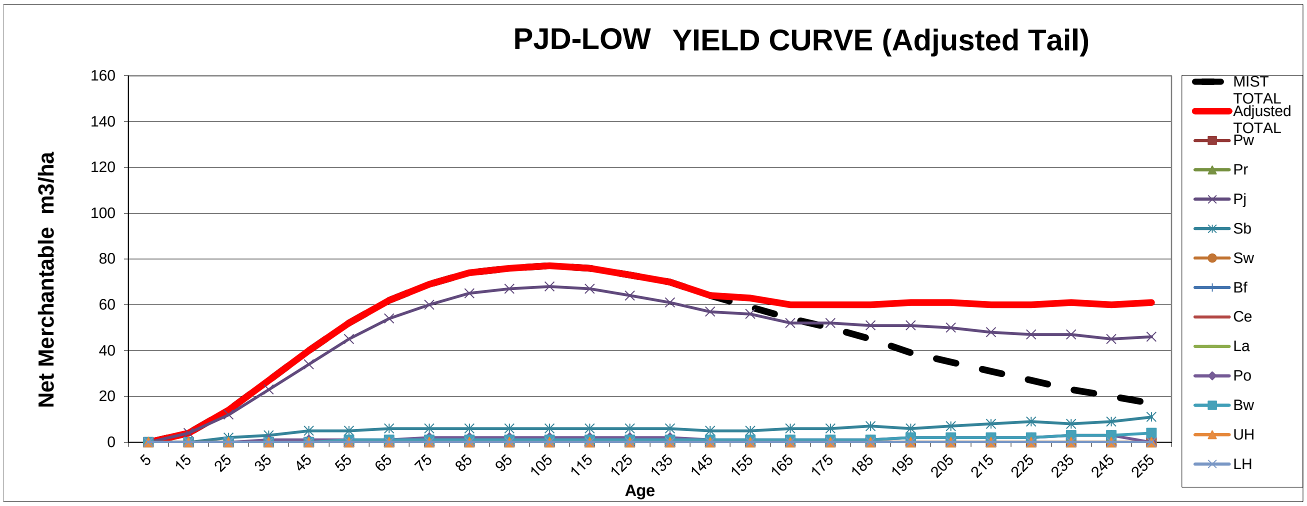
Total net merchantable volume peak of yield curve



4

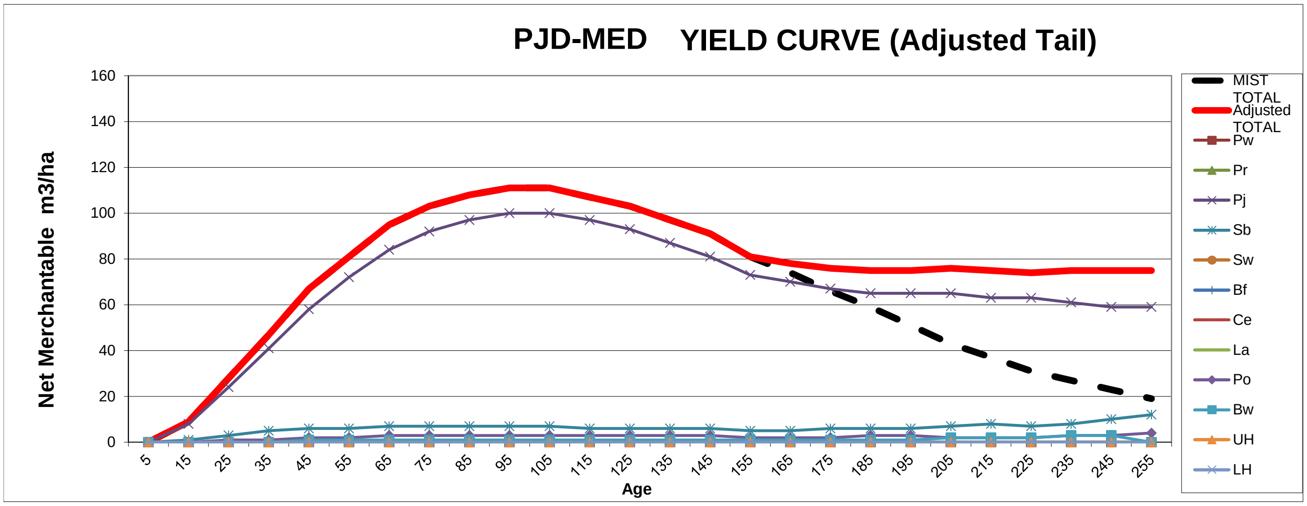
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
HRD-MED	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HRD-MED	15	1	1	0	0	0	0	0	0	0	0	1	0	0	0
HRD-MED	25	9	9	0	0	0	2	1	0	0	0	5	1	0	0
HRD-MED	35	27	27	0	0	1	5	2	1	0	0	14	4	0	0
HRD-MED	45	50	50	0	0	2	8	3	2	0	0	27	8	0	0
HRD-MED	55	73	73	0	0	3	10	4	2	0	0	41	12	0	1
HRD-MED	65	90	90	0	0	4	11	4	3	0	0	51	16	0	1
HRD-MED	75	102	102	0	0	4	12	4	3	0	0	59	19	0	1
HRD-MED	85	110	110	0	0	5	12	4	3	0	0	63	22	0	1
HRD-MED	95	112	112	0	0	5	12	4	3	0	0	64	23	0	1
HRD-MED	105	110	110	0	0	5	11	4	2	0	0	63	24	0	1
HRD-MED	115	109	109	0	0	5	11	4	2	0	0	61	25	0	1
HRD-MED	125	105	105	0	0	4	11	4	2	0	0	58	25	0	1
HRD-MED	135	100	100	0	0	4	10	4	2	0	0	55	24	0	1
HRD-MED	145	95	95	0	0	4	10	4	2	0	0	51	23	0	1
HRD-MED	155	87	87	0	0	3	9	3	2	0	0	47	22	0	1
HRD-MED	165	81	81	0	0	3	9	3	2	0	0	42	21	0	1
HRD-MED	175	75	75	0	0	3	8	3	2	0	0	38	20	0	1
HRD-MED	185	67	67	0	0	2	8	3	1	0	0	34	18	0	1
HRD-MED	195	61	65	0	0	2	8	3	1	0	0	32	18	0	1
HRD-MED	205	55	64	0	0	2	8	2	1	0	0	32	18	0	1
HRD-MED	215	48	65	0	0	1	8	3	1	0	0	32	19	0	1
HRD-MED	225	43	66	0	0	2	9	3	2	0	0	30	18	0	2
HRD-MED	235	39	65	0	0	2	8	3	2	0	0	30	18	0	2
HRD-MED	245	33	66	0	0	2	8	4	2	0	0	30	18	0	2
HRD-MED	255	29	64	0	0	2	9	2	2	0	0	29	18	0	2

Total net merchantable volume peak of yield curve



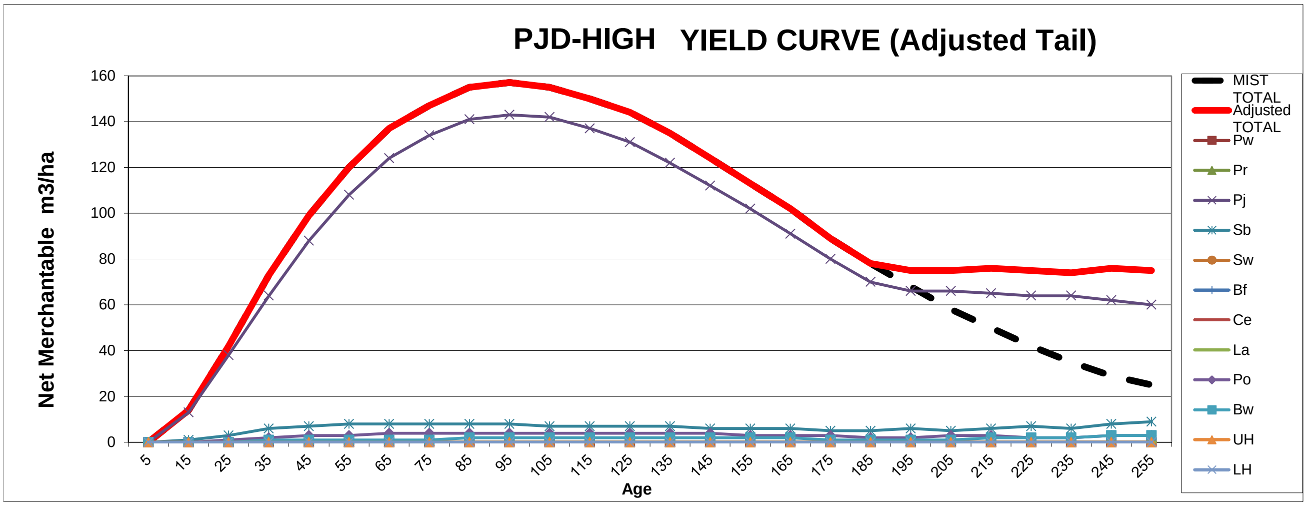
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PJD-LOW	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PJD-LOW	15	4	4	0	0	4	0	0	0	0	0	0	0	0	0
PJD-LOW	25	14	14	0	0	12	2	0	0	0	0	0	0	0	0
PJD-LOW	35	27	27	0	0	23	3	0	0	0	0	1	0	0	0
PJD-LOW	45	40	40	0	0	34	5	0	0	0	0	1	0	0	0
PJD-LOW	55	52	52	0	0	45	5	0	0	0	0	1	1	0	0
PJD-LOW	65	62	62	0	0	54	6	0	0	0	0	1	1	0	0
PJD-LOW	75	69	69	0	0	60	6	0	0	0	0	2	1	0	0
PJD-LOW	85	74	74	0	0	65	6	0	0	0	0	2	1	0	0
PJD-LOW	95	76	76	0	0	67	6	0	0	0	0	2	1	0	0
PJD-LOW	105	77	77	0	0	68	6	0	0	0	0	2	1	0	0
PJD-LOW	115	76	76	0	0	67	6	0	0	0	0	2	1	0	0
PJD-LOW	125	73	73	0	0	64	6	0	0	0	0	2	1	0	0
PJD-LOW	135	70	70	0	0	61	6	0	0	0	0	2	1	0	0
PJD-LOW	145	64	64	0	0	57	5	0	0	0	0	1	1	0	0
PJD-LOW	155	59	63	0	0	56	5	0	0	0	0	1	1	0	0
PJD-LOW	165	54	60	0	0	52	6	0	0	0	0	1	1	0	0
PJD-LOW	175	50	60	0	0	52	6	0	0	0	0	1	1	0	0
PJD-LOW	185	45	60	0	0	51	7	0	0	0	0	1	1	0	0
PJD-LOW	195	39	61	0	0	51	6	0	0	0	0	2	2	0	0
PJD-LOW	205	35	61	0	0	50	7	0	0	0	0	2	2	0	0
PJD-LOW	215	31	60	0	0	48	8	0	0	0	0	2	2	0	0
PJD-LOW	225	27	60	0	0	47	9	0	0	0	0	2	2	0	0
PJD-LOW	235	23	61	0	0	47	8	0	0	0	0	3	3	0	0
PJD-LOW	245	20	60	0	0	45	9	0	0	0	0	3	3	0	0
PJD-LOW	255	17	61	0	0	46	11	0	0	0	0	0	4	0	0

Total net merchantable volume peak of yield curve



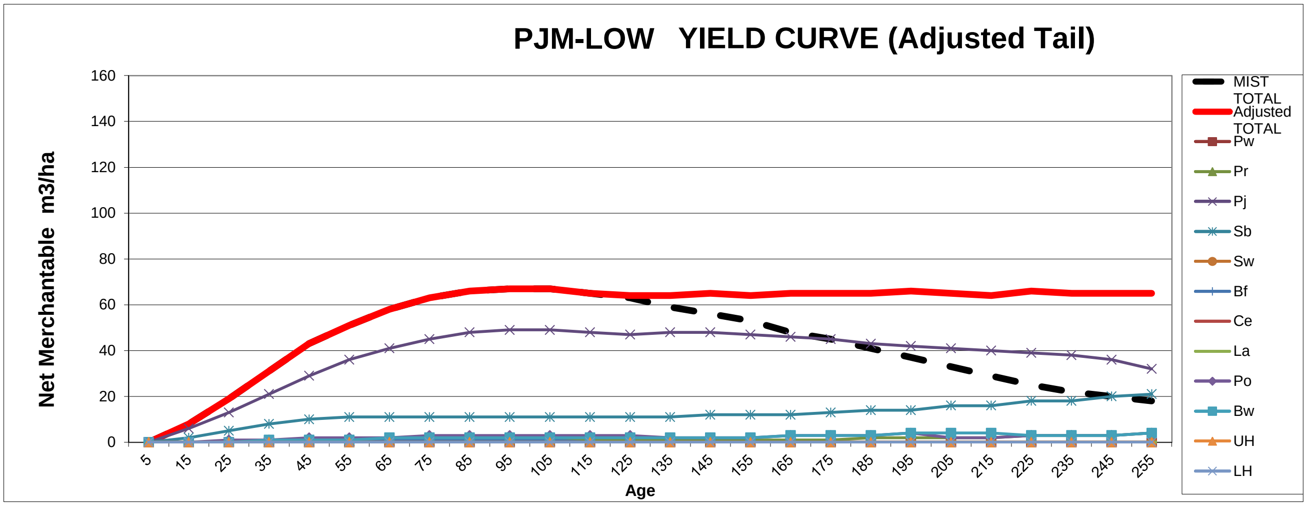
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PJD-MED	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PJD-MED	15	9	9	0	0	8	1	0	0	0	0	0	0	0	0
PJD-MED	25	28	28	0	0	24	3	0	0	0	0	1	0	0	0
PJD-MED	35	47	47	0	0	41	5	0	0	0	0	1	0	0	0
PJD-MED	45	67	67	0	0	58	6	0	0	0	0	2	1	0	0
PJD-MED	55	81	81	0	0	72	6	0	0	0	0	2	1	0	0
PJD-MED	65	95	95	0	0	84	7	0	0	0	0	3	1	0	0
PJD-MED	75	103	103	0	0	92	7	0	0	0	0	3	1	0	0
PJD-MED	85	108	108	0	0	97	7	0	0	0	0	3	1	0	0
PJD-MED	95	111	111	0	0	100	7	0	0	0	0	3	1	0	0
PJD-MED	105	111	111	0	0	100	7	0	0	0	0	3	1	0	0
PJD-MED	115	107	107	0	0	97	6	0	0	0	0	3	1	0	0
PJD-MED	125	103	103	0	0	93	6	0	0	0	0	3	1	0	0
PJD-MED	135	97	97	0	0	87	6	0	0	0	0	3	1	0	0
PJD-MED	145	91	91	0	0	81	6	0	0	0	0	3	1	0	0
PJD-MED	155	81	81	0	0	73	5	0	0	0	0	2	1	0	0
PJD-MED	165	74	78	0	0	70	5	0	0	0	0	2	1	0	0
PJD-MED	175	66	76	0	0	67	6	0	0	0	0	2	1	0	0
PJD-MED	185	59	75	0	0	65	6	0	0	0	0	3	1	0	0
PJD-MED	195	51	75	0	0	65	6	0	0	0	0	3	1	0	0
PJD-MED	205	43	76	0	0	65	7	0	0	0	0	2	2	0	0
PJD-MED	215	37	75	0	0	63	8	0	0	0	0	2	2	0	0
PJD-MED	225	31	74	0	0	63	7	0	0	0	0	2	2	0	0
PJD-MED	235	27	75	0	0	61	8	0	0	0	0	3	3	0	0
PJD-MED	245	23	75	0	0	59	10	0	0	0	0	3	3	0	0
PJD-MED	255	19	75	0	0	59	12	0	0	0	0	4	0	0	0

Total net merchantable volume peak of yield curve



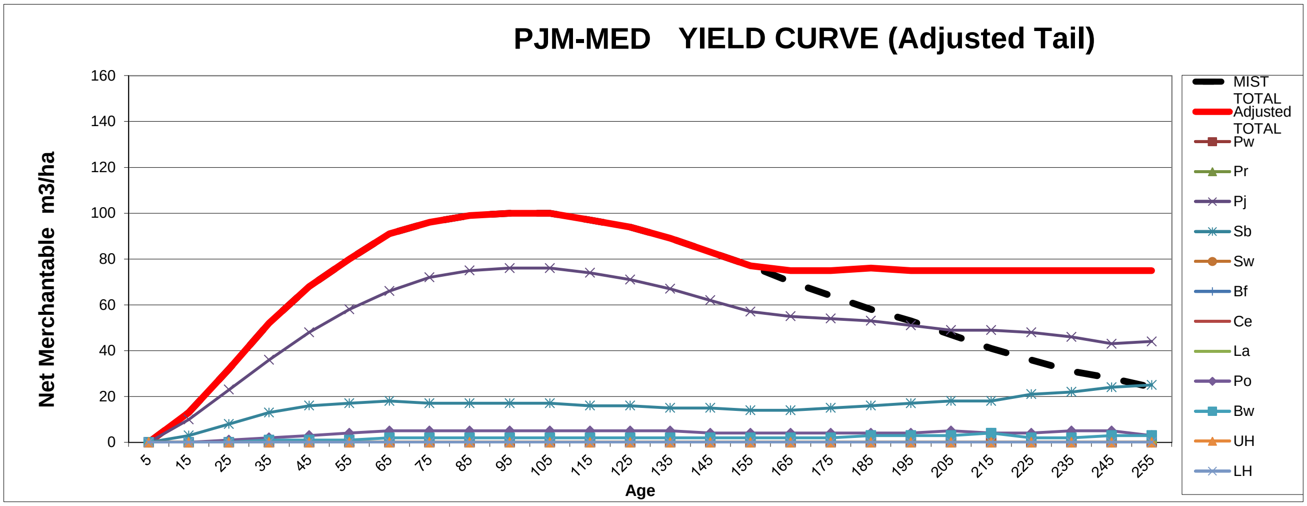
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PJD-HIGH	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PJD-HIGH	15	14	14	0	0	13	1	0	0	0	0	0	0	0	0
PJD-HIGH	25	42	42	0	0	38	3	0	0	0	0	1	0	0	0
PJD-HIGH	35	73	73	0	0	64	6	0	0	0	0	2	1	0	0
PJD-HIGH	45	99	99	0	0	88	7	0	0	0	0	3	1	0	0
PJD-HIGH	55	120	120	0	0	108	8	0	0	0	0	3	1	0	0
PJD-HIGH	65	137	137	0	0	124	8	0	0	0	0	4	1	0	0
PJD-HIGH	75	147	147	0	0	134	8	0	0	0	0	4	1	0	0
PJD-HIGH	85	155	155	0	0	141	8	0	0	0	0	4	2	0	0
PJD-HIGH	95	157	157	0	0	143	8	0	0	0	0	4	2	0	0
PJD-HIGH	105	155	155	0	0	142	7	0	0	0	0	4	2	0	0
PJD-HIGH	115	150	150	0	0	137	7	0	0	0	0	4	2	0	0
PJD-HIGH	125	144	144	0	0	131	7	0	0	0	0	4	2	0	0
PJD-HIGH	135	135	135	0	0	122	7	0	0	0	0	4	2	0	0
PJD-HIGH	145	124	124	0	0	112	6	0	0	0	0	4	2	0	0
PJD-HIGH	155	113	113	0	0	102	6	0	0	0	0	3	2	0	0
PJD-HIGH	165	102	102	0	0	91	6	0	0	0	0	3	2	0	0
PJD-HIGH	175	89	89	0	0	80	5	0	0	0	0	3	1	0	0
PJD-HIGH	185	78	78	0	0	70	5	0	0	0	0	2	1	0	0
PJD-HIGH	195	68	75	0	0	66	6	0	0	0	0	2	1	0	0
PJD-HIGH	205	58	75	0	0	66	5	0	0	0	0	3	1	0	0
PJD-HIGH	215	50	76	0	0	65	6	0	0	0	0	3	2	0	0
PJD-HIGH	225	42	75	0	0	64	7	0	0	0	0	2	2	0	0
PJD-HIGH	235	35	74	0	0	64	6	0	0	0	0	2	2	0	0
PJD-HIGH	245	29	76	0	0	62	8	0	0	0	0	3	3	0	0
PJD-HIGH	255	25	75	0	0	60	9	0	0	0	0	3	3	0	0

Total net merchantable volume peak of yield curve



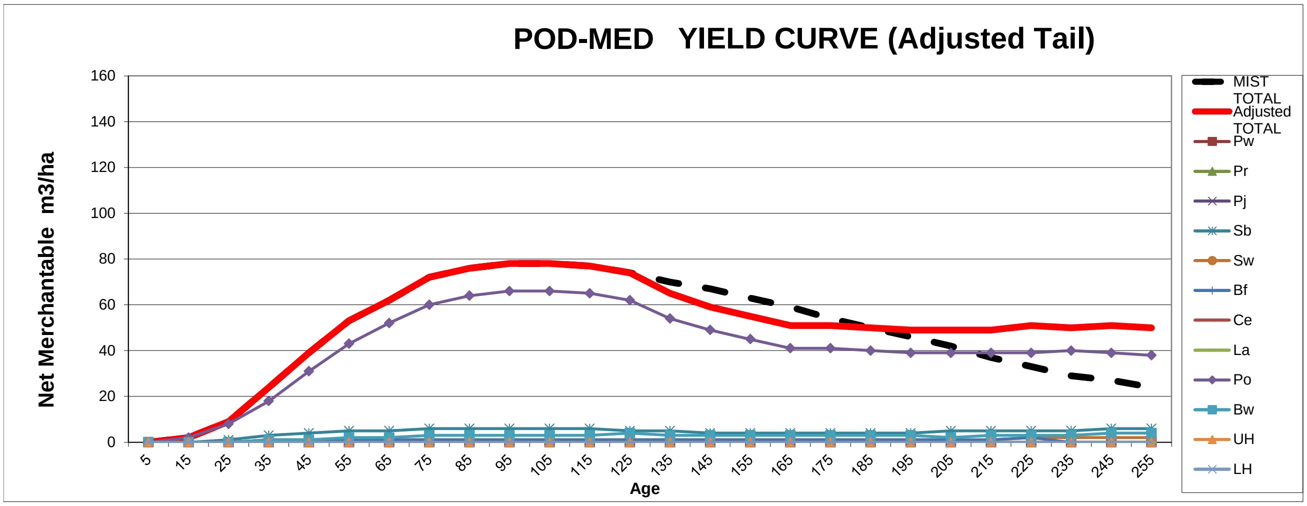
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PJM-LOW	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PJM-LOW	15	8	8	0	0	6	2	0	0	0	0	0	0	0	0
PJM-LOW	25	19	19	0	0	13	5	0	0	0	0	1	0	0	0
PJM-LOW	35	31	31	0	0	21	8	0	0	0	0	1	1	0	0
PJM-LOW	45	43	43	0	0	29	10	0	1	0	0	2	1	0	0
PJM-LOW	55	51	51	0	0	36	11	0	1	0	0	2	1	0	0
PJM-LOW	65	58	58	0	1	41	11	0	1	0	0	2	2	0	0
PJM-LOW	75	63	63	0	1	45	11	0	1	0	0	3	2	0	0
PJM-LOW	85	66	66	0	1	48	11	0	1	0	0	3	2	0	0
PJM-LOW	95	67	67	0	1	49	11	0	1	0	0	3	2	0	0
PJM-LOW	105	67	67	0	1	49	11	0	1	0	0	3	2	0	0
PJM-LOW	115	65	65	0	1	48	11	0	0	0	0	3	2	0	0
PJM-LOW	125	63	64	0	1	47	11	0	0	0	0	3	2	0	0
PJM-LOW	135	59	64	0	1	48	11	0	0	0	0	2	2	0	0
PJM-LOW	145	56	65	0	1	48	12	0	0	0	0	2	2	0	0
PJM-LOW	155	53	64	0	1	47	12	0	0	0	0	2	2	0	0
PJM-LOW	165	48	65	0	1	46	12	0	0	0	0	3	3	0	0
PJM-LOW	175	45	65	0	1	45	13	0	0	0	0	3	3	0	0
PJM-LOW	185	41	65	0	2	43	14	0	0	0	0	3	3	0	0
PJM-LOW	195	37	66	0	2	42	14	0	0	0	0	4	4	0	0
PJM-LOW	205	33	65	0	2	41	16	0	0	0	0	2	4	0	0
PJM-LOW	215	29	64	0	2	40	16	0	0	0	0	2	4	0	0
PJM-LOW	225	25	66	0	3	39	18	0	0	0	0	3	3	0	0
PJM-LOW	235	22	65	0	3	38	18	0	0	0	0	3	3	0	0
PJM-LOW	245	20	65	0	3	36	20	0	0	0	0	3	3	0	0
PJM-LOW	255	18	65	0	4	32	21	0	0	0	0	4	4	0	0

Total net merchantable volume peak of yield curve



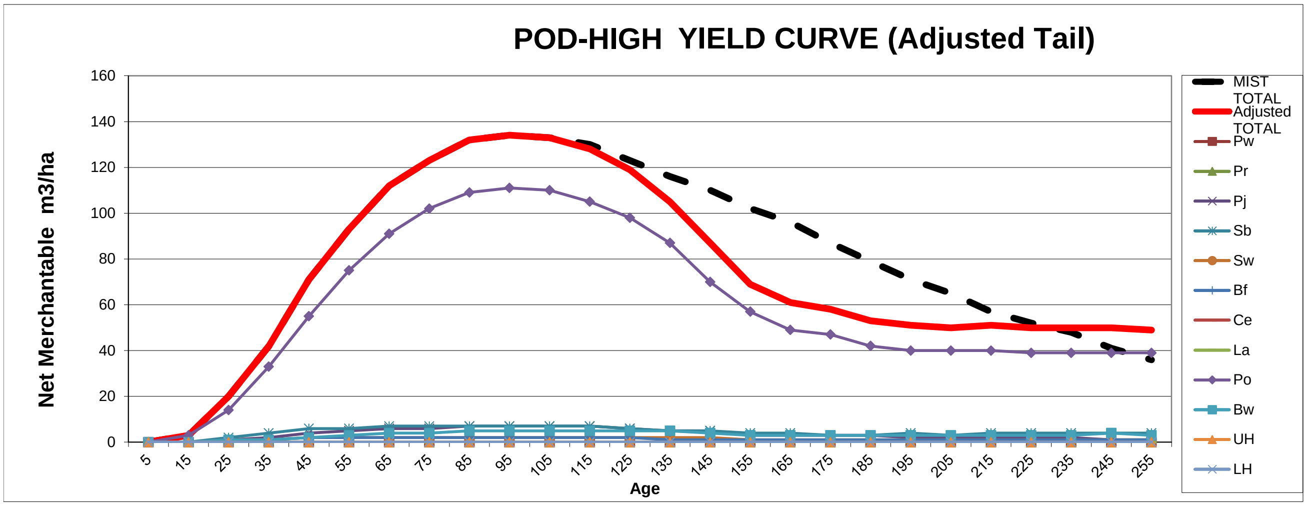
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PJM-MED	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PJM-MED	15	13	13	0	0	10	3	0	0	0	0	0	0	0	0
PJM-MED	25	32	32	0	0	23	8	0	0	0	0	1	0	0	0
PJM-MED	35	52	52	0	0	36	13	0	0	0	0	2	1	0	0
PJM-MED	45	68	68	0	0	48	16	0	0	0	0	3	1	0	0
PJM-MED	55	80	80	0	0	58	17	0	0	0	0	4	1	0	0
PJM-MED	65	91	91	0	0	66	18	0	0	0	0	5	2	0	0
PJM-MED	75	96	96	0	0	72	17	0	0	0	0	5	2	0	0
PJM-MED	85	99	99	0	0	75	17	0	0	0	0	5	2	0	0
PJM-MED	95	100	100	0	0	76	17	0	0	0	0	5	2	0	0
PJM-MED	105	100	100	0	0	76	17	0	0	0	0	5	2	0	0
PJM-MED	115	97	97	0	0	74	16	0	0	0	0	5	2	0	0
PJM-MED	125	94	94	0	0	71	16	0	0	0	0	5	2	0	0
PJM-MED	135	89	89	0	0	67	15	0	0	0	0	5	2	0	0
PJM-MED	145	83	83	0	0	62	15	0	0	0	0	4	2	0	0
PJM-MED	155	77	77	0	0	57	14	0	0	0	0	4	2	0	0
PJM-MED	165	70	75	0	0	55	14	0	0	0	0	4	2	0	0
PJM-MED	175	64	75	0	0	54	15	0	0	0	0	4	2	0	0
PJM-MED	185	58	76	0	0	53	16	0	0	0	0	4	3	0	0
PJM-MED	195	53	75	0	0	51	17	0	0	0	0	4	3	0	0
PJM-MED	205	47	75	0	0	49	18	0	0	0	0	5	3	0	0
PJM-MED	215	41	75	0	0	49	18	0	0	0	0	4	4	0	0
PJM-MED	225	36	75	0	0	48	21	0	0	0	0	4	2	0	0
PJM-MED	235	31	75	0	0	46	22	0	0	0	0	5	2	0	0
PJM-MED	245	28	75	0	0	43	24	0	0	0	0	5	3	0	0
PJM-MED	255	24	75	0	0	44	25	0	0	0	0	3	3	0	0

Total net merchantable volume peak of yield curve



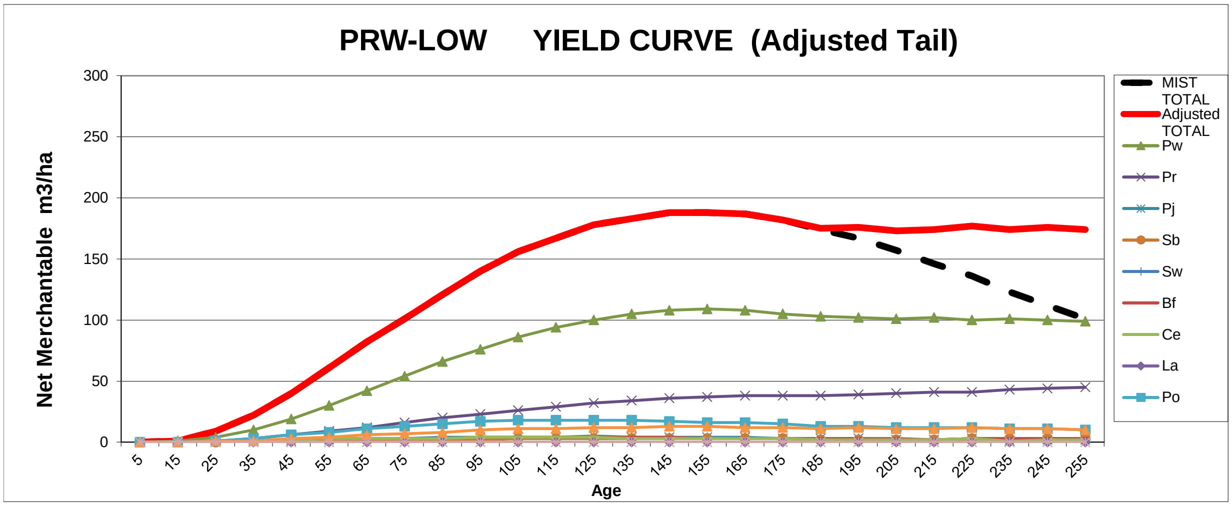
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
POD-MED	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
POD-MED	15	2	2	0	0	0	0	0	0	0	0	2	0	0	0
POD-MED	25	9	9	0	0	0	1	0	0	0	0	8	0	0	0
POD-MED	35	24	24	0	0	0	3	1	1	0	0	18	1	0	0
POD-MED	45	39	39	0	0	1	4	1	1	0	0	31	1	0	0
POD-MED	55	53	53	0	0	1	5	1	1	0	0	43	2	0	0
POD-MED	65	62	62	0	0	1	5	1	1	0	0	52	2	0	0
POD-MED	75	72	72	0	0	1	6	1	1	0	0	60	3	0	0
POD-MED	85	76	76	0	0	1	6	1	1	0	0	64	3	0	0
POD-MED	95	78	78	0	0	1	6	1	1	0	0	66	3	0	0
POD-MED	105	78	78	0	0	1	6	1	1	0	0	66	3	0	0
POD-MED	115	77	77	0	0	1	6	1	1	0	0	65	3	0	0
POD-MED	125	74	74	0	0	1	5	1	1	0	0	62	4	0	0
POD-MED	135	70	65	0	0	1	5	1	1	0	0	54	3	0	0
POD-MED	145	67	59	0	0	1	4	1	1	0	0	49	3	0	0
POD-MED	155	63	55	0	0	1	4	1	1	0	0	45	3	0	0
POD-MED	165	59	51	0	0	1	4	1	1	0	0	41	3	0	0
POD-MED	175	54	51	0	0	1	4	1	1	0	0	41	3	0	0
POD-MED	185	50	50	0	0	1	4	1	1	0	0	40	3	0	0
POD-MED	195	46	49	0	0	1	4	1	1	0	0	39	3	0	0
POD-MED	205	42	49	0	0	1	5	1	1	0	0	39	2	0	0
POD-MED	215	37	49	0	0	0	5	1	1	0	0	39	3	0	0
POD-MED	225	33	51	0	0	0	5	2	2	0	0	39	3	0	0
POD-MED	235	29	50	0	0	0	5	2	0	0	0	40	3	0	0
POD-MED	245	27	51	0	0	0	6	2	0	0	0	39	4	0	0
POD-MED	255	24	50	0	0	0	6	2	0	0	0	38	4	0	0

Total net merchantable volume peak of yield curve



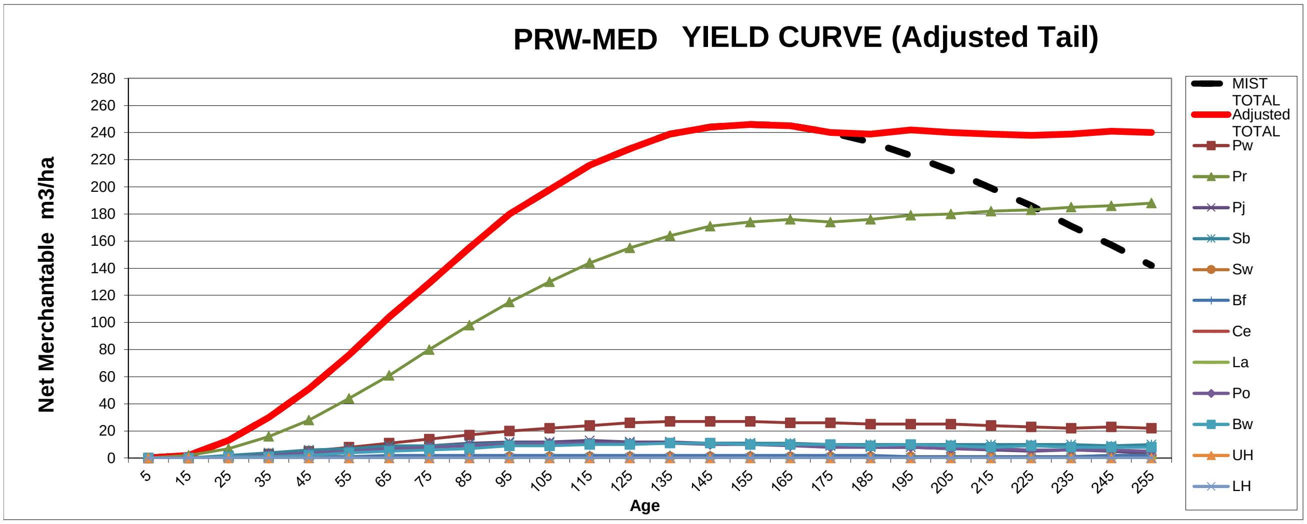
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
POD-HIGH	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
POD-HIGH	15	3	3	0	0	0	0	0	0	0	0	3	0	0	0
POD-HIGH	25	20	20	0	0	1	2	1	1	0	0	14	1	0	0
POD-HIGH	35	42	42	0	0	2	4	1	1	0	0	33	1	0	0
POD-HIGH	45	71	71	0	0	4	6	2	2	0	0	55	2	0	0
POD-HIGH	55	93	93	0	0	5	6	2	2	0	0	75	3	0	0
POD-HIGH	65	112	112	0	0	6	7	2	2	0	0	91	4	0	0
POD-HIGH	75	123	123	0	0	6	7	2	2	0	0	102	4	0	0
POD-HIGH	85	132	132	0	0	7	7	2	2	0	0	109	5	0	0
POD-HIGH	95	134	134	0	0	7	7	2	2	0	0	111	5	0	0
POD-HIGH	105	133	133	0	0	7	7	2	2	0	0	110	5	0	0
POD-HIGH	115	130	128	0	0	7	7	2	2	0	0	105	5	0	0
POD-HIGH	125	123	119	0	0	6	6	2	2	0	0	98	5	0	0
POD-HIGH	135	116	105	0	0	5	5	2	1	0	0	87	5	0	0
POD-HIGH	145	110	87	0	0	5	5	2	1	0	0	70	4	0	0
POD-HIGH	155	102	69	0	0	3	4	1	1	0	0	57	3	0	0
POD-HIGH	165	96	61	0	0	3	4	1	1	0	0	49	3	0	0
POD-HIGH	175	87	58	0	0	3	3	1	1	0	0	47	3	0	0
POD-HIGH	185	79	53	0	0	3	3	1	1	0	0	42	3	0	0
POD-HIGH	195	71	51	0	0	2	4	1	1	0	0	40	3	0	0
POD-HIGH	205	65	50	0	0	2	3	1	1	0	0	40	3	0	0
POD-HIGH	215	57	51	0	0	2	4	1	1	0	0	40	3	0	0
POD-HIGH	225	52	50	0	0	2	4	1	1	0	0	39	3	0	0
POD-HIGH	235	48	50	0	0	2	4	1	1	0	0	39	3	0	0
POD-HIGH	245	41	50	0	0	1	4	1	1	0	0	39	4	0	0
POD-HIGH	255	36	49	0	0	1	4	1	1	0	0	39	3	0	0

Total net merchantable volume peak of yield curve



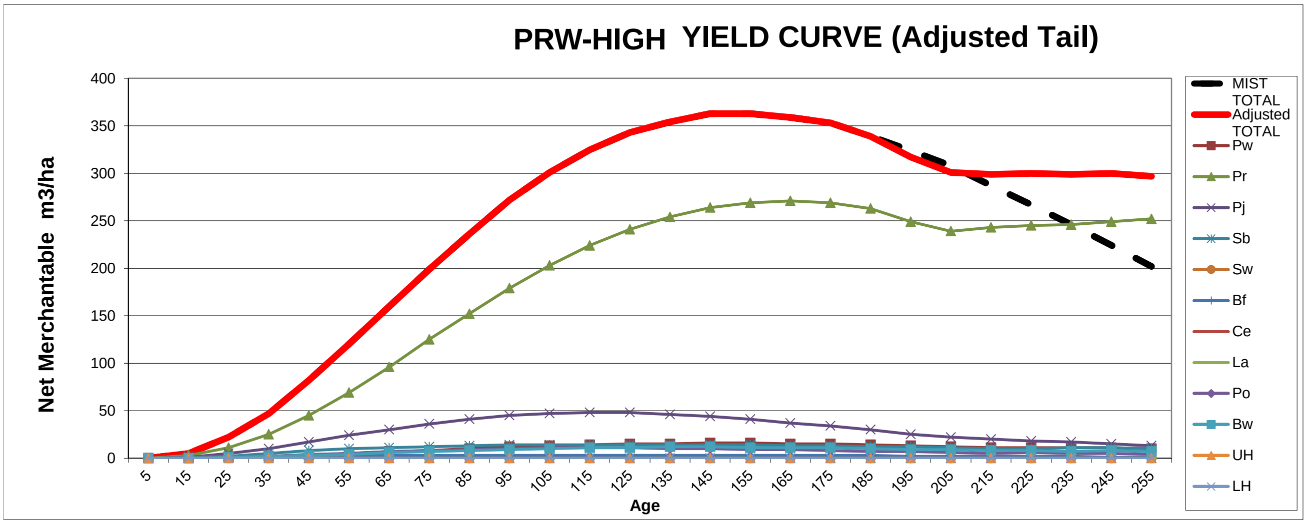
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PRW-LOW	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PRW-LOW	15	1	1	1	0	0	0	0	0	0	0	0	0	0	0
PRW-LOW	25	9	9	4	1	0	0	0	1	1	0	1	1	0	0
PRW-LOW	35	22	22	10	3	1	1	0	1	2	0	3	1	0	0
PRW-LOW	45	40	40	19	6	1	1	0	2	2	0	6	3	0	0
PRW-LOW	55	61	61	30	9	2	2	0	3	3	0	8	4	0	0
PRW-LOW	65	82	82	42	12	3	2	0	3	3	0	11	6	0	0
PRW-LOW	75	101	101	54	16	3	2	0	3	3	0	13	7	0	0
PRW-LOW	85	121	121	66	20	4	2	0	3	3	0	15	8	0	0
PRW-LOW	95	140	140	76	23	4	2	0	4	4	0	17	10	0	0
PRW-LOW	105	156	156	86	26	4	3	0	4	4	0	18	11	0	0
PRW-LOW	115	167	167	94	29	4	3	0	4	4	0	18	11	0	0
PRW-LOW	125	178	178	100	32	5	3	0	4	4	0	18	12	0	0
PRW-LOW	135	183	183	105	34	4	3	0	4	3	0	18	12	0	0
PRW-LOW	145	188	188	108	36	4	3	0	4	3	0	17	13	0	0
PRW-LOW	155	188	188	109	37	4	3	0	3	3	0	16	13	0	0
PRW-LOW	165	187	187	108	38	4	3	0	3	3	0	16	12	0	0
PRW-LOW	175	182	182	105	38	3	3	0	3	3	0	15	12	0	0
PRW-LOW	185	174	175	103	38	3	2	0	3	2	0	13	11	0	0
PRW-LOW	195	167	176	102	39	3	2	0	3	2	0	13	12	0	0
PRW-LOW	205	157	173	101	40	2	2	0	3	2	0	12	11	0	0
PRW-LOW	215	146	174	102	41	2	2	0	2	2	0	12	11	0	0
PRW-LOW	225	136	177	100	41	3	3	0	3	3	0	12	12	0	0
PRW-LOW	235	123	174	101	43	1	3	0	3	1	0	11	11	0	0
PRW-LOW	245	112	176	100	44	2	3	0	3	2	0	11	11	0	0
PRW-LOW	255	101	174	99	45	2	3	0	3	2	0	10	10	0	0

Total net merchantable volume peak of yield curve



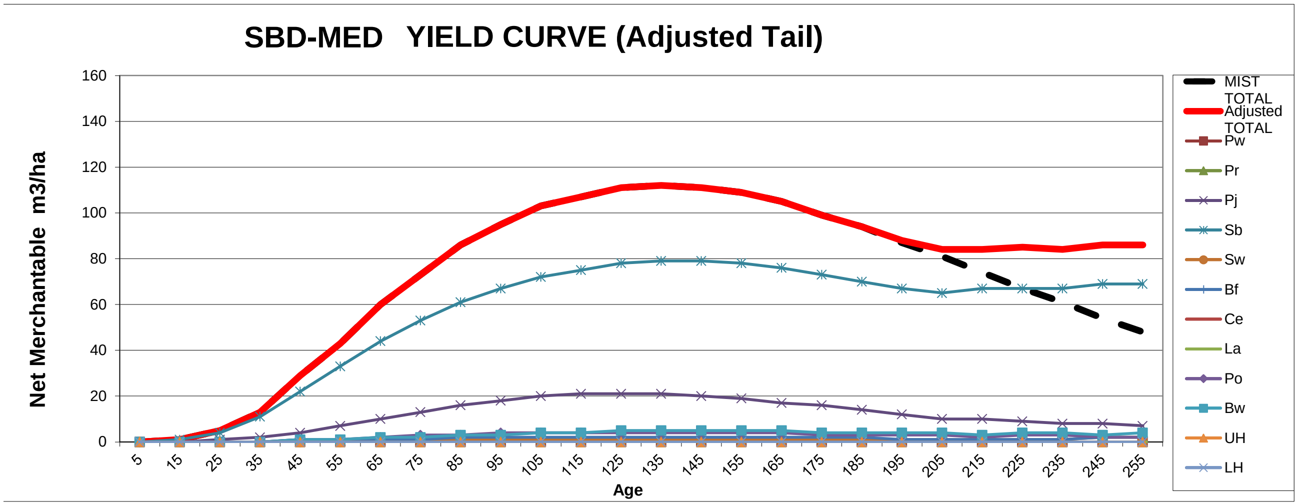
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PRW-MED	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PRW-MED	15	2	2	0	2	0	0	0	0	0	0	0	0	0	0
PRW-MED	25	13	13	1	7	1	2	0	0	0	0	1	1	0	0
PRW-MED	35	30	30	3	16	3	4	0	1	0	0	2	1	0	0
PRW-MED	45	51	51	5	28	4	6	1	1	0	0	4	2	0	0
PRW-MED	55	76	76	8	44	6	7	1	1	0	0	5	4	0	0
PRW-MED	65	104	104	11	61	8	9	1	2	0	0	7	5	0	0
PRW-MED	75	129	129	14	80	9	9	1	2	0	0	8	6	0	0
PRW-MED	85	155	155	17	98	11	10	1	2	0	0	9	7	0	0
PRW-MED	95	180	180	20	115	12	11	1	2	0	0	10	9	0	0
PRW-MED	105	198	198	22	130	12	11	1	2	0	0	11	9	0	0
PRW-MED	115	216	216	24	144	13	11	1	2	0	0	11	10	0	0
PRW-MED	125	228	228	26	155	12	11	1	2	0	0	11	10	0	0
PRW-MED	135	239	239	27	164	12	11	1	2	0	0	11	11	0	0
PRW-MED	145	244	244	27	171	11	11	1	2	0	0	10	11	0	0
PRW-MED	155	246	246	27	174	11	11	1	2	0	0	10	10	0	0
PRW-MED	165	245	245	26	176	10	11	1	2	0	0	9	10	0	0
PRW-MED	175	240	240	26	174	9	10	1	2	0	0	8	10	0	0
PRW-MED	185	233	239	25	176	8	10	1	2	0	0	8	9	0	0
PRW-MED	195	223	242	25	179	8	10	1	1	0	0	8	10	0	0
PRW-MED	205	212	240	25	180	7	10	1	1	0	0	7	9	0	0
PRW-MED	215	199	239	24	182	6	10	1	1	0	0	7	8	0	0
PRW-MED	225	186	238	23	183	5	10	1	1	0	0	6	9	0	0
PRW-MED	235	171	239	22	185	6	10	1	1	0	0	6	8	0	0
PRW-MED	245	157	241	23	186	5	9	2	2	0	0	6	8	0	0
PRW-MED	255	142	240	22	188	3	10	2	2	0	0	5	8	0	0

Total net merchantable volume peak of yield curve



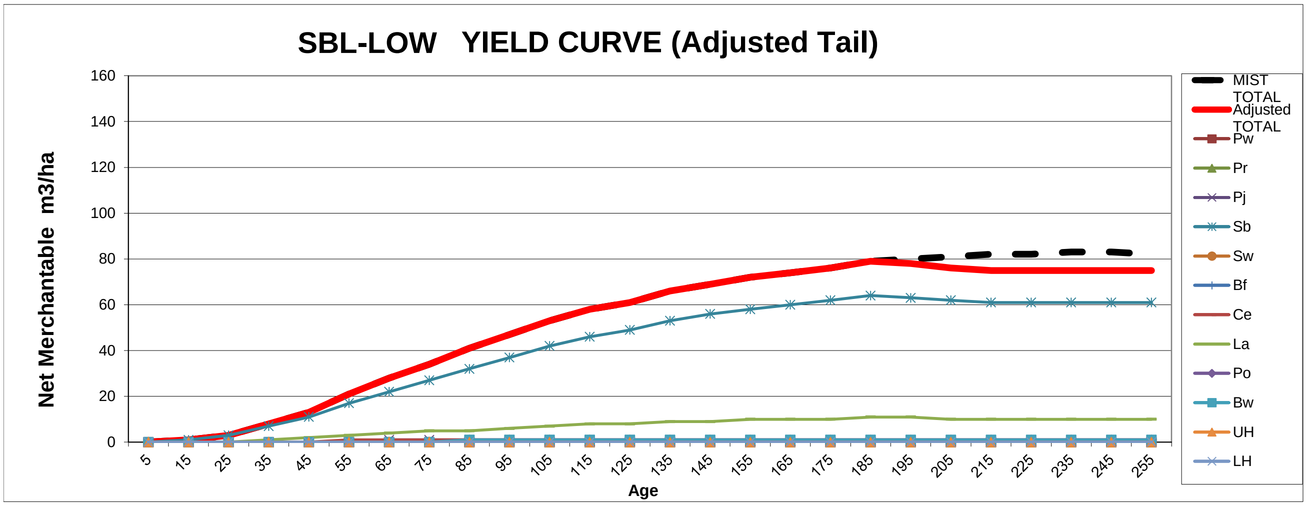
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PRW-HIGH	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PRW-HIGH	15	5	5	0	3	1	1	0	0	0	0	0	0	0	0
PRW-HIGH	25	22	22	1	11	5	2	0	1	0	0	1	1	0	0
PRW-HIGH	35	47	47	2	25	10	5	0	1	0	0	2	2	0	0
PRW-HIGH	45	82	82	3	45	17	8	0	2	0	0	4	3	0	0
PRW-HIGH	55	120	120	5	69	24	10	0	3	0	0	5	4	0	0
PRW-HIGH	65	160	160	7	96	30	11	0	3	0	0	7	6	0	0
PRW-HIGH	75	199	199	8	125	36	12	0	3	0	0	8	7	0	0
PRW-HIGH	85	236	236	10	152	41	13	0	3	0	0	9	8	0	0
PRW-HIGH	95	272	272	12	179	45	14	0	3	0	0	10	9	0	0
PRW-HIGH	105	301	301	13	203	47	14	0	3	0	0	11	10	0	0
PRW-HIGH	115	325	325	14	224	48	14	0	3	0	0	11	11	0	0
PRW-HIGH	125	343	343	15	241	48	14	0	3	0	0	11	11	0	0
PRW-HIGH	135	354	354	15	254	46	14	0	3	0	0	10	12	0	0
PRW-HIGH	145	363	363	16	264	44	14	0	3	0	0	10	12	0	0
PRW-HIGH	155	363	363	16	269	41	14	0	3	0	0	9	11	0	0
PRW-HIGH	165	359	359	15	271	37	13	0	3	0	0	9	11	0	0
PRW-HIGH	175	353	353	15	269	34	13	0	3	0	0	8	11	0	0
PRW-HIGH	185	339	339	14	263	30	12	0	3	0	0	7	10	0	0
PRW-HIGH	195	324	317	13	249	25	12	0	2	0	0	7	9	0	0
PRW-HIGH	205	308	301	12	239	22	11	0	2	0	0	6	9	0	0
PRW-HIGH	215	287	299	11	243	20	10	0	2	0	0	5	8	0	0
PRW-HIGH	225	267	300	11	245	18	10	0	2	0	0	6	8	0	0
PRW-HIGH	235	246	299	11	246	17	11	0	2	0	0	5	7	0	0
PRW-HIGH	245	224	300	11	249	15	11	0	1	0	0	5	8	0	0
PRW-HIGH	255	202	297	10	252	13	10	0	1	0	0	4	7	0	0

Total net merchantable volume peak of yield curve



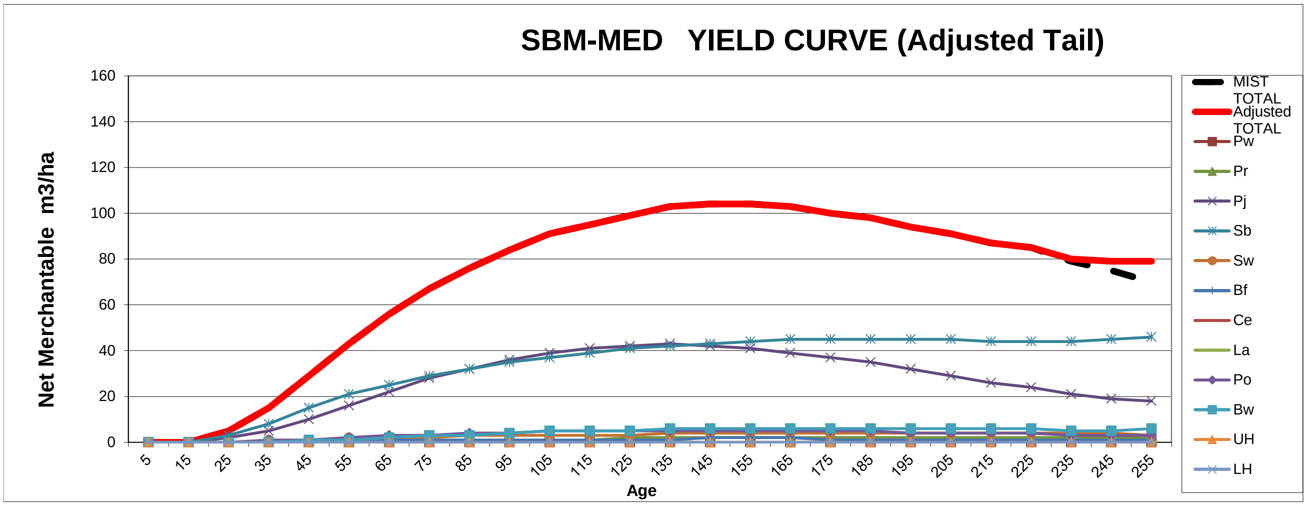
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
SBD-MED	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBD-MED	15	1	1	0	0	0	1	0	0	0	0	0	0	0	0
SBD-MED	25	5	5	0	0	1	4	0	0	0	0	0	0	0	0
SBD-MED	35	13	13	0	0	2	11	0	0	0	0	0	0	0	0
SBD-MED	45	29	29	0	0	4	22	0	1	0	0	1	1	0	0
SBD-MED	55	43	43	0	0	7	33	0	1	0	0	1	1	0	0
SBD-MED	65	60	60	0	0	10	44	1	1	0	0	2	2	0	0
SBD-MED	75	73	73	0	0	13	53	1	1	0	0	3	2	0	0
SBD-MED	85	86	86	0	0	16	61	1	2	0	0	3	3	0	0
SBD-MED	95	95	95	0	0	18	67	1	2	0	0	4	3	0	0
SBD-MED	105	103	103	0	0	20	72	1	2	0	0	4	4	0	0
SBD-MED	115	107	107	0	0	21	75	1	2	0	0	4	4	0	0
SBD-MED	125	111	111	0	0	21	78	1	2	0	0	4	5	0	0
SBD-MED	135	112	112	0	0	21	79	1	2	0	0	4	5	0	0
SBD-MED	145	111	111	0	0	20	79	1	2	0	0	4	5	0	0
SBD-MED	155	109	109	0	0	19	78	1	2	0	0	4	5	0	0
SBD-MED	165	105	105	0	0	17	76	1	2	0	0	4	5	0	0
SBD-MED	175	99	99	0	0	16	73	1	2	0	0	3	4	0	0
SBD-MED	185	94	94	0	0	14	70	1	2	0	0	3	4	0	0
SBD-MED	195	87	88	0	0	12	67	1	1	0	0	3	4	0	0
SBD-MED	205	81	84	0	0	10	65	1	1	0	0	3	4	0	0
SBD-MED	215	74	84	0	0	10	67	1	1	0	0	2	3	0	0
SBD-MED	225	67	85	0	0	9	67	1	1	0	0	3	4	0	0
SBD-MED	235	61	84	0	0	8	67	1	1	0	0	3	4	0	0
SBD-MED	245	54	86	0	0	8	69	2	2	0	0	2	3	0	0
SBD-MED	255	48	86	0	0	7	69	2	2	0	0	2	4	0	0

Total net merchantable volume peak of yield curve



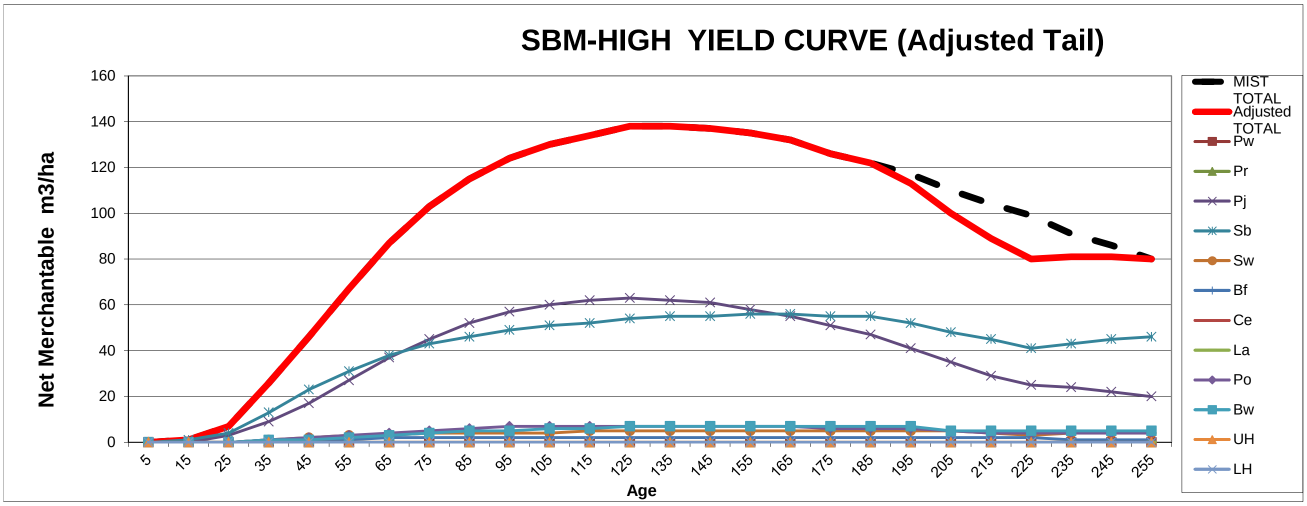
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
SBL-LOW	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBL-LOW	15	1	1	0	0	0	1	0	0	0	0	0	0	0	0
SBL-LOW	25	3	3	0	0	0	3	0	0	0	0	0	0	0	0
SBL-LOW	35	8	8	0	0	0	7	0	0	0	1	0	0	0	0
SBL-LOW	45	13	13	0	0	0	11	0	0	0	2	0	0	0	0
SBL-LOW	55	21	21	0	0	0	17	0	0	1	3	0	0	0	0
SBL-LOW	65	28	28	0	0	1	22	0	0	1	4	0	0	0	0
SBL-LOW	75	34	34	0	0	1	27	0	0	1	5	0	0	0	0
SBL-LOW	85	41	41	0	0	1	32	0	0	1	5	1	1	0	0
SBL-LOW	95	47	47	0	0	1	37	0	0	1	6	1	1	0	0
SBL-LOW	105	53	53	0	0	1	42	0	0	1	7	1	1	0	0
SBL-LOW	115	58	58	0	0	1	46	0	0	1	8	1	1	0	0
SBL-LOW	125	61	61	0	0	1	49	0	0	1	8	1	1	0	0
SBL-LOW	135	66	66	0	0	1	53	0	0	1	9	1	1	0	0
SBL-LOW	145	69	69	0	0	1	56	0	0	1	9	1	1	0	0
SBL-LOW	155	72	72	0	0	1	58	0	0	1	10	1	1	0	0
SBL-LOW	165	74	74	0	0	1	60	0	0	1	10	1	1	0	0
SBL-LOW	175	76	76	0	0	1	62	0	0	1	10	1	1	0	0
SBL-LOW	185	79	79	0	0	1	64	0	0	1	11	1	1	0	0
SBL-LOW	195	80	78	0	0	1	63	0	0	1	11	1	1	0	0
SBL-LOW	205	81	76	0	0	1	62	0	0	1	10	1	1	0	0
SBL-LOW	215	82	75	0	0	1	61	0	0	1	10	1	1	0	0
SBL-LOW	225	82	75	0	0	1	61	0	0	1	10	1	1	0	0
SBL-LOW	235	83	75	0	0	1	61	0	0	1	10	1	1	0	0
SBL-LOW	245	83	75	0	0	1	61	0	0	1	10	1	1	0	0
SBL-LOW	255	82	75	0	0	1	61	0	0	1	10	1	1	0	0

Total net merchantable volume peak of yield curve



FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
SBM-MED	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBM-MED	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBM-MED	25	5	5	0	0	2	3	0	0	0	0	0	0	0	0
SBM-MED	35	15	15	0	0	5	8	1	0	0	0	1	0	0	0
SBM-MED	45	29	29	0	0	10	15	1	1	0	0	1	1	0	0
SBM-MED	55	43	43	0	0	16	21	2	1	0	0	2	1	0	0
SBM-MED	65	56	56	0	1	22	25	2	1	0	0	3	2	0	0
SBM-MED	75	67	67	0	1	28	29	2	1	0	0	3	3	0	0
SBM-MED	85	76	76	0	1	32	32	3	1	0	0	4	3	0	0
SBM-MED	95	84	84	0	1	36	35	3	1	0	0	4	4	0	0
SBM-MED	105	91	91	0	1	39	37	3	1	0	0	5	5	0	0
SBM-MED	115	95	95	0	1	41	39	3	1	0	0	5	5	0	0
SBM-MED	125	99	99	0	2	42	41	3	1	0	0	5	5	0	0
SBM-MED	135	103	103	0	2	43	42	4	1	0	0	5	6	0	0
SBM-MED	145	104	104	0	2	42	43	4	2	0	0	5	6	0	0
SBM-MED	155	104	104	0	2	41	44	4	2	0	0	5	6	0	0
SBM-MED	165	103	103	0	2	39	45	4	2	0	0	5	6	0	0
SBM-MED	175	100	100	0	2	37	45	4	1	0	0	5	6	0	0
SBM-MED	185	98	98	0	2	35	45	4	1	0	0	5	6	0	0
SBM-MED	195	94	94	0	2	32	45	4	1	0	0	4	6	0	0
SBM-MED	205	91	91	0	2	29	45	4	1	0	0	4	6	0	0
SBM-MED	215	87	87	0	2	26	44	4	1	0	0	4	6	0	0
SBM-MED	225	85	85	0	2	24	44	4	1	0	0	4	6	0	0
SBM-MED	235	79	80	0	2	21	44	4	1	0	0	3	5	0	0
SBM-MED	245	75	79	0	2	19	45	4	1	0	0	3	5	0	0
SBM-MED	255	70	79	0	2	18	46	3	1	0	0	3	6	0	0

Total net merchantable volume peak of yield curve



FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
SBM-HIGH	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBM-HIGH	15	1	1	0	0	0	1	0	0	0	0	0	0	0	0
SBM-HIGH	25	7	7	0	0	3	4	0	0	0	0	0	0	0	0
SBM-HIGH	35	26	26	0	0	9	13	1	1	0	0	1	1	0	0
SBM-HIGH	45	46	46	0	0	17	23	2	1	0	0	2	1	0	0
SBM-HIGH	55	67	67	0	0	27	31	3	1	0	0	3	2	0	0
SBM-HIGH	65	87	87	0	0	37	38	3	2	0	0	4	3	0	0
SBM-HIGH	75	103	103	0	0	45	43	4	2	0	0	5	4	0	0
SBM-HIGH	85	115	115	0	0	52	46	4	2	0	0	6	5	0	0
SBM-HIGH	95	124	124	0	0	57	49	4	2	0	0	7	5	0	0
SBM-HIGH	105	130	130	0	0	60	51	4	2	0	0	7	6	0	0
SBM-HIGH	115	134	134	0	0	62	52	5	2	0	0	7	6	0	0
SBM-HIGH	125	138	138	0	0	63	54	5	2	0	0	7	7	0	0
SBM-HIGH	135	138	138	0	0	62	55	5	2	0	0	7	7	0	0
SBM-HIGH	145	137	137	0	0	61	55	5	2	0	0	7	7	0	0
SBM-HIGH	155	135	135	0	0	58	56	5	2	0	0	7	7	0	0
SBM-HIGH	165	132	132	0	0	55	56	5	2	0	0	7	7	0	0
SBM-HIGH	175	126	126	0	0	51	55	5	2	0	0	6	7	0	0
SBM-HIGH	185	122	122	0	0	47	55	5	2	0	0	6	7	0	0
SBM-HIGH	195	117	113	0	0	41	52	5	2	0	0	6	7	0	0
SBM-HIGH	205	110	100	0	0	35	48	5	2	0	0	5	5	0	0
SBM-HIGH	215	104	89	0	0	29	45	4	2	0	0	4	5	0	0
SBM-HIGH	225	99	80	0	0	25	41	3	2	0	0	4	5	0	0
SBM-HIGH	235	91	81	0	0	24	43	4	1	0	0	4	5	0	0
SBM-HIGH	245	86	81	0	0	22	45	4	1	0	0	4	5	0	0
SBM-HIGH	255	80	80	0	0	20	46	4	1	0	0	4	5	0	0

Total net merchantable volume peak of yield curve

Appendix 7

Summary of Investigation and LTMD Development Results

WHISKEY JACK FOREST 2024 FMP	**SUMMARY of SFMM INVESTIGATION**

Case Name: 00-NoHarv **Date:** April 23, 2023.

Purpose: Base model inputs check. Revised with Used 00_BASE inputs

Specific Inputs: Land base, forest dynamics, base silvic. Solved for Natural Succession through forest aging, and Natural Disturbance Suppresion fire cycle) only (no harvest).

Group:	Mm3/yr
SPF	
PO	
BW	
TOTAL	

Vol. Flow

RESULTS: Where projections in the following tables fall below lower targets, the data is shaded yellow; where projections exceed upper targets, the data is shaded green.

FOREST CONDITION RESULTS

Implications on Forest Condition - Good (above upper IQR) BLG indicator achievement for Mature-Late classes. Poor for Old Growth T1-3, but improves as area succeeds. Upland Conifer increases but never reaches lower IQR. Young Forest never reaches lower IQR. Early Landscape Classes and young forest are not achieved, due to min. (fire) transition to revert forest to young (i.e. harvest). Cannot create more PRW. Caribou habitats improve and overachieve by T4.

(2a) Area by Landscape Class (Productive ha)

Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	81,424	186,273	66,561	14,802	243,544	143,145	46,587
T2	24,011	223,252	60,703	16,713	255,791	153,852	48,013
T3	34,595	214,813	33,766	19,456	258,711	173,716	47,277
T4	42,834	121,231	29,897	23,998	335,712	178,378	50,280
T5	59,235	69,788	27,121	26,182	367,414	181,672	50,912
T6	59,278	37,820	26,722	32,115	399,714	176,052	50,568
T7	59,348	39,351	29,801	38,155	396,986	169,133	49,475
T8	59,538	46,562	36,355	52,730	384,198	154,491	48,238
T9	59,825	60,974	35,984	58,754	382,862	137,033	46,649
T10	60,250	61,284	35,351	63,484	396,707	118,286	46,649
T11	60,978	61,619	34,308	67,491	415,008	95,940	46,649
T12	61,961	62,185	32,792	68,747	424,763	84,867	46,649
T13	62,975	63,123	30,968	73,859	427,476	76,897	46,649
T14	63,740	64,415	29,034	75,486	433,814	68,806	46,649
T15	64,265	66,003	27,164	77,458	436,147	64,250	46,649
T16	64,736	67,578	25,512	76,873	439,789	60,798	46,649
T17	65,112	68,957	24,221	75,688	443,106	58,193	46,649
BLG Upper	263,084	228,782	63,469	16,237	269,185	65,739	16,276
BLG Lower	143,268	103,333	36,052	8,706	178,461	43,021	12,845

(2b) Old Growth by Grouping (Prod. ha) / **(2d)** / **(2e)**

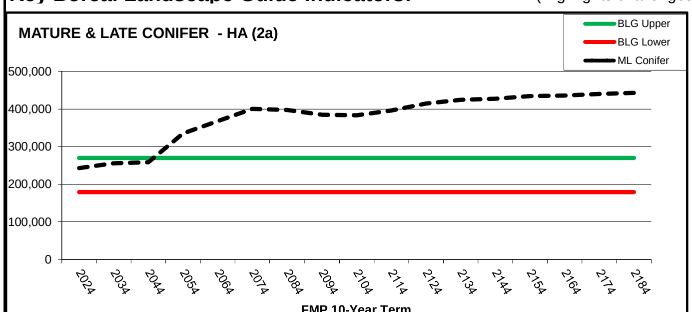
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs
T1	23,536	1,071	22,60[illegible]	30	359,248	136,124
T2	65,92[illegible]	1,897	74,2[illegible]6	149	359,248	70,126
T3	[illegible]	3,095	[illegible],140	319	363,311	51,134
T4	144,481	6,37[illegible]	164,996	594	370,744	57,561
T5	155,923	[illegible],497	188,597	[illegible]	373,757	74,805
T6	169,361	15,904	201,631	1,977	376,917	86,459
T7	226,981	23,959	214,188	2,162	380,710	86,457
T8	246,476	32,399	235,751	2,317	383,431	86,454
T9	271,951	34,885	232,019	2,375	399,286	86,448
T10	280,683	35,947	235,206	2,326	406,041	86,441
T11	292,054	35,732	228,990	2,338	412,577	86,433
T12	290,572	35,176	221,371	2,282	417,197	86,427
T13	291,450	37,281	216,973	2,361	419,907	86,423
T14	297,008	37,711	210,895	2,322	427,961	86,420
T15	299,560	37,528	208,748	2,269	432,169	86,418
T16	301,349	36,790	206,102	2,244	436,866	86,417
T17	302,154	35,930	205,279	2,228	439,604	86,416
BLG Upper	82,642	6,477	58,909		497,902	342,348
BLG Lower	51,310	4,282	35,996	1,000	475,260	196,754
				1,000 ha used		

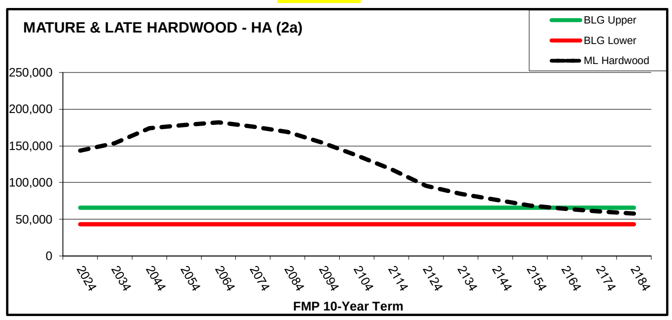
(6a) Available Forest:

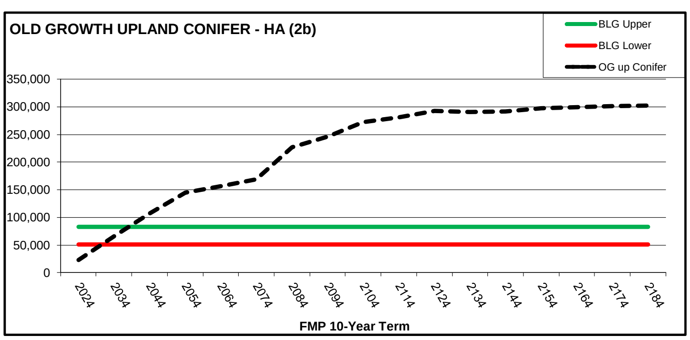
Term	
T1	196,134
T2	196,134
T3	196,134
T4	196,134
T5	196,134
T6	196,134
T7	196,134
T8	196,134
T9	196,134
T10	196,134
T11	196,134
T12	196,134
T13	196,134
T14	196,134
T15	196,134
T16	196,134
T17	196,134

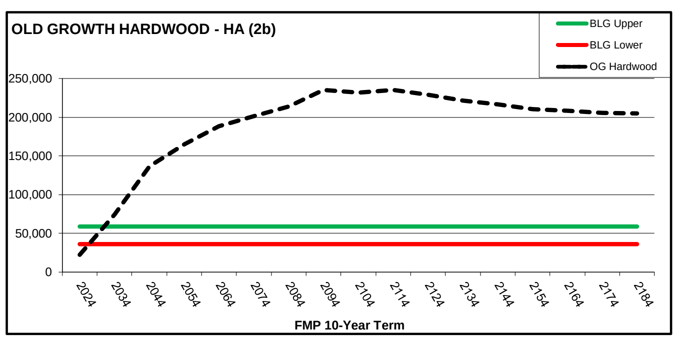
Key Boreal Landscape Guide Indicators:

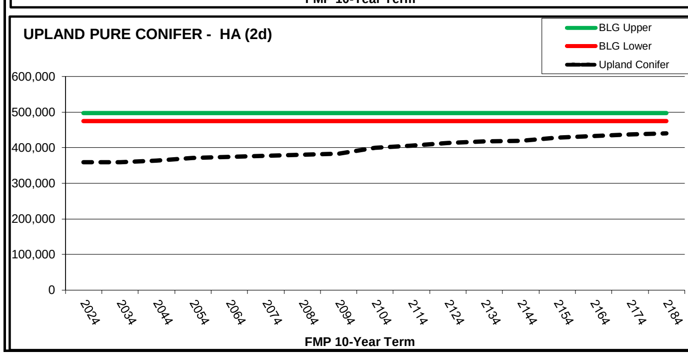
(Highlights challenges)

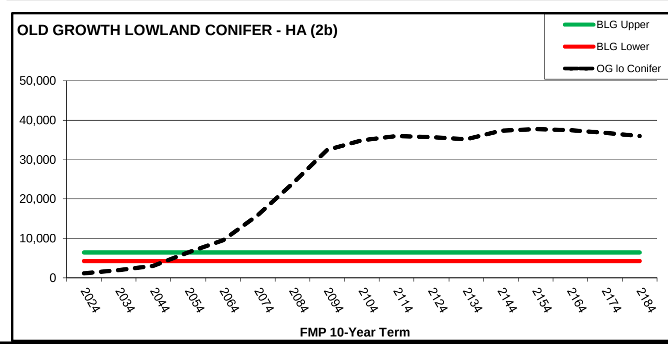










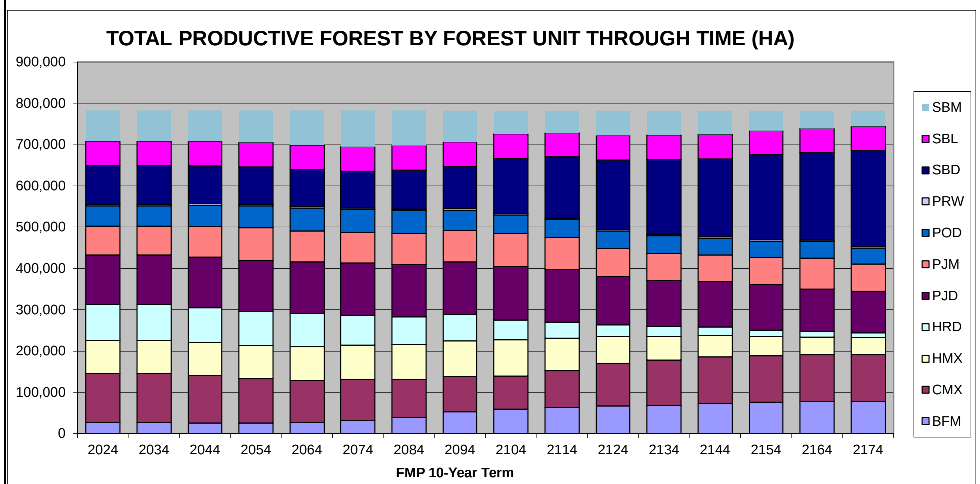


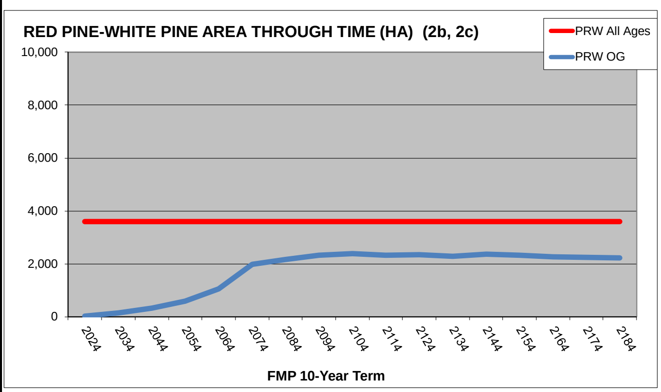
WHISKEY JACK FOREST 2024 FMP **SUMMARY of SFMM INVESTIGATION**

Case Name: **00-NoHarv** **Date:** April 23, 2023.

Productive Forest Area Through Time Data (hectares): by Forest Unit									Indicator (2c)			
Term	**TOTAL**	**BFM**	**CMX**	**HMX**	**HRD**	**PJD**	**PJM**	**POD**	**PRW**	**SBD**	**SBL**	**SBM**
T1	782,337	26,616	119,352	80,207	85,706	120,245	70,531	48,642	3,587	94,413	58,977	74,058
T2	782,337	26,616	119,352	80,207	85,706	120,245	70,531	48,642	3,587	94,413	58,977	74,058
T3	782,335	25,929	114,913	80,521	83,890	122,479	73,909	51,205	3,587	92,379	58,977	74,544
T4	782,331	25,982	106,645	80,927	81,940	124,312	78,624	53,528	3,587	90,452	58,977	77,356
T5	782,322	26,892	102,228	81,723	79,376	125,814	74,878	55,782	3,587	89,208	58,977	83,856
T6	782,269	32,626	99,343	82,393	72,783	125,517	74,838	55,641	3,587	89,310	58,977	87,253
T7	782,250	38,155	93,997	82,841	67,836	126,694	74,965	56,145	3,587	94,000	58,977	85,052
T8	782,112	52,730	84,806	87,750	62,406	128,462	76,479	48,425	3,587	102,988	58,977	75,502
T9	782,080	58,754	81,021	87,490	47,631	129,313	80,630	45,333	3,587	132,729	58,977	56,614
T10	782,010	63,484	89,319	78,451	38,462	127,541	77,796	43,688	3,587	147,485	58,977	53,219
T11	781,993	67,491	102,710	64,812	29,041	117,061	67,216	42,796	3,587	168,242	58,977	60,058
T12	781,964	68,747	109,903	56,734	23,588	111,930	65,356	43,231	3,587	180,712	58,977	59,199
T13	781,946	73,859	112,158	51,900	20,519	110,250	63,622	41,038	3,587	188,177	58,977	57,859
T14	781,942	75,486	112,752	47,310	15,118	111,045	64,012	40,751	3,587	205,053	58,977	47,851
T15	781,936	77,458	113,234	43,642	13,054	102,124	76,054	39,814	3,587	211,339	58,977	42,652
T16	781,934	76,873	114,379	40,570	11,981	101,032	65,632	38,701	3,587	232,850	58,977	37,352
T17	781,926	75,688	116,837	37,457	11,163	85,894	77,116	38,611	3,587	239,636	58,977	36,958

(Obj. 1) Caribou Habitat (Caribou Zone):		
Term	**Refuge (1b)**	**Winter (1a)**
T1	132,854	86,255
T2	146,382	104,469
T3	157,276	113,803
T4	163,892	117,159
T5	166,886	123,129
T6	166,980	121,384
T7	167,856	122,251
T8	169,000	122,590
T9	170,997	124,540
T10	173,058	126,657
T11	175,892	127,773
T12	177,757	128,508
T13	179,015	128,846
T14	181,263	130,413
T15	183,211	131,614
T16	184,267	132,172
T17	184,898	132,282
BLG Upper	161,804	115,633
BLG Lower	147,605	63,721





All ages PRW - desirable level "to increase"
Target in SFMM to not decrease.

Old Growth PRW - desirable level "to increase"

WHISKEY JACK FOREST 2024 FMP **SUMMARY of SFMM INVESTIGATION**

Case Name: **00-NoHarv** **Date:** April 23, 2023.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - NO HARVEST

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

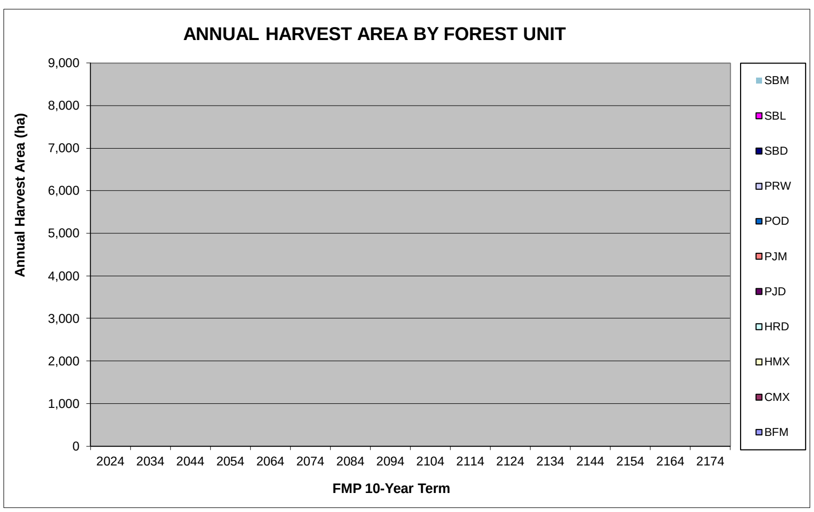
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 (6b)	0	0	0	0	0	0	0	0	0	0	0	0
T2	0	0	0	0	0	0	0	0	0	0	0	0
T3	0	0	0	0	0	0	0	0	0	0	0	0
T4	0	0	0	0	0	0	0	0	0	0	0	0
T5	0	0	0	0	0	0	0	0	0	0	0	0
T6	0	0	0	0	0	0	0	0	0	0	0	0
T7	0	0	0	0	0	0	0	0	0	0	0	0
T8	0	0	0	0	0	0	0	0	0	0	0	0
T9	0	0	0	0	0	0	0	0	0	0	0	0
T10	0	0	0	0	0	0	0	0	0	0	0	0
T11 (6b)	0	0	0	0	0	0	0	0	0	0	0	0
T12	0	0	0	0	0	0	0	0	0	0	0	0
T13	0	0	0	0	0	0	0	0	0	0	0	0
T14	0	0	0	0	0	0	0	0	0	0	0	0
T15	0	0	0	0	0	0	0	0	0	0	0	0
T16	0	0	0	0	0	0	0	0	0	0	0	0

Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	Small	Large
T1 (6c)	0.0	0.0	0.0	0.0	0.0	#DIV/0!	#DIV/0!
T2	0.0	0.0	0.0	0.0	0.0	#DIV/0!	#DIV/0!
T3	0.0	0.0	0.0	0.0	0.0	#DIV/0!	#DIV/0!
T4	0.0	0.0	0.0	0.0	0.0	#DIV/0!	#DIV/0!
T5	0.0	0.0	0.0	0.0	0.0	#DIV/0!	#DIV/0!
T6	0.0	0.0	0.0	0.0	0.0	#DIV/0!	#DIV/0!
T7	0.0	0.0	0.0	0.0	0.0	#DIV/0!	#DIV/0!
T8	0.0	0.0	0.0	0.0	0.0	#DIV/0!	#DIV/0!
T9	0.0	0.0	0.0	0.0	0.0	#DIV/0!	#DIV/0!
T10	0.0	0.0	0.0	0.0	0.0	#DIV/0!	#DIV/0!
T11 (6c)	0.0	0.0	0.0	0.0	0.0	#DIV/0!	#DIV/0!
T12	0.0	0.0	0.0	0.0	0.0	#DIV/0!	#DIV/0!
T13	0.0	0.0	0.0	0.0	0.0	#DIV/0!	#DIV/0!
T14	0.0	0.0	0.0	0.0	0.0	#DIV/0!	#DIV/0!
T15	0.0	0.0	0.0	0.0	0.0	#DIV/0!	#DIV/0!
T16	0.0	0.0	0.0	0.0	0.0	0.00	0.00
Average	0.0	0.0	0.0	0.0	0.0		

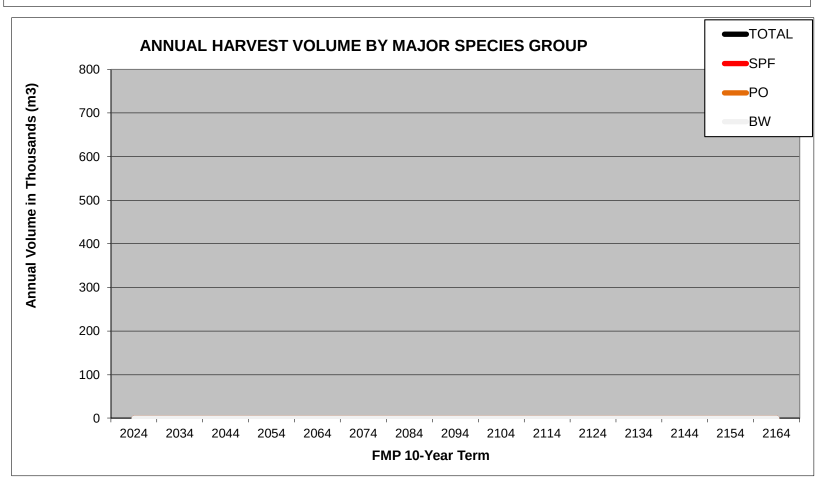
Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal ha	Natural ha	Plant ha	Seed ha
T1	0	0	0	0	0	0	0
T2	0	0	0	0	0	0	0
T3	0	0	0	0	0	0	0
T4	0	0	0	0	0	0	0
T5	0	0	0	0	0	0	0
T6	0	0	0	0	0	0	0
T7	0	0	0	0	0	0	0
T8	0	0	0	0	0	0	0
T9	0	0	0	0	0	0	0
T10	0	0	0	0	0	0	0
T11	0	0	0	0	0	0	0
T12	0	0	0	0	0	0	0
T13	0	0	0	0	0	0	0
T14	0	0	0	0	0	0	0
T15	0	0	0	0	0	0	0
T16	0	0	0	0	0	0	0



TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
MEA1				
MEA2				
MEA3				
DEA1				
CAR1				
CAR2				
LLP1				
LLP2				
LLP3				
SMZA				
LOTW				
H105				
TOTAL	-	-	-	-



WHISKEY JACK FOREST 2024 FMP **SUMMARY of SFMM INVESTIGATION**

Case Name: **01-BLG-Max** **Date:** April 26, 2023.

Purpose: Investigation to see how soon BLG indicators can be achieved.

Specific Inputs: Lower BLG IQR targets (binding) included for all indicators from T2-T6 onwards depending how soon area ages and counts. Except: Upland Conifer T14 onwards at lower level (450,000 ha), and Young T5 on (at 120,000 ha) since time needed to allow forest activities to make enough upland conifer (PJD, PJM, SBD, SBM) and harvest area (young).

Group:	Mm3/yr
SPF	
PO	
BW	
TOTAL	

Vol. Flow
+/-20%

No volume targets.

RESULTS: Where projections in the following tables fall below lower targets, the data is shaded yellow; where projections exceed upper targets, the data is shaded green.

FOREST CONDITION RESULTS

Implications on Forest Condition - Very good (or above upper IQR) BLG indicator achievement for all Mature-Late classes. Poor for Old Growth T1-5, but improves as area ages. Upland Conifer increases but never reaches lower IQR. Young Forest never reaches lower IQR. Slow creation of all-ages PRW, but OG PRW increases. Caribou habitats improve (to T3) and overachieve by T4-T5.

(2a) Area by Landscape Class (Productive ha)

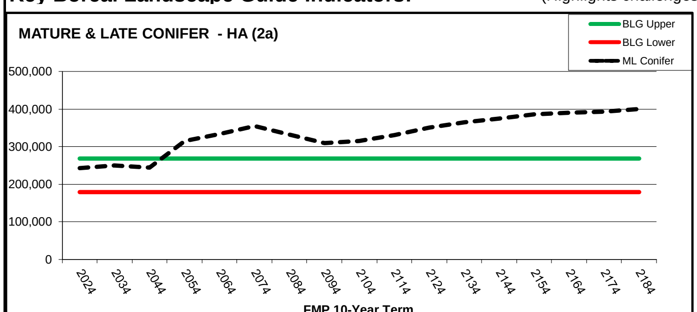
Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	81,424	186,273	66,561	14,802	243,544	143,145	46,587
T2	40,480	223,252	60,703	15,200	250,089	147,156	45,229
T3	58,483	214,708	38,635	17,946	243,881	166,348	41,970
T4	75,811	121,437	35,522	21,964	314,927	168,441	43,863
T5	94,116	80,301	34,496	23,419	334,142	172,062	43,419
T6	99,238	59,357	34,488	28,583	354,322	163,218	42,693
T7	108,998	67,727	40,532	33,281	332,884	157,032	41,418
T8	110,093	87,032	44,765	44,973	310,118	144,595	40,138
T9	106,258	104,336	45,722	48,785	314,817	121,044	40,718
T10	91,108	112,043	49,319	51,738	331,423	103,364	42,597
T11	86,590	116,738	48,956	54,033	351,077	80,878	43,276
T12	89,048	110,495	46,802	54,998	364,422	71,948	43,793
T13	86,817	106,252	45,180	57,829	374,358	67,448	43,590
T14	89,912	97,468	41,018	59,274	386,051	64,740	43,005
T15	92,659	93,568	34,247	60,826	390,586	67,551	42,026
T16	93,490	95,695	31,859	60,158	392,702	66,904	40,652
T17	91,674	97,955	28,329	58,964	400,263	66,293	37,974
BLG Upper	263,084	228,782	63,469	16,237	269,185	65,739	16,276
BLG Lower	143,268	103,333	36,052	8,706	178,461	43,021	12,845

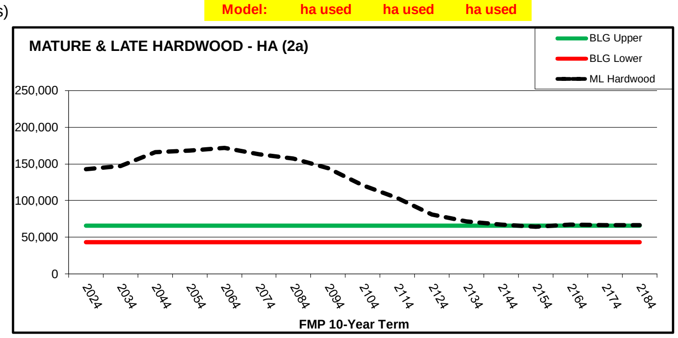
(2b) Old Growth by Grouping (Prod. ha) / **(2d)** / **(2e)** / **(6a) Available Forest:**

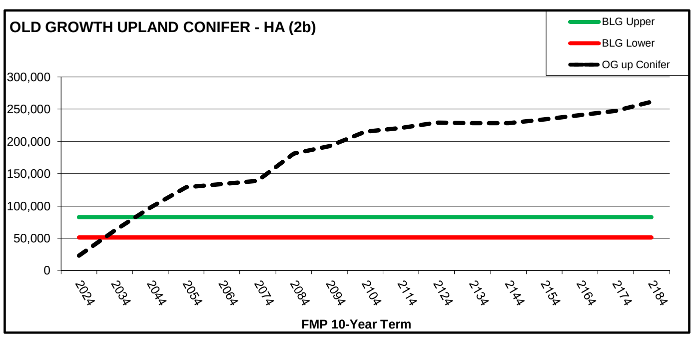
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs	Term	(6a) Available Forest
T1	23,536	1,071	22,603	30	359,248	136,124	T1	196,134
T2	62,285	1,552	72,012	149	360,860	86,595	T2	195,366
T3	97,428	1,816	132,742	278	365,693	80,032	T3	194,800
T4	129,128	4,620	160,269	523	373,03[illegible]	96,369	T4	194,800
T5	134,459	6,965	181,770	913	3[illegible],561	1[illegible],126	T5	194,800
T6	138,858	12,270	186,200	1,502	[illegible]84,439	135,[illegible]54	T6	194,800
T7	181,357	18,486	192,144	1,635	394,394	145,3[illegible]	T7	194,800
T8	192,792	24,562	205,305	1,716	397,643	149,28[illegible]	T8	194,800
T9	215,068	26,774	199,982	1,758	412,222	145,374	T9	194,800
T10	220,672	27,741	198,644	1,729	421,110	135,948	T10	194,800
T11	229,177	27,327	189,506	1,717	428,585	127,807	T11	194,800
T12	227,978	26,437	177,082	1,665	436,523	123,954	T12	194,800
T13	228,566	28,098	172,776	1,764	440,554	120,099	T13	194,800
T14	233,938	27,810	164,208	1,744	450,446	120,097	T14	194,800
T15	240,443	28,469	163,394	1,711	453,417	120,76[illegible]	T15	194,800
T16	247,563	28,011	163,765	1,729	456,745	120,[illegible]7	T16	194,800
T17	261,201	26,119	165,935	1,749	[illegible]9,056	11[illegible]095	T17	194,800
BLG Upper	82,642	6,477	58,909		497,[illegible]	[illegible]42,348		
BLG Lower	51,310	4,282	35,996	1,500	475,260	196,754		
			Model:	1,500 ha used	450,000 ha used	120,000 ha used		

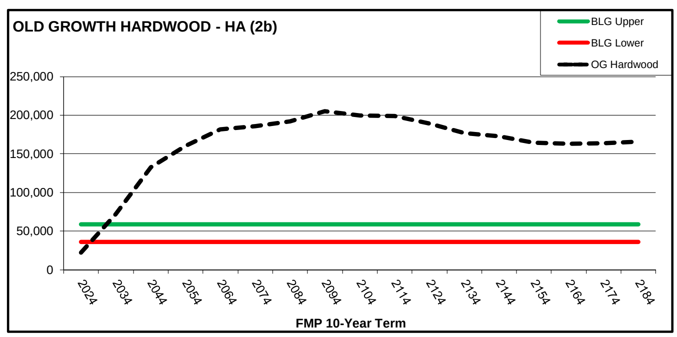
Key Boreal Landscape Guide Indicators:

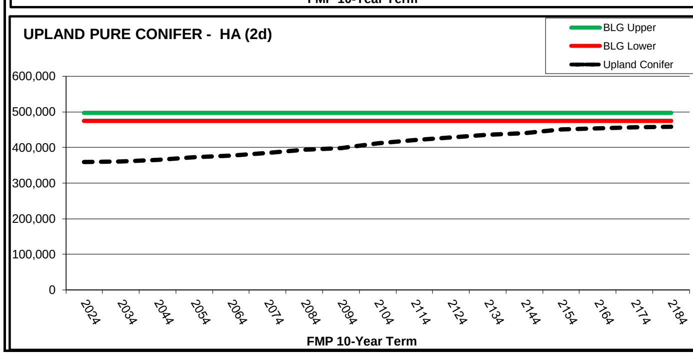
(Highlights challenges)

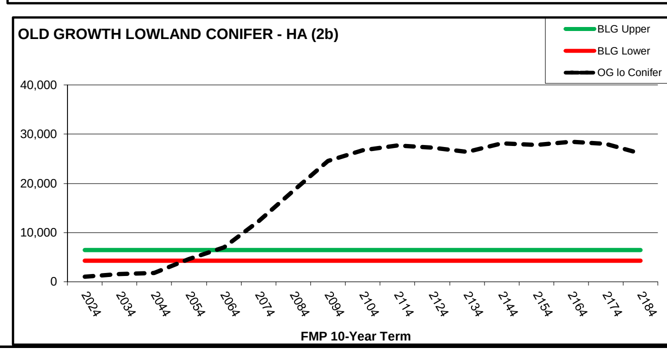












WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: 01-BLG-Max **Date:** April 26, 2023.

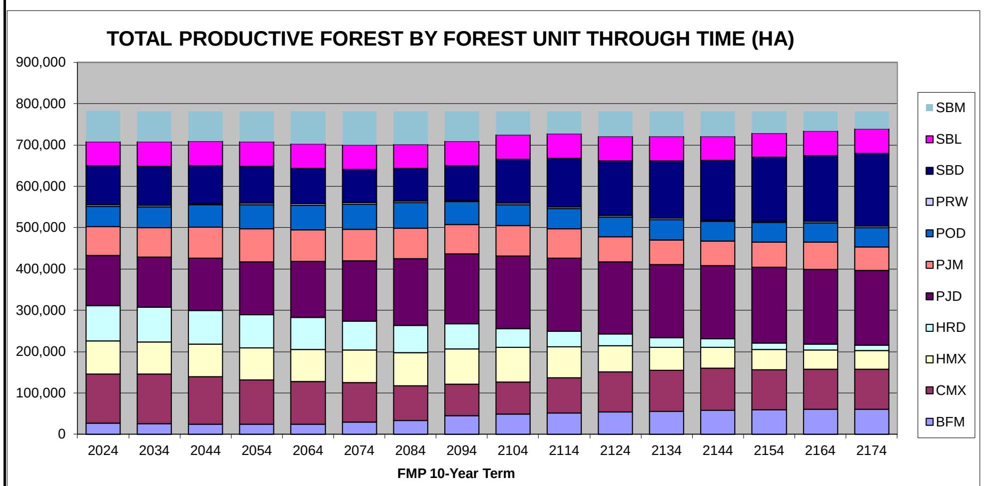
FMP 10-Year Term

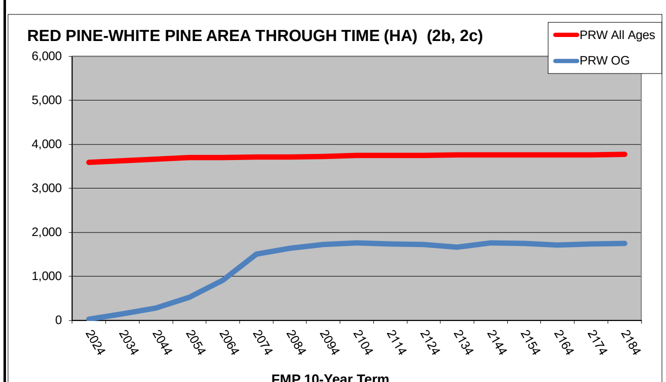
Productive Forest Area Through Time Data (hectares): by Forest Unit — Indicator (2c)

Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1	782,337	26,616	119,352	80,207	85,706	120,245	70,531	48,642	3,587	94,413	58,977	74,058
T2	782,110	25,249	120,530	77,919	83,724	121,088	70,976	51,251	3,627	94,117	58,949	74,680
T3	781,971	24,594	115,039	78,024	81,997	126,114	75,104	54,044	3,656	91,110	58,922	73,365
T4	781,965	24,192	108,034	77,342	79,355	128,638	80,293	57,388	3,693	89,433	58,922	74,675
T5	781,955	24,371	103,102	78,472	77,163	134,863	76,262	59,667	3,695	86,177	58,922	79,260
T6	781,899	29,406	96,026	78,186	70,505	145,818	75,724	60,710	3,705	80,968	58,922	81,929
T7	781,873	33,590	83,903	79,851	66,170	161,607	73,912	61,333	3,708	78,828	58,922	80,047
T8	781,714	45,197	76,676	84,333	60,731	169,607	71,591	54,495	3,717	84,056	58,922	72,388
T9	781,678	49,099	77,098	84,619	45,387	174,607	74,553	50,590	3,741	105,561	58,922	57,502
T10	781,592	52,004	84,418	75,856	36,756	176,968	71,457	48,784	3,742	117,976	58,922	54,709
T11	781,548	54,335	96,807	63,281	28,013	175,211	60,861	47,856	3,750	131,492	58,922	61,021
T12	781,505	55,272	100,037	55,760	22,117	177,958	59,219	49,111	3,762	138,429	58,922	60,917
T13	781,474	58,087	101,679	51,225	19,707	178,022	58,536	47,538	3,762	143,841	58,922	60,155
T14	781,469	59,488	97,034	48,605	15,690	183,646	60,203	47,522	3,762	154,225	58,922	52,373
T15	781,463	60,931	96,575	46,631	14,085	181,396	65,045	47,139	3,762	158,727	58,922	48,249
T16	781,461	60,241	97,702	44,571	13,117	180,751	57,111	46,401	3,762	175,736	58,922	43,146
T17	781,452	59,047	99,848	40,943	12,398	170,451	65,515	47,463	3,775	180,969	58,922	42,120

(Obj. 1) Caribou Habitat (Caribou Zone):

Term	Refuge (1b)	Winter (1a)
T1	132,854	86,255
T2	146,370	104,250
T3	156,179	111,130
T4	162,871	114,570
T5	165,939	120,030
T6	166,318	119,291
T7	167,979	121,714
T8	169,145	122,325
T9	171,266	124,845
T10	173,380	126,980
T11	176,102	128,078
T12	177,132	126,347
T13	177,465	124,954
T14	179,559	126,656
T15	181,434	127,924
T16	182,867	131,439
T17	183,869	133,412
BLG Upper	161,804	115,633
BLG Lower	147,605	63,721





All ages PRW - desirable level "to increase"
Target in SFMM to not decrease.

Old Growth PRW - desirable level "to increase"

WHISKEY JACK FOREST 2024 FMP — **SUMMARY of SFMM INVESTIGATION**

Case Name: 01-BLG-Max — **Date:** April 26, 2023.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - Variable total harvest area between terms (T1-T6, not controlled). TOTAL volumes controlled at +/-20%, but still allows signif. Changes T1-T6.
PO vol Term 1 well below commitment level, SPF vol meets commitments. (Increase harvest to supply more PO in LTMD)

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

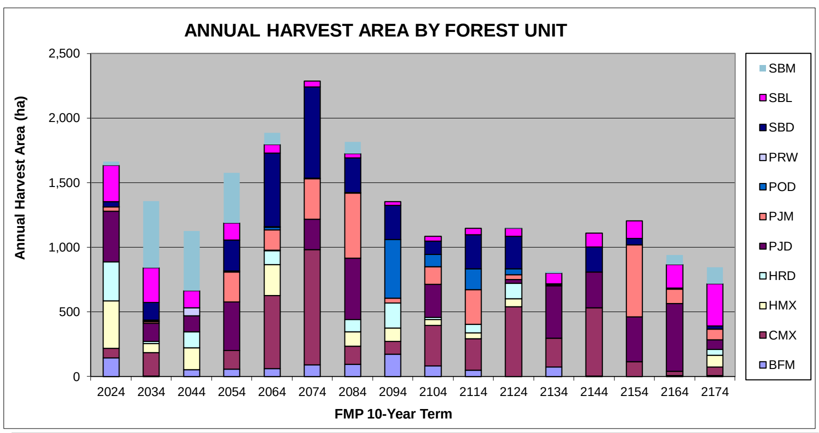
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 5b)	1,664	145	73	368	302	390	35	0	0	41	278	30
T2	1,356	4	183	67	20	140	12	5	4	136	270	514
T3	1,124	55	0	168	122	124	0	0	61	0	133	460
T4	1,577	59	143	0	0	376	231	0	10	236	133	390
T5	1,887	61	566	240	106	7	154	20	4	570	65	94
T6	2,285	89	891	0	0	236	315	0	3	705	46	0
T7	1,814	96	139	113	92	475	502	8	0	268	32	89
T8	1,353	171	100	105	195	0	37	452	0	265	29	0
T9	1,085	81	315	47	16	256	134	94	0	104	37	0
T10	1,147	49	245	46	66	0	266	161	0	266	49	0
T11 (5b)	1,149	0	542	59	120	30	35	49	0	250	63	1
T12	813	75	222	0	0	403	12	0	0	5	82	14
T13	1,109	3	529	0	0	276	0	0	0	194	107	0
T14	1,205	0	114	0	0	346	559	0	0	47	139	0
T15	942	8	34	0	0	522	111	0	0	10	180	76
T16	845	10	63	92	46	72	84	0	0	23	327	127

Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	% Small	% Large
T1 (5c)	148.9	101.1	33.6	11.6	0.0	1.00	0.00
T2	119.1	100.2	10.3	5.5	0.6	0.99	0.01
T3	120.3	83.0	17.9	8.0	10.2	0.91	0.09
T4	144.3	128.4	8.0	5.4	1.3	0.98	0.02
T5	173.2	127.6	29.9	14.3	0.5	0.99	0.01
T6	207.8	176.2	17.8	12.5	0.4	1.00	0.00
T7	166.2	141.3	16.7	7.9	0.0	1.00	0.00
T8	133.0	60.9	60.8	11.0	0.0	0.95	0.05
T9	106.4	82.5	17.0	6.5	0.0	0.98	0.02
T10	97.8	66.6	24.1	6.6	0.0	0.98	0.02
T11 (5c)	97.1	65.1	21.2	10.1	0.0	0.93	0.07
T12	77.7	68.4	4.9	3.4	0.0	0.91	0.09
T13	93.2	77.6	8.0	6.3	0.0	0.96	0.04
T14	95.2	86.0	5.1	2.8	0.0	0.98	0.02
T15	76.2	69.8	2.9	1.8	0.0	0.96	0.04
T16	60.9	47.7	7.1	2.9	0.0	1.00	0.00
Average	119.8	92.6	17.8	7.3	0.8		

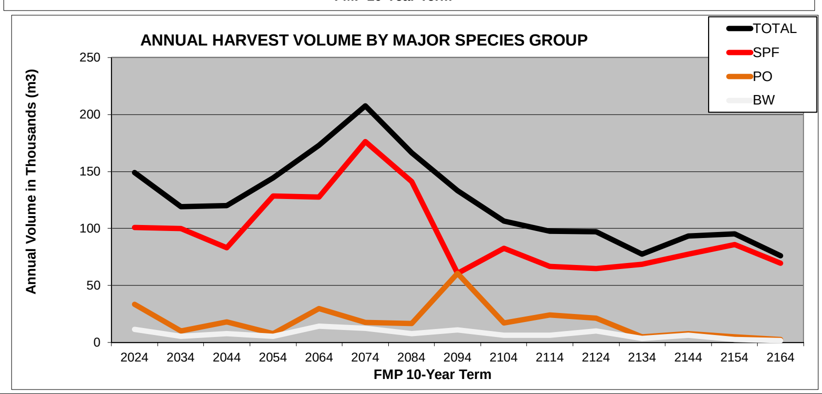
Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal Total ha	Natural ha	Plant ha	Seed ha
T1	702	702	0	**1,647**	848	283	517
T2	669	669	0	**1,343**	342	163	837
T3	649	649	0	**1,124**	382	282	460
T4	842	842	0	**1,577**	135	125	1,317
T5	862	862	0	**1,887**	371	125	1,391
T6	1,151	1,151	0	**2,285**	69	69	2,147
T7	919	919	0	**1,814**	217	124	1,473
T8	464	464	0	**1,353**	795	156	402
T9	548	548	0	**1,085**	183	93	809
T10	457	457	0	**1,147**	336	34	777
T11	449	449	0	**1,149**	291	0	858
T12	446	446	0	**813**	82	75	656
T13	512	512	0	**1,109**	108	2	999
T14	558	558	0	**1,205**	139	0	1,067
T15	455	455	0	**942**	180	52	709
T16	331	331	0	**845**	454	133	258



TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
CAR2	154	275		
DEA1	253	190	125	137
H105	462	266	277	448
LLP1			26	61
LLP2			46	41
LLP3	137			
LOTW	463	490	456	674
MEA1	73	25	26	95
MEA2	58	75	138	61
MEA3	63	35	31	61
CAR1				
SMZA				
TOTAL	**1,664**	**1,356**	**1,124**	**1,577**



WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: 01-BLG-Max

Date: April 26, 2023.

Breakdown of PLANFU Available Harvest Area by Analysis Unit and Age Class TERM 1

Forest Unit: (Analysis Unit)

	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
A5	0																
A15																	
A25																	
A35																	
A45																	
A55				113		18	76										
A65				240		82					0						1
A75	25			15		36	8										
A85	36					23		70		6							1
A95	50	2				59		246		17				34			17
A105	24	61	0		0			70		8				5			11
A115	8	6						4		4				3	125	5	0
A125	2	4						1							46		
A135															55	1	
A145	1														17		
A155															17	1	
A165		0													3		
A175															4		
A185															1		
A195															1		
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	145	72	0	368	0	218	84	390	0	35	0	0	0	41	271	7	30
																Total:	**1,664**

Renewal Area by Treatment Type Term 1

	Total	Natural	Plant	Seed
BFM	144	-	144	-
CMX	72	-	-	72
CMXC	0	-	-	0
HMX	364	273	91	-
HRDA	0	0	-	-
HRDB	216	216	-	-
HRD	83	83	-	-
PJDD	387	-	48	339
PJDS	-	-	-	-
PJM	35	-	-	35
POD	0	0	-	-
PRWR	-	-	-	-
PRWW	-	-	-	-
SBD	41	-	-	41
SBL	269	269	-	-
SBLC	7	7	-	-
SBM	30	-	-	30
	1,647	**848**	**283**	**517**
	Renewal:	**51%**	**17%**	**31%**

Available Harvest Area by Analysis Unit

Forest Unit: (Analysis Unit)

Term	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
T1	145	72	0	368	0	218	84	390		35	0			41	271	7	30
T2	4	180	3	67	0	2	17	140		12	5		4	136	190	80	514
T3	55			168	0	4	118	124				50	11		133		460
T4	59	143			0			58	318	231		3	7	236	93	40	390
T5	61	496	70	240	0	10	96		7	154	20	4		570	65		94
T6	89	868	23		0			222	14	315		3		705	46		
T7	96	137	2	113	0	33	60	475		502	8			268	32		89
T8	171	99	1	105	0	22	173			37	452			265	29		
T9	81	315	0	47	0	1	16	256		134	94			104	37		
T10	49	245		46	0	1	64			266	161			266	49		
T11		540	1	59	0	14	106	29	1	35	49			250	63		1
T12	75	218	4		0			403	0	12				5	82		14
T13	3	526	3		0			276						194	107		
T14		114	1		0			346		559				47	139		
T15	8	33	0		0			261	261	111				10	180		76
T16	10	63	0	92	0	0	46	62	11	84				23	235	92	127

WHISKEY JACK FOREST 2024 FMP	SUMMARY of SFMM INVESTIGATION

Case Name: 02-BLG+20 **Date:** April 30, 2023.

Purpose: Investigation to see how soon BLG indicators can be achieved, but slightly "relaxed" achievement timeframe for certain indicators.

Specific Inputs: Same lower BLG IQR targets (binding) included for all indicators from T2-T6 onwards as 01-BLG-Max. Except: Upland Conifer T10 onwards at lower level (420,000 ha), and Young at 110,000 ha T3 on. Minor delay in OG to achieve by T4 (except OG PRW still at T6).

Group:	Mm3/yr
SPF	
PO	
BW	
TOTAL	

Vol. Flow
+/-20%

No volume targets.

RESULTS: Where projections in the following tables fall below lower targets, the data is shaded yellow; where projections exceed upper targets, the data is shaded green.

FOREST CONDITION RESULTS

Implications on Forest Condition - Very good (or above upper IQR) BLG indicator achievement for all Mature-Late classes. Similar / Poor for Old Growth T1-5, but improves as area ages. Upland Conifer increases but never reaches lower IQR (lower than 02-BLG-Max). Young Forest never reaches lower IQR but better overall than BLG-Max. Slow creation of all-ages PRW, but OG PRW increases. Caribou habitats improve (to T3) and overachieve by T4-T5 (same as BLG-Max).

(2a) Area by Landscape Class (Productive ha)

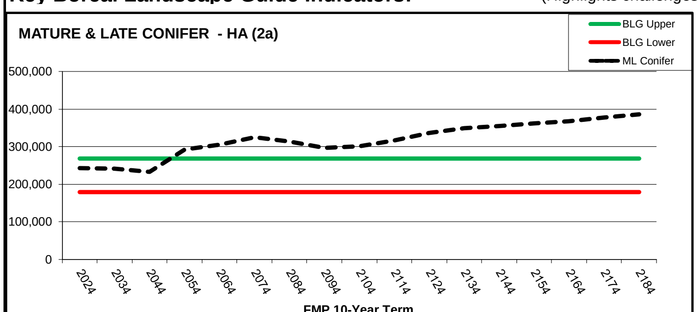
Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	81,424	186,273	66,561	14,802	243,544	143,145	46,587
T2	57,341	223,199	60,703	16,701	241,120	137,221	45,715
T3	81,384	214,731	45,549	19,266	233,233	146,232	41,317
T4	107,548	121,712	49,030	22,636	292,410	146,006	42,362
T5	120,517	89,517	50,243	23,781	305,912	150,360	41,359
T6	118,307	73,685	49,875	28,435	325,340	145,706	40,275
T7	109,360	94,368	52,889	32,683	314,340	139,236	38,702
T8	105,182	117,751	50,220	43,218	297,249	130,423	37,303
T9	105,133	129,284	48,238	47,944	301,095	112,070	37,512
T10	103,199	124,407	50,545	50,869	317,176	94,481	40,484
T11	104,368	114,747	53,680	53,629	335,987	76,490	42,212
T12	101,967	109,122	54,234	54,358	350,004	67,685	43,697
T13	98,556	107,782	53,253	57,913	354,559	64,553	44,421
T14	92,996	111,046	46,642	59,448	361,647	64,382	44,871
T15	89,894	111,005	38,710	61,021	367,311	68,096	44,987
T16	85,907	109,007	32,925	60,499	377,299	70,525	44,860
T17	83,428	107,172	29,128	59,110	386,787	71,686	43,702
BLG Upper	263,084	228,782	63,469	16,237	269,185	65,739	16,276
BLG Lower	143,268	103,333	36,052	8,706	178,461	43,021	12,845

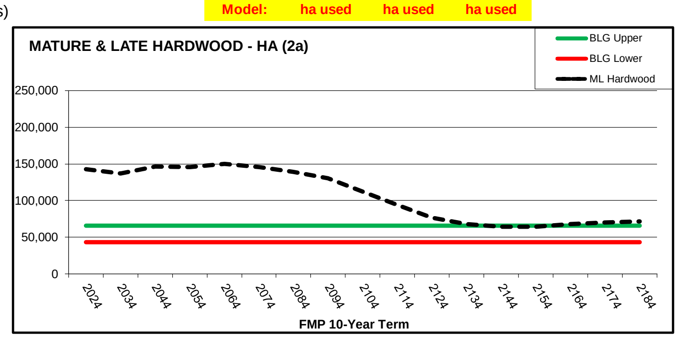
(2b) Old Growth by Grouping (Prod. ha) / **(2d)** / **(2e)** / **(6a) Available Forest:**

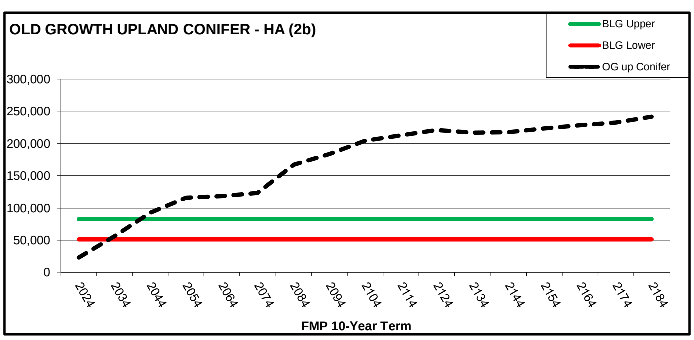
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs	Term	(6a) Available Forest
T1	23,536	1,071	22,603	30	359,248	136,[illegible]24	T1	196,134
T2	56,027	1,667	71,548	149	362,025	103,455	T2	194,577
T3	92,366	1,803	123,602	254	368,136	110,073	T3	193,304
T4	115,682	4,463	143,612	524	377,396	142,085	T4	193,304
T5	118,674	6,823	158,255	915	383,371	163,867	T5	193,304
T6	123,103	12,058	166,153	1,507	386,72[illegible]	163,280	T6	193,304
T7	167,000	18,157	173,638	1,640	395,09[illegible]	150,773	T7	193,304
T8	183,673	23,926	187,659	1,721	399,387	144,631	T8	193,304
T9	204,298	25,203	186,256	1,742	412,352	146,491	T9	193,304
T10	212,407	25,799	186,326	1,696	420,754	148,504	T10	193,304
T11	220,630	25,538	180,107	1,645	424,37[illegible]	150,684	T11	193,304
T12	216,835	25,018	171,996	1,596	428,46[illegible]	144,921	T12	193,304
T13	217,663	26,960	170,718	1,697	430,012	136,387	T13	193,304
T14	223,583	27,694	167,116	1,680	436,161	127,363	T14	193,304
T15	228,469	28,403	164,595	1,648	440,874	119,476	T15	193,304
T16	232,556	27,953	163,688	1,681	445,225	113,88[illegible]	T16	193,304
T17	241,597	26,765	165,088	1,765	447,937	110,[illegible]12	T17	193,304
BLG Upper	82,642	6,477	58,909		497,902	342,348		
BLG Lower	51,310	4,282	35,996	1,500	475,260	196,754		
Model:				1,500 ha used	420,000 ha used	110,000 ha used		

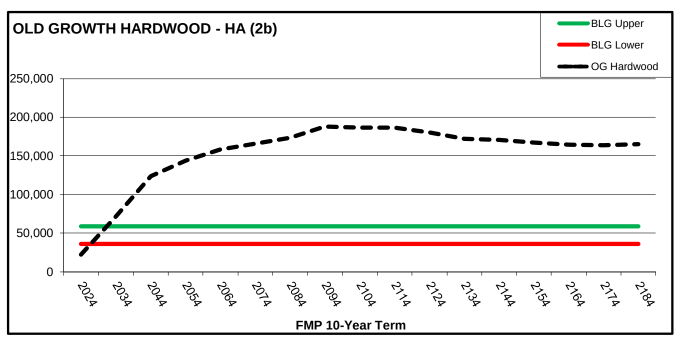
Key Boreal Landscape Guide Indicators:

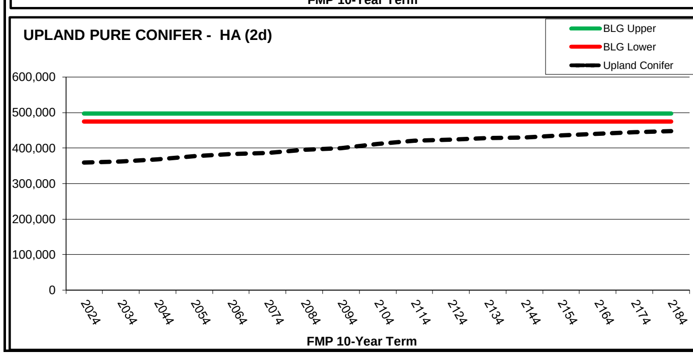
(Highlights challenges)

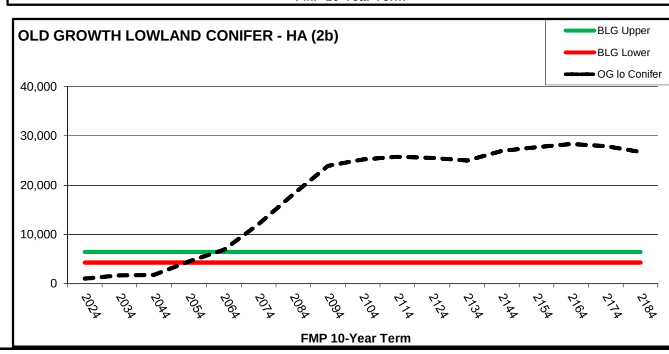












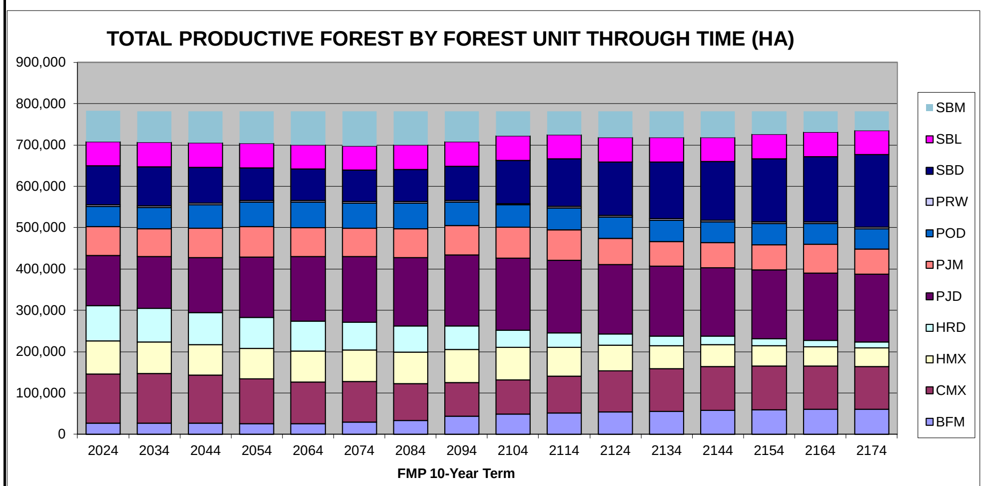
WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

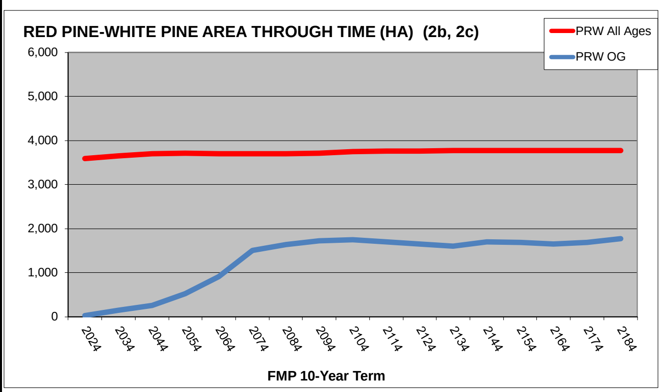
Case Name: 02-BLG+20 **Date:** April 30, 2023.

FMP 10-Year Term

Productive Forest Area Through Time Data (hectares): by Forest Unit									Indicator (2c)			
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1	782,337	26,616	119,352	80,207	85,706	120,245	70,531	48,642	3,587	94,413	58,977	74,058
T2	782,000	26,985	120,282	75,681	82,199	125,000	67,221	52,229	3,646	94,171	58,954	75,633
T3	781,712	26,383	116,667	73,814	78,157	132,632	71,455	55,946	3,693	87,484	58,916	76,565
T4	781,704	25,379	108,369	73,568	75,064	146,165	73,958	59,301	3,712	79,252	58,916	78,020
T5	781,688	25,224	100,968	74,969	73,069	155,835	70,397	61,472	3,699	75,782	58,916	81,356
T6	781,623	29,663	98,080	76,409	66,812	158,752	68,526	61,325	3,696	75,637	58,916	83,807
T7	781,577	33,406	88,959	76,799	62,383	165,361	69,999	62,329	3,697	78,286	58,916	81,444
T8	781,346	43,759	81,750	79,743	56,995	171,785	70,601	57,082	3,714	83,635	58,916	73,365
T9	781,276	48,434	82,608	79,157	42,158	174,351	74,312	53,911	3,740	104,338	58,916	59,350
T10	781,162	51,336	88,879	70,756	34,228	175,435	74,076	52,540	3,752	115,173	58,916	56,071
T11	781,113	54,122	99,775	61,220	27,366	168,092	63,521	51,576	3,761	129,962	58,916	62,801
T12	781,068	54,872	104,339	55,378	22,989	168,840	59,493	52,340	3,767	137,150	58,916	62,982
T13	781,037	58,385	106,034	52,370	20,732	165,977	59,995	50,821	3,767	141,441	58,916	62,599
T14	781,031	59,780	105,412	49,533	16,585	166,883	60,920	50,878	3,767	153,298	58,916	55,059
T15	781,025	61,185	103,581	47,358	14,963	162,748	69,744	50,381	3,767	157,971	58,916	50,412
T16	781,023	60,572	103,431	45,424	13,984	163,927	60,640	49,705	3,767	174,875	58,916	45,783
T17	781,014	59,149	104,704	42,629	13,535	154,460	69,059	50,376	3,768	180,273	58,916	44,145

(Obj. 1) Caribou Habitat (Caribou Zone):		
Term	Refuge (1b)	Winter (1a)
T1	132,854	86,255
T2	146,454	104,285
T3	156,540	110,578
T4	163,239	114,036
T5	166,298	120,114
T6	166,620	118,777
T7	168,714	122,105
T8	169,678	122,846
T9	171,446	125,598
T10	173,860	127,712
T11	176,139	128,821
T12	176,517	125,415
T13	177,594	125,383
T14	179,666	127,113
T15	181,513	128,490
T16	183,324	132,555
T17	183,989	133,098
BLG Upper	161,804	115,633
BLG Lower	147,605	63,721





All ages PRW - desirable level "to increase"
Target in SFMM to not decrease.

Old Growth PRW - desirable level "to increase"

WHISKEY JACK FOREST 2024 FMP	SUMMARY of SFMM INVESTIGATION		
Case Name:	**02-BLG+20**	**Date:**	April 30, 2023.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - Higher 40-year harvest than BLG-Max.harvest to create more Ypung earlier. TOTAL volumes controlled at +/-20%, but still allows signif. Changes T1-T6. PO vol Term 1 meets commitment level (improved), SPF vol meets/above commitments. (Reduce conifer harvest in LTMD)

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

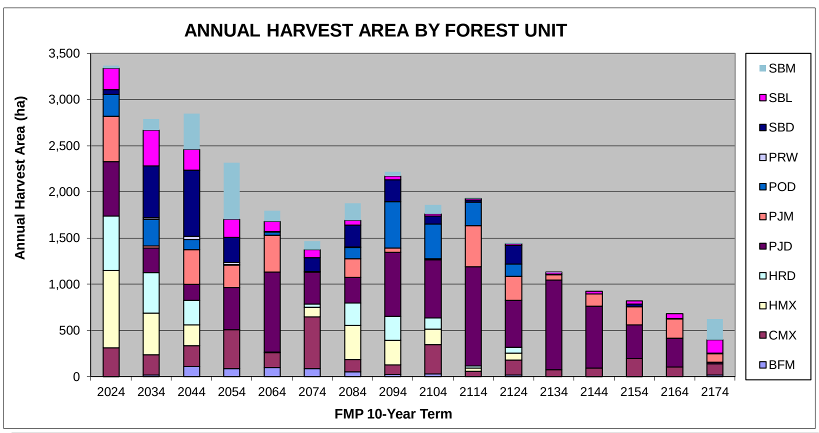
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 5b)	3,367	1	312	836	588	592	487	239	0	52	230	29
T2	2,792	16	218	453	440	265	24	286	19	562	387	123
T3	2,849	108	225	229	262	174	377	108	34	719	223	390
T4	2,318	86	423	0	0	455	246	2	22	275	196	612
T5	1,796	98	163	0	6	865	398	31	6	0	109	118
T6	1,466	89	559	102	34	346	1	3	5	149	85	92
T7	1,878	54	133	368	241	277	204	124	5	235	53	185
T8	2,218	23	105	266	256	695	49	501	0	239	37	46
T9	1,862	29	317	171	122	629	10	377	0	82	26	100
T10	1,929	0	57	34	26	1,071	446	253	0	23	18	0
T11 (5b)	1,449	15	163	78	64	505	262	130	0	203	16	13
T12	1,130	0	76	0	0	971	57	0	0	3	21	0
T13	925	0	92	0	0	672	133	0	0	0	28	0
T14	823	1	195	0	0	367	193	0	0	31	36	0
T15	679	0	106	0	0	313	203	0	0	9	48	0
T16	626	16	121	0	0	20	88	0	0	7	146	227

Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	% Small	% Large
T1 (5c)	337.8	197.9	107.9	29.8	0.0	0.99	0.01
T2	270.2	163.3	79.9	20.4	3.0	0.97	0.03
T3	259.4	192.4	42.8	16.5	5.7	0.99	0.01
T4	207.6	178.0	13.7	10.6	3.3	0.95	0.05
T5	166.0	147.2	11.7	5.3	0.8	0.99	0.01
T6	141.6	113.2	17.5	9.2	0.7	0.99	0.01
T7	169.9	114.9	42.4	11.5	0.6	0.99	0.01
T8	203.9	123.8	69.1	10.6	0.0	1.00	0.00
T9	166.1	107.0	50.0	8.8	0.0	1.00	0.00
T10	172.2	138.0	29.9	4.1	0.0	1.00	0.00
T11 (5c)	137.8	106.2	24.8	6.6	0.0	0.97	0.03
T12	110.2	103.8	4.3	1.8	0.0	1.00	0.00
T13	88.2	82.2	4.0	1.7	0.0	1.00	0.00
T14	70.5	62.9	4.5	2.7	0.0	1.00	0.00
T15	56.4	50.8	3.3	1.8	0.0	1.00	0.00
T16	45.1	38.2	3.2	2.3	0.0	1.00	0.00
Average	162.7	120.0	31.8	9.0	0.9		

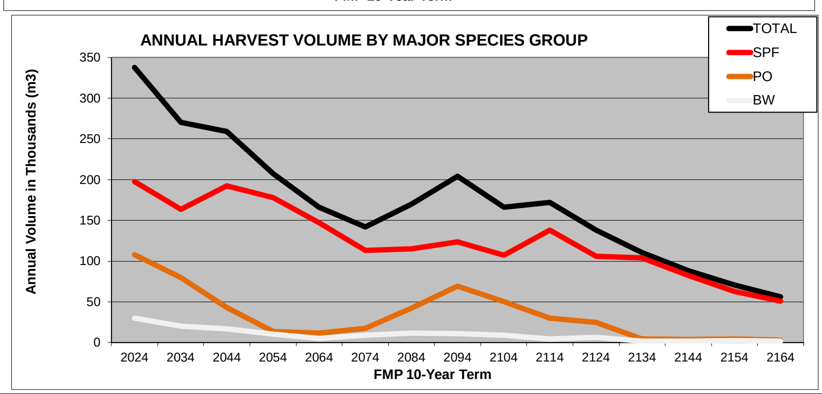
Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal Total ha	Natural ha	Plant ha	Seed ha
T1	1,411	1,411	0	**3,333**	1,462	489	1,382
T2	1,187	1,187	0	**2,764**	1,261	483	1,020
T3	1,340	1,340	0	**2,849**	672	292	1,885
T4	1,189	1,189	0	**2,318**	186	120	2,012
T5	959	959	0	**1,796**	138	114	1,544
T6	754	754	0	**1,466**	198	120	1,147
T7	792	792	0	**1,878**	664	180	1,034
T8	870	870	0	**2,218**	891	193	1,133
T9	740	740	0	**1,862**	640	85	1,137
T10	908	892	0	**1,929**	335	58	1,535
T11	705	656	0	**1,449**	252	51	1,145
T12	662	592	0	**1,130**	0	21	1,108
T13	525	490	0	**925**	0	28	896
T14	406	406	0	**823**	36	0	786
T15	329	329	0	**679**	48	0	631
T16	255	255	0	**626**	244	58	325



TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
CAR2	134	572		
DEA1	458	300	277	219
H105	1,086	1,176	620	812
LLP1			82	40
LLP2			129	107
LLP3	192			
LOTW	948	519	1,021	828
MEA1	242	34	66	49
MEA2	228	110	510	195
MEA3	78	80	145	69
CAR1				
SMZA				
TOTAL	**3,367**	**2,792**	**2,849**	**2,318**



WHISKEY JACK FOREST 2024 FMP		SUMMARY of SFMM INVESTIGATION		
Case Name:	02-BLG+20		Date:	April 30, 2023.

Breakdown of PLANFU Available Harvest Area by Analysis Unit and Age Class TERM 1

	Forest Unit: BFM	CMX	(Analysis Unit) CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
A5	0																
A15																	
A25																	
A35																	
A45																	
A55								4		1							
A65				5			23										
A75	1			206		26	263				27						
A85				132		31	146	8	20	72	106			8			1
A95		204		454	0	85	14	353	46	270	106			34			17
A105		61	0	40				91	43	139				5			11
A115		6		0				23		5				3	134		0
A125		16	9					3							2		
A135		1	4											3	53		
A145			4					0							19		
A155			7												17		
A165			1												3		
A175																	
A185															1		
A195															1		
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	1	288	25	836	0	143	445	482	109	487	239	0	0	52	230	0	29
																Total:	**3,367**

Renewal Area by Treatment Type Term 1

	Total	Natural	Plant	Seed
BFM	1	-	1	-
CMX	285	-	-	285
CMXC	24	-	-	24
HMX	828	621	207	-
HRDA	0	0	-	-
HRDB	141	106	35	-
HRD	441	330	110	-
PJDD	478	-	76	402
PJDS	108	-	-	108
PJM	482	-	-	482
POD	237	177	59	-
PRWR	-	-	-	-
PRWW	-	-	-	-
SBD	52	-	-	52
SBL	228	228	-	-
SBLC	-	-	-	-
SBM	29	-	-	29
	3,333	**1,462**	**489**	**1,382**
	Renewal:	**44%**	**15%**	**41%**

Available Harvest Area by Analysis Unit

Term	Forest Unit: BFM	CMX	(Analysis Unit) CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
T1	1	288	25	836	0	143	445	482	109	487	239			52	230		29
T2	16	202	17	453	0	112	329	260	5	24	286	7	12	562	299	88	123
T3	108	199	27	229	0	13	249	172	2	377	108	34		719	223		390
T4	86	405	18		0			165	290	246	2	12	10	275	156	40	612
T5	98	152	11		0	1	5	805	60	398	31	4	2	0	109		118
T6	89	555	5	102	0	9	25	332	14	1	3	3	2	149	76	8	92
T7	54	130	2	368	0	24	217	258	19	204	124		5	235	53		185
T8	23	102	2	266	0	22	234	695		49	501			239	37		46
T9	29	316	1	171	0	2	119	629		10	377			82	26		100
T10		56	2	34	0	0	25	966	105	446	253			23	18		0
T11	15	160	2	78	0	15	49	503	1	262	130			203	16		13
T12		75	1		0			971	0	57				3	21		0
T13	0	91	1		0			672		133					28		
T14	1	194	0		0			304	64	193				31	36		
T15		106	0		0			147	166	203				9	47	1	
T16	16	120	0		0				20	88				7	61	85	227

WHISKEY JACK FOREST 2024 FMP	SUMMARY of SFMM INVESTIGATION

Case Name: 03-BLG+30 **Date:** May 1, 2023.

Purpose: Investigation to see how soon BLG indicators can be achieved, but more "relaxed" achievement timeframe for certain indicators.

Specific Inputs: Same lower BLG IQR targets (binding) included for all indicators from T2-T6 onwards as 02-BLG+20. Except: Upland Conifer T9 onwards at lower level (400,000 ha), and Young at 100,000 ha T4 on. Minor delay in OG to achieve by T4 (except OG PRW still at T5).

Group:	Mm3/yr
SPF	
PO	
BW	
TOTAL	

Vol. Flow
+/-20%

No volume targets.

RESULTS: Where projections in the following tables fall below lower targets, the data is shaded yellow; where projections exceed upper targets, the data is shaded green.

FOREST CONDITION RESULTS

Use these relaxed BLG targets for wood supply investigations

Implications on Forest Condition - Very good (or above upper IQR) BLG indicator achievement for all Mature-Late classes. Similar / Poor for Old Growth T1-5, but improves as area ages. Upland Conifer increases but never reaches lower IQR (lower than 02-BLG-Max). Young Forest never reaches lower IQR but better overall than BLG-Max (overachieves relaxed target). Slow creation of all-ages PRW, but OG PRW increases. Caribou habitats improve (to T3) and overachieve by T4-T5 (same as BLG-Max).

(2a) Area by Landscape Class (Productive ha)

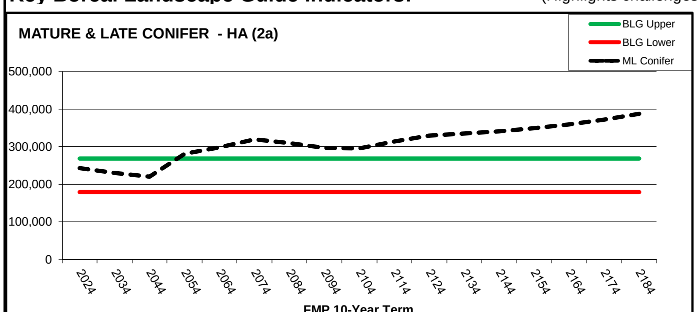
Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	81,424	186,273	66,561	14,802	243,544	143,145	46,587
T2	64,404	223,100	60,703	16,603	229,926	140,577	46,611
T3	91,528	214,521	45,441	19,104	220,581	146,400	44,027
T4	113,669	121,243	52,162	22,014	281,382	146,319	44,804
T5	118,503	95,917	54,239	23,824	298,206	147,555	43,327
T6	112,273	79,531	56,369	28,308	320,147	144,105	40,736
T7	108,420	98,110	59,049	32,227	310,054	134,689	38,871
T8	110,931	105,556	58,798	43,112	297,323	128,240	37,218
T9	118,452	115,503	53,079	47,882	295,995	113,669	36,526
T10	118,300	107,294	56,510	50,880	314,359	95,679	37,975
T11	111,397	109,933	58,704	53,497	329,953	77,620	39,847
T12	103,313	119,323	60,899	54,238	335,264	66,179	41,700
T13	94,701	120,345	59,510	57,832	340,319	64,471	43,712
T14	89,577	120,043	54,670	59,336	349,039	63,632	44,586
T15	88,292	112,936	45,064	60,920	359,287	69,181	45,197
T16	83,936	108,073	37,950	60,416	372,027	72,828	45,646
T17	78,885	102,656	32,654	59,227	387,627	73,879	45,939
BLG Upper	263,084	228,782	63,469	16,237	269,185	65,739	16,276
BLG Lower	143,268	103,333	36,052	8,706	178,461	43,021	12,845

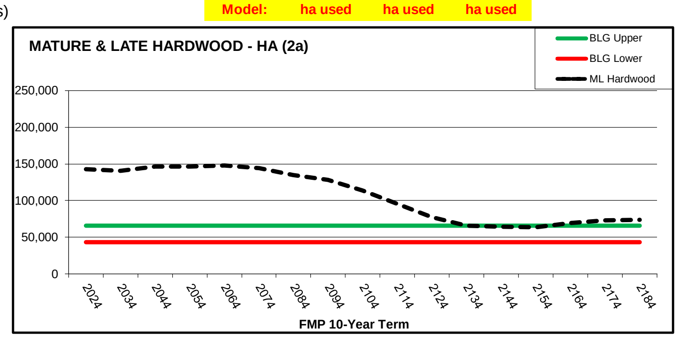
(2b) Old Growth by Grouping (Prod. ha) / **(2d)** / **(2e)** / **(6a) Available Forest:**

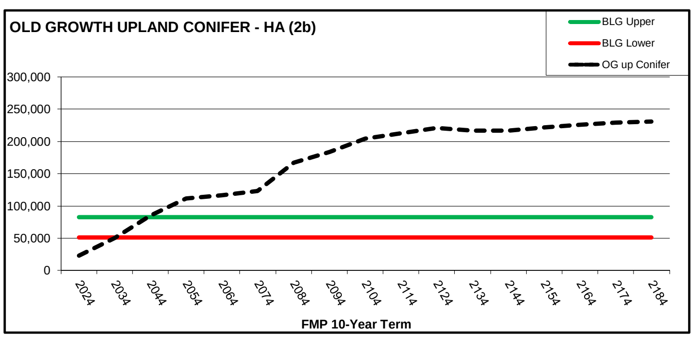
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs	(6a) Term	Available Forest
T1	23,536	1,071	22,603	30	359,248	136,[illegible]24	T1	196,134
T2	50,152	1,667	67,625	149	360,015	110,51[illegible]	T2	194,320
T3	85,096	2,519	119,568	319	364,987	119,995	T3	192,882
T4	111,400	5,113	139,221	584	373,617	151,285	T4	192,882
T5	117,081	7,741	154,658	921	378,57[illegible]	169,055	T5	192,882
T6	123,371	11,970	163,338	1,500	381,13[illegible]	162,010	T6	192,882
T7	166,966	18,083	170,545	1,634	389,66[illegible]	152,437	T7	192,882
T8	183,841	23,840	185,083	1,715	391,52[illegible]	152,947	T8	192,882
T9	204,536	25,084	183,865	1,736	403,48[illegible]	160,875	T9	192,882
T10	212,536	25,684	186,279	1,690	408,59[illegible]	166,773	T10	192,882
T11	220,908	25,426	179,888	1,639	413,42[illegible]	164,108	T11	192,882
T12	217,082	24,889	171,781	1,590	418,45[illegible]	151,820	T12	192,882
T13	217,123	26,892	170,319	1,692	420,66[illegible]	138,748	T13	192,882
T14	222,025	27,352	166,899	1,674	426,713	127,471	T14	192,882
T15	225,786	27,598	164,149	1,643	431,495	119,102	T15	192,882
T16	229,398	27,108	161,683	1,689	435,897	112,62[illegible]	T16	192,882
T17	230,979	26,578	163,640	1,755	438,104	106,[illegible]28	T17	192,882
BLG Upper	82,642	6,477	58,909		497,902	342,348		
BLG Lower	51,310	4,282	35,996	1,500	475,260	196,754		
Model:				1,500 ha used	400,000 ha used	100,000 ha used		

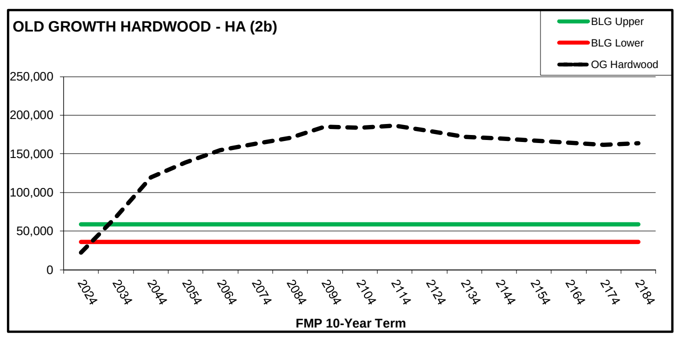
Key Boreal Landscape Guide Indicators:

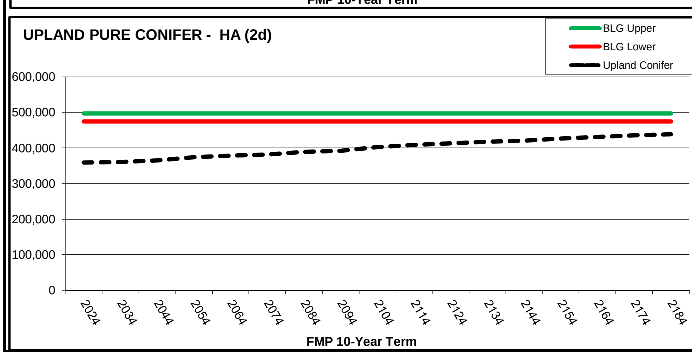
(Highlights challenges)

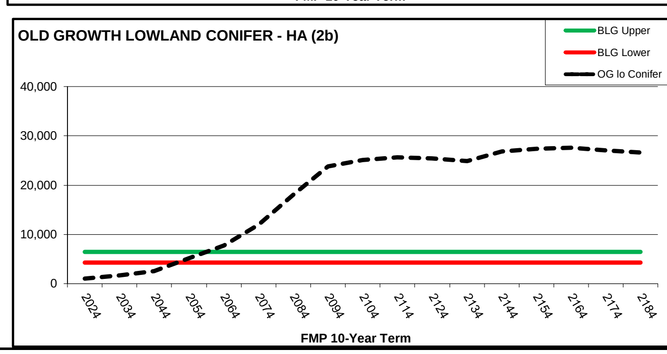












WHISKEY JACK FOREST 2024 FMP **SUMMARY of SFMM INVESTIGATION**

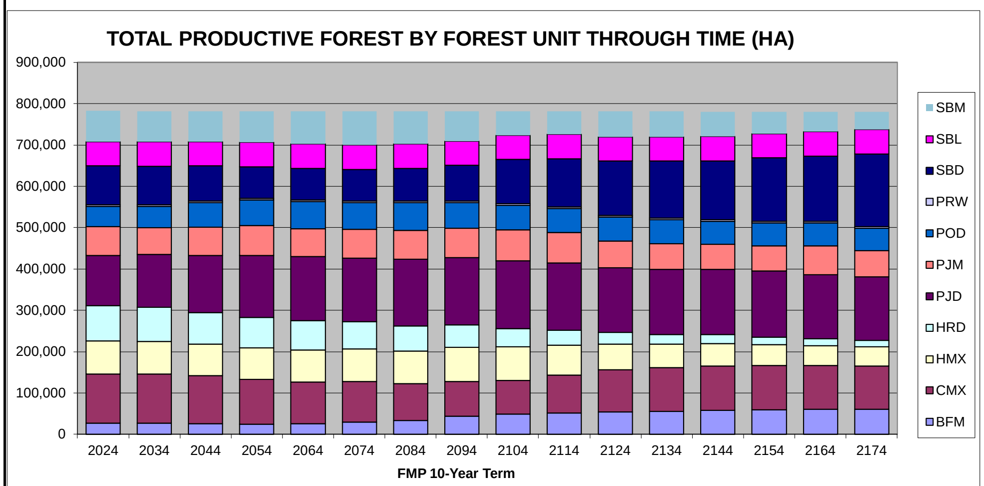
Case Name: **03-BLG+30** **Date:** May 1, 2023.

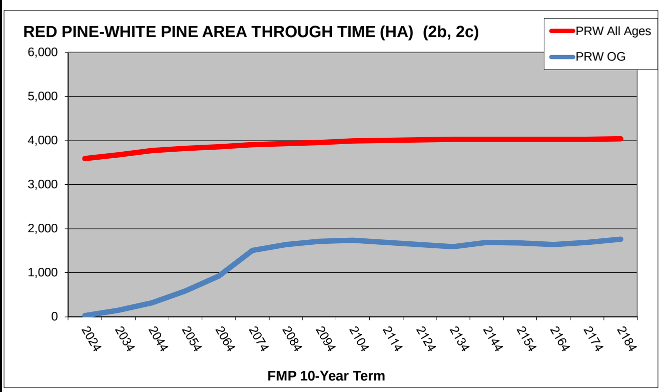
FMP 10-Year Term

Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
Productive Forest Area Through Time Data (hectares): by Forest Unit									**Indicator (2c)**			
T1	782,337	26,616	119,352	80,207	85,706	120,245	70,531	48,642	3,587	94,413	58,977	74,058
T2	781,924	26,768	119,158	79,276	81,726	128,967	63,533	52,351	3,667	93,482	58,963	74,033
T3	781,601	26,145	116,433	76,072	75,945	138,681	67,543	59,308	3,768	85,437	58,944	73,326
T4	781,592	24,677	108,164	76,196	74,153	150,146	71,495	62,028	3,813	77,047	58,944	74,928
T5	781,571	25,271	101,501	76,967	70,944	155,148	67,984	65,511	3,855	76,439	58,944	79,008
T6	781,469	29,564	98,681	78,110	65,752	154,521	68,831	65,375	3,909	76,195	58,944	81,589
T7	781,419	33,062	89,924	77,881	61,119	161,716	69,730	66,898	3,925	79,575	58,944	78,645
T8	781,177	43,818	83,543	82,672	54,993	162,681	71,460	61,731	3,956	85,795	58,944	71,584
T9	781,106	48,504	82,341	81,311	43,139	165,009	74,463	59,398	3,988	106,550	58,944	57,459
T10	780,998	51,497	91,748	73,010	35,287	162,701	73,712	57,912	4,002	117,313	58,944	54,872
T11	780,952	54,127	102,418	62,316	28,273	155,441	65,496	57,437	4,013	131,529	58,944	60,959
T12	780,916	54,900	106,581	56,387	23,949	157,164	62,171	57,677	4,023	138,168	58,944	60,953
T13	780,889	58,387	107,438	53,765	21,832	157,989	60,388	55,834	4,023	141,772	58,944	60,518
T14	780,884	59,780	106,754	51,006	17,687	160,287	60,092	55,977	4,023	153,305	58,944	53,029
T15	780,878	61,189	104,958	48,773	16,022	154,831	69,989	55,475	4,023	158,260	58,944	48,415
T16	780,876	60,576	104,927	46,722	15,015	154,427	62,450	54,772	4,023	175,258	58,944	43,763
T17	780,866	59,323	107,199	43,968	14,600	142,688	71,423	54,691	4,037	180,603	58,944	43,389

(Obj. 1) Caribou Habitat (Caribou Zone):

Term	Refuge (1b)	Winter (1a)
T1	132,854	86,255
T2	146,381	104,370
T3	156,047	110,578
T4	162,742	114,036
T5	165,797	120,114
T6	165,829	118,561
T7	168,024	121,651
T8	168,966	122,169
T9	170,526	124,976
T10	172,879	127,084
T11	175,160	128,188
T12	175,586	124,947
T13	176,596	124,816
T14	178,681	126,498
T15	180,539	127,829
T16	182,307	131,889
T17	183,026	132,487
BLG Upper	161,804	115,633
BLG Lower	147,605	63,721





All ages PRW - desirable level "to increase"
Target in SFMM to not decrease.

Old Growth PRW - desirable level "to increase"

WHISKEY JACK FOREST 2024 FMP	SUMMARY of SFMM INVESTIGATION

Case Name: 03-BLG+30 **Date:** May 1, 2023.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - Higher 10-year harvest than BLG-Max.harvest to create more Young earlier. TOTAL volumes controlled at +/-20%, but still allows signif. Changes T1-T6. PO vol Term 1 just meets commitment level (improved), SPF vol above commitments. (Reduce conifer harvest in LTMD, needs vol flow control)

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

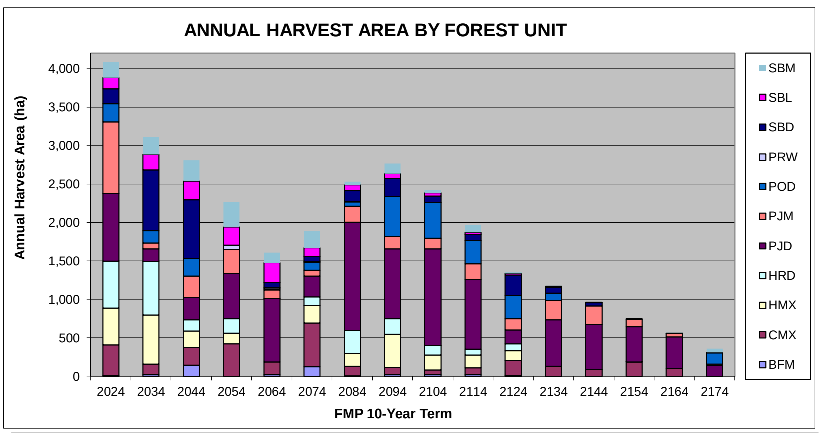
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 5b)	4,080	11	396	480	610	878	931	237	0	196	140	201
T2	3,115	22	135	639	693	164	76	165	0	790	196	234
T3	2,808	148	225	214	145	293	281	224	1	763	241	272
T4	2,265	0	423	138	188	590	308	2	53	0	237	325
T5	1,610	23	163	0	0	824	113	13	23	62	258	131
T6	1,887	122	569	232	109	267	80	101	7	67	113	217
T7	2,531	9	122	164	297	1,411	206	58	5	140	79	39
T8	2,766	22	99	429	198	909	157	522	0	238	58	134
T9	2,422	21	61	195	128	1,253	136	469	0	81	38	40
T10	1,969	22	87	170	74	909	203	300	0	79	27	99
T11 (5b)	1,353	16	189	127	90	177	146	308	0	265	19	15
T12	1,177	3	131	0	0	601	248	97	0	80	13	4
T13	963	0	91	0	0	580	246	0	0	36	9	0
T14	748	0	190	0	0	457	95	0	0	0	6	0
T15	566	0	100	0	0	412	44	0	0	0	4	5
T16	358	2	0	0	0	135	20	148	0	0	3	49

Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	% Small	% Large
T1 (5c)	396.2	266.3	98.7	29.8	0.0	0.98	0.02
T2	316.9	188.0	96.4	30.6	0.0	0.97	0.03
T3	253.6	187.4	49.3	14.4	0.2	0.98	0.02
T4	202.8	148.4	29.6	13.5	8.9	0.95	0.05
T5	162.3	142.4	9.0	4.4	4.0	0.96	0.04
T6	166.9	115.4	36.8	12.3	1.0	0.99	0.01
T7	200.2	159.7	29.9	9.2	0.6	1.00	0.00
T8	240.3	153.1	74.7	11.8	0.0	1.00	0.00
T9	202.6	137.9	56.9	7.5	0.0	1.00	0.00
T10	162.1	116.5	39.2	6.0	0.0	1.00	0.00
T11 (5c)	129.7	77.6	43.7	8.1	0.0	0.96	0.04
T12	103.7	88.3	12.8	2.5	0.0	1.00	0.00
T13	83.0	77.1	4.1	1.6	0.0	1.00	0.00
T14	66.4	59.6	4.3	2.4	0.0	1.00	0.00
T15	53.1	48.6	2.8	1.6	0.0	0.99	0.01
T16	42.5	24.3	16.8	1.4	0.0	0.82	0.18
Average	173.9	124.4	37.8	9.8	0.9		

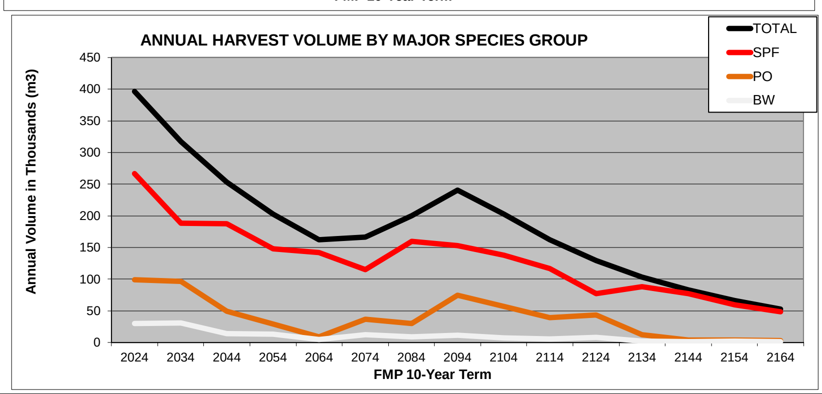
Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal Total ha	Natural ha	Plant ha	Seed ha
T1	1,827	1,827	0	**4,039**	1,370	421	2,248
T2	1,335	1,335	0	**3,084**	1,526	565	993
T3	1,266	1,266	0	**2,808**	823	285	1,700
T4	1,076	1,076	0	**2,265**	627	205	1,433
T5	963	963	0	**1,610**	283	306	1,020
T6	797	797	0	**1,887**	595	99	1,193
T7	1,059	1,059	0	**2,531**	605	30	1,895
T8	1,063	1,063	0	**2,766**	1,117	183	1,466
T9	942	942	0	**2,422**	798	57	1,568
T10	786	786	0	**1,969**	586	31	1,353
T11	547	513	0	**1,353**	494	72	788
T12	574	568	0	**1,177**	97	16	1,064
T13	493	493	0	**963**	5	4	954
T14	383	383	0	**748**	6	1	742
T15	312	298	0	**566**	0	9	557
T16	173	173	0	**358**	167	71	120



TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
CAR2	10	696		
DEA1	648	221	195	254
H105	1,111	1,265	1,311	345
LLP1			88	29
LLP2			239	12
LLP3	209			
LOTW	1,391	358	589	1,367
MEA1	295	49	23	79
MEA2	316	388	224	151
MEA3	99	137	140	29
CAR1				
SMZA				
TOTAL	**4,080**	**3,115**	**2,808**	**2,265**



WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: **03-BLG+30** **Date:** May 1, 2023.

Breakdown of PLANFU Available Harvest Area by Analysis Unit and Age Class TERM 1

	Forest Unit:		(Analysis Unit)														
	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
A5	0																
A15																	
A25																	
A35																	
A45								10									
A55								4		1							
A65				5						37							1
A75	1	44		10			2			68	18						
A85		42		23		23	146	174	20	137	106			8			1
A95		204		392	0	59	372	461	46	462	106			34			32
A105		59	0	38			8	90	43	222	7			100			119
A115	7	5		4				25	1	5				41	96		20
A125	2	16	9	9				1						10	2		20
A135		1	4	0										3	0		3
A145	1		4					1							19		4
A155			7												17		
A165			1												3		
A175																	
A185															1		
A195															1		
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	11	371	25	480	0	82	528	767	111	931	237	0	0	196	140	0	201
																Total:	**4,080**

Renewal Area by Treatment Type Term 1

	Total	Natural	Plant	Seed
BFM	11	3	7	-
CMX	367	-	-	367
CMXC	24	-	-	24
HMX	476	357	119	-
HRDA	0	0	-	-
HRDB	81	81	-	-
HRD	523	523	-	-
PJDD	760	-	63	697
PJDS	110	33	33	44
PJM	922	-	-	922
POD	234	234	-	-
PRWR	-	-	-	-
PRWW	-	-	-	-
SBD	194	-	-	194
SBL	139	139	-	-
SBLC	-	-	-	-
SBM	199	-	199	-
	4,039	**1,370**	**421**	**2,248**
	Renewal:	**34%**	**10%**	**56%**

Available Harvest Area by Analysis Unit

	Forest Unit:		(Analysis Unit)														
Term	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
T1	11	371	25	480	0	82	528	767	111	931	237			196	140		201
T2	22	118	17	639	0	161	532	159	5	76	165			790	182	14	234
T3	148	199	27	214	0	12	133	269	24	281	224	1		763	237	4	272
T4		405	18	138	0	5	183	272	319	308	2	37	16		226	10	325
T5	23	151	11		0			807	17	113	13	15	8	62	158	100	131
T6	122	565	5	232	0	17	93	253	14	80	101	5	2	67	111	2	217
T7	9	120	2	164	0	29	267	1,392	19	206	58		5	140	78	1	39
T8	22	97	2	429	0	15	183	877	33	157	522			238	54	4	134
T9	21	60	1	195	0	2	126	1,247	6	136	469			81	38		40
T10	22	85	2	170	0	1	73	869	40	203	300			79	27		99
T11	16	187	2	127	0	17	73	161	16	146	308			265	19		15
T12	3	130	1		0			591	10	248	97			80	13		4
T13		90	1		0			496	84	246				36	9		
T14		190	0		0			446	11	95					6		
T15		100			0			409	3	44					4		5
T16	2							135		20	148				3		49

WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: 12-2012FMP

Date: May 2, 2023.

Purpose: Investigation to see if harvest volumes from 2012 FMP are possible (and for how long). Includes consideration for relaxed BLG indicator achievement.

Specific Inputs: Lower BLG IQR targets (binding) included for all indicators from T7 onwards. Upland Conifer at 400,000 ha T7 onwards, Young at 130,000 ha T5 on. AllOP Young also included at lower IQR 72,209 ha T5 onwards.

Group:	Mm3/yr
SPF	340,000
PO	190,000
BW	33,600
TOTAL	

Vol. Flow

No volume flow.
AllOp growing stock at 16 million T17 (control end)
Volume targets Term 1 only.

RESULTS: Where projections in the following tables fall below lower targets, the data is shaded yellow; where projections exceed upper targets, the data is shaded green.

FOREST CONDITION RESULTS

Used similar / relaxed BLG targets for wood supply investigations

Implications on Forest Condition - Very good (or above upper IQR) BLG indicator achievement for all Mature-Late classes. Similar / Poor for Old Growth T1-5, but improves as area ages. Upland Conifer increases but never reaches lower IQR. Young Forest never reaches lower IQR but relatively stable through time. Slow creation of all-ages PRW, but OG PRW increases. Caribou habitats improve (to T3) and overachieve by T4-T5 (same as BLG-Max).

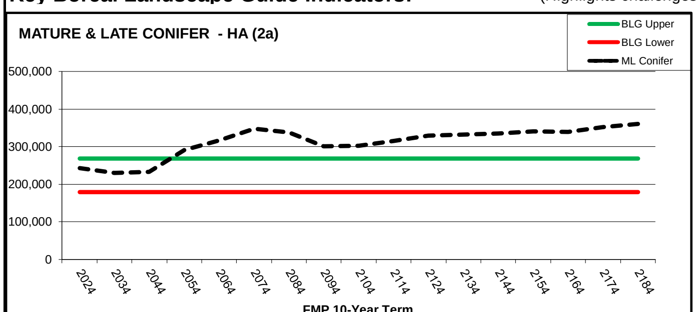
(2a) Area by Landscape Class (Productive ha)

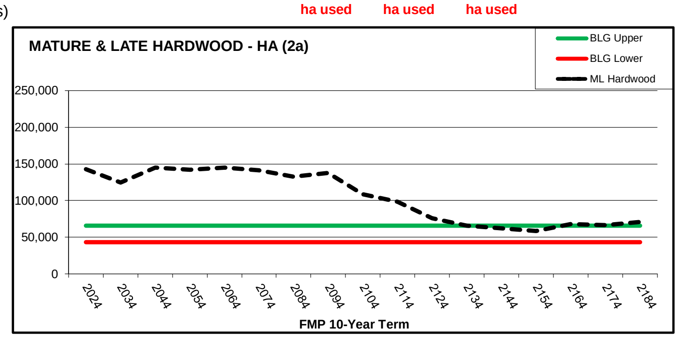
Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	81,424	186,273	66,561	14,802	243,544	143,145	46,587
T2	80,448	223,114	60,703	15,873	229,860	124,957	46,778
T3	71,093	215,436	53,540	18,558	233,196	145,291	44,590
T4	109,427	121,940	49,101	21,889	291,343	142,213	45,782
T5	97,774	102,549	52,089	23,384	317,023	144,936	43,924
T6	98,916	71,607	52,163	27,571	347,978	141,302	42,044
T7	90,190	94,490	54,168	32,243	338,520	132,881	39,039
T8	105,552	109,596	46,201	43,430	301,325	137,929	37,266
T9	138,695	99,080	46,993	47,943	303,103	109,025	36,390
T10	118,529	106,019	54,432	50,955	315,369	98,345	37,473
T11	124,186	105,309	52,866	53,550	330,039	76,145	38,980
T12	108,288	121,897	57,309	54,058	332,828	65,564	41,097
T13	102,712	125,282	55,983	57,656	334,571	62,281	42,531
T14	88,677	136,351	53,249	59,044	340,995	58,483	44,211
T15	115,332	112,764	40,369	60,717	339,155	67,979	44,688
T16	110,887	107,174	39,366	60,120	351,627	66,908	44,919
T17	102,294	111,475	32,397	58,988	360,212	70,879	44,749
BLG Upper	263,084	228,782	63,469	16,237	269,185	65,739	16,276
BLG Lower	143,268	103,333	36,052	8,706	178,461	43,021	12,845

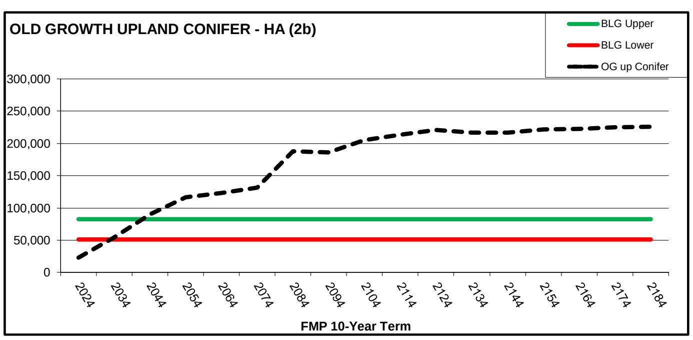
(2b) Old Growth by Grouping (Prod. ha)	Lower Old Growth Age (Years):				(2d)	(2e)	(6a) Available Forest:	
Term:	OGupC	OGloC	OGhmx	OGprw	Upland Conifer	Young <36 yrs	Term	
T1	23,536	1,071	22,603	30	359,248	136,124	T1	782,337
T2	54,466	1,552	66,274	149	364,530	126,562	T2	781,733
T3	90,505	2,549	119,672	319	368,666	108,035	T3	781,703
T4	116,397	5,212	139,162	561	379,829	144,067	T4	781,696
T5	123,429	7,740	154,297	921	386,962	145,553	T5	781,679
T6	131,789	12,911	162,670	1,534	391,835	134,916	T6	781,581
T7	187,632	18,068	170,582	1,634	400,706	133,118	T7	781,532
T8	186,198	23,826	185,105	1,715	400,703	141,247	T8	781,299
T9	205,188	25,098	183,889	1,736	410,332	172,413	T9	781,230
T10	213,151	25,697	186,558	1,690	416,465	167,205	T10	781,123
T11	220,977	25,439	179,935	1,639	420,031	177,755	T11	781,076
T12	216,745	24,860	171,667	1,590	424,226	159,306	T12	781,041
T13	216,857	26,845	172,453	1,692	427,102	139,543	T13	781,015
T14	221,572	27,354	166,791	1,674	433,543	131,201	T14	781,010
T15	222,870	27,394	163,588	1,629	434,710	147,496	T15	781,004
T16	225,313	26,861	161,405	1,685	439,179	137,783	T16	781,002
T17	226,301	26,174	162,275	1,690	441,562	131,199	T17	780,992
BLG Upper	82,642	6,477	58,909		497,902	342,348		
BLG Lower	51,310	4,282	35,996	1,500	475,260	196,754		
			Model:	1,500 ha used	400,000 ha used	130,000 ha used		

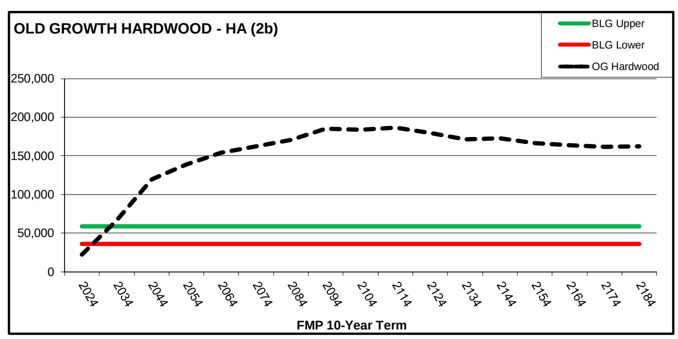
Key Boreal Landscape Guide Indicators:

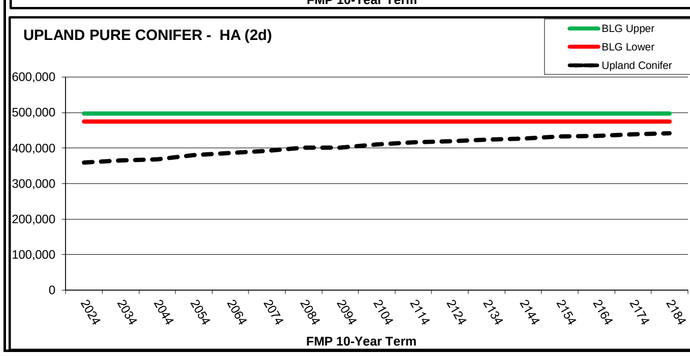
(Highlights challenges)

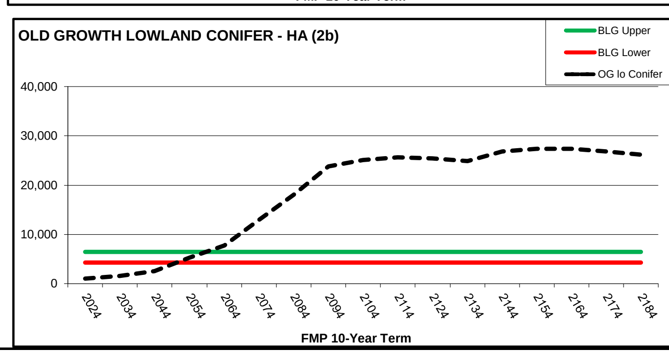












WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: 12-2012FMP

Date: May 2, 2023.

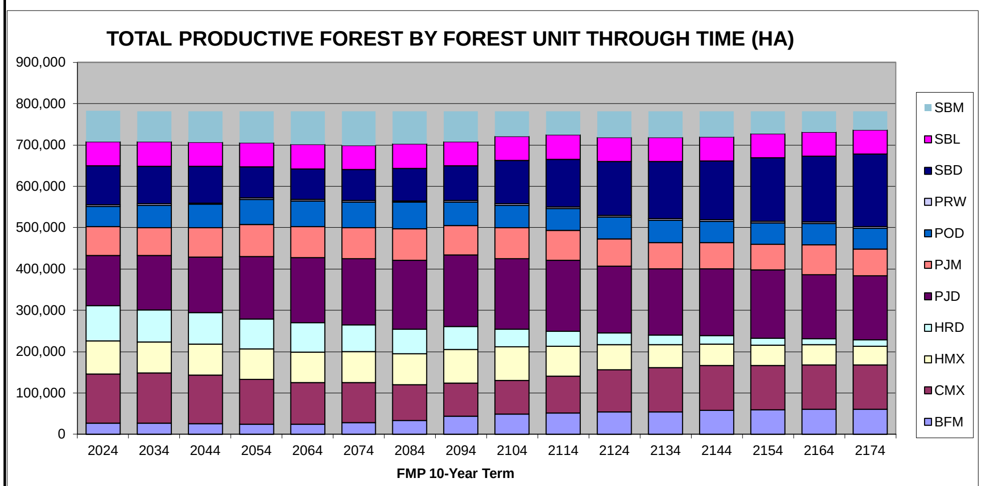
FMP 10-Year Term

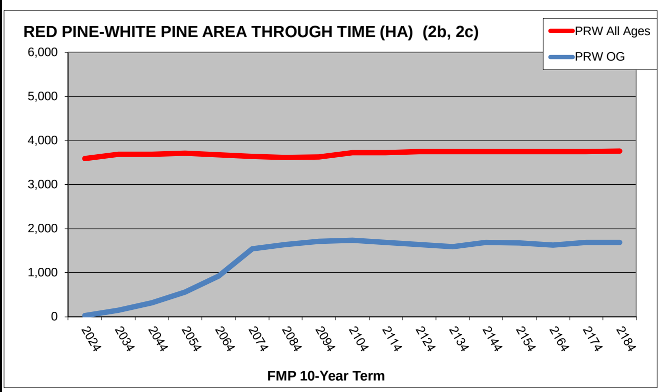
Productive Forest Area Through Time Data (hectares): by Forest Unit

Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	Indicator (2c) PRW	SBD	SBL	SBM
T1	782,337	26,616	119,352	80,207	85,706	120,245	70,531	48,642	3,587	94,413	58,977	74,058
T2	781,733	26,426	122,022	74,748	77,262	132,080	67,839	54,097	3,683	90,304	58,965	74,306
T3	781,703	25,672	117,681	74,962	75,518	134,566	71,173	56,570	3,684	88,159	58,949	74,768
T4	781,696	24,697	108,463	73,381	72,177	151,402	77,301	60,490	3,707	75,141	58,949	75,985
T5	781,679	24,932	100,707	73,690	69,960	157,756	74,811	62,804	3,675	73,966	58,949	80,430
T6	781,581	28,901	96,669	74,516	64,567	160,181	75,081	62,504	3,639	74,037	58,949	82,535
T7	781,532	33,111	87,412	74,535	59,216	167,205	75,889	63,984	3,618	78,213	58,949	79,398
T8	781,299	43,744	80,789	80,791	55,292	172,986	71,297	57,407	3,624	83,391	58,949	73,028
T9	781,230	48,524	81,953	80,836	42,935	171,126	74,587	53,983	3,717	104,700	58,949	59,918
T10	781,123	51,372	89,648	72,270	35,416	172,081	72,291	53,283	3,719	115,761	58,949	56,331
T11	781,076	54,051	102,002	61,409	27,484	161,402	66,174	53,409	3,740	130,103	58,949	62,352
T12	781,041	54,600	107,057	55,215	23,079	160,882	63,474	54,166	3,749	137,713	58,949	62,157
T13	781,015	58,136	107,786	51,915	20,947	162,064	62,599	52,429	3,750	141,203	58,949	61,236
T14	781,010	59,509	106,686	49,419	16,873	165,183	61,877	52,280	3,750	152,959	58,949	53,524
T15	781,004	60,932	107,049	48,473	15,280	155,008	72,264	51,861	3,750	158,040	58,949	49,398
T16	781,002	60,310	107,155	46,222	14,294	155,332	64,407	51,141	3,750	175,029	58,949	44,410
T17	780,992	59,064	108,965	43,182	13,784	144,126	72,914	51,733	3,752	180,318	58,949	44,203

(Obj. 1) Caribou Habitat (Caribou Zone):

Term	Refuge (1b)	Winter (1a)
T1	132,854	86,255
T2	145,810	102,102
T3	156,686	111,022
T4	163,383	114,465
T5	166,440	120,529
T6	167,736	120,803
T7	168,707	122,245
T8	169,705	123,621
T9	171,863	125,579
T10	173,789	127,691
T11	176,067	128,799
T12	175,663	124,121
T13	176,802	124,288
T14	178,904	126,138
T15	180,779	127,445
T16	183,191	132,173
T17	183,844	132,638
BLG Upper	161,804	115,633
BLG Lower	147,605	63,721





All ages PRW - desirable level "to increase"
Target in SFMM to not decrease.

Old Growth PRW - desirable level "to increase"

WHISKEY JACK FOREST 2024 FMP — **SUMMARY of SFMM INVESTIGATION**

Case Name: **12-2012FMP** — **Date:** May 2, 2023.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - 2012 FMP volumes feasible for 1 term only due to smaller land base from which to harvest the volume. Very variable harvest areas and volumes (not sustainable). . TOTAL volumes not controlled.

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

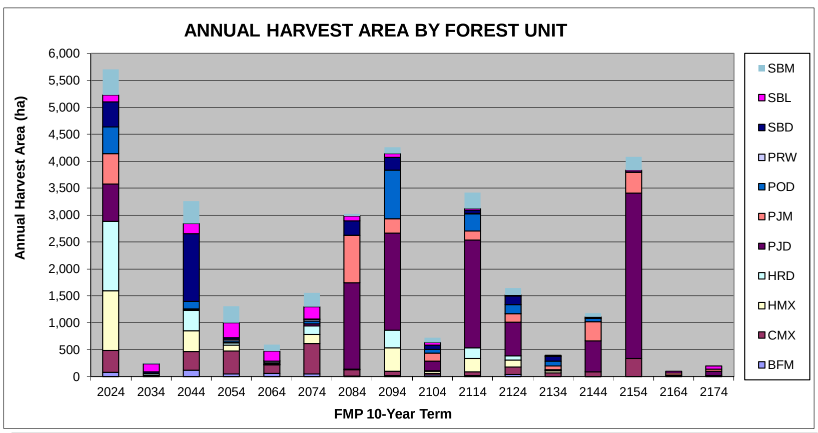
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 5b)	5,701	81	402	1,113	1,281	697	566	495	0	470	123	473
T2	245	7	4	22	22	0	0	5	0	25	154	4
T3	3,257	116	350	388	370	18	11	139	3	1,253	196	412
T4	1,306	52	423	109	43	5	0	35	26	32	273	309
T5	599	59	163	0	14	0	0	26	27	0	183	128
T6	1,559	48	569	163	161	43	0	46	26	18	227	258
T7	3,016	11	122	4	0	1,610	875	0	5	267	91	31
T8	4,253	22	73	437	328	1,799	272	902	0	239	64	116
T9	723	26	33	42	12	173	151	68	0	82	44	92
T10	3,413	20	64	254	198	1,994	170	325	2	61	31	295
T11 (5b)	1,647	38	138	132	79	627	151	177	0	154	23	128
T12	392	0	73	34	10	10	71	86	0	92	15	0
T13	1,179	4	89	0	0	574	349	65	0	12	20	67
T14	4,075	0	338	0	0	3,064	387	0	0	9	31	246
T15	102	0	19	0	0	10	40	0	0	0	33	0
T16	199	0	21	0	0	79	40	0	0	0	58	0

Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	% Small	% Large
T1 (5c)	584.5	340.0	190.0	53.2	0.0	0.99	0.01
T2	16.9	11.8	2.8	0.9	0.0	1.00	0.00
T3	297.7	213.4	60.1	21.9	0.5	1.00	0.00
T4	111.5	80.0	16.8	8.0	3.9	0.96	0.04
T5	51.9	35.3	6.6	3.1	5.1	0.94	0.06
T6	133.0	88.9	26.4	10.3	4.9	0.97	0.03
T7	285.7	265.8	11.8	6.7	0.6	0.99	0.01
T8	399.5	259.0	121.9	18.0	0.0	1.00	0.00
T9	61.0	48.0	10.1	2.4	0.0	1.00	0.00
T10	299.2	232.1	55.6	11.0	0.2	1.00	0.00
T11 (5c)	151.9	111.8	31.8	8.0	0.0	0.97	0.03
T12	33.0	20.4	10.4	1.9	0.0	1.00	0.00
T13	101.0	88.7	9.8	2.3	0.0	1.00	0.00
T14	345.1	321.8	15.1	7.7	0.0	1.00	0.00
T15	6.8	5.8	0.5	0.3	0.0	1.00	0.00
T16	13.5	11.9	0.6	0.4	0.0	1.00	0.00
Average	180.8	133.4	35.6	9.8	0.9		

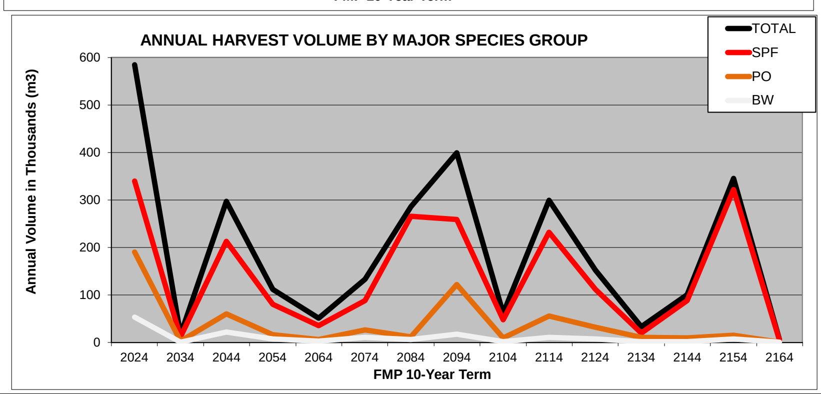
Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal Total ha	Natural ha	Plant ha	Seed ha
T1	2,417	2,417	0	**5,644**	2,268	795	2,581
T2	87	87	0	**242**	155	55	33
T3	1,450	1,450	0	**3,257**	870	343	2,044
T4	582	582	0	**1,306**	419	118	769
T5	289	289	0	**599**	219	89	290
T6	658	658	0	**1,559**	551	120	888
T7	1,705	1,634	0	**3,016**	4	164	2,847
T8	1,789	1,789	0	**4,253**	1,690	422	2,142
T9	319	319	0	**723**	165	30	527
T10	1,539	1,517	0	**3,413**	724	115	2,575
T11	750	750	0	**1,647**	358	96	1,193
T12	143	143	0	**392**	136	10	247
T13	573	573	0	**1,179**	85	4	1,090
T14	2,055	2,055	0	**4,075**	101	0	3,975
T15	39	39	0	**102**	32	1	69
T16	79	79	0	**199**	88	18	94



TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
CAR2	549	111		
DEA1	775	31	243	202
H105	1,928	22	1,309	459
LLP1			51	36
LLP2			101	38
LLP3	194			
LOTW	1,284	66	945	394
MEA1	274	14	36	30
MEA2	567	0	369	114
MEA3	130		202	34
CAR1				
SMZA				
TOTAL	**5,701**	**245**	**3,257**	**1,306**



WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: **12-2012FMP** **Date:** May 2, 2023.

Breakdown of PLANFU Available Harvest Area by Analysis Unit and Age Class TERM 1

Forest Unit: (Analysis Unit)

	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
A5	0																
A15																	
A25																	
A35																	
A45																	
A55								14									
A65				240		77	180			7	100						1
A75	1	44		221		36	274	60		61	166						6
A85	3	43		155		31	156	170		95	111			41			12
A95	42	207		454	0	85	428	353		255	109			249			222
A105	24	61	0	40			13	73		141	9			120			172
A115	8	6		4				23		6				44	1	5	28
A125	2	16	9					3						13	2		24
A135		1	4											3	67	1	3
A145	1		4					0							19		4
A155			7												17	1	
A165		0	1												3		
A175															4		
A185															1		
A195															1		
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	81	377	25	1,113	0	230	1,051	697	0	566	495	0	0	470	116	7	473
																Total:	**5,701**

Renewal Area by Treatment Type Term 1

	Total	Natural	Plant	Seed
BFM	80	-	80	-
CMX	373	-	-	373
CMXC	24	-	-	24
HMX	1,102	827	276	-
HRDA	0	0	-	-
HRDB	227	170	57	-
HRD	1,041	781	260	-
PJDD	690	-	-	690
PJDS	-	-	-	-
PJM	560	-	-	560
POD	490	368	123	-
PRWR	-	-	-	-
PRWW	-	-	-	-
SBD	465	-	-	465
SBL	115	115	-	-
SBLC	7	7	-	-
SBM	468	-	-	468
	5,644	**2,268**	**795**	**2,581**
	Renewal:	**40%**	**14%**	**46%**

Available Harvest Area by Analysis Unit

Forest Unit: (Analysis Unit)

Term	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
T1	81	377	25	1,113	0	230	1,051	697		566	495			470	116	7	473
T2	7	4		22	0	14	9	0		0	5			25	151	3	4
T3	116	306	43	388	0	24	346	18		11	139		3	1,253	196		412
T4	52	405	18	109	0	11	32	5			35	8	18	32	255	17	309
T5	59	151	11	0	0	0	14				26	27		0	183		128
T6	48	565	5	163	0	20	141	43			46	22	4	18	128	99	258
T7	11	120	2	4	0			1,417	192	875	0		5	267	89	1	31
T8	22	71	2	437	0	25	303	1,596	203	272	902			239	63	1	116
T9	26	33		42	0	1	12	167	6	151	68			82	44		92
T10	20	62	2	254	0	5	193	1,979	15	170	325	2		61	31		295
T11	38	135	2	132	0	15	63	610	17	151	177			154	21	1	128
T12		72	1	34	0	1	9	10	0	71	86			92	15		
T13	4	88	1		0			545	29	349	65			12	20		67
T14		338	0		0			3,050	15	387				9	25	5	246
T15		19	0		0				10	40					33		
T16		21			0				79	40					43	15	

WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: 13-Bench

Date: May 2, 2023.

Purpose: Investigation to see if harvest volumes from Ontario Forest Accord Advisory Board Benchmark are possible (and for how long). Includes consideration for relaxed BLG indicator achievement (same as 12-2012FMP).

Specific Inputs: Same as 12-2012FMP (except different volume targets). Lower BLG IQR targets (binding) included for all indicators from T7 onwards. Upland Conifer at 400,000 ha T7 onwards, Young at 130,000 ha T5 on. AllOP Young also included at lower IQR 72,209 ha T 5 onwards.

Group:	Mm3/yr
SPF	354,000
PO	149,000
BW	4,000
TOTAL	

Vol. Flow

No volume flow.
AllOp growing stock at 16 million T17 (control end)
Volume targets Term 1 only.

RESULTS: Where projections in the following tables fall below lower targets, the data is shaded yellow; where projections exceed upper targets, the data is shaded green.

FOREST CONDITION RESULTS

Used similar / relaxed BLG targets for wood supply investigations

Implications on Forest Condition - Very good (or above upper IQR) BLG indicator achievement for all Mature-Late classes. Similar / Poor for Old Growth T1-5, but improves as area ages. Upland Conifer increases but never reaches lower IQR. Young Forest never reaches lower IQR but relatively stable through time. Slow creation of all-ages PRW, but OG PRW increases. Caribou habitats improve (to T3) and overachieve by T4-T5 (same as BLG-Max).

(2a) Area by Landscape Class (Productive ha)

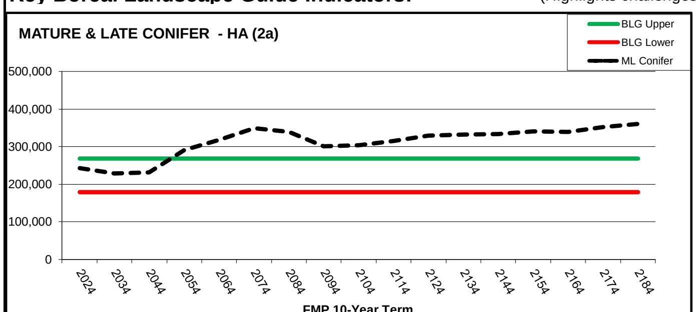
Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	81,424	186,273	66,561	14,802	243,544	143,145	46,587
T2	81,231	223,110	60,703	15,456	228,446	126,106	46,655
T3	72,688	215,419	52,822	18,189	231,840	146,255	44,466
T4	109,691	121,923	48,494	21,889	291,844	142,174	45,656
T5	95,673	103,950	52,060	23,385	317,864	144,899	43,824
T6	96,633	72,966	52,141	27,579	348,878	141,396	41,964
T7	90,112	94,219	54,097	32,253	339,001	132,826	38,999
T8	105,990	108,944	46,783	43,413	301,591	137,308	37,243
T9	139,747	97,083	47,528	47,930	303,403	109,037	36,476
T10	119,500	104,530	54,106	50,948	315,621	98,823	37,567
T11	124,408	105,431	52,544	53,563	329,871	76,151	39,082
T12	107,366	123,098	57,384	54,055	332,417	65,501	41,194
T13	101,637	126,449	56,002	57,655	334,284	62,347	42,614
T14	88,961	136,370	53,204	59,044	340,568	58,572	44,265
T15	115,700	112,362	40,684	60,710	339,071	67,751	44,701
T16	111,395	106,183	39,696	60,113	351,975	66,686	44,928
T17	102,062	110,940	32,443	58,987	360,813	70,942	44,780
BLG Upper	263,084	228,782	63,469	16,237	269,185	65,739	16,276
BLG Lower	143,268	103,333	36,052	8,706	178,461	43,021	12,845

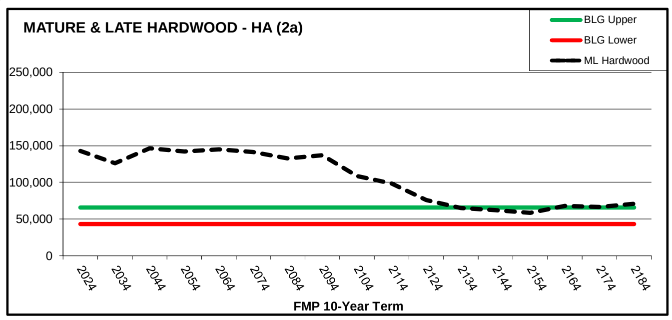
(2b) Old Growth by Grouping (Prod. ha) / **(2d)** / **(2e)** / **(6a) Available Forest:**

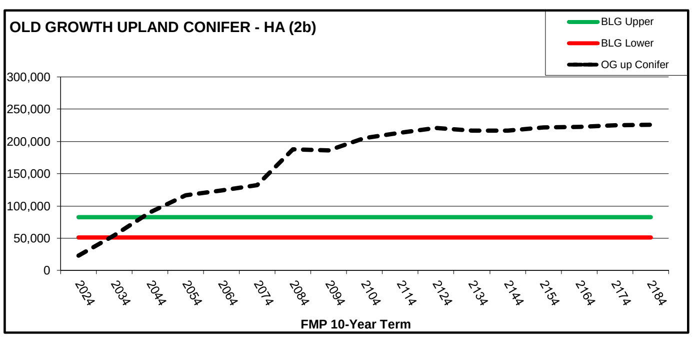
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs	(6a) Available Forest: Term	
T1	23,536	1,071	22,603	30	359,248	136,124	T1	782,337
T2	54,488	1,521	65,858	149	364,860	127,346	T2	781,708
T3	90,135	2,519	119,303	319	368,989	108,892	T3	781,679
T4	116,535	5,182	139,162	561	379,901	143,707	T4	781,672
T5	124,006	7,728	154,260	921	387,026	144,470	T5	781,655
T6	132,288	12,884	162,647	1,534	391,844	133,239	T6	781,557
T7	188,062	18,071	170,561	1,634	400,743	132,466	T7	781,508
T8	186,509	23,829	185,075	1,715	400,737	141,497	T8	781,272
T9	205,274	25,101	183,861	1,736	410,158	173,465	T9	781,203
T10	213,234	25,700	186,505	1,690	416,309	168,034	T10	781,096
T11	221,057	25,442	179,908	1,639	420,052	177,693	T11	781,050
T12	216,769	24,879	171,643	1,590	424,246	158,957	T12	781,015
T13	216,881	26,866	172,343	1,692	427,125	138,773	T13	780,989
T14	221,576	27,395	166,720	1,674	433,392	131,202	T14	780,984
T15	222,723	27,403	163,600	1,629	434,467	147,884	T15	780,978
T16	225,102	26,869	161,405	1,684	438,949	138,250	T16	780,976
T17	226,093	26,183	162,524	1,690	441,202	131,199	T17	780,966
BLG Upper	82,642	6,477	58,909		497,902	342,348		
BLG Lower	51,310	4,282	35,996	1,500	475,260	196,754		
			Model:	1,500 ha used	400,000 ha used	130,000 ha used		

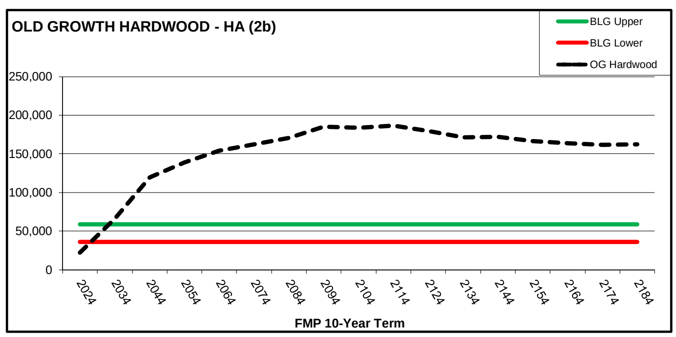
Key Boreal Landscape Guide Indicators:

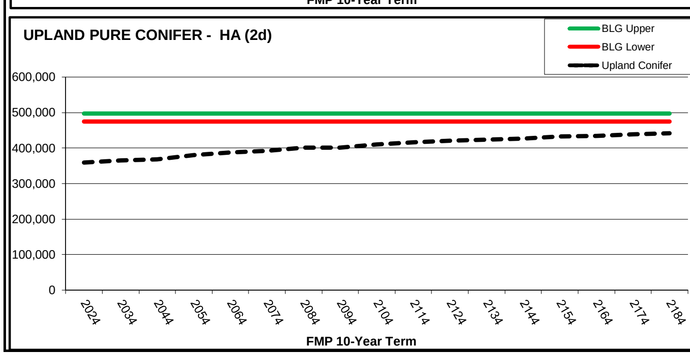
(Highlights challenges)

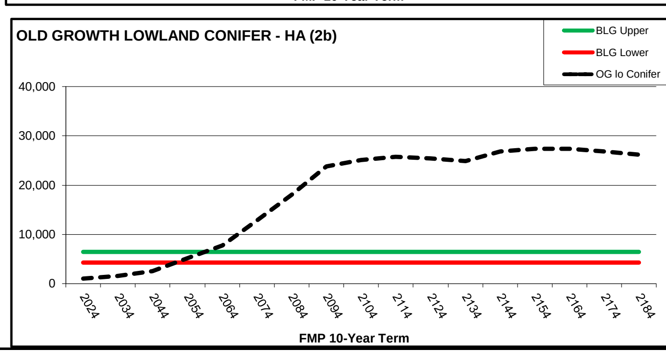












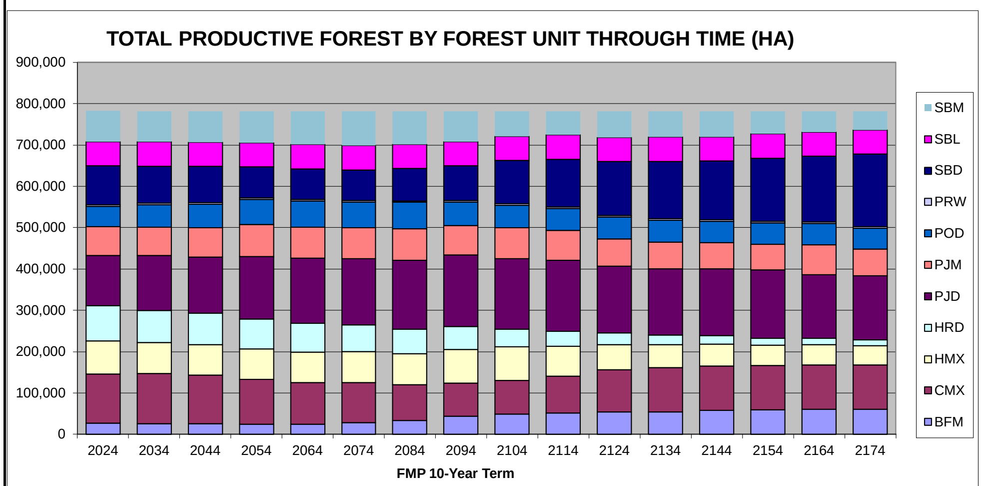
WHISKEY JACK FOREST 2024 FMP **SUMMARY of SFMM INVESTIGATION**

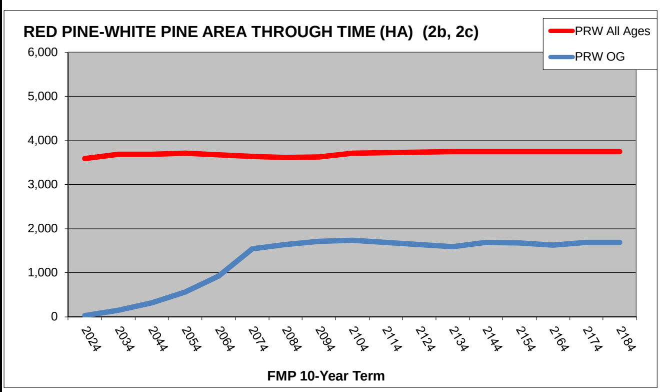
Case Name: 13-Bench **Date:** May 2, 2023.

FMP 10-Year Term

Productive Forest Area Through Time Data (hectares): by Forest Unit									Indicator (2c)			
Term	**TOTAL**	**BFM**	**CMX**	**HMX**	**HRD**	**PJD**	**PJM**	**POD**	**PRW**	**SBD**	**SBL**	**SBM**
T1	782,337	26,616	119,352	80,207	85,706	120,245	70,531	48,642	3,587	94,413	58,977	74,058
T2	781,708	25,989	121,699	74,551	77,330	133,117	68,256	54,634	3,681	89,457	58,964	74,031
T3	781,679	25,287	117,384	74,773	75,464	135,593	71,561	57,150	3,684	87,333	58,948	74,502
T4	781,672	24,699	108,436	73,342	72,173	151,134	77,665	60,464	3,707	75,265	58,948	75,837
T5	781,655	24,934	100,684	73,652	69,963	157,444	75,091	62,779	3,669	73,984	58,948	80,507
T6	781,557	28,907	96,632	74,474	64,680	159,764	75,287	62,434	3,637	74,052	58,948	82,741
T7	781,508	33,122	87,381	74,501	59,221	166,995	76,096	63,973	3,619	78,229	58,948	79,424
T8	781,272	43,744	80,742	80,777	55,295	173,073	71,250	57,406	3,622	83,384	58,948	73,030
T9	781,203	48,516	81,950	80,898	42,934	170,878	74,596	54,085	3,714	104,716	58,948	59,969
T10	781,096	51,356	89,646	72,331	35,417	171,759	72,402	53,373	3,717	115,777	58,948	56,372
T11	781,050	54,062	101,925	61,391	27,496	161,468	66,281	53,437	3,738	130,075	58,948	62,228
T12	781,015	54,597	106,988	55,207	23,106	160,975	63,536	54,176	3,747	137,690	58,948	62,045
T13	780,989	58,133	107,700	51,922	20,958	161,994	62,643	52,455	3,748	141,360	58,948	61,128
T14	780,984	59,507	106,727	49,458	16,892	164,785	61,878	52,311	3,748	152,975	58,948	53,753
T15	780,978	60,930	107,160	48,518	15,310	154,839	72,184	51,897	3,748	158,108	58,948	49,336
T16	780,976	60,309	107,253	46,267	14,324	155,159	64,342	51,179	3,748	175,095	58,948	44,353
T17	780,966	59,063	109,233	43,194	13,806	143,859	72,832	51,771	3,750	180,374	58,948	44,138

(Obj. 1) Caribou Habitat (Caribou Zone):		
Term	**Refuge (1b)**	**Winter (1a)**
T1	132,854	86,255
T2	145,771	101,994
T3	156,684	111,025
T4	163,381	114,468
T5	166,437	120,532
T6	167,718	120,893
T7	168,687	122,241
T8	169,681	123,606
T9	171,804	125,561
T10	173,751	127,672
T11	176,028	128,780
T12	175,658	124,135
T13	176,800	124,304
T14	178,903	126,145
T15	180,779	127,455
T16	183,256	132,198
T17	183,915	132,652
BLG Upper	161,804	115,633
BLG Lower	147,605	63,721





All ages PRW - desirable level "to increase"
Target in SFMM to not decrease.

Old Growth PRW - desirable level "to increase"

WHISKEY JACK FOREST 2024 FMP **SUMMARY of SFMM INVESTIGATION**

Case Name: **13-Bench** **Date:** May 2, 2023.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - OFAAB Benchmark volumes feasible for 1 term only due to smaller land base from which to harvest the volume. Very variable harvest areas and volumes (not sustainable). TOTAL volumes not controlled.

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

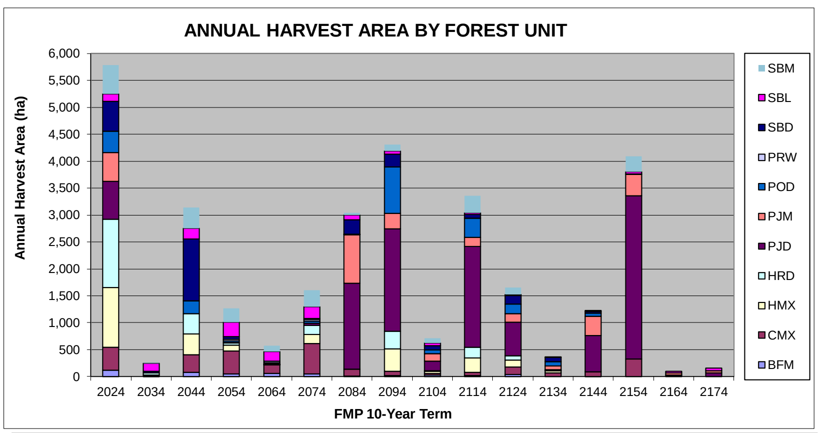
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 5b)	5,780	121	423	1,113	1,266	697	536	395	0	561	136	532
T2	255	4	4	22	37	0	0	6	0	25	155	3
T3	3,135	79	328	388	370	0	0	239	3	1,150	197	378
T4	1,267	52	423	109	43	5	0	35	30	43	271	257
T5	574	59	163	0	0	13	0	26	23	0	181	108
T6	1,608	49	569	163	174	31	0	46	26	18	223	310
T7	3,035	12	122	4	0	1,599	901	0	5	267	89	36
T8	4,308	22	74	421	324	1,905	280	866	0	239	62	115
T9	714	26	33	41	12	174	140	69	0	82	43	93
T10	3,354	18	63	266	202	1,872	162	356	2	66	30	317
T11 (5b)	1,650	40	138	132	77	628	155	180	0	153	21	128
T12	368	0	73	34	10	10	72	83	0	71	15	0
T13	1,225	4	89	0	0	667	355	65	0	27	19	0
T14	4,091	0	330	0	0	3,029	396	0	0	9	34	293
T15	102	0	19	0	0	10	40	0	0	0	32	0
T16	163	0	0	0	0	68	40	0	0	0	55	0

Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	% Small	% Large
T1 (5c)	590.6	354.0	181.7	53.5	0.0	0.99	0.01
T2	17.6	11.5	3.6	1.2	0.0	1.00	0.00
T3	288.5	195.6	69.3	21.3	0.5	0.99	0.01
T4	108.0	76.2	16.6	7.8	4.6	0.97	0.03
T5	49.5	34.6	5.9	2.8	4.4	0.94	0.06
T6	137.6	92.2	27.2	10.8	4.9	0.97	0.03
T7	287.8	267.7	11.9	6.7	0.6	0.99	0.01
T8	403.5	267.0	118.2	17.7	0.0	1.00	0.00
T9	60.4	47.4	10.1	2.4	0.0	1.00	0.00
T10	294.0	223.5	58.7	11.2	0.2	1.00	0.00
T11 (5c)	152.3	111.9	32.0	8.0	0.0	0.97	0.03
T12	30.8	18.7	10.0	1.9	0.0	1.00	0.00
T13	106.1	93.9	9.9	2.2	0.0	1.00	0.00
T14	345.2	321.8	15.1	7.9	0.0	1.00	0.00
T15	6.8	5.8	0.5	0.3	0.0	1.00	0.00
T16	11.0	9.9	0.3	0.2	0.0	1.00	0.00
Average	180.6	133.2	35.7	9.7	0.9		

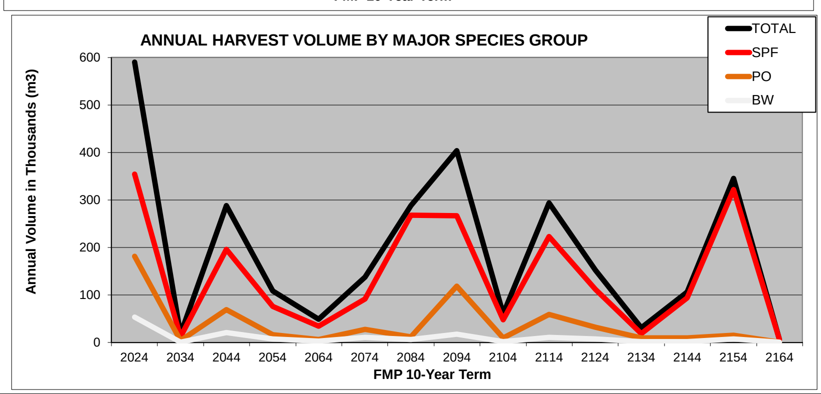
Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal Total ha	Natural ha	Plant ha	Seed ha
T1	2,497	2,497	0	**5,722**	2,195	806	2,721
T2	86	86	0	**253**	168	54	31
T3	1,347	1,347	0	**3,135**	946	331	1,857
T4	564	564	0	**1,267**	418	121	728
T5	277	277	0	**574**	207	83	285
T6	680	680	0	**1,608**	560	121	928
T7	1,717	1,636	0	**3,035**	4	154	2,877
T8	1,835	1,835	0	**4,308**	1,642	417	2,249
T9	315	315	0	**714**	165	31	519
T10	1,489	1,468	0	**3,354**	768	116	2,471
T11	751	751	0	**1,650**	360	94	1,196
T12	132	132	0	**368**	134	8	226
T13	606	606	0	**1,225**	73	14	1,138
T14	2,055	2,055	0	**4,091**	120	0	3,972
T15	39	39	0	**102**	32	1	69
T16	66	66	0	**163**	77	21	66



TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
CAR2	548	112		
DEA1	789	6	233	221
H105	1,876	24	1,372	459
LLP1			44	37
LLP2			100	36
LLP3	194			
LOTW	1,287	96	953	354
MEA1	280	12	30	34
MEA2	669	0	204	96
MEA3	137	5	199	30
CAR1				
SMZA				
TOTAL	**5,780**	**255**	**3,135**	**1,267**



WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: **13-Bench** | **Date:** May 2, 2023.

Breakdown of PLANFU Available Harvest Area by Analysis Unit and Age Class TERM 1

	Forest Unit:		(Analysis Unit)														
	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
A5	0																
A15																	
A25																	
A35																	
A45								0									
A55								14									
A65		22		240		63	180			7							2
A75	4	44		221		36	274	60		52	166						6
A85	32	43		155		31	156	170		77	111			41			12
A95	50	207		454	0	85	428	353		255	109			339			280
A105	24	61	0	40			13	73		141	9			120			172
A115	8	6		4				23		4				44	10	5	28
A125	2	16	9					3						13	2		24
A135		1	4											3	68	1	3
A145	1		4					0							19		4
A155			7												17	1	
A165		0	1												3		
A175															4	3	
A185															1		
A195															1		
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	121	399	25	1,113	0	215	1,051	697	0	536	395	0	0	561	125	10	532
																Total:	**5,780**

Renewal Area by Treatment Type Term 1

	Total	Natural	Plant	Seed
BFM	119	-	119	-
CMX	395	-	-	395
CMXC	24	-	-	24
HMX	1,102	827	276	-
HRDA	0	0	-	-
HRDB	213	160	53	-
HRD	1,041	781	260	-
PJDD	690	-	-	690
PJDS	-	-	-	-
PJM	530	-	-	530
POD	391	293	98	-
PRWR	-	-	-	-
PRWW	-	-	-	-
SBD	555	-	-	555
SBL	124	124	-	-
SBLC	10	10	-	-
SBM	527	-	-	527
	5,722	**2,195**	**806**	**2,721**
	Renewal:	**38%**	**14%**	**48%**

Available Harvest Area by Analysis Unit

	Forest Unit:		(Analysis Unit)														
Term	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
T1	121	399	25	1,113	0	215	1,051	697		536	395			561	125	10	532
T2	4	4		22	0	28	9				6			25	152	3	3
T3	79	285	43	388	0	24	346				239		3	1,150	197		378
T4	52	405	18	109	0	11	32	5			35	11	18	43	256	14	257
T5	59	151	11	0	0	0	0	13			26	23		0	179	2	108
T6	49	565	5	163	0	20	154	31			46	22	4	18	126	97	310
T7	12	120	2	4	0			1,437	162	901	0		5	267	88	1	36
T8	22	72	2	421	0	25	299	1,678	227	280	866			239	62	1	115
T9	26	33		41	0	1	12	168	6	140	69			82	43		93
T10	18	60	2	266	0	5	197	1,857	15	162	356	2		66	30		317
T11	40	135	2	132	0	16	61	610	17	155	180			153	21	0	128
T12		72	1	34	0	1	9	10	0	72	83			71	15		
T13	4	88	1		0			637	29	355	65			27	19		
T14		330	0		0			3,014	15	396				9	25	9	293
T15		19	0		0				10	40					32		
T16					0				68	40					42	13	

WHISKEY JACK FOREST 2024 FMP		SUMMARY of SFMM INVESTIGATION	
Case Name:	**14-Commit**	**Date:**	May 2, 2023.

Purpose: Investigation to see if current wood supply commitment volumes are possible (and for how long). Includes consideration for relaxed BLG indicator achievement (same as 12-2012FMP and 13-Bench).

Specific Inputs: Same as 12-2012FMP (except different volume targets, as revised/draft 2023 commitments). Lower BLG IQR targets (binding) included for all indicators from T7 onwards. Upland Conifer at 400,000 ha T7 onwards, Young at 130,000 ha T5 on. AllOP Young also included at lower IQR 72,209 ha T5 onwards.

Group:	Mm3/yr
SPF	76,000
PO	100,000
BW	
TOTAL	

Vol. Flow

No volume flow.
AllOp growing stock at 16 million T17 (control end)
Volume targets Term 1 only.

RESULTS: Where projections in the following tables fall below lower targets, the data is shaded yellow; where projections exceed upper targets, the data is shaded green.

FOREST CONDITION RESULTS

Used similar / relaxed BLG targets for wood supply investigations

Implications on Forest Condition - Very good (or above upper IQR) BLG indicator achievement for all Mature-Late classes. Similar / Poor for Old Growth T1-5, but improves as area ages. Upland Conifer increases but never reaches lower IQR. Young Forest never reaches lower IQR but relatively stable through time. Slow creation of all-ages PRW, but OG PRW increases. Caribou habitats improve (to T3) and overachieve by T4-T5 (same as BLG-Max).

(2a) Area by Landscape Class (Productive ha)

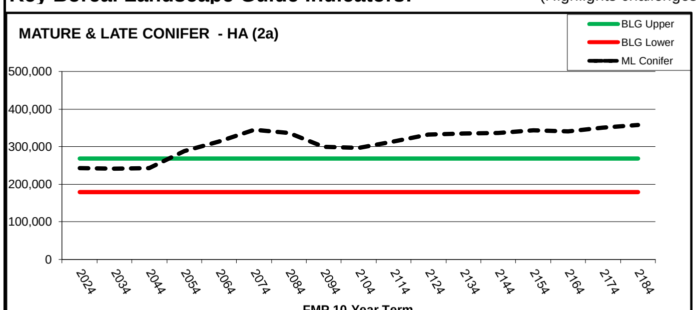
Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	81,424	186,273	66,561	14,802	243,544	143,145	46,587
T2	54,076	223,252	60,703	16,548	242,229	138,379	46,839
T3	71,825	214,917	44,210	19,245	243,162	144,075	44,390
T4	112,028	121,952	49,447	21,885	288,672	142,262	45,570
T5	115,290	87,767	52,156	23,383	314,358	144,984	43,863
T6	109,948	63,212	52,233	27,568	345,253	141,483	42,006
T7	90,060	97,065	54,299	32,243	336,185	132,793	39,017
T8	104,668	112,243	54,047	43,196	299,806	130,222	37,255
T9	124,907	113,111	46,744	47,971	296,213	116,084	36,339
T10	118,461	114,447	48,753	50,948	313,154	97,871	37,631
T11	122,879	104,381	53,025	53,525	332,116	76,140	39,151
T12	113,354	114,856	57,312	54,055	334,871	65,565	41,163
T13	106,121	119,564	55,852	57,655	336,987	62,391	42,580
T14	87,009	135,169	53,133	59,052	344,014	58,518	44,249
T15	111,425	114,713	44,977	60,626	341,383	63,242	44,772
T16	108,961	111,295	38,661	60,144	350,148	67,095	44,832
T17	103,042	113,351	32,092	58,993	357,976	70,886	44,786
BLG Upper	263,084	228,782	63,469	16,237	269,185	65,739	16,276
BLG Lower	143,268	103,333	36,052	8,706	178,461	43,021	12,845

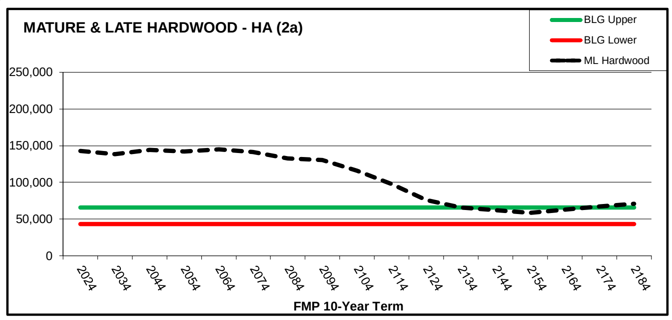
(2b) Old Growth by Grouping (Prod. ha)	Lower Old Growth Age (Years):				(2d)	(2e)
Term:	OGupC	OGloC	OGhmx	OGprw	Upland Conifer	Young <36 yrs
T1	23,536	1,071	22,603	30	359,248	136,124
T2	56,823	1,873	67,813	149	362,956	100,190
T3	97,287	2,375	120,421	255	368,580	99,159
T4	115,966	5,017	139,156	530	379,534	147,027
T5	122,209	7,745	154,282	923	386,667	160,280
T6	129,523	12,940	162,668	1,604	391,517	153,171
T7	185,310	18,073	170,617	1,636	400,418	138,105
T8	184,407	23,831	185,140	1,717	400,423	140,310
T9	204,756	25,103	183,921	1,738	411,004	158,718
T10	212,461	25,702	186,358	1,692	417,428	161,250
T11	220,577	25,444	179,969	1,642	420,145	176,270
T12	216,540	24,880	171,695	1,592	424,313	163,949
T13	216,659	26,866	170,572	1,693	427,211	145,950
T14	220,933	27,326	167,192	1,676	433,339	131,175
T15	223,304	27,582	164,976	1,631	434,996	143,484
T16	225,506	26,875	161,683	1,672	440,171	135,235
T17	226,356	26,230	161,530	1,705	442,760	131,172
BLG Upper	82,642	6,477	58,909		497,902	342,348
BLG Lower	51,310	4,282	35,996	1,500	475,260	196,754
			Model:	1,500 ha used	400,000 ha used	130,000 ha used

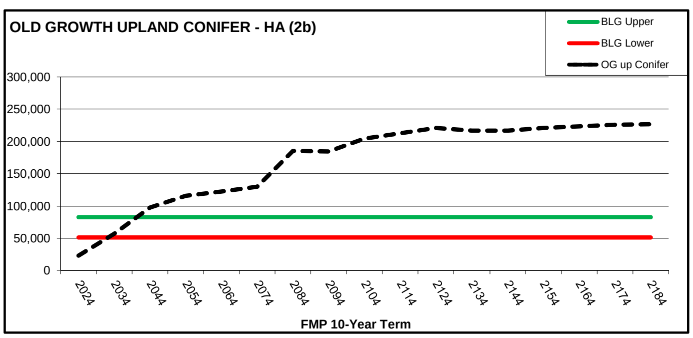
(6a) Available Forest: Term	
T1	196,134
T2	194,723
T3	193,748
T4	193,748
T5	193,748
T6	193,748
T7	193,748
T8	193,748
T9	193,748
T10	193,748
T11	193,748
T12	193,748
T13	193,748
T14	193,748
T15	193,748
T16	193,748
T17	193,748

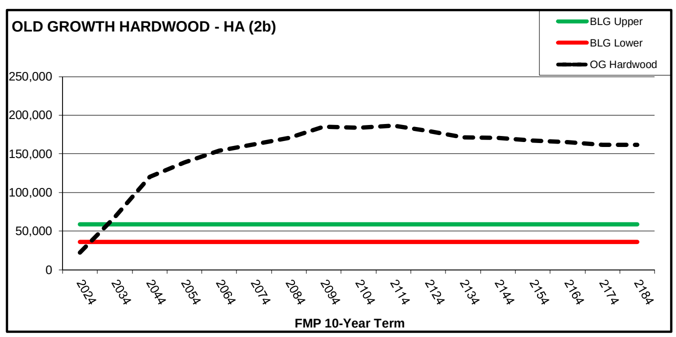
Key Boreal Landscape Guide Indicators:

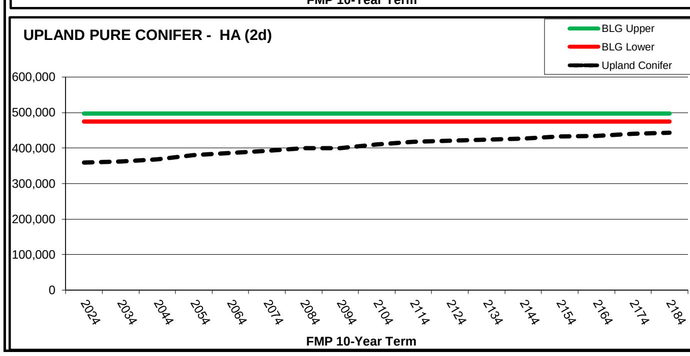
(Highlights challenges)

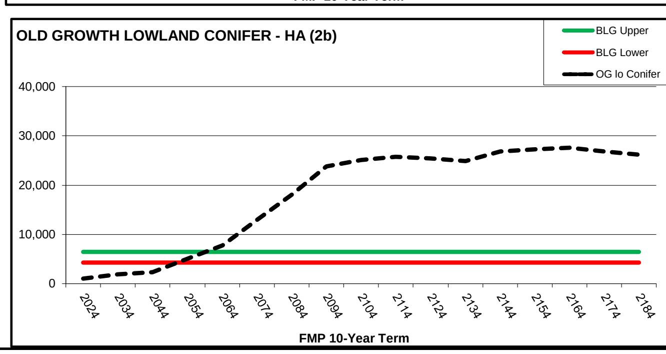












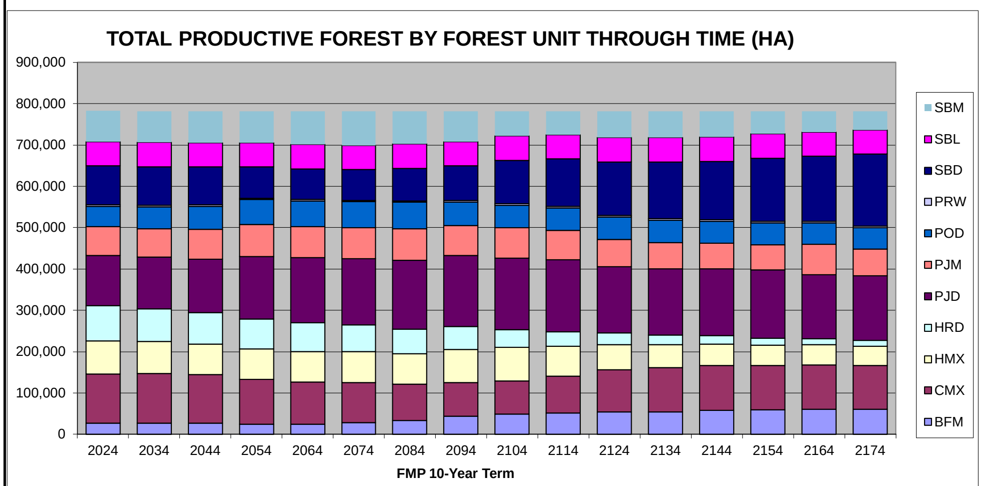
WHISKEY JACK FOREST 2024 FMP **SUMMARY of SFMM INVESTIGATION**

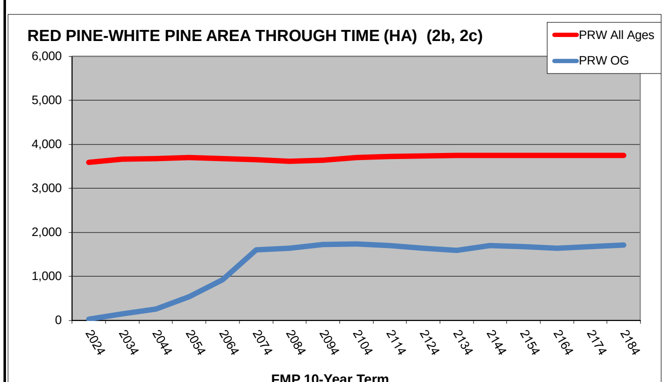
Case Name: 14-Commit **Date:** May 2, 2023.

FMP 10-Year Term

Productive Forest Area Through Time Data (hectares): by Forest Unit									Indicator (2c)			
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1	782,337	26,616	119,352	80,207	85,706	120,245	70,531	48,642	3,587	94,413	58,977	74,058
T2	782,026	26,814	119,752	78,257	78,489	125,953	67,838	53,135	3,658	93,920	58,966	75,245
T3	781,825	26,396	118,035	74,183	75,468	129,990	71,588	56,541	3,675	90,799	58,947	76,204
T4	781,817	24,701	108,767	73,520	72,222	151,091	77,105	60,425	3,700	75,089	58,947	76,248
T5	781,801	24,938	101,001	73,828	70,004	157,474	74,645	62,741	3,674	73,916	58,947	80,633
T6	781,705	28,902	96,924	74,645	64,725	160,016	74,968	62,398	3,646	73,982	58,947	82,551
T7	781,662	33,118	87,682	74,676	59,261	166,985	75,741	63,942	3,618	78,158	58,947	79,534
T8	781,437	43,756	81,107	80,887	55,332	172,008	71,592	57,347	3,638	83,569	58,947	73,253
T9	781,369	48,416	80,584	80,992	43,371	172,295	74,758	54,357	3,698	104,406	58,947	59,545
T10	781,264	51,368	89,140	72,174	35,208	174,636	71,415	53,282	3,716	115,188	58,947	56,189
T11	781,217	54,023	102,127	61,423	27,378	161,181	65,863	53,439	3,735	129,978	58,947	63,123
T12	781,175	54,596	107,166	55,219	22,989	160,685	63,188	54,201	3,744	137,531	58,947	62,910
T13	781,149	58,132	107,897	51,904	20,831	161,557	62,295	52,481	3,745	141,388	58,947	61,971
T14	781,143	59,510	107,148	49,340	16,794	164,924	61,361	52,320	3,745	152,615	58,947	54,439
T15	781,137	60,930	107,442	48,053	15,155	155,239	72,900	51,869	3,745	157,482	58,947	49,375
T16	781,135	60,328	106,594	45,963	14,194	156,121	65,014	51,193	3,745	174,524	58,947	44,512
T17	781,126	59,069	107,773	43,186	13,761	145,215	73,313	51,884	3,746	179,857	58,947	44,376

(Obj. 1) Caribou Habitat (Caribou Zone):		
Term	Refuge (1b)	Winter (1a)
T1	132,854	86,255
T2	146,331	104,218
T3	156,607	110,781
T4	163,305	114,232
T5	166,363	120,304
T6	166,573	119,022
T7	168,730	122,138
T8	169,698	122,793
T9	171,509	125,608
T10	173,834	127,720
T11	176,113	128,828
T12	175,714	124,147
T13	176,858	124,316
T14	178,962	126,090
T15	180,839	127,483
T16	183,335	132,229
T17	183,993	132,673
BLG Upper	161,804	115,633
BLG Lower	147,605	63,721





All ages PRW - desirable level "to increase"
Target in SFMM to not decrease.

Old Growth PRW - desirable level "to increase"

WHISKEY JACK FOREST 2024 FMP **SUMMARY of SFMM INVESTIGATION**

Case Name: **14-Commit** **Date:** May 2, 2023.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - Current 2023 Draft wood supply commitments are feasible for 2 terms only (limited by 100K Poplar commitment) due to smaller land base from which to harvest the volume. SPF is lower volume and is available for more 10-year terms. Very variable harvest areas and volumes (not sustainable). TOTAL volumes not controlled. Volume change flow (PO specifically) will be needed for development of LTMD run.

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

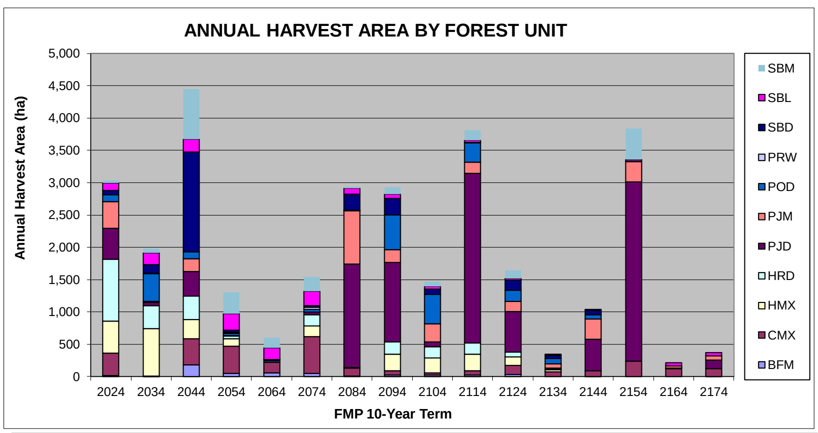
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 5b)	3,037	16	350	490	956	482	415	101	0	68	117	42
T2	1,981	4	5	731	356	52	16	430	7	134	181	65
T3	4,451	185	400	301	362	381	193	108	1	1,545	198	775
T4	1,300	51	423	109	43	5	0	35	21	32	258	323
T5	598	58	163	0	0	0	0	26	20	0	180	151
T6	1,540	48	569	163	174	43	0	46	33	18	225	221
T7	2,939	11	122	4	0	1,606	827	0	5	246	90	28
T8	2,927	22	70	252	189	1,232	202	530	0	259	63	108
T9	1,468	27	33	230	170	74	282	455	0	81	43	73
T10	3,812	22	67	254	179	2,620	173	297	2	12	30	156
T11 (5b)	1,642	36	138	131	77	628	152	172	0	159	21	128
T12	348	0	73	35	10	10	72	83	0	51	15	0
T13	1,041	3	88	0	0	488	309	65	0	68	19	0
T14	3,835	0	241	0	0	2,771	312	0	0	9	25	477
T15	217	0	124	0	0	6	37	0	0	0	50	0
T16	370	2	120	0	0	135	67	0	0	0	45	0

Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	%Small	%Large
T1 (5c)	309.2	175.2	100.0	33.0	0.0	0.99	0.01
T2	207.7	84.4	100.0	20.3	1.1	0.95	0.05
T3	423.7	336.5	59.5	25.7	0.1	0.99	0.01
T4	111.9	81.2	16.8	8.1	3.1	0.96	0.04
T5	51.7	37.1	6.1	2.9	3.8	0.95	0.05
T6	131.1	85.2	26.8	10.4	6.2	0.97	0.03
T7	275.9	256.6	11.4	6.5	0.6	0.99	0.01
T8	273.6	188.3	73.2	11.4	0.0	1.00	0.00
T9	132.2	64.2	59.2	8.4	0.0	1.00	0.00
T10	338.8	274.2	53.5	10.6	0.2	1.00	0.00
T11 (5c)	150.4	111.3	31.0	7.8	0.0	0.97	0.03
T12	29.1	17.1	10.0	1.8	0.0	1.00	0.00
T13	89.9	78.3	9.4	2.0	0.0	1.00	0.00
T14	329.4	307.6	14.2	7.4	0.0	1.00	0.00
T15	14.7	11.1	1.8	1.3	0.0	1.00	0.00
T16	25.7	21.6	2.1	1.5	0.0	1.00	0.00
Average	181.0	133.1	35.9	10.0	0.9		

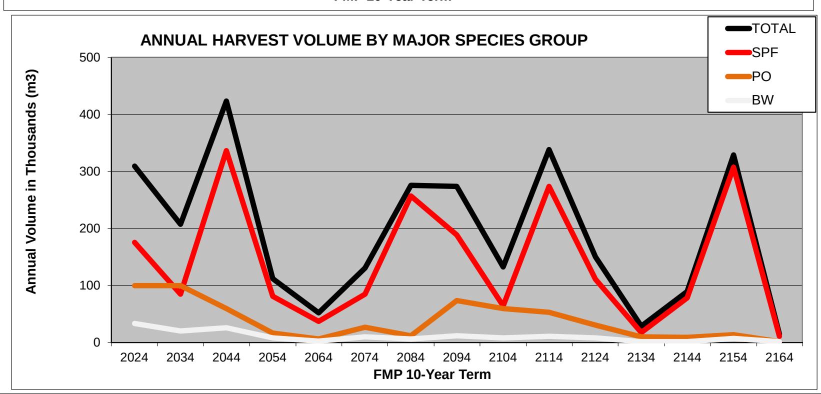
Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal Total ha	Natural ha	Plant ha	Seed ha
T1	1,256	1,256	0	**3,006**	1,265	399	1,343
T2	685	685	0	**1,961**	1,308	384	269
T3	2,226	2,226	0	**4,451**	656	499	3,296
T4	582	582	0	**1,300**	403	114	782
T5	288	288	0	**598**	205	80	313
T6	647	647	0	**1,540**	564	125	851
T7	1,646	1,632	0	**2,939**	3	206	2,729
T8	1,283	1,283	0	**2,927**	998	276	1,653
T9	481	481	0	**1,468**	807	121	539
T10	1,802	1,747	0	**3,812**	678	116	3,019
T11	745	745	0	**1,642**	353	90	1,199
T12	122	122	0	**348**	135	7	205
T13	507	507	0	**1,041**	74	13	954
T14	1,963	1,963	0	**3,835**	25	0	3,810
T15	76	76	0	**217**	84	0	133
T16	143	143	0	**370**	146	17	206



TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
CAR2	104	581		
DEA1	406	216	407	232
H105	941	812	1,550	437
LLP1			64	37
LLP2			144	36
LLP3	194			
LOTW	812	232	1,316	405
MEA1	231	21	62	41
MEA2	270	68	669	83
MEA3	79	52	239	30
CAR1				
SMZA				
TOTAL	**3,037**	**1,981**	**4,451**	**1,300**



WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: **14-Commit** **Date:** May 2, 2023.

Breakdown of PLANFU Available Harvest Area by Analysis Unit and Age Class TERM 1

Forest Unit: (Analysis Unit)

	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
A5	0																
A15																	
A25																	
A35																	
A45																	
A55																	
A65				5													1
A75	4			24		25	261				18						
A85	3	42		28		23	146	12		19	24			8			1
A95	2	200		392	0	85	409	372		252	52			34			17
A105	2	61	0	38			8	73		141	7			5			11
A115	1	6		4				23		4				9	102		0
A125	2	16	9					1						10	2		7
A135		1	4											3	0		0
A145	1		4					0							11		4
A155			7														
A165		0	1														
A175																	
A185															1		
A195															1		
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	16	325	25	490	0	133	823	482	0	415	101	0	0	68	117	0	42
																Total:	**3,037**

Renewal Area by Treatment Type Term 1

	Total	Natural	Plant	Seed
BFM	16	-	16	-
CMX	322	-	-	322
CMXC	24	-	-	24
HMX	486	364	121	-
HRDA	0	0	-	-
HRDB	132	99	33	-
HRD	815	611	204	-
PJDD	477	-	-	477
PJDS	-	-	-	-
PJM	411	-	-	411
POD	100	75	25	-
PRWR	-	-	-	-
PRWW	-	-	-	-
SBD	67	-	-	67
SBL	116	116	-	-
SBLC	-	-	-	-
SBM	41	-	-	41
	3,006	**1,265**	**399**	**1,343**
	Renewal:	**42%**	**13%**	**45%**

Available Harvest Area by Analysis Unit

Forest Unit: (Analysis Unit)

Term	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
T1	16	325	25	490	0	133	823	482		415	101			68	117		42
T2	4	5		731	0	119	237	52		16	430	2	4	134	153	29	65
T3	185	357	43	301	0	16	346	381		193	108		1	1,545	198		775
T4	51	405	18	109	0	11	32	5			35	5	16	32	258		323
T5	58	151	11	0	0						26	20		0	180		151
T6	48	565	5	163	0	20	155	43			46	29	4	18	126	99	221
T7	11	120	2	4	0			1,272	334	827	0		5	246	88	1	28
T8	22	68	2	252	0	16	173	1,166	66	202	530			259	62	1	108
T9	27	33		230	0	10	160	68	6	282	455			81	43		73
T10	22	65	2	254	0	4	175	2,605	15	173	297	2		12	30		156
T11	36	135	2	131	0	16	61	611	17	152	172			159	21	0	128
T12		72	1	35	0	1	9	10	0	72	83			51	15		
T13	3	87	1		0			474	15	309	65			68	19		
T14		241	0		0			2,742	29	312				9	25		477
T15		124	0		0				6	37					33	17	
T16	2	120			0				135	67					42	3	

WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: 15-Bal-Flow **Date:** May 3, 2023.

Purpose: Early LTMD development to improve wood supply and flow through time. Includes consideration for relaxed BLG indicator achievement (same as investigations 12-13-14).

Specific Inputs: Built on 14-Commit with current wood supply commitments levels, but control decrease in Poplar and Spruce-Pine-Fir through addition of volume change flow constraints (PO +/- 30%, SPF +/- 20%) and PO target T1, and SPF targets all terms (at wood supply commitment levels T1).

Group:	Mm3/yr	Mm3/yr	Vol. Flow
SPF	76,000	76,000	+/-30%
PO	100,000		+/-30%
BW			
TOTAL			
	T1	T2	

Scenario INFEASIBLE with T1 wood supply commitments, and +/- 20% PO and SPF. Lessened PO flow to 30.
AllOp growing stock at 16 million T17 (control end)
Volume targets PO Term 1 and 2 only, SPF all terms.

RESULTS: Where projections in the following tables fall below lower targets, the data is shaded yellow; where projections exceed upper targets, the data is shaded green.

FOREST CONDITION RESULTS

Used similar / relaxed BLG targets for wood supply investigations

Implications on Forest Condition - Same as other runs - Very good (or above upper IQR) BLG indicator achievement for all Mature-Late classes. Similar for Old Growth T1-5, but improves as area ages. Upland Conifer increases but never reaches lower IQR. Young Forest never reaches lower IQR but relatively stable through time. Slow creation of all-ages PRW, but OG PRW increases. Caribou habitats improve (to T3) and overachieve by T4-T5 (same as BLG-Max).

(2a) Area by Landscape Class (Productive ha)

Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	81,424	186,273	66,561	14,802	243,544	143,145	46,587
T2	50,963	223,252	60,703	16,701	246,483	138,212	45,750
T3	71,719	214,915	43,938	19,178	241,639	148,366	42,070
T4	97,245	121,850	46,841	22,057	303,710	146,864	43,254
T5	110,138	85,042	48,738	23,412	324,902	147,888	41,685
T6	106,504	65,875	49,968	27,595	349,360	141,735	40,670
T7	102,812	84,483	53,881	32,243	335,867	133,238	39,141
T8	109,159	104,111	53,656	43,282	308,181	125,284	37,766
T9	119,031	114,045	51,995	48,049	295,872	114,435	37,959
T10	123,596	106,064	51,329	50,846	313,157	96,005	40,281
T11	118,708	106,872	54,398	53,534	329,087	76,998	41,638
T12	106,133	119,702	55,572	54,220	334,236	68,167	43,171
T13	97,231	125,748	54,124	57,819	338,572	64,350	43,337
T14	94,023	126,424	49,042	59,338	345,959	63,279	43,112
T15	99,599	119,528	44,078	60,671	350,026	64,878	42,389
T16	102,176	109,444	37,615	60,077	362,239	68,445	41,171
T17	101,777	105,364	32,769	58,821	372,893	70,810	38,725
BLG Upper	263,084	228,782	63,469	16,237	269,185	65,739	16,276
BLG Lower	143,268	103,333	36,052	8,706	178,461	43,021	12,845

(2b) Old Growth by Grouping (Prod. ha); (2d); (2e)

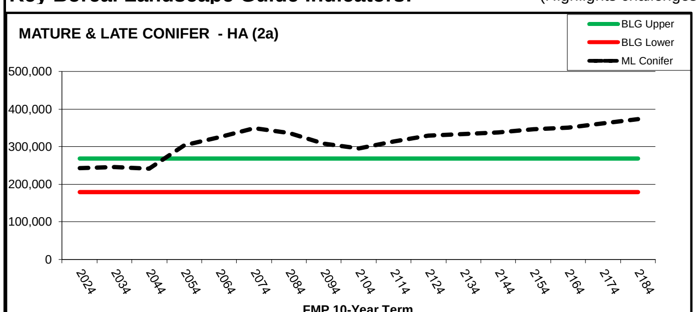
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs
T1	23,536	1,071	22,603	30	359,248	136,124
T2	60,503	1,667	67,983	149	363,090	97,077
T3	96,344	2,477	120,448	319	368,366	98,779
T4	123,755	5,117	139,503	521	379,566	129,536
T5	129,232	6,804	154,378	911	386,809	150,392
T6	132,698	12,039	162,624	1,500	391,740	151,657
T7	186,836	18,136	170,493	1,634	400,456	145,897
T8	188,537	23,906	185,087	1,715	401,088	148,747
T9	204,819	25,258	183,959	1,736	410,528	159,858
T10	212,523	25,781	186,220	1,690	415,499	167,968
T11	220,610	25,520	179,836	1,639	419,972	166,748
T12	216,626	24,939	171,685	1,590	424,294	154,396
T13	217,257	26,920	170,479	1,692	426,200	139,865
T14	222,433	27,342	166,806	1,674	432,042	131,171
T15	225,025	27,529	164,136	1,643	436,287	131,461
T16	226,760	26,909	161,574	1,680	441,253	131,672
T17	227,750	26,102	163,016	1,692	443,571	131,169
BLG Upper	82,642	6,477	58,909		497,902	342,348
BLG Lower	51,310	4,282	35,996	1,500	475,260	196,754
			Model:	1,500 ha used	400,000 ha used	130,000 ha used

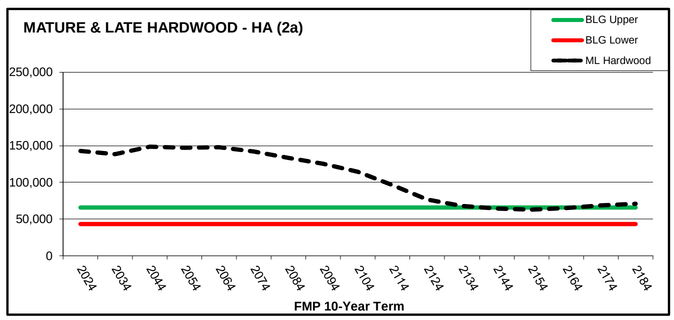
(6a) Available Forest:

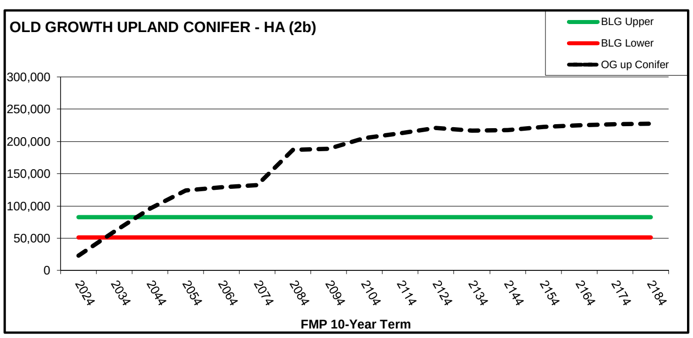
Term	
T1	196,134
T2	194,852
T3	193,812
T4	193,812
T5	193,812
T6	193,812
T7	193,812
T8	193,812
T9	193,812
T10	193,812
T11	193,812
T12	193,812
T13	193,812
T14	193,812
T15	193,812
T16	193,812
T17	193,812

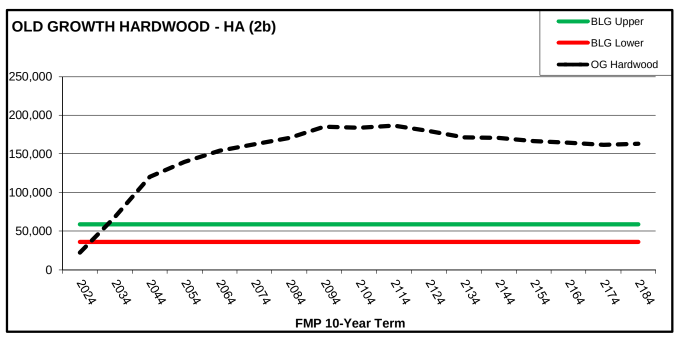
Key Boreal Landscape Guide Indicators:

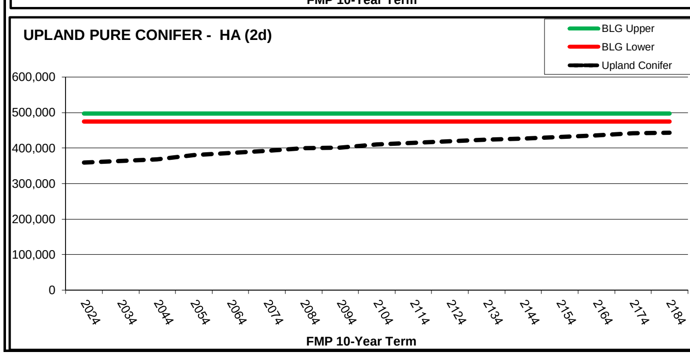
(Highlights challenges)

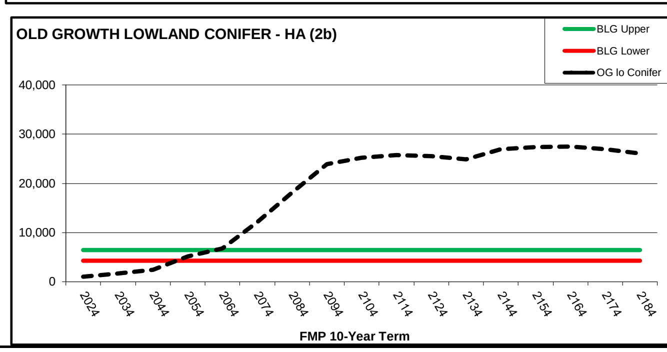












WHISKEY JACK FOREST 2024 FMP **SUMMARY of SFMM INVESTIGATION**

Case Name: 15-Bal-Flow **Date:** May 3, 2023.

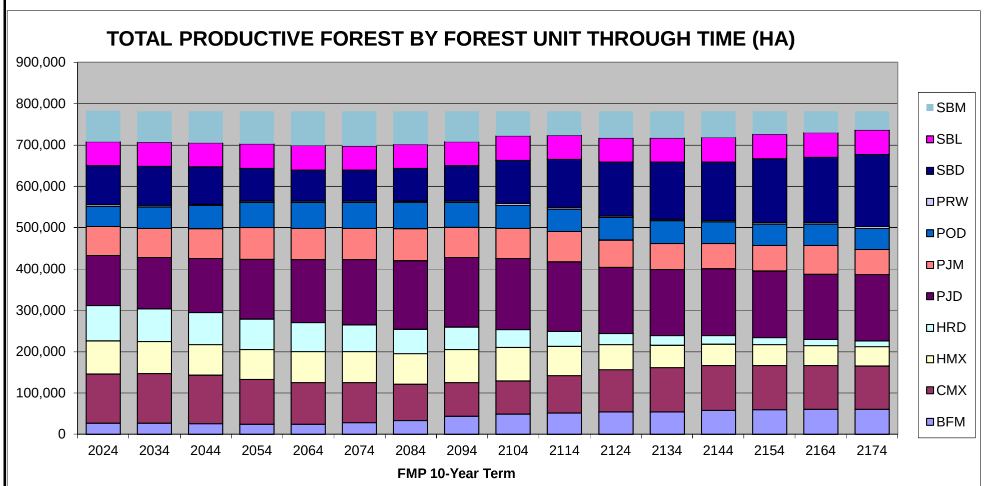
FMP 10-Year Term

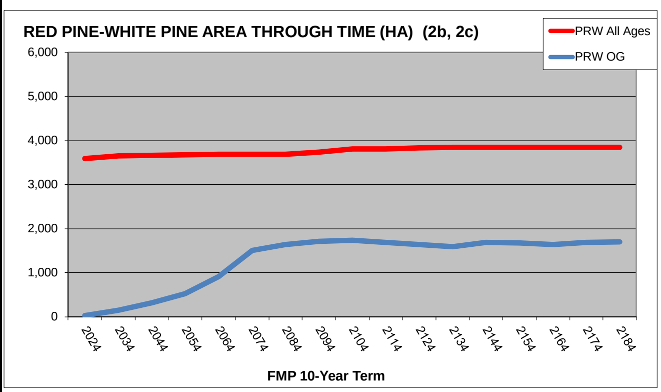
Productive Forest Area Through Time Data (hectares): by Forest Unit

Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW (Indicator (2c))	SBD	SBL	SBM
T1	782,337	26,616	119,352	80,207	85,706	120,245	70,531	48,642	3,587	94,413	58,977	74,058
T2	782,064	26,965	119,968	78,005	79,162	123,102	70,914	52,267	3,653	94,064	58,955	75,009
T3	781,826	26,228	116,853	74,455	77,385	129,501	73,292	55,949	3,666	89,605	58,923	75,969
T4	781,821	24,770	107,654	73,388	73,491	143,735	77,166	60,355	3,674	79,378	58,923	79,287
T5	781,805	24,904	100,352	74,636	69,940	153,176	75,025	62,560	3,680	75,387	58,923	83,221
T6	781,709	28,925	96,885	74,957	64,202	157,496	76,012	62,393	3,684	74,552	58,923	83,681
T7	781,665	33,118	87,816	74,415	59,164	165,553	77,299	64,080	3,691	77,784	58,923	79,820
T8	781,439	43,964	81,580	79,329	54,320	168,940	73,537	58,497	3,737	85,404	58,923	73,207
T9	781,385	48,610	80,649	80,880	42,695	171,549	74,289	55,295	3,804	104,868	58,923	59,822
T10	781,279	51,381	90,522	71,403	35,632	168,314	74,151	54,107	3,811	115,631	58,923	57,403
T11	781,235	54,074	101,635	61,275	27,663	159,574	66,149	53,863	3,829	130,395	58,923	63,854
T12	781,200	54,754	106,350	55,072	22,928	160,319	62,206	55,037	3,841	137,940	58,923	63,831
T13	781,180	58,283	107,721	52,487	20,912	160,441	60,973	52,813	3,841	141,544	58,923	63,240
T14	781,176	59,690	107,302	50,018	16,884	161,783	61,369	52,474	3,841	153,096	58,923	55,794
T15	781,169	60,941	105,723	48,240	15,266	156,692	70,108	51,948	3,841	157,884	58,923	51,603
T16	781,168	60,231	104,936	46,413	14,292	159,963	61,284	51,277	3,841	174,737	58,923	45,269
T17	781,158	58,904	106,339	43,759	13,876	151,527	68,821	51,941	3,844	180,073	58,923	43,151

(Obj. 1) Caribou Habitat (Caribou Zone):

Term	Refuge (1b)	Winter (1a)
T1	132,854	86,255
T2	146,378	104,222
T3	156,573	110,781
T4	163,269	114,232
T5	166,325	120,304
T6	166,357	118,872
T7	168,468	122,086
T8	169,411	122,605
T9	170,977	125,359
T10	173,310	127,466
T11	175,591	128,570
T12	175,659	124,553
T13	176,811	124,734
T14	178,895	126,433
T15	180,752	127,805
T16	182,828	132,257
T17	183,464	132,655
BLG Upper	161,804	115,633
BLG Lower	147,605	63,721





All ages PRW - desirable level "to increase"
Target in SFMM to not decrease.

Old Growth PRW - desirable level "to increase"

WHISKEY JACK FOREST 2024 FMP	SUMMARY of SFMM INVESTIGATION

Case Name: 15-Bal-Flow **Date:** May 3, 2023.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - Current 2023 Draft wood supply commitments are feasible for 1 term only (limited by 100K Poplar commitment) due to smaller land base from which to harvest the volume. SPF is available for all 10-year terms. Harvest is variable and higher in T1-3 than desired. TOTAL volumes not controlled. Volume change flow (PO specifically) will be needed for development of LTMD run. Consider increasing Upland Conifer target (will still be below IQR) to reduce conifer harvest.

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

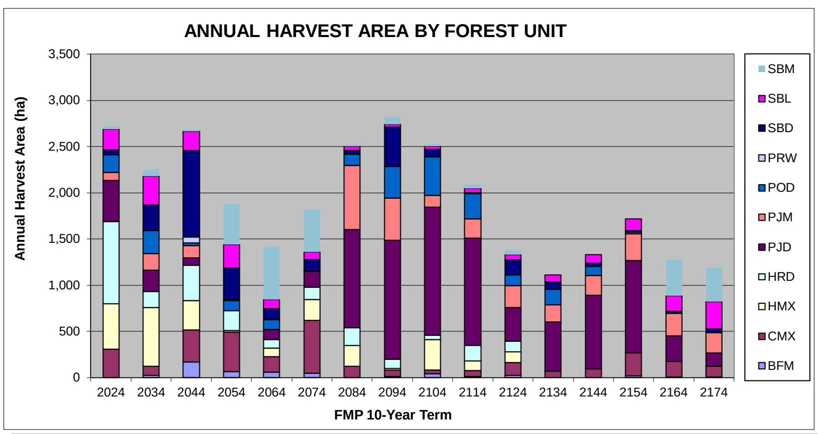
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 5b)	2,722	1	309	492	886	447	88	186	0	52	226	35
T2	2,256	25	96	639	172	234	177	246	0	277	312	77
T3	2,680	168	350	314	382	81	136	28	63	936	206	16
T4	1,881	68	423	17	218	0	0	109	13	339	251	442
T5	1,413	61	163	96	90	113	0	103	6	113	101	565
T6	1,816	50	569	224	134	172	0	0	5	126	79	456
T7	2,520	2	122	226	188	1,064	694	120	5	35	49	16
T8	2,824	14	68	17	101	1,288	456	341	0	423	35	81
T9	2,529	45	37	330	50	1,385	124	417	0	81	34	26
T10	2,087	14	64	105	167	1,156	208	275	0	13	44	40
T11 (5b)	1,377	24	137	118	115	362	238	119	0	161	57	45
T12	1,108	0	73	0	0	532	184	169	0	77	74	0
T13	1,333	0	92	0	0	803	211	97	0	34	97	0
T14	1,718	17	249	0	0	1,000	291	17	0	18	126	0
T15	1,279	10	164	0	0	278	243	6	0	15	168	394
T16	1,190	8	115	0	1	142	221	0	0	41	298	365

Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	%Small	%Large
T1 (5c)	277.2	141.9	102.4	30.8	0.0	0.98	0.02
T2	227.9	135.9	71.7	17.4	0.0	0.96	0.04
T3	260.1	176.6	50.2	21.0	10.4	0.98	0.02
T4	176.9	123.6	35.1	13.9	1.7	0.95	0.05
T5	135.9	100.9	24.6	8.7	0.8	0.92	0.08
T6	170.6	131.2	25.8	12.0	0.7	0.97	0.03
T7	214.1	170.5	33.5	9.0	0.6	0.99	0.01
T8	273.2	221.7	43.5	7.6	0.0	1.00	0.00
T9	220.2	155.2	56.6	8.1	0.0	1.00	0.00
T10	176.0	129.1	39.6	6.7	0.0	1.00	0.00
T11 (5c)	126.2	90.4	27.7	7.5	0.0	0.95	0.05
T12	99.3	76.8	19.4	2.3	0.0	1.00	0.00
T13	116.6	99.8	13.6	2.3	0.0	1.00	0.00
T14	144.3	129.7	9.5	3.9	0.0	0.99	0.01
T15	102.8	90.8	6.7	3.8	0.0	1.00	0.00
T16	86.8	76.0	4.7	3.4	0.0	1.00	0.00
Average	175.5	128.1	35.3	9.9	0.9		

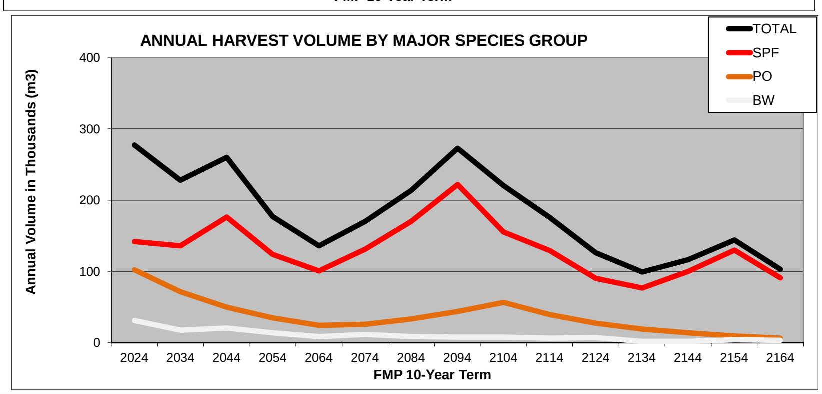
Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal Total ha	Natural ha	Plant ha	Seed ha
T1	1,053	1,037	0	**2,695**	1,385	388	922
T2	971	971	0	**2,233**	955	426	853
T3	1,295	1,295	0	**2,680**	753	408	1,520
T4	863	863	0	**1,881**	492	184	1,204
T5	685	685	0	**1,413**	318	139	955
T6	879	879	0	**1,816**	348	145	1,323
T7	1,129	1,129	0	**2,520**	694	143	1,683
T8	1,455	1,455	0	**2,824**	503	296	2,025
T9	1,051	1,051	0	**2,529**	763	115	1,650
T10	867	867	0	**2,087**	565	50	1,472
T11	612	612	0	**1,377**	343	97	937
T12	512	512	0	**1,108**	187	56	865
T13	651	651	0	**1,333**	138	55	1,140
T14	839	839	0	**1,718**	140	20	1,558
T15	593	593	0	**1,279**	174	11	1,094
T16	504	504	0	**1,190**	387	98	705



TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
CAR2	25	661		
DEA1	374	233	265	275
H105	975	666	1,027	749
LLP1			41	18
LLP2			85	25
LLP3	194			
LOTW	675	483	664	553
MEA1	173	83	40	43
MEA2	231	95	378	163
MEA3	75	36	179	54
CAR1				
SMZA				
TOTAL	**2,722**	**2,256**	**2,680**	**1,881**



WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: 15-Bal-Flow **Date:** May 3, 2023.

Breakdown of PLANFU Available Harvest Area by Analysis Unit and Age Class TERM 1

	Forest Unit: BFM	CMX	(Analysis Unit) CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
A5	0																
A15																	
A25																	
A35																	
A45																	
A55																	
A65				5													1
A75	1			10		25	261				18						
A85				48		23	146	8		6	59			8			1
A95		204		392	0	59	372	347		73	106			34			17
A105		59	0	38				72		7	3			5			11
A115		5						18		2				3	134		0
A125		16	9					2							4		
A135			4											3	47		
A145			4												19		4
A155			7												17		
A165			1												3		
A175																	
A185															1		
A195															1		
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	1	284	25	492	0	107	779	447	0	88	186	0	0	52	226	0	35
																Total:	2,722

Renewal Area by Treatment Type Term 1

	Total	Natural	Plant	Seed
BFM	1	-	1	-
CMX	281	-	-	281
CMXC	24	-	-	24
HMX	487	365	122	-
HRDA	0	0	0	-
HRDB	106	79	26	-
HRD	771	578	193	-
PJDD	442	-	-	442
PJDS	-	-	-	-
PJM	87	-	-	87
POD	184	138	46	-
PRWR	-	-	-	-
PRWW	-	-	-	-
SBD	52	-	-	52
SBL	224	224	-	-
SBLC	-	-	-	-
SBM	34	-	-	34
	2,695	**1,385**	**388**	**922**
	Renewal:	**51%**	**14%**	**34%**

Available Harvest Area by Analysis Unit

Term	Forest Unit: BFM	CMX	(Analysis Unit) CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
T1	1	284	25	492	0	107	779	447		88	186			52	226		35
T2	25	96		639	0	74	98	234		177	246			277	294	18	77
T3	168	306	43	314	0	74	308	81		136	28	48	15	936	206		16
T4	68	405	18	17	0	12	206				109	5	7	339	144	107	442
T5	61	152	11	96	0	11	79	113			103	4	2	113	101		565
T6	50	565	5	224	0	20	114	172				3	2	126	71	8	456
T7	2	120	2	226	0	14	174	695	370	694	120		5	35	49		16
T8	14	66	2	17	0	3	98	1,256	33	456	341			423	35		81
T9	45	37		330	0	3	47	1,380	6	124	417			81	34		26
T10	14	62	2	105	0	10	157	1,141	15	208	275			13	44		40
T11	24	134	2	118	0	18	97	345	17	238	119			161	57		45
T12		72	1		0			532	0	184	169			77	74		
T13		91	1		0			803		211	97			34	97		
T14	17	249	0		0			957	43	291	17			18	126		
T15	10	164	0		0			273	5	243	6			15	163	4	394
T16	8	115	0		0	0	1	45	97	221				41	213	86	365

WHISKEY JACK FOREST 2024 FMP — **SUMMARY of SFMM INVESTIGATION**

Case Name: 16-Bal-Harv — **Date:** May 3, 2023.

Purpose: Early LTMD development to improve wood supply and flow through time. Includes consideration for relaxed BLG indicator achievement (same as investigations 12-13-14).

Specific Inputs: Built on 15-Bal-Flow with current wood supply commitments levels, but control decrease in Poplar and Spruce-Pine-Fir through addition of volume change flow constraints (PO +/- 30%, SPF +/- 20%) and PO target T1 95 and T2 75 , and SPF targets all terms (at wood supply commitment levels T1).

Group:	Mm3/yr	Mm3/yr	Vol. Flow
SPF	76,000	76,000	+/-20%
PO	95,000	75,000	+/-30%
BW			
TOTAL			
	T1	T2	

Scenario INFEASIBLE with T1 wood supply commitments, and +/- 20% PO and SPF. Lessened PO flow to 30.
AllOp growing stock at 16 million T17 (control end)
Volume targets PO Term 1 and 2 only, SPF all terms.
Reduced whole forest Young target from 130,000 to 120,000 ha (still meets OpZone Young IQR T4-T17)
Increased MLconifer to 240,000 ha (but overachieves anyway)

RESULTS: Where projections in the following tables fall below lower targets, the data is shaded yellow; where projections exceed upper targets, the data is shaded green.

FOREST CONDITION RESULTS

Used similar / relaxed BLG targets for wood supply investigations

Implications on Forest Condition - Same as other runs - Very good (or above upper IQR) BLG indicator achievement for all Mature-Late classes. Similar for Old Growth T1-5, but improves as area ages. Upland Conifer increases but never reaches lower IQR. Young Forest never reaches lower IQR but relatively stable through time. Slow creation of all-ages PRW, but OG PRW increases. Caribou habitats improve (to T3) and overachieve by T4-T5 (same as BLG-Max).

(2a) Area by Landscape Class (Productive ha)

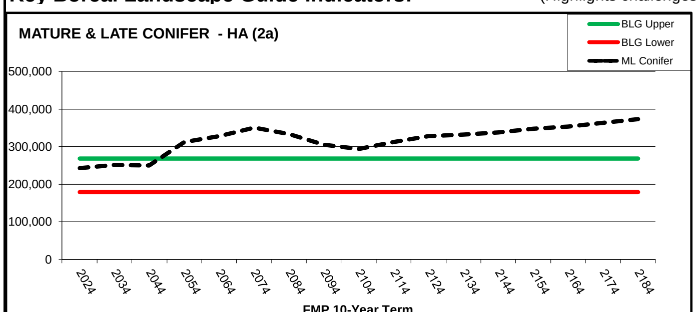
Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	81,424	186,273	66,561	14,802	243,544	143,145	46,587
T2	45,414	223,252	60,703	16,454	251,692	138,881	45,714
T3	67,040	214,691	43,276	17,861	250,261	147,383	41,317
T4	89,179	121,666	46,705	22,221	312,115	147,443	42,494
T5	111,605	80,664	47,708	24,039	328,509	147,707	41,580
T6	109,975	61,110	50,148	27,843	350,852	141,293	40,495
T7	110,506	78,079	54,236	32,230	334,329	133,257	39,040
T8	115,881	100,396	54,306	43,266	304,806	125,146	37,662
T9	119,975	115,581	52,105	47,910	294,429	113,530	37,881
T10	120,369	109,324	52,608	50,850	312,419	94,950	40,789
T11	113,265	113,063	54,227	53,523	327,958	77,048	42,182
T12	104,336	122,640	55,264	54,252	332,984	68,510	43,236
T13	96,674	126,483	53,975	57,841	338,152	64,570	43,505
T14	94,764	124,243	48,865	59,359	347,288	63,396	43,282
T15	99,726	115,077	43,496	60,812	354,195	65,245	42,639
T16	101,865	108,625	37,540	60,202	362,985	68,466	41,505
T17	101,599	104,972	32,700	58,927	372,942	70,840	39,199
BLG Upper	263,084	228,782	63,469	16,237	269,185	65,739	16,276
BLG Lower	143,268	103,333	36,052	8,706	178,461	43,021	12,845

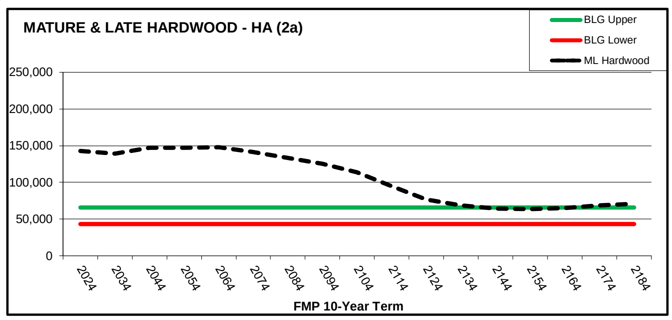
(2b) Old Growth by Grouping (Prod. ha) / **(2d)** / **(2e)** / **(6a) Available Forest:**

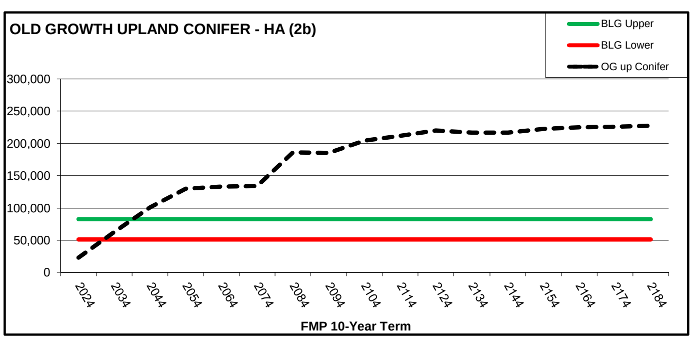
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs	(6a) Available Forest: Term	
T1	23,536	1,071	22,603	30	359,248	136,124	T1	196,134
T2	62,822	1,667	68,539	149	361,115	91,528	T2	195,086
T3	101,357	1,803	121,622	319	367,297	93,416	T3	194,016
T4	129,553	4,490	139,423	521	380,009	121,346	T4	194,016
T5	133,182	6,823	154,767	911	386,333	148,961	T5	194,016
T6	133,989	12,000	162,750	1,500	391,521	155,394	T6	194,016
T7	186,047	18,180	170,425	1,634	400,276	153,590	T7	194,016
T8	185,656	23,948	185,073	1,715	400,512	157,215	T8	194,016
T9	204,453	25,225	183,804	1,736	411,052	161,649	T9	194,016
T10	212,167	25,820	186,229	1,690	415,794	166,278	T10	194,016
T11	220,294	25,558	179,857	1,639	420,519	161,991	T11	194,016
T12	216,437	24,976	171,703	1,590	424,711	150,661	T12	194,016
T13	216,535	26,956	170,262	1,692	426,508	138,804	T13	194,016
T14	222,186	27,377	167,277	1,674	432,149	131,151	T14	194,016
T15	224,756	28,009	164,340	1,643	436,588	131,381	T15	194,016
T16	226,280	27,356	161,811	1,672	441,329	131,715	T16	194,016
T17	227,485	26,132	163,512	1,693	443,200	131,148	T17	194,016
BLG Upper	82,642	6,477	58,909		497,902	342,348		
BLG Lower	51,310	4,282	35,996	1,500	475,260	196,754		
			Model:	1,500 ha used	400,000 ha used	130,000 ha used		

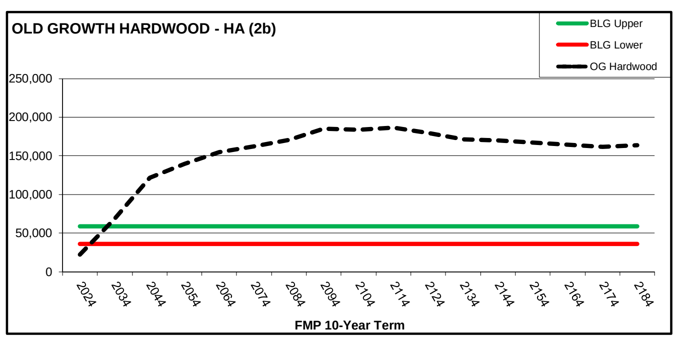
Key Boreal Landscape Guide Indicators:

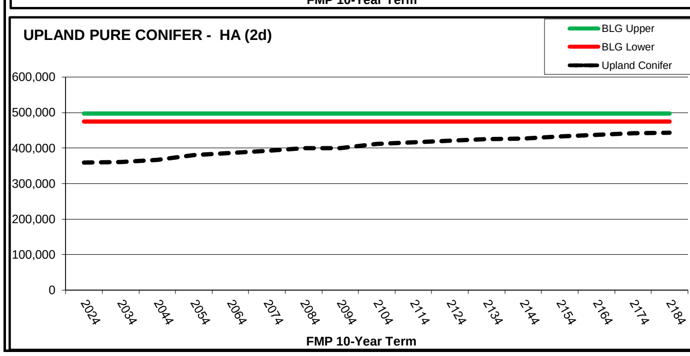
(Highlights challenges)

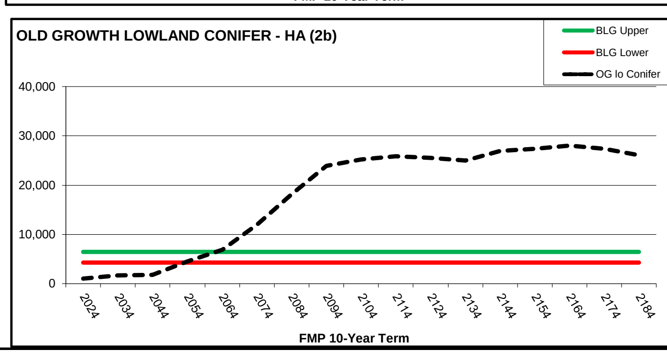












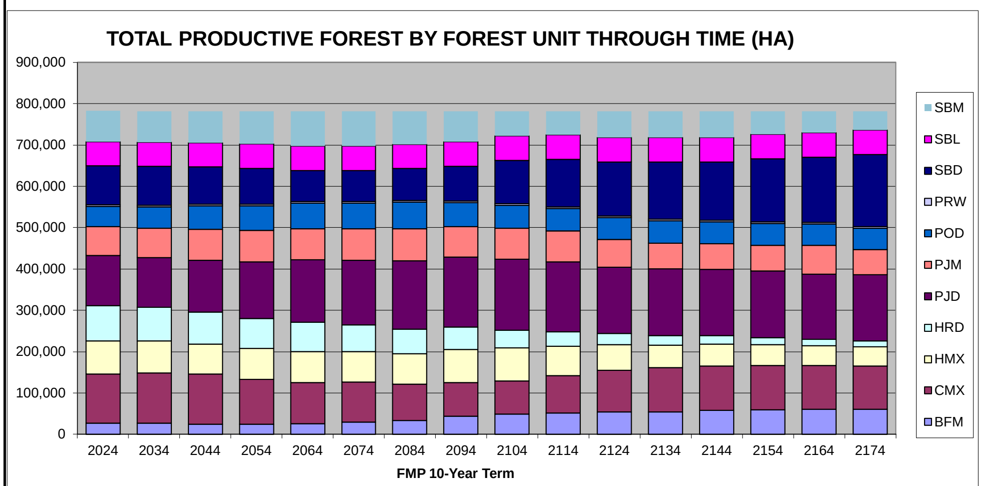
WHISKEY JACK FOREST 2024 FMP **SUMMARY of SFMM INVESTIGATION**

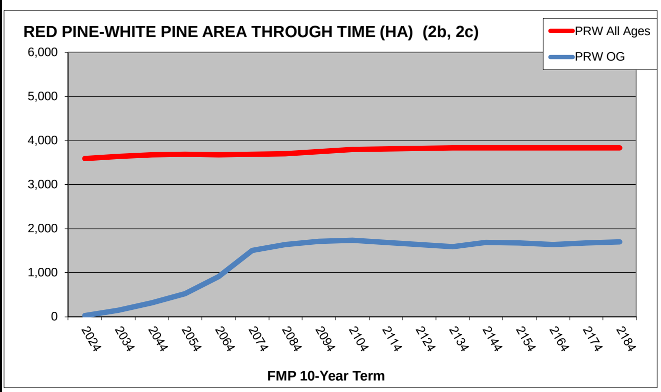
Case Name: **16-Bal-Harv** **Date:** May 3, 2023.

FMP 10-Year Term

Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
Productive Forest Area Through Time Data (hectares): by Forest Unit									Indicator (2c)			
T1	782,337	26,616	119,352	80,207	85,706	120,245	70,531	48,642	3,587	94,413	58,977	74,058
T2	782,110	26,696	122,288	77,044	80,845	120,987	71,229	51,528	3,640	94,048	58,954	74,851
T3	781,829	24,937	120,347	73,001	77,210	125,494	75,195	56,454	3,668	90,626	58,916	75,983
T4	781,824	24,920	107,551	74,978	72,219	137,229	76,628	59,552	3,679	86,722	58,916	79,430
T5	781,813	25,534	100,210	74,750	70,163	151,501	74,524	62,228	3,679	75,436	58,916	84,872
T6	781,717	29,184	96,937	74,558	64,407	156,111	75,854	62,512	3,683	74,955	58,916	84,602
T7	781,678	33,107	87,891	74,523	59,202	165,714	77,284	64,071	3,691	77,416	58,916	79,862
T8	781,463	43,960	81,816	79,736	54,420	168,971	72,966	58,363	3,742	85,115	58,916	73,460
T9	781,412	48,469	80,677	79,855	42,743	172,217	74,641	55,908	3,793	104,754	58,916	59,440
T10	781,308	51,393	90,439	71,540	35,131	168,911	74,455	54,292	3,804	115,505	58,916	56,923
T11	781,266	54,065	101,267	61,107	27,661	160,584	66,366	53,915	3,817	130,242	58,916	63,328
T12	781,223	54,775	105,969	54,964	23,160	161,431	62,021	54,903	3,825	137,800	58,916	63,459
T13	781,201	58,303	107,514	52,349	21,105	160,038	61,795	52,681	3,825	141,738	58,916	62,937
T14	781,196	59,714	107,333	49,828	17,094	161,130	62,575	52,337	3,825	152,929	58,916	55,514
T15	781,190	61,068	105,410	48,079	15,245	157,646	70,000	52,056	3,828	157,656	58,916	51,287
T16	781,188	60,360	104,807	46,280	14,273	160,512	61,155	51,395	3,828	174,537	58,916	45,125
T17	781,179	59,006	106,575	43,641	13,887	151,426	68,992	52,122	3,832	179,946	58,916	42,837

Term	Refuge (1b)	Winter (1a)
(Obj. 1) Caribou Habitat (Caribou Zone):		
T1	132,854	86,255
T2	146,379	104,244
T3	156,518	110,578
T4	163,216	114,036
T5	166,273	120,114
T6	166,306	118,669
T7	168,559	122,070
T8	169,505	122,594
T9	171,082	125,451
T10	173,552	127,562
T11	175,831	128,669
T12	176,125	125,072
T13	177,207	125,070
T14	179,282	126,763
T15	181,133	128,157
T16	182,982	132,380
T17	183,648	132,897
BLG Upper	161,804	115,633
BLG Lower	147,605	63,721





All ages PRW - desirable level "to increase"
Target in SFMM to not decrease.

Old Growth PRW - desirable level "to increase"

WHISKEY JACK FOREST 2024 FMP **SUMMARY of SFMM INVESTIGATION**

Case Name: **16-Bal-Harv** **Date:** May 3, 2023.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - Slightly underachieve PO T1 (95 vs 100K), SPF met in all terms. PO decreases over first 5 terms Harvest is variable and higher in T1-4 than desired, then low in T5. TOTAL volumes not controlled. Consider using TOTAL volume target to better control harvest through time.

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

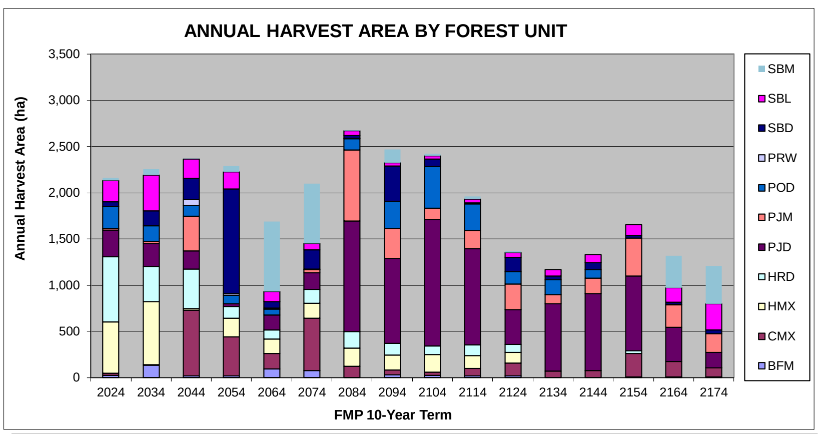
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 5b)	2,162	25	22	558	703	288	18	237	0	52	230	29
T2	2,256	133	10	679	383	248	25	164	0	164	386	65
T3	2,369	20	707	20	429	196	377	117	60	229	209	6
T4	2,292	17	423	202	127	31	0	94	15	1,132	186	64
T5	1,692	97	163	159	95	167	0	64	6	75	108	758
T6	2,097	75	569	163	150	180	31	0	5	207	72	645
T7	2,677	0	122	198	175	1,198	768	120	5	32	50	7
T8	2,468	31	52	164	122	922	322	292	0	383	35	144
T9	2,424	27	33	188	96	1,370	119	453	0	81	32	26
T10	1,958	17	85	139	116	1,036	199	286	0	12	41	26
T11 (5b)	1,374	21	137	116	87	376	276	133	0	157	53	19
T12	1,169	0	73	0	0	725	100	161	0	40	69	0
T13	1,333	0	75	0	0	835	166	95	0	71	90	0
T14	1,654	6	258	0	26	808	412	0	0	25	117	0
T15	1,318	9	164	0	0	370	245	4	0	22	159	345
T16	1,210	10	97	0	2	166	200	0	0	44	281	411

Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	% Small	% Large
T1 (5c)	224.5	100.5	95.3	26.6	0.0	0.97	0.03
T2	220.5	120.6	75.0	21.4	0.0	0.97	0.03
T3	226.5	144.7	52.5	17.5	9.8	0.96	0.04
T4	221.1	164.6	36.8	15.6	2.3	0.99	0.01
T5	170.3	131.7	25.7	11.0	0.8	0.91	0.09
T6	198.1	158.0	25.4	13.0	0.7	0.95	0.05
T7	232.7	189.6	33.0	8.9	0.6	0.99	0.01
T8	231.5	180.1	42.9	8.1	0.0	1.00	0.00
T9	207.0	144.0	55.6	7.0	0.0	1.00	0.00
T10	160.5	115.2	38.9	6.0	0.0	1.00	0.00
T11 (5c)	127.1	92.2	27.2	7.1	0.0	0.96	0.04
T12	107.2	85.1	19.1	2.3	0.0	1.00	0.00
T13	118.6	102.2	13.3	2.3	0.0	1.00	0.00
T14	137.5	122.6	9.3	4.4	0.0	1.00	0.00
T15	109.9	98.1	6.5	3.8	0.0	1.00	0.00
T16	89.1	78.5	4.6	3.4	0.0	1.00	0.00
Average	173.9	126.7	35.1	9.9	0.9		

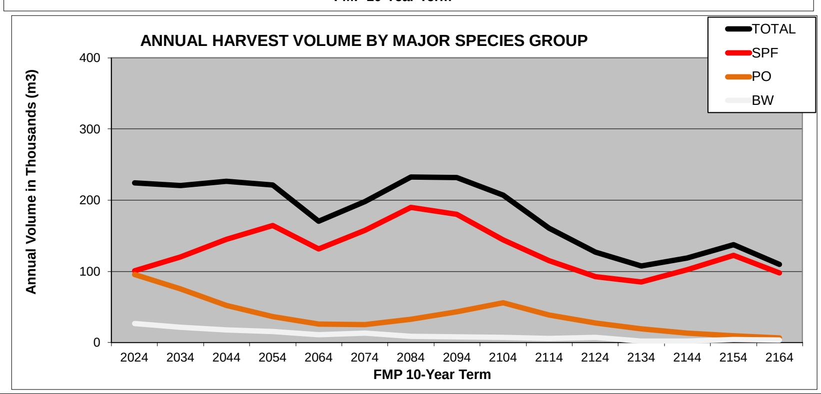
Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal Total ha	Natural ha	Plant ha	Seed ha
T1	780	780	0	**2,140**	1,339	395	406
T2	887	887	0	**2,234**	1,293	435	506
T3	1,088	1,088	0	**2,369**	637	218	1,515
T4	1,126	1,123	0	**2,292**	327	315	1,650
T5	883	883	0	**1,692**	313	217	1,162
T6	1,049	1,049	0	**2,097**	306	158	1,633
T7	1,249	1,249	0	**2,677**	655	169	1,852
T8	1,193	1,193	0	**2,468**	592	251	1,625
T9	978	978	0	**2,424**	732	68	1,625
T10	778	778	0	**1,958**	585	24	1,348
T11	622	622	0	**1,374**	312	99	963
T12	564	564	0	**1,169**	161	69	939
T13	666	666	0	**1,333**	115	71	1,147
T14	794	794	0	**1,654**	144	6	1,504
T15	638	638	0	**1,318**	163	34	1,121
T16	519	519	0	**1,210**	423	125	662



TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
CAR2	22	684		
DEA1	323	206	345	169
H105	856	718	763	872
LLP1			34	23
LLP2			80	31
LLP3	187			
LOTW	361	461	897	556
MEA1	156	39	96	38
MEA2	199	77	108	446
MEA3	58	71	46	158
CAR1				
SMZA				
TOTAL	**2,162**	**2,256**	**2,369**	**2,292**



WHISKEY JACK FOREST 2024 FMP	SUMMARY of SFMM INVESTIGATION
Case Name: 16-Bal-Harv	Date: May 3, 2023.

Breakdown of PLANFU Available Harvest Area by Analysis Unit and Age Class TERM 1

	Forest Unit:		(Analysis Unit)														
	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
A5	0																
A15																	
A25																	
A35																	
A45																	
A55																	
A65				5													
A75	1			10		25	69				18						
A85	6			110		23	146	8		5	106			8			1
A95	8	13		392	0	59	372	190		5	106			34			17
A105			0	38			8	72		6	7			5			11
A115	7	5		4				18		2				3	134		0
A125	2	4													2		
A135														3	53		
A145	1														19		
A155															17		
A165															3		
A175																	
A185															1		
A195															1		
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	25	22	0	558	0	107	595	288	0	18	237	0	0	52	230	0	29
																Total:	2,162

Renewal Area by Treatment Type Term 1

	Total	Natural	Plant	Seed
BFM	25	-	25	-
CMX	22	-	-	22
CMXC	0	-	-	0
HMX	552	414	138	-
HRDA	0	0	-	-
HRDB	106	79	26	-
HRD	590	442	147	-
PJDD	285	-	-	285
PJDS	-	-	-	-
PJM	18	-	-	18
POD	234	176	59	-
PRWR	-	-	-	-
PRWW	-	-	-	-
SBD	52	-	-	52
SBL	228	228	-	-
SBLC	-	-	-	-
SBM	29	-	-	29
	2,140	**1,339**	**395**	**406**
	Renewal:	**63%**	**18%**	**19%**

Available Harvest Area by Analysis Unit

	Forest Unit:		(Analysis Unit)														
Term	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
T1	25	22	0	558	0	107	595	288		18	237			52	230		29
T2	133	10		679	0	94	289	248		25	164			164	299	88	65
T3	20	639	68	20	0	60	369	196		377	117	45	15	229	209		6
T4	17	405	18	202	0		127	31			94	8	7	1,132	146	40	64
T5	97	152	11	159	0	17	78	167			64	4	2	75	102	6	758
T6	75	565	5	163	0	20	130	180		31		3	2	207	72		645
T7	0	120	2	198	0	14	162	828	370	768	120		5	32	50		7
T8	31	51	1	164	0	6	116	889	33	322	292			383	35		144
T9	27	33		188	0	9	87	1,364	6	119	453			81	32		26
T10	17	81	4	139	0	0	116	1,021	15	199	286			12	41		26
T11	21	134	2	116	0	19	68	374	2	276	133			157	53		19
T12		72	1		0			725	0	100	161			40	69		
T13		74	1		0			835		166	95			71	90		
T14	6	258	0		0		26	751	57	412				25	117		
T15	9	164	0		0			365	5	245	4			22	153	6	345
T16	10	97	0		0	0	2	69	97	200				44	198	82	411

WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: 18-Bal-TOTv **Date:** May 3, 2023.

Purpose: Early LTMD development to improve wood supply and flow through time. Includes consideration for relaxed BLG indicator achievement (same as investigations 12-13-14).

Specific Inputs: Built on 17-Bal-Harv with adjusted harvest volumes to control decrease in Poplar and Spruce-Pine-Fir through time. Same flow constraints (PO +/- 30%, SPF +/- 20%) and PO target T1 95 - T2 75 - T3 54 , and SPF targets all terms (at wood supply commitment level 76). New TOTAL volume through time target 170,000 (except T16 130K) to boost harvest in low periods.

Group:	Mm3/yr	Mm3/yr	Vol. Flow	T3
SPF	76,000	76,000	+/-20%	76
PO	95,000	75,000	+/-30%	54
BW				
TOTAL	170,000	170,000		
	T1	T2		

AllOp growing stock reduced slightly to 15 million T17 (control end, change from 16 mill.)
Volume targets PO Term 1, 2 and 3 only, SPF all terms.
Same s 16-17 - Reduced whole forest Young target from 130,000 to 120,000 ha (still meets OpZone Young IQR T4-T17)
Same as 16-17 - Increased MLconifer to 240,000 ha (but overachieves anyway)
Reduced UpCon (PurCn) same level 400K, but T9 on rather than T7.

RESULTS: Where projections in the following tables fall below lower targets, the data is shaded yellow; where projections exceed upper targets, the data is shaded green.

FOREST CONDITION RESULTS

Used similar / relaxed BLG targets for wood supply investigations

Implications on Forest Condition - Same as other runs - Very good (or above upper IQR) BLG indicator achievement for all Mature-Late classes. Similar for Old Growth T1-5, but improves as area ages. Upland Conifer increases but never reaches lower IQR. Young Forest never reaches lower IQR but relatively stable through time. Slow creation of all-ages PRW, but OG PRW increases. Caribou habitats improve (to T3) and overachieve by T4-T5 (same as BLG-Max).

(2a) Area by Landscape Class (Productive ha)

Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	81,424	186,273	66,561	14,802	243,544	143,145	46,587
T2	42,847	223,252	60,703	16,106	251,915	139,477	47,821
T3	58,179	214,856	44,457	17,948	250,261	149,353	46,859
T4	77,421	121,845	48,245	22,324	314,878	147,408	49,785
T5	97,608	77,298	51,513	24,156	333,865	147,088	50,368
T6	100,677	52,767	55,117	28,354	354,860	140,027	49,998
T7	101,873	65,367	60,868	33,576	337,330	133,851	48,892
T8	102,648	83,554	59,445	44,663	315,572	127,999	47,653
T9	101,897	102,364	54,588	49,275	307,761	119,379	46,218
T10	100,375	109,214	51,015	50,887	319,895	103,596	46,394
T11	99,819	108,897	50,775	53,613	337,254	84,545	46,449
T12	98,984	107,504	51,962	54,393	348,004	73,998	46,472
T13	98,566	106,776	53,771	57,895	350,232	67,587	46,469
T14	100,985	104,544	52,469	59,380	354,134	63,337	46,443
T15	104,917	103,846	49,869	60,853	353,535	61,874	46,393
T16	106,252	105,596	45,563	60,244	357,176	60,956	45,497
T17	101,366	108,851	41,868	59,006	362,050	62,819	45,316
BLG Upper	263,084	228,782	63,469	16,237	269,185	65,739	16,276
BLG Lower	143,268	103,333	36,052	8,706	178,461	43,021	12,845

(2b) Old Growth by Grouping (Prod. ha) / **(2d)** / **(2e)**

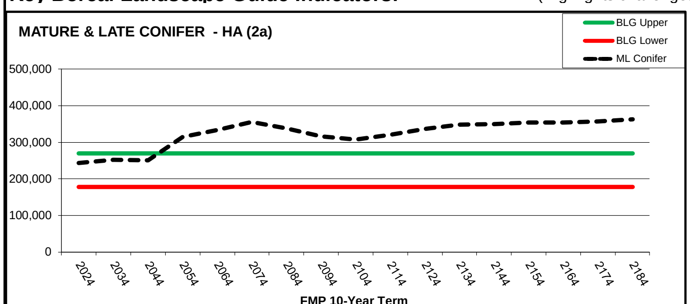
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs
T1	23,536	1,071	22,603	30	359,248	136,124
T2	64,210	1,825	67,288	149	361,795	88,962
T3	103,338	2,676	119,529	310	366,927	85,698
T4	133,278	5,878	139,497	522	376,786	111,111
T5	138,832	8,954	154,922	912	381,423	136,562
T6	144,130	15,334	163,233	1,500	384,573	147,334
T7	186,245	23,376	171,749	1,634	391,327	146,889
T8	194,781	31,813	186,465	1,715	393,500	143,831
T9	208,414	34,304	185,176	1,736	404,520	141,330
T10	214,378	35,365	186,199	1,690	412,229	141,036
T11	221,405	35,143	179,848	1,640	417,796	141,311
T12	217,658	34,573	171,768	1,607	422,428	142,171
T13	218,048	36,654	169,618	1,707	424,162	142,137
T14	222,533	37,048	165,984	1,690	429,629	141,338
T15	224,935	36,881	163,956	1,658	433,188	141,181
T16	226,084	35,247	161,619	1,583	437,115	140,592
T17	225,436	34,203	160,763	1,586	439,478	136,363
BLG Upper	82,642	6,477	58,909		497,902	342,348
BLG Lower	51,310	4,282	35,996	1,500	475,260	196,754
			Model:	1,500 ha used	400,000 ha used	130,000 ha used

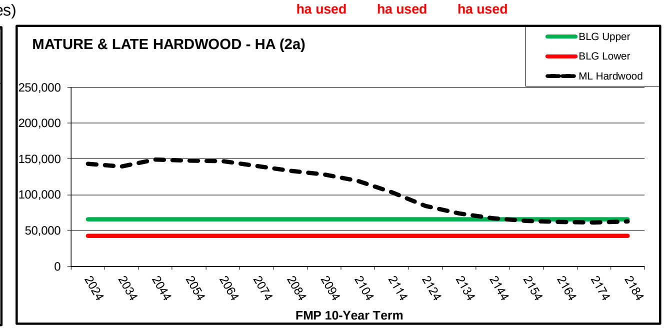
(6a) Available Forest:

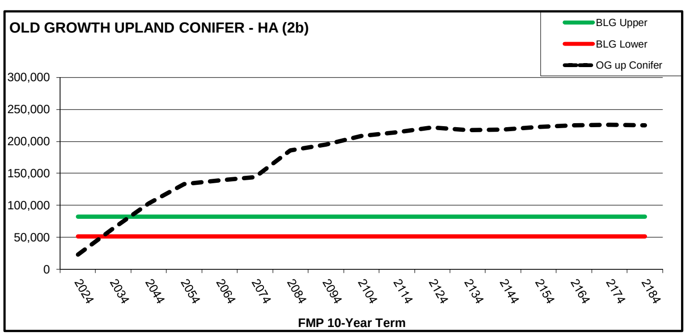
Term	
T1	196,134
T2	195,194
T3	194,369
T4	194,369
T5	194,369
T6	194,369
T7	194,369
T8	194,369
T9	194,369
T10	194,369
T11	194,369
T12	194,369
T13	194,369
T14	194,369
T15	194,369
T16	194,369
T17	194,369

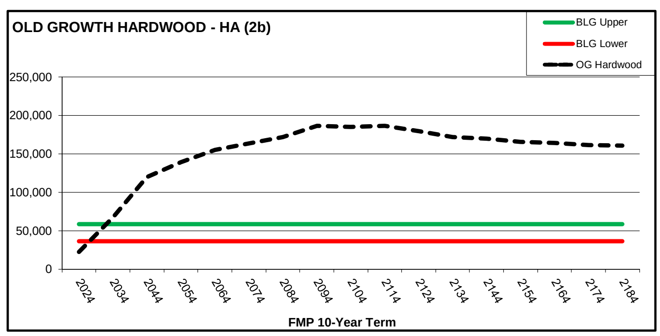
Key Boreal Landscape Guide Indicators:

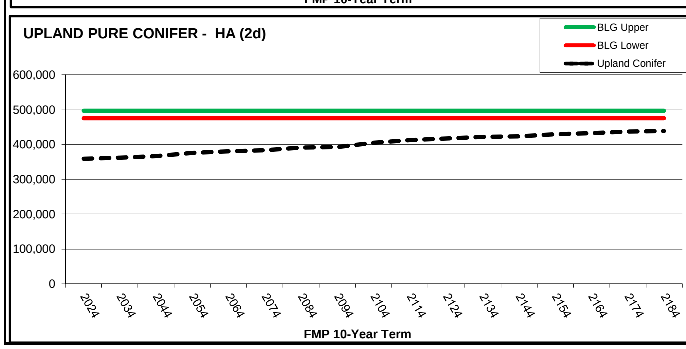
(Highlights challenges)

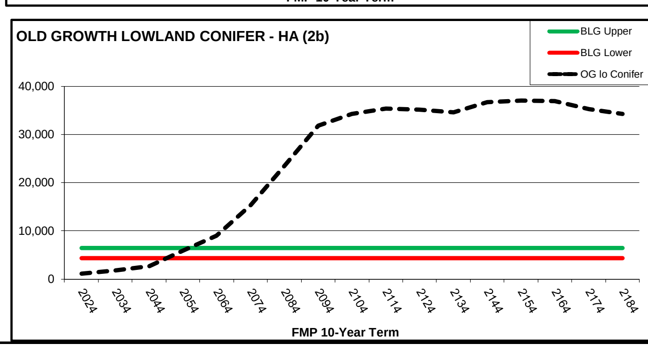












WHISKEY JACK FOREST 2024 FMP	SUMMARY of SFMM INVESTIGATION

Case Name: 18-Bal-TOTv **Date:** May 3, 2023.

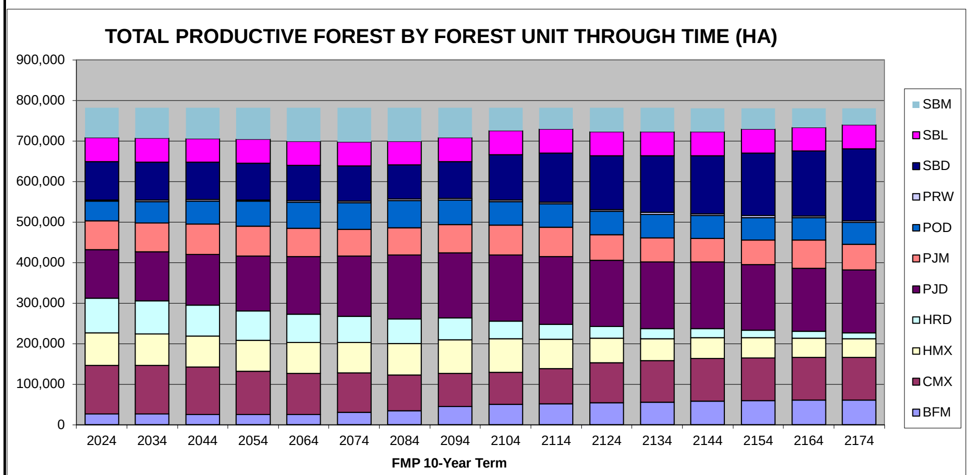
FMP 10-Year Term

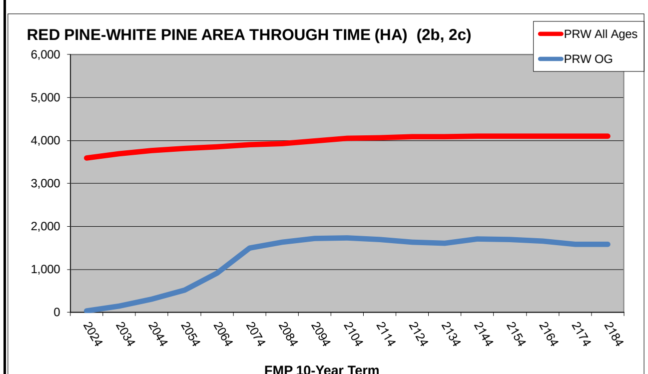
Productive Forest Area Through Time Data (hectares): by Forest Unit

									Indicator (2c)			
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1	782,337	26,616	119,352	80,207	85,706	120,245	70,531	48,642	3,587	94,413	58,977	74,058
T2	782,122	26,310	120,118	77,800	80,910	121,403	70,951	52,526	3,690	94,625	58,975	74,815
T3	781,913	24,949	117,070	76,102	77,246	124,930	74,573	56,879	3,766	91,771	58,973	75,653
T4	781,908	25,000	106,689	75,789	73,163	135,397	73,295	61,697	3,811	89,923	58,973	78,172
T5	781,896	25,655	100,335	76,253	70,177	142,748	68,780	65,230	3,851	86,783	58,973	83,112
T6	781,800	29,739	97,540	76,075	64,531	148,363	65,270	66,471	3,897	86,311	58,973	84,629
T7	781,757	34,452	88,372	77,393	60,081	158,186	66,865	67,233	3,925	84,027	58,973	82,250
T8	781,535	45,358	81,383	82,321	54,681	159,942	69,738	61,328	3,992	90,594	58,973	73,226
T9	781,482	49,814	79,407	83,116	43,776	163,223	72,991	57,831	4,046	112,162	58,973	56,144
T10	781,378	51,401	87,555	72,385	36,359	167,553	71,719	58,414	4,062	120,294	58,973	52,664
T11	781,351	54,138	98,019	61,197	28,473	163,933	62,565	58,672	4,083	132,293	58,973	59,005
T12	781,317	54,916	102,823	54,621	24,427	164,753	58,758	59,038	4,092	139,679	58,973	59,238
T13	781,297	58,421	104,638	52,243	22,341	163,429	58,188	56,424	4,095	143,522	58,973	59,023
T14	781,292	59,835	104,760	50,122	18,387	162,482	60,326	55,492	4,095	155,141	58,973	51,680
T15	781,286	61,268	104,154	48,548	16,360	155,677	70,028	54,693	4,101	160,029	58,973	47,454
T16	781,284	60,596	105,238	45,726	15,218	155,697	62,359	54,320	4,098	177,077	58,973	41,982
T17	781,275	59,288	107,272	42,399	14,971	145,407	71,766	54,791	4,103	181,741	58,973	40,565

(Obj. 1) Caribou Habitat (Caribou Zone):

Term	Refuge (1b)	Winter (1a)
T1	132,854	86,255
T2	146,438	104,456
T3	156,066	111,126
T4	162,755	114,565
T5	165,804	120,626
T6	165,859	119,084
T7	167,513	121,580
T8	168,482	122,093
T9	170,218	124,502
T10	172,525	126,613
T11	174,805	127,720
T12	175,153	124,713
T13	176,165	124,726
T14	178,250	126,432
T15	180,109	127,752
T16	181,955	131,530
T17	182,674	132,021
BLG Upper	161,804	115,633
BLG Lower	147,605	63,721





All ages PRW - desirable level "to increase"
Target in SFMM to not decrease.

Old Growth PRW - desirable level "to increase"

WHISKEY JACK FOREST 2024 FMP	SUMMARY of SFMM INVESTIGATION
Case Name: 18-Bal-TOTv	**Date:** May 3, 2023.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - Slightly underachieve PO T1 (95 vs 100K), SPF met in all terms. PO decreases over first 6 terms Harvest is variable and higher in T1-4 than desired, then low in T5. TOTAL volumes sustainable at 170,000+ m3 except T16. However harvest shifts from poplar domiinated to conifer through time (as expected, and as projected in previous FMPs). Best balance of harvest area and volume so far.

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

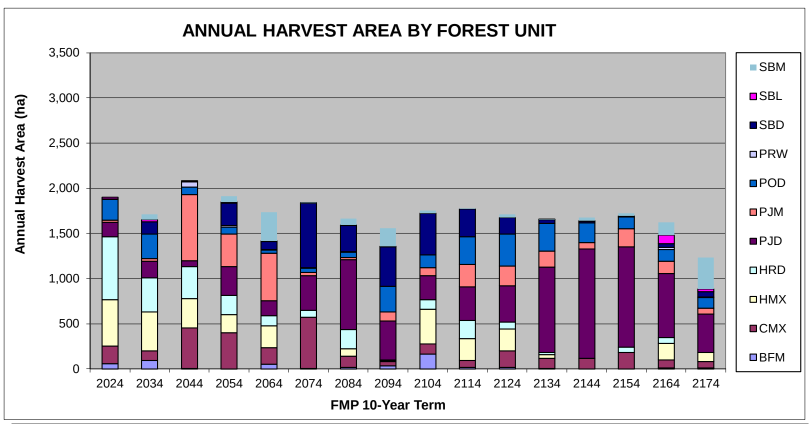
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 5b)	1,903	58	196	512	697	159	24	228	1	8	19	0
T2	1,709	91	108	434	376	186	27	272	0	134	24	58
T3	2,082	3	451	323	358	60	732	85	57	3	9	0
T4	1,913	0	402	202	207	319	363	77	15	253	7	69
T5	1,737	54	183	240	113	167	526	35	6	89	5	319
T6	1,843	2	568	0	79	384	35	46	6	716	3	5
T7	1,666	14	124	88	212	774	23	58	5	290	2	75
T8	1,560	33	51	8	5	431	102	285	0	438	2	205
T9	1,751	164	114	381	106	268	88	142	0	458	2	26
T10	1,775	14	81	239	202	375	249	304	0	306	3	3
T11 (5b)	1,711	19	179	245	78	399	217	354	0	183	3	34
T12	1,661	5	112	39	25	948	172	310	0	42	5	4
T13	1,677	0	120	0	0	1,210	67	220	0	17	6	37
T14	1,722	0	184	0	59	1,111	197	133	0	0	8	30
T15	1,626	12	90	178	65	710	136	131	21	41	95	147
T16	1,232	10	74	100	0	425	65	114	7	63	24	350

Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	% Small	% Large
T1 (5c)	202.1	79.8	95.0	27.0	0.1	0.97	0.03
T2	182.1	88.6	75.0	18.3	0.0	0.97	0.03
T3	187.5	106.3	54.0	17.9	9.1	0.98	0.02
T4	170.0	115.7	37.8	13.8	2.4	0.99	0.01
T5	170.0	132.5	26.5	10.2	0.8	0.94	0.06
T6	170.0	140.7	18.5	9.5	0.9	0.99	0.01
T7	170.0	136.8	23.9	8.6	0.6	0.98	0.02
T8	170.0	132.5	31.1	6.3	0.0	0.96	0.04
T9	170.0	117.7	40.4	11.8	0.0	1.00	0.00
T10	170.0	107.9	52.5	9.6	0.0	0.97	0.03
T11 (5c)	170.0	104.1	55.9	9.9	0.0	0.92	0.08
T12	170.0	124.9	40.2	4.8	0.0	0.90	0.10
T13	170.0	138.2	28.1	3.6	0.0	0.90	0.10
T14	170.0	140.2	24.4	5.2	0.0	0.93	0.07
T15	170.0	124.7	31.8	8.5	4.0	0.92	0.08
T16	130.0	99.7	22.2	6.0	1.7	0.91	0.09
Average	171.4	118.2	41.1	10.7	1.2		

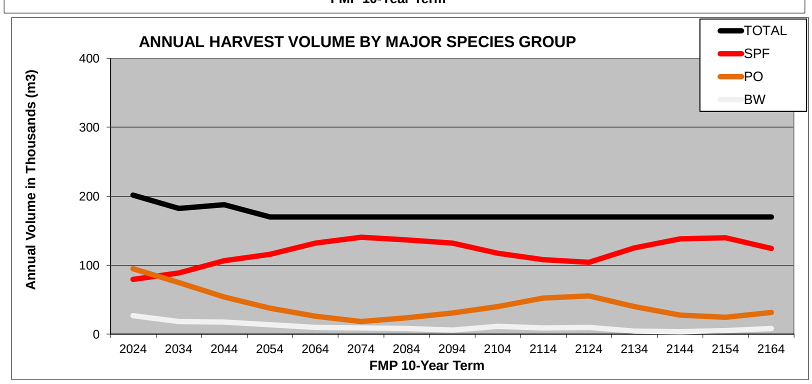
Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal Total ha	Natural ha	Plant ha	Seed ha
T1	640	640	0	**1,884**	1,342	316	225
T2	662	662	0	**1,692**	1,065	321	306
T3	831	831	0	**2,082**	784	103	1,196
T4	809	809	0	**1,913**	609	111	1,194
T5	883	883	0	**1,737**	473	242	1,022
T6	927	927	0	**1,843**	140	109	1,595
T7	903	903	0	**1,666**	349	262	1,055
T8	876	876	0	**1,560**	317	288	956
T9	799	776	0	**1,751**	585	214	952
T10	748	647	0	**1,775**	694	77	1,005
T11	729	665	0	**1,711**	616	89	1,007
T12	837	710	0	**1,661**	364	19	1,278
T13	906	772	0	**1,677**	220	6	1,451
T14	917	809	0	**1,722**	192	8	1,522
T15	872	872	0	**1,626**	386	262	977
T16	676	546	0	**1,232**	275	38	919



TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
CAR2	129	521		
DEA1	306	130	316	186
H105	674	686	654	541
LLP1			47	10
LLP2			134	22
LLP3	118			
LOTW	401	246	682	1,007
MEA1	95	59	55	106
MEA2	152	78	114	90
MEA3	45	34	81	62
CAR1				
SMZA				
TOTAL	**1,920**	**1,754**	**2,082**	**2,025**



WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: 18-Bal-TOTv

Date: May 3, 2023.

Breakdown of PLANFU Available Harvest Area by Analysis Unit and Age Class TERM 1

Forest Unit: (Analysis Unit)

	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
A5	0																
A15																	
A25																	
A35																	
A45																	
A55																	
A65				5													
A75	1			10			2				4						
A85				23		23	146	8		6	106						
A95	48	176		421	0	85	428	105		8	109						
A105				40			13	33		7	9			5			
A115	7	6		4				14		2				3			
A125	2	4		9													
A135				0									1				
A145	1		4												12		
A155		0	7												5		
A165		0															
A175																	
A185															1		
A195															1		
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	58	186	11	512	0	108	589	159	0	24	228	0	1	8	19	0	0
																Total:	**1,903**

Renewal Area by Treatment Type Term 1

	Total	Natural	Plant	Seed
BFM	58	17	40	-
CMX	184	-	-	184
CMXC	11	-	-	11
HMX	507	390	117	-
HRDA	0	0	-	-
HRDB	107	107	-	-
HRD	584	584	-	-
PJDD	158	-	158	-
PJDS	-	-	-	-
PJM	23	-	-	23
POD	226	226	-	-
PRWR	-	-	-	-
PRWW	1	-	1	-
SBD	8	-	-	8
SBL	19	19	-	-
SBLC	-	-	-	-
SBM	-	-	-	-
	1,884	**1,342**	**316**	**225**
	Renewal:	**71%**	**17%**	**12%**

Available Harvest Area by Analysis Unit

Forest Unit: (Analysis Unit)

Term	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
T1	58	186	11	512	0	108	589	159		24	228		1	8	19		
T2	91	108	0	434	0	74	302	186		27	272			134	13	11	58
T3	3	394	57	323	0	72	286	37	23	732	85	43	14	3	9		
T4	0	384	18	202	0	7	200		319	363	77	8	7	253	7		69
T5	54	172	11	240	0	17	96	167		526	35	3	2	89	5		319
T6	2	563	5		0	0	79	353	31	35	46	4	2	716	3		5
T7	14	122	2	88	0	29	183	756	19	23	58		5	290	2		75
T8	33	50	1	8	0	2	3	398	33	102	285			438	2		205
T9	164	114	1	381	0	5	101	263	6	88	142			458	2		26
T10	14	78	3	239	0	12	190	359	15	249	304			306	3		3
T11	19	176	2	245	0	16	62	382	17	217	354			183	3		34
T12	5	111	1	39	0	1	23	936	12	172	310			42	5		4
T13		119	1		0			1,124	86	67	220			17	6		37
T14		183	0		0	2	57	1,103	8	197	133				8		30
T15	12	90	0	178	0	1	64	703	7	136	131	14	7	41	10	85	147
T16	10	74		100	0			413	12	65	114	7		63	13	11	350

WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: 20-Bal-Vol

Date: May 7, 2023.

Purpose: Early LTMD development to improve wood supply and flow through time. BLG indicator achievement (same as investigations 12-13-14). Adjustment to increase short-term SPF and decrease PO to better approx. forest composition, rather than only wood commit. proportions.

Specific Inputs: Built on 19-Bal-Vol with adjusted harvest volumes to control harvest of Poplar and Spruce-Pine-Fir through time. Flow constraints (PO +/- 20%, SPF/TOTAL still +/- 10%) and PO target T1-2 = 70K and SPF still 100K all terms, TOTAL 170K (except T14-16 150K) to boost harvest in low periods.

Group:	Mm3/yr	Mm3/yr	Vol. Flow
SPF	100,000	100,000	+/-10%
PO	70,000	70,000	+/-20%
BW			
TOTAL	170,000	170,000	
	T1	T2	

All same as Run 19:
AllOp growing stock reduced slightly to 15 million T17 (control end, change from 16 mill.)(as per 17, 18)
Volume targets PO Term 1, 2 only, SPF all terms.
Same s 16-18 - Reduced whole forest Young target from 130,000 to 120,000 ha (still meets OpZone Young IQR T4-T17)
Same as 16-18 - Increased MLconifer to 240,000 ha (but overachieves anyway)
Same as 18 - Reduced UpCon (PurCn) same level 400K, but T9 on rather than T7.

RESULTS: Where projections in the following tables fall below lower targets, the data is shaded yellow; where projections exceed upper targets, the data is shaded green.

FOREST CONDITION RESULTS

Used similar / relaxed BLG targets for wood supply investigations

Implications on Forest Condition - Same as other runs - Very good (or above upper IQR) BLG indicator achievement for all Mature-Late classes. Similar for Old Growth T1-5, but improves as area ages. Upland Conifer increases but never reaches lower IQR. Young Forest never reaches lower IQR but relatively stable through time. Slow creation of all-ages PRW, but OG PRW increases. Caribou habitats improve (to T3) and overachieve by T4-T5 (same as BLG-Max).

(2a) Area by Landscape Class (Productive ha)

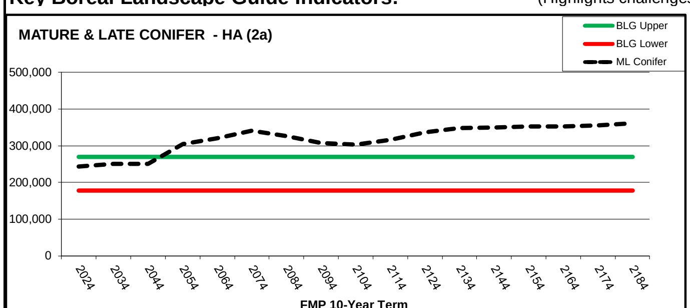
Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	81,424	186,273	66,561	14,802	243,544	143,145	46,587
T2	45,484	223,252	60,703	15,549	250,174	142,201	44,710
T3	68,682	209,069	42,556	18,161	250,261	151,783	41,317
T4	92,337	121,787	46,691	22,537	304,204	151,480	42,789
T5	111,960	81,492	49,414	24,339	320,694	151,353	42,562
T6	110,720	62,022	53,201	29,033	341,355	143,666	41,721
T7	105,641	79,441	59,346	34,168	326,738	135,967	40,378
T8	101,681	100,288	60,326	45,062	307,753	127,305	39,061
T9	100,301	115,894	56,013	48,473	303,044	117,606	40,095
T10	99,644	116,487	53,966	50,857	316,601	101,478	42,290
T11	101,096	109,961	53,634	53,527	336,912	82,482	43,669
T12	100,685	106,044	54,585	54,328	347,717	73,340	44,548
T13	100,930	104,927	54,790	57,839	349,619	68,011	45,109
T14	103,202	104,334	52,519	59,352	352,226	64,154	45,433
T15	104,022	106,176	49,223	60,851	351,850	63,520	45,571
T16	102,828	108,463	44,932	60,281	356,141	63,277	45,289
T17	99,953	111,104	40,742	59,050	361,813	63,429	45,111
BLG Upper	263,084	228,782	63,469	16,237	269,185	65,739	16,276
BLG Lower	143,268	103,333	36,052	8,706	178,461	43,021	12,845

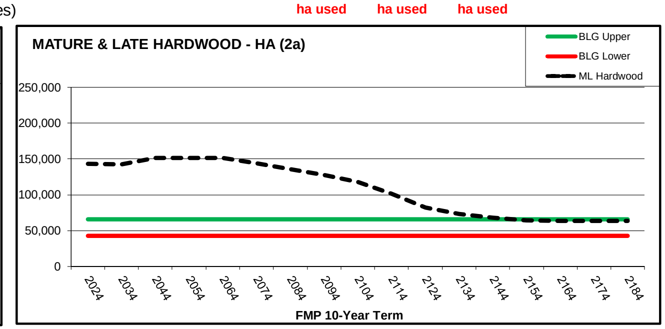
(2b) Old Growth by Grouping (Prod. ha); (2d); (2e); (6a) Available Forest:

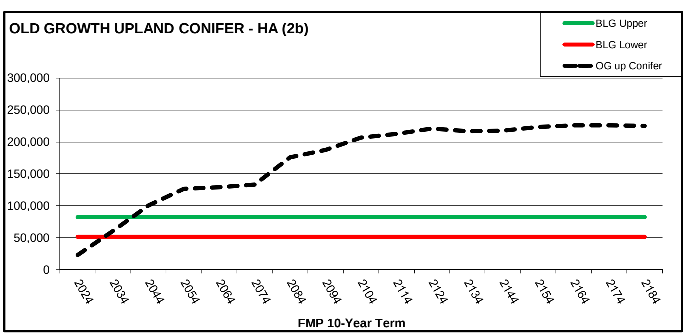
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs	(6a) Available Forest: Term	
T1	23,536	1,071	22,603	30	359,248	136,124	T1	196,134
T2	61,066	1,277	68,386	149	358,867	91,599	T2	195,109
T3	101,017	1,803	122,369	319	361,404	94,334	T3	194,029
T4	126,581	4,340	139,658	521	371,724	124,611	T4	194,029
T5	129,461	7,092	154,867	911	375,760	151,817	T5	194,029
T6	133,206	12,410	163,757	1,500	379,913	159,658	T6	194,029
T7	175,885	18,554	172,198	1,634	387,973	153,291	T7	194,029
T8	187,744	24,308	186,727	1,715	390,984	145,584	T8	194,029
T9	206,940	25,800	184,204	1,736	403,374	142,001	T9	194,029
T10	212,721	26,923	186,101	1,690	411,338	141,971	T10	194,029
T11	220,529	26,875	179,758	1,639	416,783	143,426	T11	194,029
T12	216,990	26,520	171,638	1,590	421,400	144,577	T12	194,029
T13	217,794	28,792	169,478	1,692	423,183	144,068	T13	194,029
T14	223,004	29,578	166,040	1,674	428,571	142,785	T14	194,029
T15	225,834	29,803	163,714	1,643	432,579	140,521	T15	194,029
T16	225,852	28,893	161,307	1,704	436,847	137,632	T16	194,029
T17	225,356	27,925	160,364	1,658	438,680	134,682	T17	194,029
BLG Upper	82,642	6,477	58,909		497,902	342,348		
BLG Lower	51,310	4,282	35,996	1,500	475,260	196,754		
			Model:	1,500 ha used	400,000 ha used	130,000 ha used		

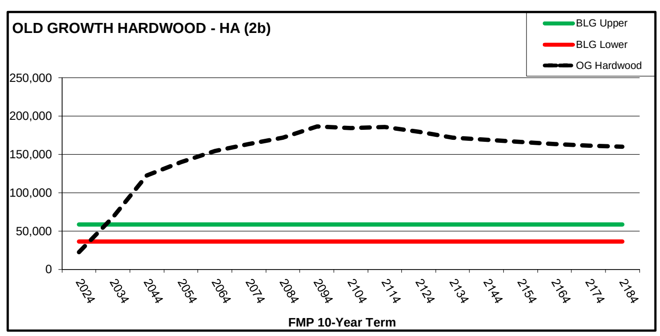
Key Boreal Landscape Guide Indicators:

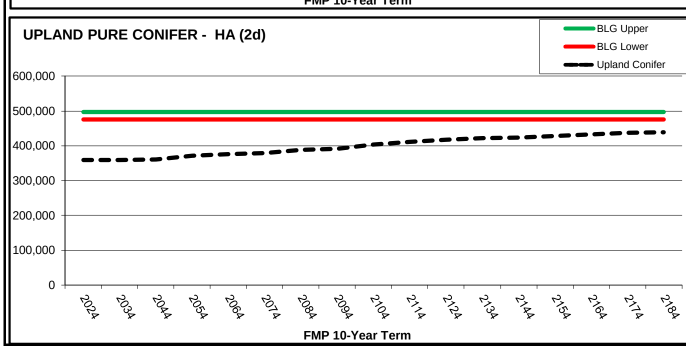
(Highlights challenges)

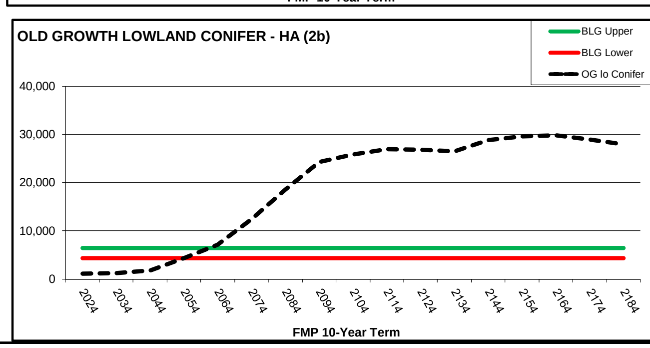












WHISKEY JACK FOREST 2024 FMP	SUMMARY of SFMM INVESTIGATION

Case Name: 20-Bal-Vol **Date:** May 7, 2023.

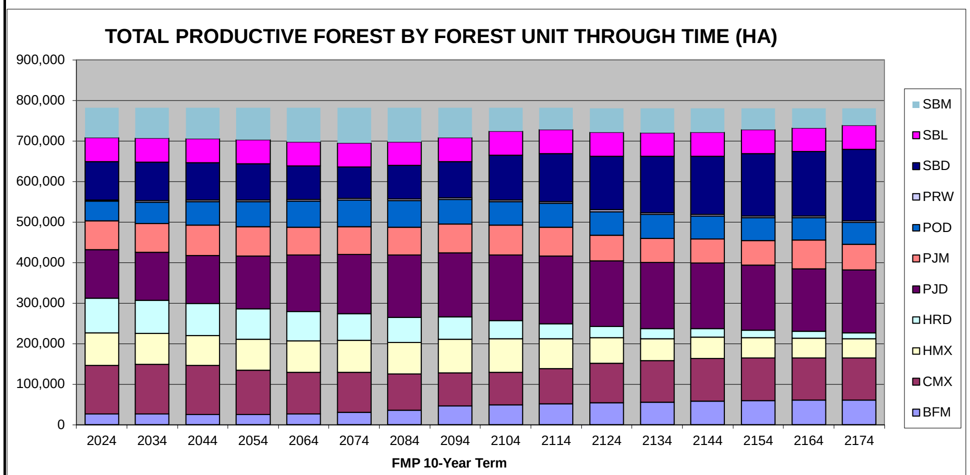
FMP 10-Year Term

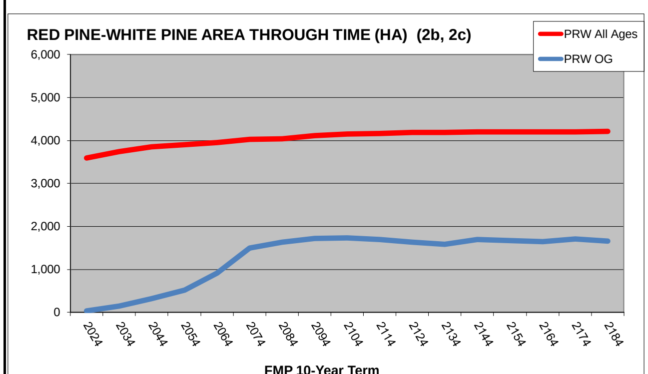
Productive Forest Area Through Time Data (hectares): by Forest Unit

Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW (Indicator (2c))	SBD	SBL	SBM
T1	782,337	26,616	119,352	80,207	85,706	120,245	70,531	48,642	3,587	94,413	58,977	74,058
T2	782,073	25,786	122,745	77,156	81,655	117,738	71,241	53,182	3,738	94,812	58,944	75,077
T3	781,830	25,267	121,339	73,748	78,769	118,186	74,781	58,533	3,854	92,360	58,916	76,076
T4	781,825	25,237	109,494	76,521	73,960	131,395	71,640	62,069	3,904	89,834	58,916	78,855
T5	781,813	25,840	103,396	77,790	72,042	139,218	69,349	64,112	3,958	83,025	58,916	84,168
T6	781,718	30,419	99,342	78,119	65,458	146,820	68,224	65,528	4,023	77,984	58,916	86,885
T7	781,678	35,069	89,551	78,438	61,152	154,427	68,164	66,545	4,035	82,046	58,916	83,335
T8	781,476	45,783	82,353	82,567	55,632	157,799	70,412	61,133	4,109	88,977	58,916	73,797
T9	781,425	49,010	80,492	83,073	43,993	162,514	73,151	58,417	4,149	110,522	58,916	57,186
T10	781,323	51,411	87,407	73,156	36,533	167,489	71,777	58,401	4,162	118,227	58,916	53,846
T11	781,281	54,108	98,026	62,120	28,609	161,874	62,512	58,535	4,183	132,074	58,916	60,324
T12	781,248	54,903	102,678	55,046	24,414	162,746	59,064	59,698	4,193	139,040	58,916	60,551
T13	781,225	58,389	104,337	52,942	22,021	161,456	58,452	57,240	4,198	142,960	58,916	60,315
T14	781,220	59,811	104,652	50,781	17,758	160,301	60,552	56,530	4,202	154,639	58,916	53,079
T15	781,214	61,242	103,591	48,957	16,205	154,934	70,144	55,521	4,203	158,744	58,916	48,758
T16	781,212	60,610	104,107	46,680	15,199	155,494	62,430	54,650	4,203	176,216	58,916	42,708
T17	781,203	59,342	106,669	43,128	15,332	144,159	71,730	54,929	4,207	180,968	58,916	41,823

(Obj. 1) Caribou Habitat (Caribou Zone):

Term	Refuge (1b)	Winter (1a)
T1	132,854	86,255
T2	146,350	104,079
T3	156,352	110,626
T4	163,042	114,082
T5	166,091	120,158
T6	166,130	118,790
T7	167,729	121,910
T8	168,675	122,373
T9	170,280	124,683
T10	172,659	126,794
T11	174,939	127,902
T12	175,173	124,552
T13	176,168	124,497
T14	178,251	126,186
T15	180,108	127,556
T16	182,046	131,471
T17	182,772	132,029
BLG Upper	161,804	115,633
BLG Lower	147,605	63,721





All ages PRW - desirable level "to increase"
Target in SFMM to not decrease.

Old Growth PRW - desirable level "to increase"

WHISKEY JACK FOREST 2024 FMP	SUMMARY of SFMM INVESTIGATION
Case Name: 20-Bal-Vol	Date: May 7, 2023.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - Underachieve PO commitment T1-2 (70 vs 100K) but stable for 20 years, SPF met (over) in all terms. PO decreases 6-7 terms. Harvest is relatively stable for 40 years, then decreases slightly. TOTAL volumes sustainable at 170,000+ m3 except T14-16 (150K). Harvest shifts from poplar domiinated to conifer through time (as expected). Improved balance of forest unit harvest area and volume so far.

Renewal - Reduced PO volume aids renewal treatment projections.

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

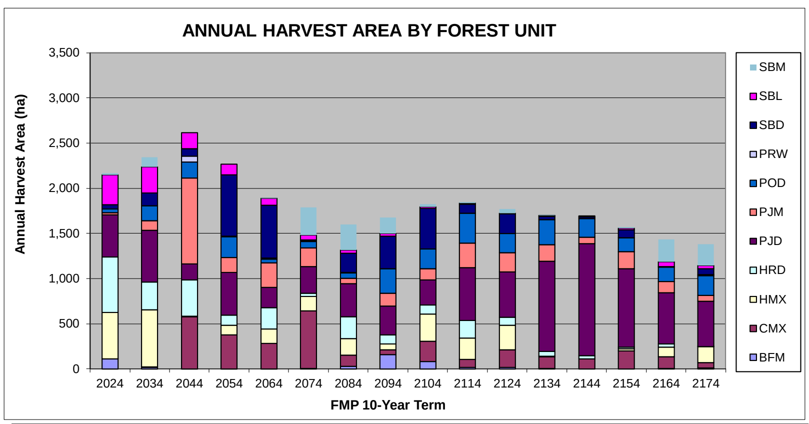
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 5b)	2,169	112	0	514	610	468	27	41	0	44	330	22
T2	2,345	16	9	631	307	572	106	165	0	143	286	109
T3	2,615	0	578	4	403	175	951	182	65	79	179	0
T4	2,264	0	375	110	108	474	164	234	5	680	114	0
T5	1,890	1	282	159	235	223	272	44	12	581	80	0
T6	1,789	4	636	162	34	296	208	71	5	11	56	306
T7	1,599	28	122	187	239	365	62	58	5	211	39	282
T8	1,677	160	54	61	105	317	142	269	0	362	27	181
T9	1,823	80	224	305	97	278	126	218	0	450	19	26
T10	1,847	18	89	232	198	586	270	328	0	103	13	9
T11 (5b)	1,772	16	194	275	86	505	212	209	0	219	9	46
T12	1,704	6	130	3	53	998	182	278	0	37	12	4
T13	1,697	0	111	0	38	1,238	71	208	0	15	16	0
T14	1,567	0	199	25	16	872	185	155	0	89	21	7
T15	1,431	7	127	108	37	566	124	162	3	0	54	244
T16	1,382	9	62	177	0	499	70	218	13	62	38	236

Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	%Small	%Large
T1 (5c)	218.6	121.3	70.0	24.3	0.0	0.99	0.01
T2	224.8	133.4	70.0	18.9	0.0	0.96	0.04
T3	232.7	146.7	56.0	17.5	10.8	0.95	0.05
T4	209.9	150.2	44.8	13.1	0.6	0.97	0.03
T5	188.9	137.1	35.8	13.6	1.5	0.99	0.01
T6	170.0	128.9	28.7	10.9	0.7	0.96	0.04
T7	170.0	126.8	30.9	11.2	0.6	0.96	0.04
T8	170.0	123.8	37.1	8.7	0.0	0.99	0.01
T9	170.0	115.0	44.6	10.2	0.0	1.00	0.00
T10	170.0	107.5	53.5	8.8	0.0	1.00	0.00
T11 (5c)	170.0	117.2	42.8	9.9	0.0	0.96	0.04
T12	170.0	128.9	36.4	4.6	0.0	0.91	0.09
T13	170.0	136.7	29.1	4.0	0.0	0.91	0.09
T14	153.0	123.0	25.0	4.7	0.0	0.93	0.07
T15	150.0	111.8	30.0	7.0	0.5	0.90	0.10
T16	150.0	103.6	36.0	7.2	2.8	0.89	0.11
Average	180.5	125.7	41.9	10.9	1.1		

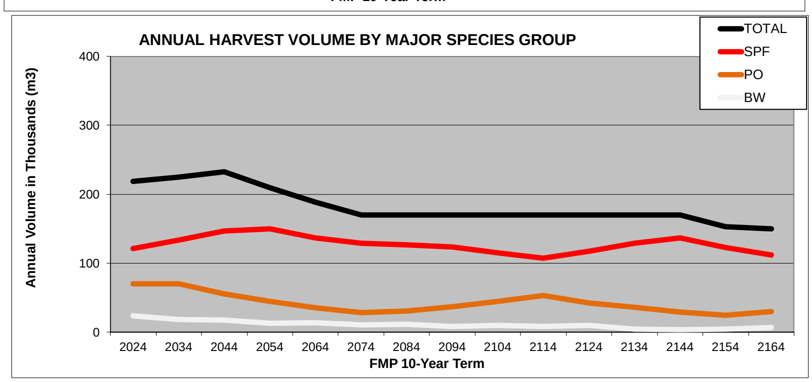
Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal Total ha	Natural ha	Plant ha	Seed ha
T1	886	886	0	**2,147**	1,523	512	113
T2	953	953	0	**2,321**	1,412	439	471
T3	1,111	1,111	0	**2,615**	778	113	1,724
T4	1,022	1,022	0	**2,264**	662	216	1,386
T5	936	936	0	**1,890**	484	264	1,142
T6	866	866	0	**1,789**	288	90	1,411
T7	853	853	0	**1,599**	491	315	794
T8	832	832	0	**1,677**	504	254	918
T9	786	767	0	**1,823**	569	153	1,101
T10	747	699	0	**1,847**	711	89	1,047
T11	797	748	0	**1,772**	501	99	1,171
T12	858	745	0	**1,704**	334	19	1,351
T13	899	776	0	**1,697**	246	16	1,435
T14	809	734	0	**1,567**	189	27	1,351
T15	753	753	0	**1,431**	335	184	913
T16	728	529	0	**1,382**	524	40	818



TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
CAR2	39	662		
DEA1	348	135	395	218
H105	726	639	828	768
LLP1			29	14
LLP2			70	41
LLP3	173			
LOTW	522	744	905	802
MEA1	171	35	156	65
MEA2	145	73	176	276
MEA3	44	57	57	81
CAR1				
SMZA				
TOTAL	**2,169**	**2,345**	**2,615**	**2,264**



WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: 20-Bal-Vol

Date: May 7, 2023.

Breakdown of PLANFU Available Harvest Area by Analysis Unit and Age Class TERM 1

Forest Unit: (Analysis Unit)

	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
A5	0																
A15																	
A25																	
A35																	
A45																	
A55																	
A65				5													
A75				10			2				4						
A85	33			56		23	146	8	8	6	1						
A95	48			392	0	59	372	353		8	29			34			14
A105	22			38			8	73		8	7			5			3
A115	7	0		4				23		5				3	134	21	0
A125	2			9				3							48		4
A135				0										3	68		
A145	1														19		
A155															17	12	
A165		0													3	2	
A175															4		
A185															1		
A195															1		
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	112	0	0	514	0	82	528	460	8	27	41	0	0	44	296	35	22
																Total:	**2,169**

Renewal Area by Treatment Type Term 1

	Total	Natural	Plant	Seed
BFM	111	33	77	-
CMX	0	-	-	0
CMXC	-	-	-	-
HMX	509	509	-	-
HRDA	0	0	-	-
HRDB	81	81	-	-
HRD	523	523	-	-
PJDD	455	-	432	23
PJDS	8	2	2	3
PJM	26	-	-	26
POD	40	40	-	-
PRWR	-	-	-	-
PRWW	-	-	-	-
SBD	44	-	-	44
SBL	293	293	-	-
SBLC	34	34	-	-
SBM	22	7	-	15
	2,147	**1,523**	**512**	**113**
Renewal:	**71%**	**24%**	**5%**	

Available Harvest Area by Analysis Unit

Forest Unit: (Analysis Unit)

Term	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
T1	112	0		514	0	82	528	460	8	27	41			44	296	35	22
T2	16	9		631	0	91	216	572		106	165			143	233	53	109
T3	0	511	68	4	0	71	332	139	35	951	182	50	15	79	163	15	
T4	0	357	18	110	0	9	99	155	319	164	234	3	2	680	114		
T5	1	271	11	159	0	15	220	206	17	272	44	4	8	581	80		0
T6	4	632	5	162	0	9	25	282	14	208	71	3	2	11	56		306
T7	28	120	2	187	0	19	220	347	19	62	58		5	211	39		282
T8	160	53	1	61	0	13	92	285	33	142	269			362	27		181
T9	80	224		305	0	2	95	273	6	126	218			450	19		26
T10	18	86	4	232	0	12	185	569	17	270	328			103	13		9
T11	16	191	2	275	0	17	69	489	16	212	209			219	9		46
T12	6	129	1	3	0	1	52	983	15	182	278			37	12		4
T13		110	1		0	1	37	1,152	86	71	208			15	16		
T14		199	0	25	0	2	14	860	12	185	155			89	21		7
T15	7	126	0	108	0	2	36	555	11	124	162	1	1		27	28	244
T16	9	62		177	0			494	5	70	218	9	4	62	35	3	236

WHISKEY JACK FOREST 2024 FMP	SUMMARY of SFMM INVESTIGATION

Case Name: 22-Bal-AHA **Date:** May 8, 2023.

Purpose: Building on early LTMD development to improve wood supply and harvest area by forest unit through time. Same BLG indicator achievement as previous investigations. Add 1,500 PRW vol/year T1.. Adjustment to further control SBL harvest area between terms.

Specific Inputs: Built on 21-Bal-Vol with adjusted harvest area changes in SBL to control amount of SBL change between terms (+/-10%).
Same (as 20-21): flow constraints (PO +/- 20%, SPF/TOTAL still +/- 10%) and PO target T1-2 = 70K and SPF still 100K all terms, TOTAL 170K (except T14-16 150K) to boost harvest in low periods.

Group:	Mm3/yr	Mm3/yr	Vol. Flow
SPF	100,000	100,000	+/-10%
PO	70,000	70,000	+/-20%
BW			
TOTAL	170,000	170,000	
	T1	T2	

Same as Run 21 except:
SBL harvest area control of +/- 10% rather than 15% change.
Add T1 lower target of 1,500 m3/year PRW volume.
UpConifer (PurCn) AllOP (harvest area) increased to 145,000 ha T17 to nudge upland conifer a bit higher (150K was infeasible).

AllOP (harvest area) Young in IQR by T4 (still low in entire forest), PurCn improved but still below IQR (low in entire forest).

RESULTS: Where projections in the following tables fall below lower targets, the data is shaded yellow; where projections exceed upper targets, the data is shaded green.

FOREST CONDITION RESULTS

Used similar / relaxed BLG targets for wood supply investigations

Implications on Forest Condition - Same as other runs - Very good (or above upper IQR) BLG indicator achievement for all Mature-Late classes. Similar for Old Growth T1-5, but improves as area ages. Upland Conifer increases but never reaches lower IQR. Young Forest never reaches lower IQR but relatively stable through time. Slow creation of all-ages PRW, but OG PRW increases. Caribou habitats improve (to T3) and overachieve by T4-T5 (same as BLG-Max).

(2a) Area by Landscape Class (Productive ha)

Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	81,424	186,273	66,561	14,802	243,544	143,145	46,587
T2	43,341	223,252	60,703	15,827	250,244	142,353	46,385
T3	65,025	210,588	42,009	18,199	250,262	151,708	44,086
T4	87,808	121,871	45,830	22,573	307,609	150,135	46,045
T5	108,292	79,980	48,967	24,378	323,729	150,597	45,917
T6	108,444	58,860	52,156	29,072	345,098	143,207	44,929
T7	105,188	74,815	57,967	34,209	330,848	135,405	43,293
T8	101,592	96,192	59,446	45,220	310,902	126,569	41,605
T9	100,813	112,680	55,153	48,878	306,553	116,478	40,919
T10	100,203	114,647	52,511	50,862	319,919	101,388	41,842
T11	101,153	110,318	52,005	53,520	339,602	82,301	42,431
T12	101,137	106,134	52,813	54,281	350,895	73,186	42,850
T13	101,163	106,118	52,749	57,834	351,806	68,376	43,227
T14	103,873	105,565	50,340	59,338	354,483	64,104	43,567
T15	104,153	106,936	47,173	60,844	355,153	63,201	43,803
T16	103,090	109,355	43,127	60,208	359,560	62,031	43,889
T17	100,485	111,989	39,126	58,741	366,071	61,169	43,671
BLG Upper	263,084	228,782	63,469	16,237	269,185	65,739	16,276
BLG Lower	143,268	103,333	36,052	8,706	178,461	43,021	12,845

(2b) Old Growth by Grouping (Prod. ha); (2d); (2e)

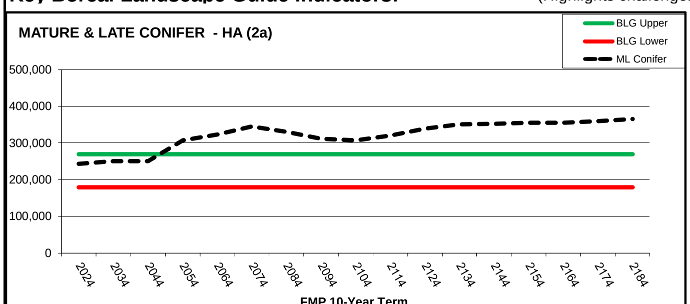
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs
T1	23,536	1,071	22,603	30	359,248	136,124
T2	61,066	1,315	68,461	92	359,872	89,456
T3	101,092	1,803	122,295	254	364,042	90,052
T4	128,752	4,340	140,602	524	374,971	119,108
T5	132,297	7,092	154,906	915	379,527	147,160
T6	135,243	12,932	163,796	1,503	383,835	156,048
T7	178,919	19,558	172,242	1,637	392,047	151,193
T8	190,594	25,765	186,954	1,718	394,682	144,940
T9	207,244	27,880	184,732	1,739	407,627	141,773
T10	213,953	28,642	186,135	1,693	414,630	141,829
T11	221,703	28,190	179,754	1,642	420,057	142,665
T12	217,691	27,452	171,631	1,593	424,495	143,666
T13	218,192	29,425	169,468	1,694	426,198	143,256
T14	223,265	29,999	166,015	1,677	431,836	142,478
T15	225,740	30,023	163,922	1,645	436,019	140,015
T16	226,547	29,159	161,113	1,660	440,514	137,160
T17	225,284	27,822	159,732	1,676	444,442	134,547
BLG Upper	82,642	6,477	58,909		497,902	342,348
BLG Lower	51,310	4,282	35,996	1,500	475,260	196,754
			Model:	1,500 ha used	400,000 ha used	130,000 ha used

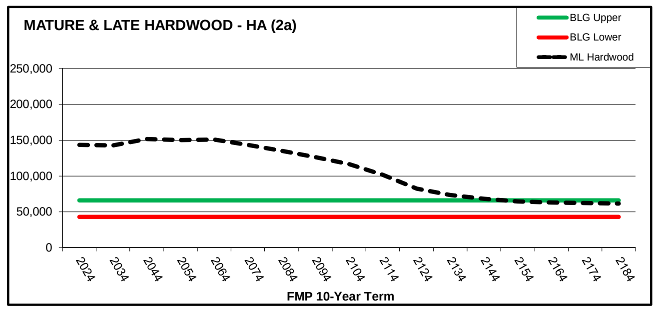
(6a) Available Forest:

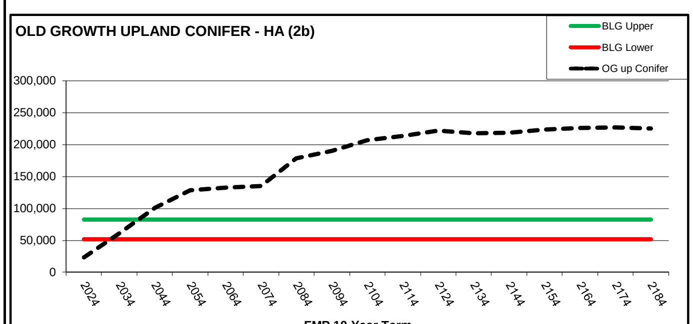
Term	
T1	196,134
T2	195,201
T3	194,211
T4	194,211
T5	194,211
T6	194,211
T7	194,211
T8	194,211
T9	194,211
T10	194,211
T11	194,211
T12	194,211
T13	194,211
T14	194,211
T15	194,211
T16	194,211
T17	194,211

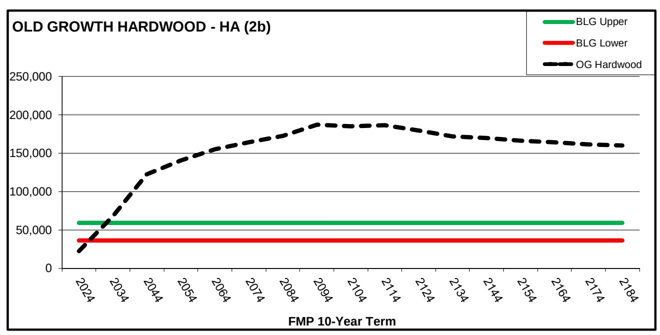
Key Boreal Landscape Guide Indicators:

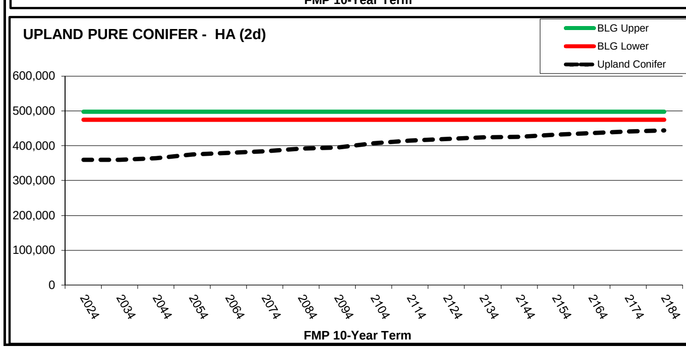
(Highlights challenges)

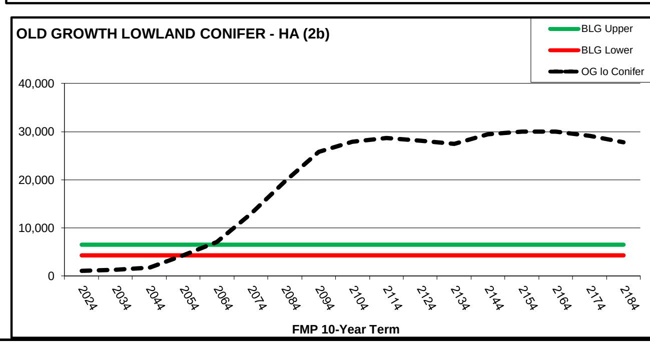












WHISKEY JACK FOREST 2024 FMP **SUMMARY of SFMM INVESTIGATION**

Case Name: 22-Bal-AHA **Date:** May 8, 2023.

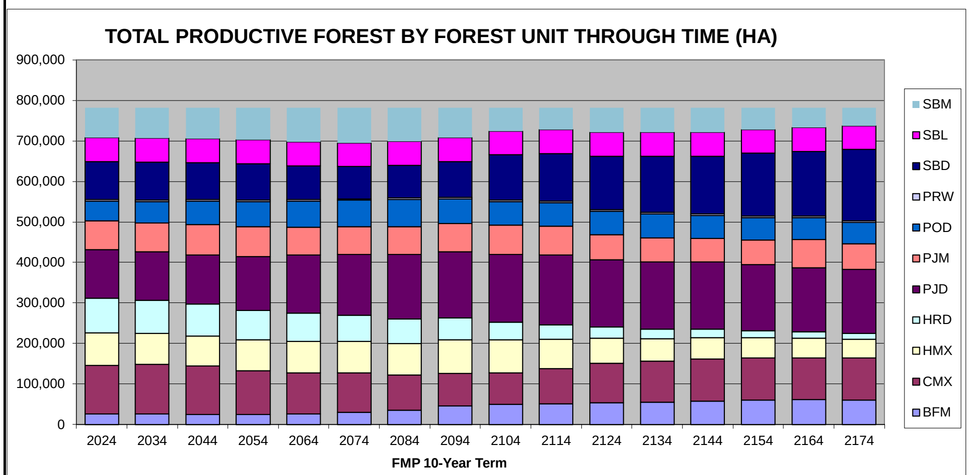
FMP 10-Year Term

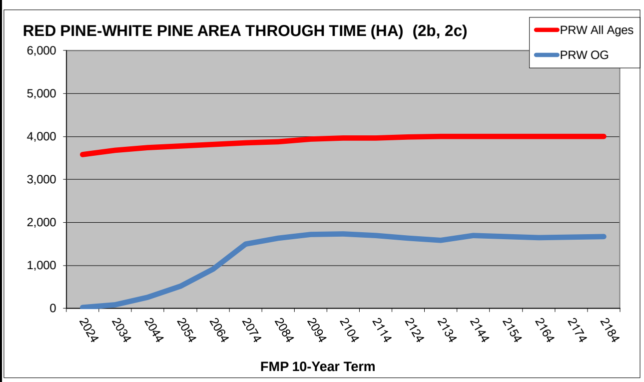
Productive Forest Area Through Time Data (hectares): by Forest Unit — Indicator (2c)

Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1	782,337	26,616	119,352	80,207	85,706	120,245	70,531	48,642	3,587	94,413	58,977	74,058
T2	782,106	25,984	122,029	77,420	81,396	119,246	71,187	52,764	3,681	94,366	58,961	75,073
T3	781,877	25,157	119,907	73,633	78,454	121,630	74,689	57,997	3,741	91,421	58,944	76,302
T4	781,872	25,166	108,267	75,281	72,647	133,240	73,216	62,814	3,781	89,541	58,944	78,974
T5	781,860	25,741	101,728	77,493	69,884	143,887	67,862	64,730	3,814	83,545	58,944	84,234
T6	781,765	30,310	97,599	77,486	64,641	150,040	68,169	65,091	3,858	79,342	58,944	86,284
T7	781,726	34,974	87,700	77,726	60,263	159,454	68,601	66,196	3,875	81,274	58,944	82,718
T8	781,525	45,865	80,665	82,105	54,648	162,598	70,522	60,676	3,939	88,283	58,944	73,279
T9	781,474	49,387	78,380	81,661	43,291	166,840	72,806	58,221	3,963	110,699	58,944	57,282
T10	781,372	51,328	86,725	72,435	35,792	171,833	71,650	57,545	3,973	117,280	58,944	53,866
T11	781,330	54,035	97,363	61,312	27,973	165,983	62,316	57,655	3,991	131,474	58,944	60,284
T12	781,296	54,796	102,172	54,288	23,831	166,610	58,661	58,772	3,999	138,711	58,944	60,514
T13	781,274	58,310	103,759	52,133	21,858	165,059	58,233	56,072	3,999	142,639	58,944	60,268
T14	781,269	59,749	104,104	49,891	17,267	164,119	60,321	55,472	4,007	154,337	58,944	53,059
T15	781,263	61,210	103,238	48,133	15,750	157,929	70,146	53,962	4,007	159,269	58,944	48,675
T16	781,261	60,559	104,069	45,585	14,723	157,925	62,981	52,867	4,001	175,868	58,944	43,740
T17	781,252	59,082	105,943	41,135	14,084	148,823	72,722	53,622	3,999	180,551	58,944	42,345

(Obj. 1) Caribou Habitat (Caribou Zone):

Term	Refuge (1b)	Winter (1a)
T1	132,854	86,255
T2	146,319	104,143
T3	156,600	110,841
T4	163,292	114,290
T5	166,343	120,360
T6	166,393	118,943
T7	168,312	122,107
T8	169,251	122,579
T9	170,814	125,182
T10	172,986	127,287
T11	175,268	128,388
T12	175,437	124,894
T13	176,464	124,895
T14	178,549	126,582
T15	180,407	127,909
T16	182,369	131,931
T17	183,084	132,425
BLG Upper	161,804	115,633
BLG Lower	147,605	63,721





All ages PRW - desirable level "to increase"
Target in SFMM to not decrease.

Old Growth PRW - desirable level "to increase"

WHISKEY JACK FOREST 2024 FMP | **SUMMARY of SFMM INVESTIGATION**

Case Name: 22-Bal-AHA | **Date:** May 8, 2023.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - Similar volumes to Run 21: Underachieve PO commitment T1-2 (70 vs 100K) but stable for 20 years, SPF met (over) in all terms. PO decreases 6-7 terms. Harvest is relatively stable for 40 years, then decreases slightly. TOTAL volumes sustainable at 170,000+ m3 except T14-16 (150K). Harvest shifts from poplar dominated to conifer through time (as expected). Improved balance of forest unit harvest area and volume. SBL harvest controlled better than Run 21.
Renewal - Improvement in balance of Natural, Plant, Seed.

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

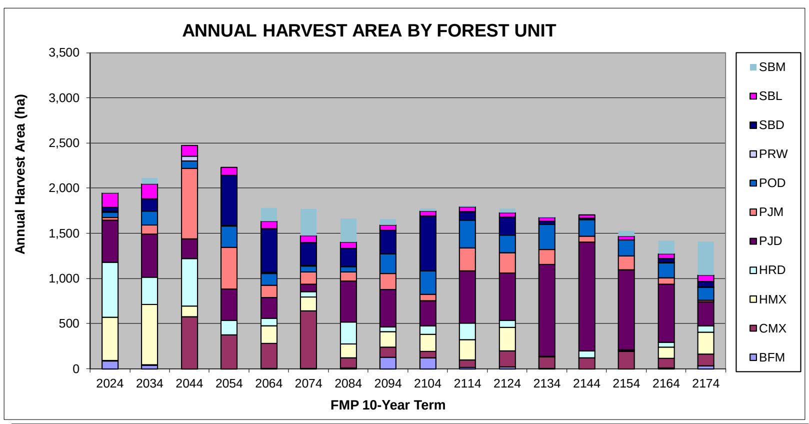
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 5b)	1,953	85	5	481	610	464	29	59	9	44	163	4
T2	2,114	39	5	671	296	480	98	158	0	134	167	65
T3	2,474	0	578	116	525	218	782	79	56	0	119	0
T4	2,233	0	375	0	157	349	463	239	5	552	93	0
T5	1,782	1	282	196	83	228	136	132	9	486	84	146
T6	1,770	4	635	154	61	86	135	64	8	254	75	296
T7	1,666	10	110	156	242	454	100	58	5	200	68	264
T8	1,655	128	110	171	56	413	175	222	0	258	61	60
T9	1,775	123	68	192	93	277	70	263	0	607	55	26
T10	1,804	16	80	229	179	579	256	305	0	97	49	13
T11 (5b)	1,773	20	176	263	77	527	222	197	0	202	44	45
T12	1,680	3	131	3	2	1,019	165	276	0	37	40	4
T13	1,706	0	120	0	77	1,203	68	185	0	16	36	0
T14	1,527	0	196	7	8	885	154	181	0	0	40	58
T15	1,423	11	105	126	49	648	69	164	7	44	49	151
T16	1,409	33	128	246	71	265	17	144	5	56	75	370

Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	%Small	%Large
T1 (5c)	205.2	108.6	70.0	23.6	1.5	0.99	0.01
T2	210.1	119.5	70.0	19.0	0.0	0.96	0.04
T3	217.7	131.4	56.0	19.9	9.2	0.97	0.03
T4	203.2	144.6	44.8	12.2	0.6	0.96	0.04
T5	182.9	133.7	35.8	11.3	1.2	0.97	0.03
T6	170.0	127.5	28.7	11.8	1.0	0.96	0.04
T7	170.0	129.1	29.2	10.4	0.6	0.97	0.03
T8	170.0	125.8	35.0	8.4	0.0	0.99	0.01
T9	170.0	118.0	42.0	9.2	0.0	1.00	0.00
T10	170.0	110.5	50.5	8.5	0.0	1.00	0.00
T11 (5c)	170.0	119.5	40.4	9.5	0.0	0.96	0.04
T12	170.0	131.5	34.2	3.8	0.0	0.90	0.10
T13	170.0	135.6	29.2	4.7	0.0	0.92	0.08
T14	153.0	122.1	25.9	4.5	0.0	0.90	0.10
T15	150.0	109.9	31.1	7.3	1.1	0.91	0.09
T16	150.0	100.0	37.3	10.3	1.5	0.93	0.07
Average	177.0	123.0	41.3	10.9	1.0		

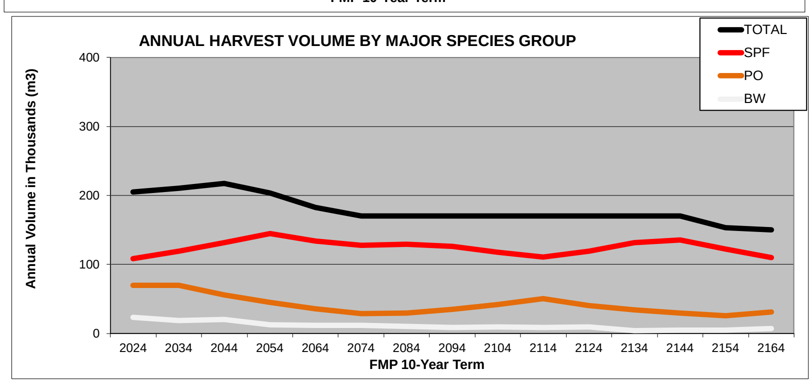
Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal Total ha	Natural ha	Plant ha	Seed ha
T1	810	810	0	**1,933**	1,182	411	340
T2	860	860	0	**2,093**	1,114	360	619
T3	1,000	1,000	0	**2,474**	819	90	1,565
T4	985	985	0	**2,233**	490	101	1,642
T5	910	910	0	**1,782**	446	274	1,062
T6	862	862	0	**1,770**	317	134	1,319
T7	866	866	0	**1,666**	486	285	895
T8	845	845	0	**1,655**	468	263	925
T9	804	804	0	**1,775**	513	215	1,047
T10	764	715	0	**1,804**	656	123	1,025
T11	811	776	0	**1,773**	471	130	1,173
T12	873	765	0	**1,680**	280	43	1,356
T13	895	813	0	**1,706**	234	65	1,407
T14	806	773	0	**1,527**	147	89	1,292
T15	748	709	0	**1,423**	256	150	1,017
T16	701	644	0	**1,409**	422	152	836



TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
CAR2	37	638		
DEA1	278	240	395	157
H105	663	596	719	815
LLP1			29	18
LLP2			106	12
LLP3	151			
LOTW	464	552	861	969
MEA1	166	13	111	109
MEA2	158	45	165	97
MEA3	35	31	89	56
CAR1				
SMZA				
TOTAL	1,953	2,114	2,474	2,233



WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: 22-Bal-AHA

Date: May 8, 2023.

Breakdown of PLANFU Available Harvest Area by Analysis Unit and Age Class TERM 1

	Forest Unit:		(Analysis Unit)														
	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
A5	0																
A15																	
A25																	
A35																	
A45																	
A55																	
A65				5													
A75				10			2				4						
A85	6			23		23	146	12		5	1						
A95	48	2		392	0	59	372	353		10	47	1		34			
A105	22	2		38			8	73		8	7	1		5			3
A115	7	0		4				23		6		1		3	74	21	0
A125	2			9				3				0	0		2		
A135				0								1	1	3	10		0
A145	1											1	3		19		
A155															17	12	
A165		0													3	2	
A175																	
A185															1		
A195															1		
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	85	5	0	481	0	82	528	464	0	29	59	4	4	44	128	35	4
																Total:	**1,953**

Renewal Area by Treatment Type Term 1

	Total	Natural	Plant	Seed
BFM	84	-	84	-
CMX	5	-	-	5
CMXC	-	-	-	-
HMX	476	357	119	-
HRDA	0	0	-	-
HRDB	81	81	-	-
HRD	523	523	-	-
PJDD	459	-	200	259
PJDS	-	-	-	-
PJM	29	-	-	29
POD	58	58	-	-
PRWR	4	-	4	-
PRWW	4	1	3	-
SBD	44	-	-	44
SBL	126	126	-	-
SBLC	35	35	-	-
SBM	4	-	-	4
	1,933	**1,182**	**411**	**340**
	Renewal:	**61%**	**21%**	**18%**

Available Harvest Area by Analysis Unit

	Forest Unit:		(Analysis Unit)														
Term	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
T1	85	5		481	0	82	528	464		29	59	4	4	44	128	35	4
T2	39	5		671	0	91	205	480		98	158			134	115	52	65
T3	0	511	68	116	0	80	445	195	23	782	79	46	11	0	103	15	
T4	0	357	18		0	7	150	30	319	463	239	3	2	552	93		
T5	1	271	11	196	0	8	75	210	17	136	132	4	5	486	84		146
T6	4	630	5	154	0	9	51	86		135	64	3	4	254	75		296
T7	10	107	2	156	0	22	220	422	32	100	58		5	200	68		264
T8	128	109	1	171	0	10	45	380	33	175	222			258	61		60
T9	123	68		192	0	2	91	271	6	70	263			607	55		26
T10	16	76	4	229	0	13	166	563	15	256	305			97	49		13
T11	20	174	2	263	0	17	60	510	17	222	197			202	44		45
T12	3	130	1	3	0	0	1	1,007	12	165	276			37	40		4
T13		119	1		0	2	76	1,072	131	68	185			16	36		
T14		195	0	7	0	0	8	868	16	154	181				40		58
T15	11	105	0	126	0	2	48	648		69	164	2	5	44	44	5	151
T16	33	128	0	246	0	3	68	265		17	144	5		56	48	27	370

WHISKEY JACK FOREST 2024 FMP	**SUMMARY of SFMM INVESTIGATION**

Case Name: 25-Bal-AHA **Date:** May 9, 2023.

Purpose: LTMD development to improve wood supply and harvest area by forest unit through time. Same BLG indicator achievement as previous investigations. Adjustment to further control harvest area changes between terms.

Specific Inputs: Built on 24-Bal-AHA with max. SBL harvest area T1 and T2 set at 50 ha per year to control amount of SBL harvest area per year. All other target and flow controls the same as Run 24.

Group:	Mm3/yr	Mm3/yr	Vol. Flow
SPF	100,000	100,000	+/-10%
PO	70,000	70,000	+/-20%
BW			
TOTAL	170,000	170,000	
	T1	T2	

Same as Run 24 except:
Max. Harvest area SBL 50 ha per year T1 and T1

RESULTS: Where projections in the following tables fall below lower targets, the data is shaded yellow; where projections exceed upper targets, the data is shaded green.

FOREST CONDITION RESULTS

Used similar / relaxed BLG targets for wood supply investigations

Implications on Forest Condition - Same as other runs - Very good (or above upper IQR) BLG indicator achievement for all Mature-Late classes. Similar for Old Growth T1-5, but improves as area ages. Upland Conifer increases but never reaches lower IQR. Young Forest never reaches lower IQR but relatively stable through time. Slow creation of all-ages PRW, but OG PRW increases. Caribou habitats improve (to T3) and overachieve by T4-T5 (same as BLG-Max).

(2a) Area by Landscape Class (Productive ha)

Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	81,424	186,273	66,561	14,802	243,544	143,145	46,587
T2	42,251	222,608	60,703	15,815	250,815	142,412	47,513
T3	61,845	211,220	42,245	18,051	250,263	152,816	45,462
T4	80,497	121,885	45,674	22,113	313,901	150,063	47,763
T5	98,694	78,777	48,616	23,992	334,753	149,193	47,858
T6	99,711	56,427	51,961	28,572	355,687	142,234	47,195
T7	101,895	68,491	57,557	33,729	340,546	133,692	45,834
T8	103,303	86,246	59,456	44,749	317,412	126,004	44,376
T9	103,283	103,869	55,277	49,215	309,856	116,994	42,999
T10	102,649	107,034	52,181	51,265	322,146	102,230	43,886
T11	102,362	108,538	51,095	53,574	337,672	83,782	44,331
T12	101,242	109,234	51,687	54,351	346,130	74,004	44,674
T13	100,721	109,001	51,486	57,899	348,322	69,001	44,870
T14	102,144	107,968	49,800	59,375	352,543	64,459	45,006
T15	102,975	107,579	47,597	60,842	354,619	62,592	45,085
T16	102,640	108,568	44,109	60,186	359,715	61,010	45,060
T17	100,495	110,538	40,546	58,739	366,598	59,423	44,938
BLG Upper	263,084	228,782	63,469	16,237	269,185	65,739	16,276
BLG Lower	143,268	103,333	36,052	8,706	178,461	43,021	12,845

(2b) Old Growth by Grouping (Prod. ha), **(2d)**, **(2e)**

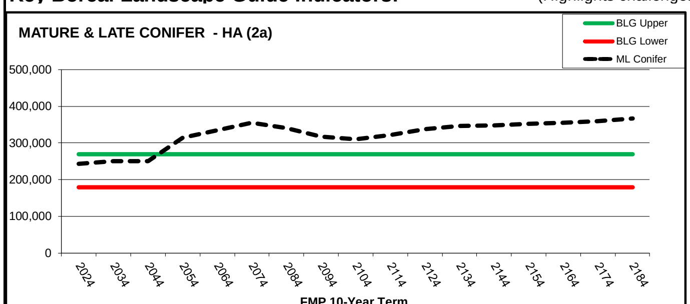
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs
T1	23,536	1,071	22,603	30	359,248	136,124
T2	62,923	1,667	67,960	125	360,873	88,366
T3	103,249	1,803	119,949	296	366,125	87,116
T4	132,595	4,335	140,655	522	375,168	111,655
T5	136,290	6,806	156,471	914	379,378	136,500
T6	142,052	12,530	163,307	1,504	384,088	146,492
T7	184,023	20,318	171,772	1,638	390,045	145,821
T8	193,938	28,537	187,098	1,719	394,136	145,202
T9	210,176	30,844	185,101	1,740	406,850	144,355
T10	215,704	31,763	186,502	1,694	414,248	143,821
T11	222,557	31,438	179,717	1,643	420,285	143,533
T12	218,296	30,800	171,670	1,594	424,261	143,051
T13	218,159	32,848	169,357	1,695	426,429	142,544
T14	222,226	33,203	165,682	1,678	431,967	141,645
T15	224,356	33,487	163,838	1,646	435,777	139,505
T16	226,067	32,725	161,446	1,698	440,677	137,251
T17	226,869	31,709	160,071	1,730	444,392	134,746
BLG Upper	82,642	6,477	58,909		497,902	342,348
BLG Lower	51,310	4,282	35,996	1,500	475,260	196,754
			Model:	1,500 ha used	400,000 ha used	130,000 ha used

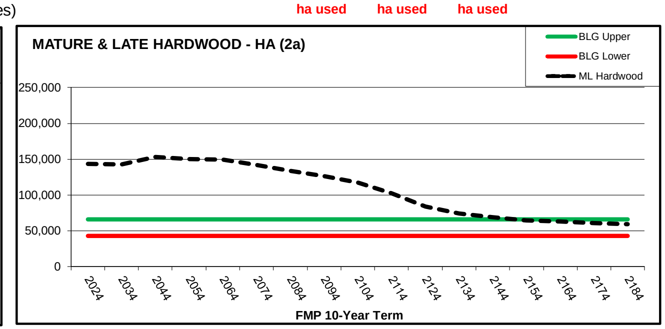
(6a) Available Forest:

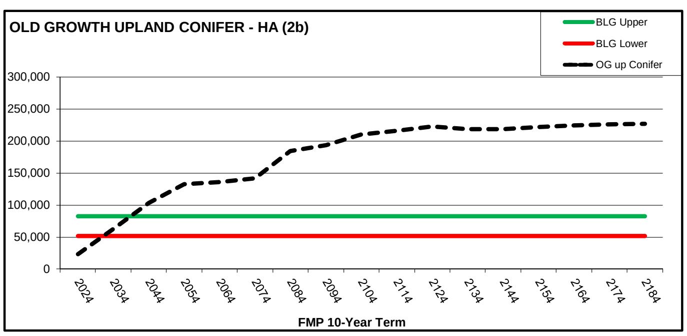
Term	
T1	196,134
T2	195,246
T3	194,347
T4	194,347
T5	194,347
T6	194,347
T7	194,347
T8	194,347
T9	194,347
T10	194,347
T11	194,347
T12	194,347
T13	194,347
T14	194,347
T15	194,347
T16	194,347
T17	194,347

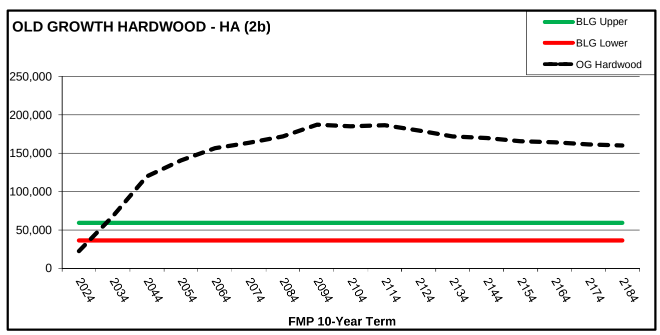
Key Boreal Landscape Guide Indicators:

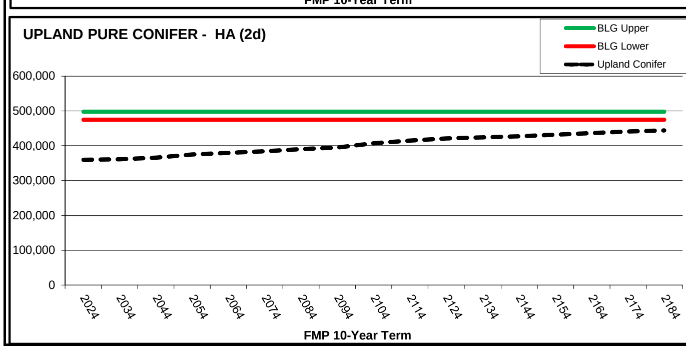
(Highlights challenges)

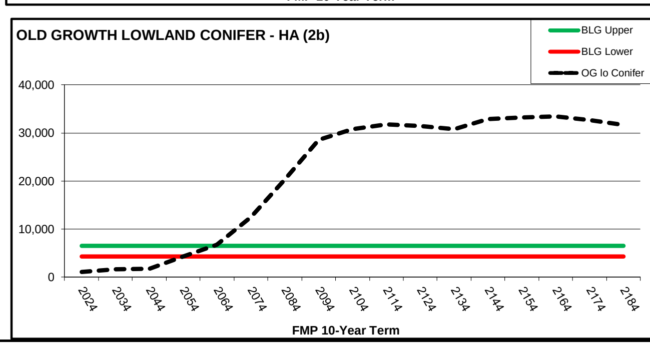












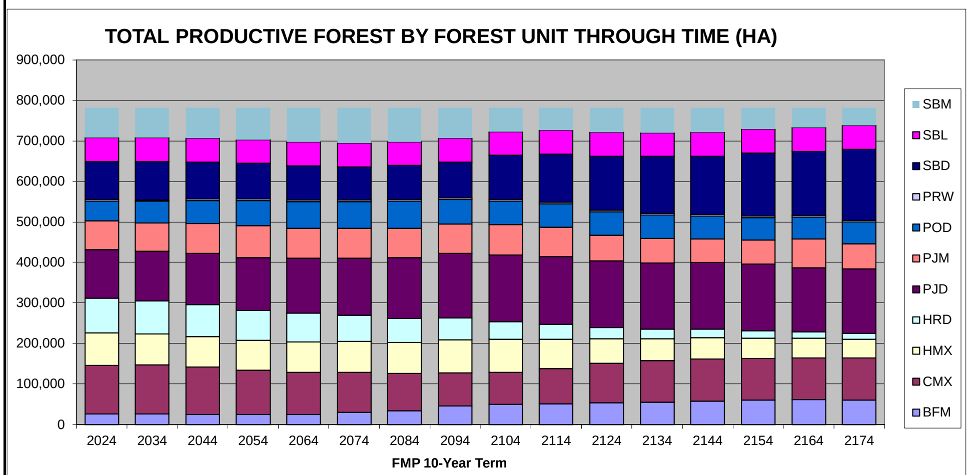
WHISKEY JACK FOREST 2024 FMP **SUMMARY of SFMM INVESTIGATION**

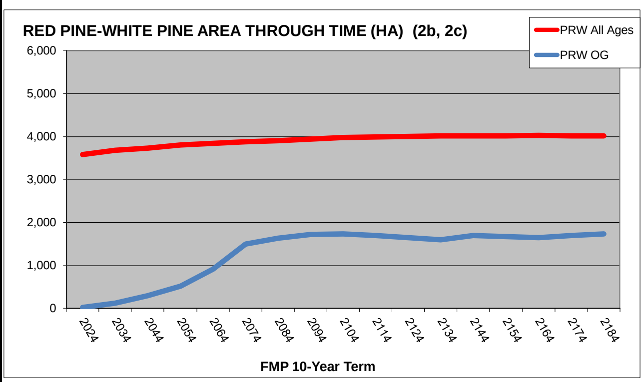
Case Name: **25-Bal-AHA** **Date:** May 9, 2023.

FMP 10-Year Term

Productive Forest Area Through Time Data (hectares): by Forest Unit									Indicator (2c)			
Term	**TOTAL**	**BFM**	**CMX**	**HMX**	**HRD**	**PJD**	**PJM**	**POD**	**PRW**	**SBD**	**SBL**	**SBM**
T1	782,337	26,616	119,352	80,207	85,706	120,245	70,531	48,642	3,587	94,413	58,977	74,058
T2	782,116	25,981	120,726	77,284	81,664	121,806	70,484	52,934	3,682	93,816	58,972	74,767
T3	781,902	24,989	117,070	74,379	79,608	125,919	73,494	57,046	3,727	90,867	58,959	75,845
T4	781,896	24,732	108,927	74,741	73,088	130,813	77,946	62,478	3,804	87,787	58,959	78,622
T5	781,884	25,426	103,778	74,928	70,435	135,493	74,414	65,139	3,840	84,936	58,959	84,535
T6	781,787	29,859	99,180	76,191	64,399	141,135	73,680	65,232	3,880	82,544	58,959	86,729
T7	781,744	34,555	91,613	76,364	59,637	149,849	72,606	66,664	3,906	83,696	58,959	83,894
T8	781,546	45,415	82,387	81,437	54,413	158,405	72,610	60,854	3,944	88,409	58,959	74,712
T9	781,495	49,742	78,827	81,930	43,406	164,611	74,586	57,805	3,976	109,212	58,959	58,441
T10	781,391	51,709	86,663	72,526	35,820	168,376	71,780	57,480	3,987	119,116	58,959	54,976
T11	781,354	54,030	97,025	61,139	27,764	164,216	62,792	58,145	4,008	132,540	58,959	60,738
T12	781,322	54,824	102,363	54,545	23,688	163,533	59,692	58,667	4,015	140,103	58,959	60,934
T13	781,300	58,334	103,580	52,147	21,750	164,138	58,581	56,086	4,016	143,326	58,959	60,384
T14	781,296	59,762	103,724	50,037	17,412	165,122	59,644	55,413	4,022	154,448	58,959	52,753
T15	781,289	61,216	103,444	48,022	15,884	158,851	69,908	53,964	4,023	158,908	58,959	48,110
T16	781,287	60,547	103,861	45,792	14,712	159,148	62,626	52,723	4,016	175,584	58,959	43,320
T17	781,278	59,098	105,932	41,413	14,116	148,875	71,991	53,347	4,022	180,546	58,959	42,980

(Obj. 1) Caribou Habitat (Caribou Zone):		
Term	**Refuge (1b)**	**Winter (1a)**
T1	132,854	86,255
T2	146,277	104,164
T3	156,537	111,120
T4	163,229	114,559
T5	166,281	120,618
T6	166,470	119,182
T7	168,236	122,036
T8	169,175	122,659
T9	170,754	125,142
T10	172,907	127,245
T11	175,188	128,345
T12	175,540	125,492
T13	176,320	124,844
T14	178,409	126,533
T15	180,271	127,855
T16	182,116	131,408
T17	183,021	132,315
BLG Upper	161,804	115,633
BLG Lower	147,605	63,721





All ages PRW - desirable level "to increase"
Target in SFMM to not decrease.

Old Growth PRW - desirable level "to increase"

WHISKEY JACK FOREST 2024 FMP	SUMMARY of SFMM INVESTIGATION

Case Name: 25-Bal-AHA **Date:** May 9, 2023.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - Similar volumes to Run 21-24: Underachieve PO commitment T1-2 (70 vs 100K) but stable for 20 years, SPF met (over) in all terms. PO decreases 6-7 terms. Harvest is relatively stable for 40 years, then decreases slightly. TOTAL volumes sustainable at 170,000+ m3 except T14-16 (150K). Harvest shifts from poplar dominated to conifer through time (as expected). Improved balance of forest unit harvest area and volume. SBL harvest area at acceptable level.
Renewal - good balance of Natural, Plant, Seed. Is future PRW a concern (can't increase much)?

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

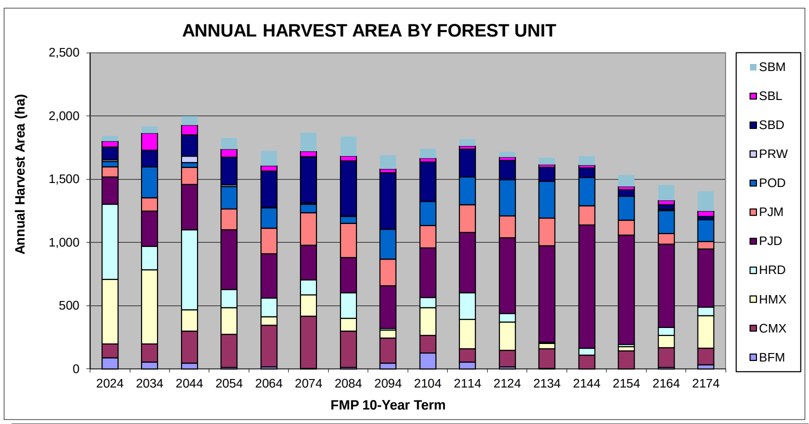
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 5b)	1,842	86	111	509	594	214	84	40	12	100	50	41
T2	1,917	52	145	584	188	278	105	244	0	129	138	53
T3	1,997	43	256	168	632	361	131	38	51	168	79	69
T4	1,825	10	263	209	147	470	164	179	11	219	64	90
T5	1,722	16	330	68	145	350	205	158	6	284	43	116
T6	1,869	4	412	167	121	272	257	71	5	370	39	151
T7	1,837	10	288	102	202	277	269	58	5	434	35	157
T8	1,691	43	201	61	12	337	211	237	0	446	32	110
T9	1,742	124	140	221	78	392	176	192	0	312	29	77
T10	1,815	55	102	235	211	477	220	217	0	219	26	54
T11 (5b)	1,714	16	130	222	70	598	174	286	0	153	23	42
T12	1,668	4	153	42	12	763	217	294	0	107	21	55
T13	1,681	0	110	0	54	975	152	221	0	75	23	72
T14	1,536	0	142	32	18	866	118	189	0	52	25	93
T15	1,452	12	153	98	64	659	83	183	8	37	33	121
T16	1,404	31	132	256	69	461	58	174	0	26	40	157

Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	%Small	%Large
T1 (5c)	197.0	100.0	70.0	24.3	2.2	0.98	0.02
T2	191.7	103.9	70.0	16.4	0.0	0.94	0.06
T3	200.4	114.3	56.0	21.2	7.9	0.97	0.03
T4	185.0	125.8	44.8	12.2	1.5	0.94	0.06
T5	172.6	124.1	35.8	11.2	0.8	0.95	0.05
T6	173.3	132.5	28.7	10.8	0.7	0.98	0.02
T7	170.0	132.4	26.1	10.5	0.6	0.98	0.02
T8	170.0	130.9	31.3	7.4	0.0	0.98	0.02
T9	170.0	122.7	37.6	9.4	0.0	0.99	0.01
T10	170.0	114.8	45.1	9.8	0.0	0.99	0.01
T11 (5c)	170.0	113.6	47.0	9.1	0.0	0.93	0.07
T12	170.0	125.0	39.5	5.3	0.0	0.90	0.10
T13	170.0	133.2	31.6	4.9	0.0	0.91	0.09
T14	153.0	119.9	27.7	5.0	0.0	0.91	0.09
T15	150.0	107.9	33.3	7.1	1.3	0.91	0.09
T16	150.0	100.0	40.0	9.5	0.0	0.93	0.07
Average	172.7	118.8	41.5	10.9	0.9		

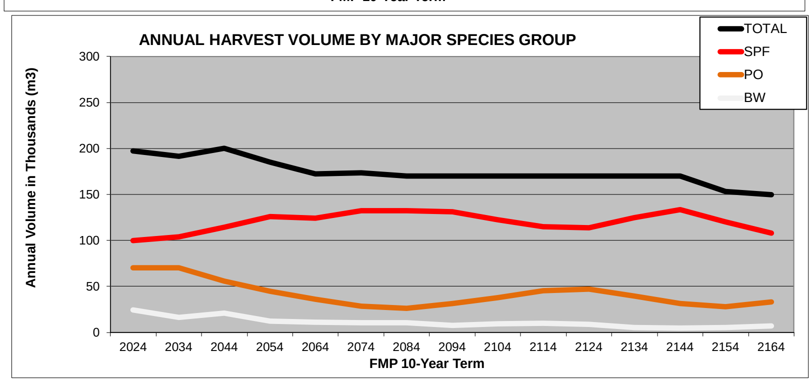
Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal Total ha	Natural ha	Plant ha	Seed ha
T1	756	756	0	**1,824**	1,086	372	366
T2	758	758	0	**1,898**	1,020	304	574
T3	881	881	0	**1,997**	891	297	809
T4	873	873	0	**1,825**	548	231	1,046
T5	844	844	0	**1,722**	398	181	1,144
T6	888	888	0	**1,869**	356	136	1,376
T7	882	882	0	**1,837**	373	159	1,305
T8	870	870	0	**1,691**	327	210	1,154
T9	827	827	0	**1,742**	465	195	1,081
T10	785	756	0	**1,815**	604	139	1,072
T11	779	708	0	**1,714**	522	95	1,097
T12	838	727	0	**1,668**	338	36	1,295
T13	881	754	0	**1,681**	275	23	1,384
T14	793	760	0	**1,536**	179	85	1,272
T15	738	718	0	**1,452**	261	138	1,053
T16	687	648	0	**1,404**	415	155	834



TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
CAR2	59	591		
DEA1	302	185	293	163
H105	704	556	768	662
LLP1			21	17
LLP2			38	60
LLP3	170			
LOTW	360	474	507	712
MEA1	68	26	179	100
MEA2	136	61	100	105
MEA3	43	25	90	5
CAR1				
SMZA				
TOTAL	**1,842**	**1,917**	**1,997**	**1,825**



WHISKEY JACK FOREST 2024 FMP	SUMMARY of SFMM INVESTIGATION
Case Name: 25-Bal-AHA	Date: May 9, 2023.

Breakdown of PLANFU Available Harvest Area by Analysis Unit and Age Class TERM 1

Forest Unit: (Analysis Unit)

	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
A5	0																
A15																	
A25																	
A35																	
A45								58									
A55								6									
A65				5													
A75	1			10			2				4						
A85	6			23		23	130	16		1	1	2					
A95	48	44		419	0	59	372	23	16	5	29	3		34			14
A105	22	59		40			8	70		73	7	5		8			9
A115	7	5		4				23		5		1		42			6
A125	2	4		9				2				0		13	2		11
A135				0								1		3	6		0
A145	1											1			19		
A155															17		
A165															3		
A175																	
A185															1		
A195															1		
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	86	111	0	509	0	82	512	198	16	84	40	12	0	100	50	0	41
																Total:	1,842

Renewal Area by Treatment Type Term 1

	Total	Natural	Plant	Seed
BFM	85	26	60	-
CMX	110	-	-	110
CMXC	-	-	-	-
HMX	504	378	126	-
HRDA	0	0	-	-
HRDB	81	81	-	-
HRD	507	507	-	-
PJDD	196	-	169	27
PJDS	16	5	5	6
PJM	83	-	-	83
POD	40	40	-	-
PRWR	12	-	12	-
PRWW	-	-	-	-
SBD	99	-	-	99
SBL	50	50	-	-
SBLC	-	-	-	-
SBM	40	-	-	40
	1,824	**1,086**	**372**	**366**
	Renewal:	**60%**	**20%**	**20%**

Available Harvest Area by Analysis Unit

Forest Unit: (Analysis Unit)

Term	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
T1	86	111		509	0	82	512	198	16	84	40	12		100	50		41
T2	52	145		584	0	74	114	257	21	105	244			129	50	88	53
T3	43	188	68	168	0	97	535	334	27	131	38	36	15	168	54	25	69
T4	10	245	18	209	0	2	144	435	35	164	179	4	7	219	48	16	90
T5	16	318	11	68	0	22	123	304	46	205	158	4	2	284	43		116
T6	4	408	5	167	0	13	108	213	59	257	71	3	2	370	39		151
T7	10	285	2	102	0	17	185	200	77	269	58		5	434	35		157
T8	43	200	1	61	0	3	9	260	77	211	237			446	32		110
T9	124	140		221	0		78	338	54	176	192			312	29		77
T10	55	98	4	235	0	15	196	440	38	220	217			219	26		54
T11	16	127	2	222	0	16	54	572	26	174	286			153	23		42
T12	4	152	1	42	0	1	11	743	20	217	294			107	21		55
T13		109	1		0	1	52	950	25	152	221			75	23		72
T14		142	0	32	0	2	16	838	28	118	189			52	25		93
T15	12	153	0	98	0	2	62	637	23	83	183	3	5	37	28	5	121
T16	31	132	0	256	0	2	67	446	16	58	174			26	30	10	157

WHISKEY JACK FOREST 2024 FMP	**SUMMARY of SFMM INVESTIGATION**

Case Name: 26-Bal-SBL-PRW **Date:** May 9, 2023.

Purpose: LTMD development to improve wood supply and harvest area by forest unit through time (done). Same BLG indicator achievement as previous investigations. Adjustment to see if additional all ages Pred Pine - White Pine is possible. **Potential LTMD Run**

Specific Inputs: Built on 25-Bal-AHA with increased entire forest all ages Red Pine - White Pine (PRW forest unit) area target to nudge PRW area achievement higher, if it is possible. Same harvest and flow controls as Run 25 (acceptable).

Group:	Mm3/yr	Mm3/yr	Vol. Flow
SPF	100,000	100,000	+/-10%
PO	70,000	70,000	+/-20%
BW			
TOTAL	170,000	170,000	
	T1	T2	

Same as Run 25 except:
PRW target T17 increased from 4,000 ha to 4,200 ha.
Increased targets of 4,500 and 4,300 ha T17 were tried, however SFMM returned infeasible solutions (hence target was reduced to 4,200 ha that solved).

RESULTS: Where projections in the following tables fall below lower targets, the data is shaded yellow; where projections exceed upper targets, the data is shaded green.

FOREST CONDITION RESULTS

Used similar / relaxed BLG targets for wood supply investigations

Implications on Forest Condition - Same as other runs - Very good (or above upper IQR) BLG indicator achievement for all Mature-Late classes. Similar for Old Growth T1-5, but improves as area ages. Upland Conifer increases but never reaches lower IQR. Young Forest never reaches lower IQR but relatively stable through time. Slow creation of all-ages PRW, but OG PRW increases. Caribou habitats improve (to T3) and overachieve by T4-T5 (same as BLG-Max).

(2a) Area by Landscape Class (Productive ha)

Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	81,424	186,273	66,561	14,802	243,544	143,145	46,587
T2	42,339	222,608	60,703	15,722	250,806	142,421	47,513
T3	61,696	211,214	42,322	17,982	250,263	152,961	45,462
T4	80,052	121,942	45,846	22,424	313,903	149,976	47,750
T5	97,601	78,888	49,061	24,298	335,079	149,227	47,727
T6	98,703	56,265	52,465	28,869	356,257	142,336	46,890
T7	100,957	67,954	58,094	34,027	341,632	133,701	45,378
T8	102,240	85,316	60,011	45,036	318,851	126,294	43,791
T9	102,460	102,776	55,647	49,720	310,947	117,634	42,302
T10	102,417	106,069	52,092	52,846	322,499	102,366	43,095
T11	101,794	107,874	51,446	54,556	337,819	84,394	43,470
T12	100,777	108,939	51,711	54,887	346,207	74,959	43,839
T13	100,943	108,210	51,283	58,075	349,019	69,647	44,119
T14	101,767	107,747	50,013	59,436	353,359	64,657	44,313
T15	102,557	107,412	47,806	60,911	355,679	62,493	44,426
T16	102,327	108,057	44,040	60,242	361,383	60,870	44,365
T17	100,006	110,565	40,973	58,761	367,837	58,853	44,279
BLG Upper	263,084	228,782	63,469	16,237	269,185	65,739	16,276
BLG Lower	143,268	103,333	36,052	8,706	178,461	43,021	12,845

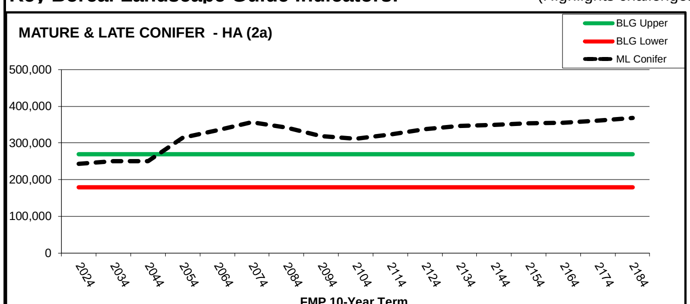
(2b) Old Growth by Grouping (Prod. ha), **(2d)**, **(2e)**

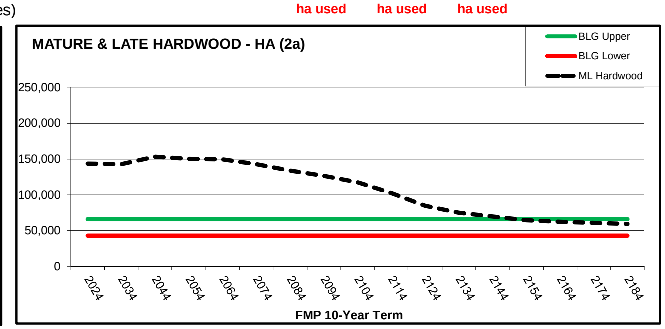
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs
T1	23,536	1,071	22,603	30	359,248	136,124
T2	62,957	1,693	67,865	125	360,810	88,454
T3	103,413	1,803	119,874	296	365,455	87,058
T4	132,861	4,333	140,600	522	373,957	111,439
T5	136,892	7,152	156,383	914	377,979	135,923
T6	142,815	12,825	163,601	1,504	382,769	145,814
T7	185,558	19,862	172,092	1,638	388,407	144,997
T8	195,793	27,951	186,943	1,719	392,460	144,218
T9	211,426	30,147	185,520	1,740	404,844	143,494
T10	215,796	30,972	188,015	1,694	411,320	143,142
T11	222,701	30,567	180,654	1,643	417,949	143,140
T12	218,426	29,862	172,183	1,594	422,418	142,786
T13	218,175	31,856	169,534	1,695	424,970	142,366
T14	222,098	32,150	165,723	1,678	431,222	141,427
T15	224,291	32,365	163,845	1,643	435,463	139,206
T16	225,705	31,478	161,413	1,767	440,474	136,965
T17	226,313	30,424	160,028	1,820	444,388	134,632
BLG Upper	82,642	6,477	58,909		497,902	342,348
BLG Lower	51,310	4,282	35,996	1,500	475,260	196,754
			Model:	1,500 ha used	400,000 ha used	130,000 ha used

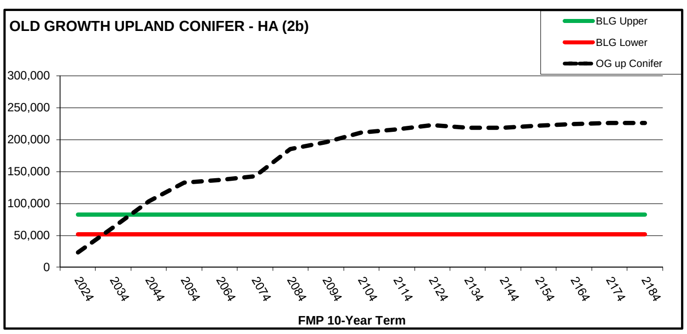
(6a) Available Forest:

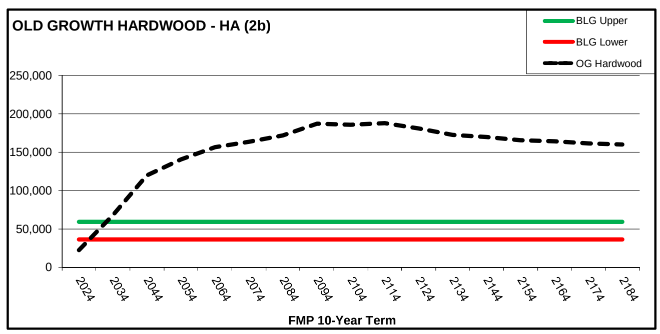
Term	
T1	196,134
T2	195,242
T3	194,350
T4	194,350
T5	194,350
T6	194,350
T7	194,350
T8	194,350
T9	194,350
T10	194,350
T11	194,350
T12	194,350
T13	194,350
T14	194,350
T15	194,350
T16	194,350
T17	194,350

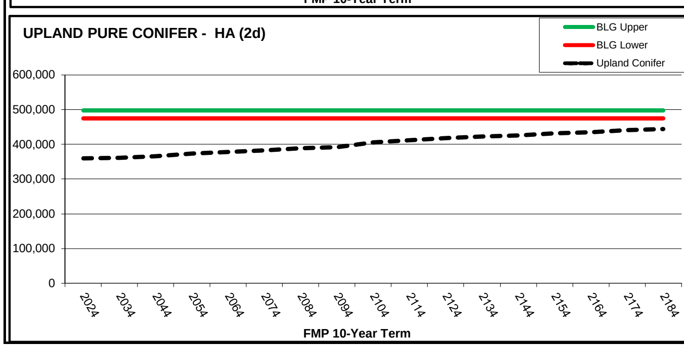
Key Boreal Landscape Guide Indicators: (Highlights challenges)

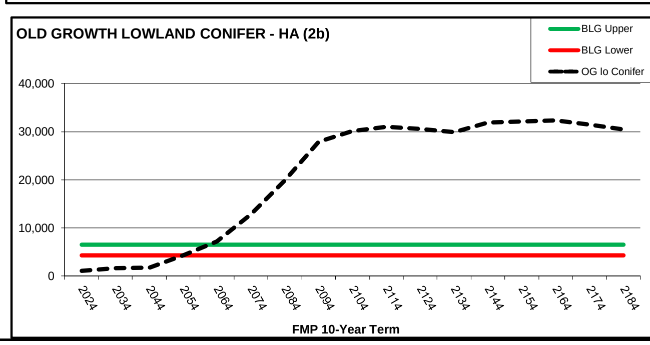












WHISKEY JACK FOREST 2024 FMP **SUMMARY of SFMM INVESTIGATION**

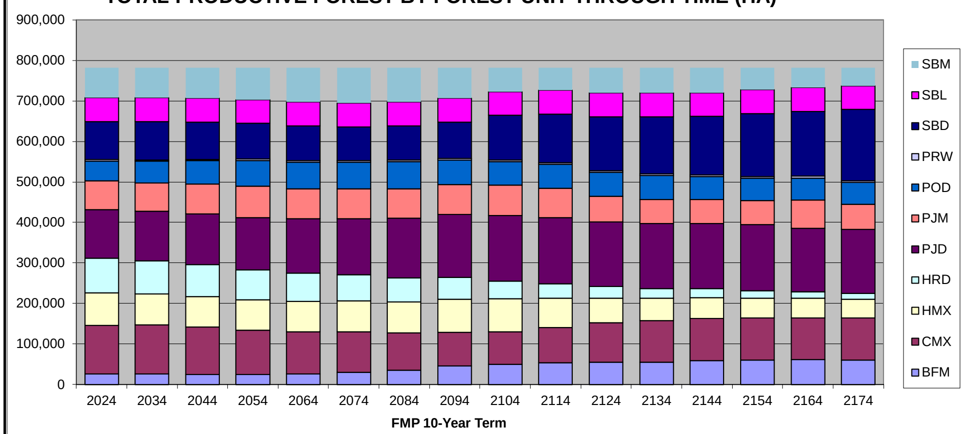
Case Name: **26-Bal-SBL-PRW** **Date:** May 9, 2023.

FMP 10-Year Term

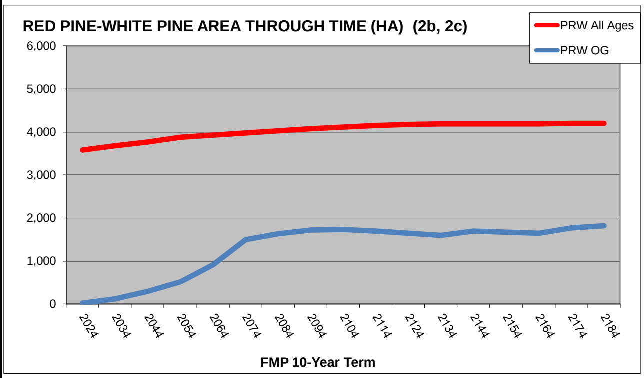
Productive Forest Area Through Time Data (hectares): by Forest Unit									Indicator (2c)			
Term	**TOTAL**	**BFM**	**CMX**	**HMX**	**HRD**	**PJD**	**PJM**	**POD**	**PRW**	**SBD**	**SBL**	**SBM**
T1	782,337	26,616	119,352	80,207	85,706	120,245	70,531	48,642	3,587	94,413	58,977	74,058
T2	782,112	25,901	120,770	77,215	81,792	121,673	70,474	52,964	3,687	93,903	58,972	74,760
T3	781,899	24,974	117,390	74,977	79,019	124,960	73,452	57,358	3,768	91,251	58,959	75,793
T4	781,894	25,129	109,293	74,651	73,151	129,099	77,893	62,878	3,876	88,374	58,959	78,590
T5	781,881	25,834	104,119	74,903	70,682	133,417	74,303	65,471	3,935	85,710	58,959	84,549
T6	781,785	30,260	99,345	76,257	64,639	139,004	73,539	65,574	3,983	83,446	58,959	86,779
T7	781,742	34,977	92,012	76,353	59,912	147,199	72,370	67,099	4,024	84,819	58,959	84,019
T8	781,539	45,810	82,844	81,497	54,680	155,209	73,196	61,214	4,076	89,373	58,959	74,682
T9	781,487	50,314	79,283	82,419	43,635	161,120	75,359	57,917	4,116	109,997	58,959	58,368
T10	781,384	53,364	87,215	71,912	36,134	163,546	72,643	58,326	4,153	120,077	58,959	55,054
T11	781,353	55,058	97,474	60,976	27,958	159,901	63,331	58,802	4,178	133,467	58,959	61,250
T12	781,319	55,387	102,600	55,101	23,702	159,933	60,048	58,964	4,188	141,027	58,959	61,409
T13	781,297	58,528	103,934	52,343	21,914	161,132	58,819	56,461	4,188	144,174	58,959	60,845
T14	781,292	59,864	103,923	49,876	17,536	162,923	59,805	55,718	4,194	155,262	58,959	53,231
T15	781,286	61,332	103,224	47,909	16,114	157,222	69,990	54,090	4,195	159,677	58,959	48,574
T16	781,284	60,627	103,724	45,457	14,963	157,746	62,717	52,880	4,200	176,317	58,959	43,694
T17	781,275	59,157	105,682	40,630	14,391	147,779	72,111	53,861	4,205	181,243	58,959	43,255

(Obj. 1) Caribou Habitat (Caribou Zone):		
Term	**Refuge (1b)**	**Winter (1a)**
T1	132,854	86,255
T2	146,188	103,992
T3	156,292	111,036
T4	162,981	114,479
T5	166,030	120,540
T6	166,380	119,203
T7	167,928	121,767
T8	168,871	122,522
T9	170,502	124,845
T10	172,753	126,952
T11	175,033	128,055
T12	175,430	125,345
T13	176,127	124,564
T14	178,223	126,256
T15	180,093	127,590
T16	181,920	131,133
T17	182,898	132,118
BLG Upper	161,804	115,633
BLG Lower	147,605	63,721

TOTAL PRODUCTIVE FOREST BY FOREST UNIT THROUGH TIME (HA)



RED PINE-WHITE PINE AREA THROUGH TIME (HA) (2b, 2c)



All ages PRW - desirable level "to increase" **Old Growth PRW** - desirable level "to increase"

Target in SFMM to not decrease.

Improved achievement through addition of slightly higher target T17.

WHISKEY JACK FOREST 2024 FMP **SUMMARY of SFMM INVESTIGATION**

Case Name: 26-Bal-SBL-PRW **Date:** May 9, 2023.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - Similar volumes to Run 21-24: Underachieve PO commitment T1-2 (70 vs 100K) but stable for 20 years, SPF met (over) in all terms. PO decreases 6-7 terms. Harvest is relatively stable for 40 years, then decreases slightly. TOTAL volumes sustainable at 170,000+ m3 except T14-16 (150K). Harvest shifts from poplar dominated to conifer through time (as expected). Improved balance of forest unit harvest area and volume. SBL harvest area at acceptable level.
Renewal - good balance of Natural, Plant, Seed. Future PRW area may be increased somewhat through operational treatments.

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

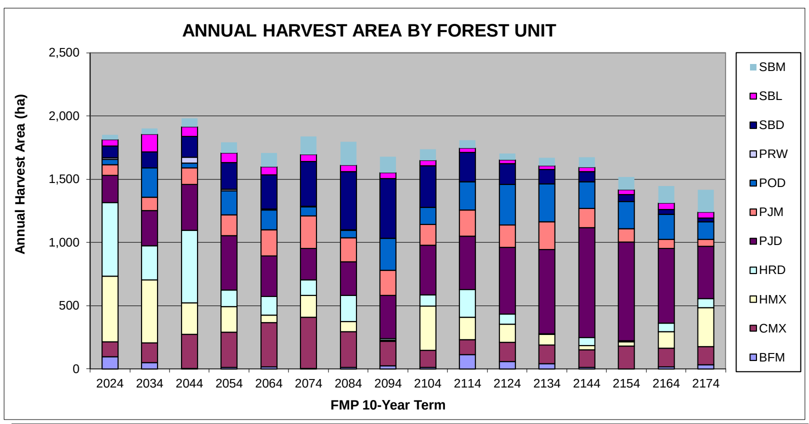
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 5b)	1,851	95	119	518	584	214	84	41	12	95	50	38
T2	1,902	50	154	499	271	278	105	233	0	124	138	50
T3	1,980	3	269	252	572	361	131	38	48	161	80	65
T4	1,791	9	279	202	130	431	164	190	14	210	76	84
T5	1,707	16	351	59	146	321	205	158	6	273	62	109
T6	1,837	4	403	175	121	250	256	71	5	354	56	142
T7	1,795	11	281	83	203	269	189	58	5	461	50	185
T8	1,678	23	196	8	13	342	196	255	0	472	45	129
T9	1,737	9	137	351	86	394	164	133	0	330	41	91
T10	1,810	113	118	178	216	424	205	223	0	231	37	63
T11 (5b)	1,702	59	151	141	83	527	176	322	0	162	33	48
T12	1,669	41	145	86	2	668	220	301	0	113	30	62
T13	1,672	11	140	32	65	867	154	210	0	79	33	81
T14	1,519	0	181	32	8	780	108	214	0	56	36	105
T15	1,447	17	147	128	67	591	75	196	1	39	50	136
T16	1,417	33	143	309	70	414	53	142	0	27	49	177

Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	%Small	%Large
T1 (5c)	196.9	100.0	70.0	24.2	2.2	0.99	0.01
T2	190.2	101.8	70.0	17.0	0.0	0.94	0.06
T3	197.4	112.0	56.0	20.9	7.5	0.97	0.03
T4	182.7	123.2	44.8	11.8	2.0	0.94	0.06
T5	170.0	121.7	35.8	10.9	0.8	0.95	0.05
T6	170.0	129.1	28.7	10.8	0.7	0.98	0.02
T7	170.0	132.6	25.5	10.6	0.6	0.97	0.03
T8	170.0	132.0	30.6	6.8	0.0	0.97	0.03
T9	170.0	123.0	36.8	9.8	0.0	0.99	0.01
T10	170.0	115.2	44.1	10.2	0.0	0.98	0.02
T11 (5c)	170.0	111.0	49.3	9.3	0.0	0.92	0.08
T12	170.0	122.1	41.6	6.0	0.0	0.90	0.10
T13	170.0	130.4	33.2	5.9	0.0	0.91	0.09
T14	153.0	117.4	29.9	5.1	0.1	0.91	0.09
T15	150.0	105.6	35.9	7.6	0.2	0.91	0.09
T16	150.0	100.0	39.4	10.0	0.0	0.94	0.06
Average	171.9	117.3	42.0	11.1	0.9		

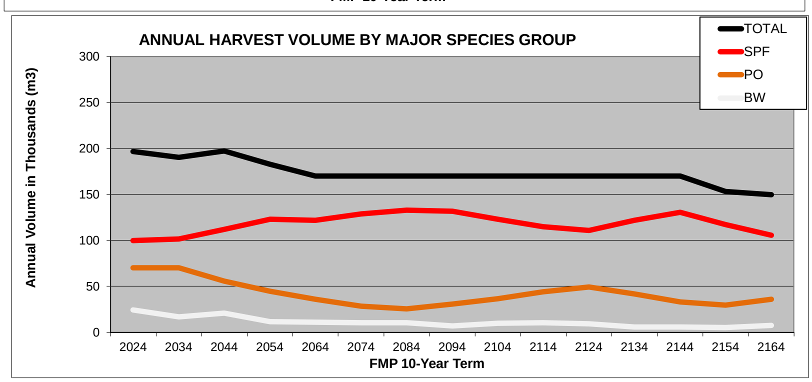
Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal Total ha	Natural ha	Plant ha	Seed ha
T1	756	756	0	**1,833**	1,119	374	339
T2	745	745	0	**1,883**	1,127	319	437
T3	863	863	0	**1,980**	950	303	728
T4	861	861	0	**1,791**	601	250	940
T5	830	830	0	**1,707**	430	183	1,094
T6	867	867	0	**1,837**	424	152	1,262
T7	884	884	0	**1,795**	377	190	1,228
T8	876	876	0	**1,678**	318	219	1,141
T9	829	829	0	**1,737**	523	240	973
T10	788	788	0	**1,810**	609	170	1,030
T11	766	741	0	**1,702**	511	136	1,055
T12	824	757	0	**1,669**	367	93	1,209
T13	867	813	0	**1,672**	246	104	1,321
T14	781	754	0	**1,519**	191	100	1,229
T15	719	714	0	**1,447**	294	164	989
T16	688	649	0	**1,417**	440	163	814



TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
CAR2	112	543		
DEA1	301	186	248	198
H105	664	528	794	661
LLP1			25	26
LLP2			59	21
LLP3	170			
LOTW	362	474	551	678
MEA1	77	39	131	88
MEA2	122	94	104	85
MEA3	43	38	68	33
CAR1				
SMZA				
TOTAL	**1,851**	**1,902**	**1,980**	**1,791**



WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: 26-Bal-SBL-PRW **Date:** May 9, 2023.

Breakdown of PLANFU Available Harvest Area by Analysis Unit and Age Class TERM 1

Forest Unit: (Analysis Unit)

	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
A5	0																
A15																	
A25																	
A35																	
A45								58									
A55								6									
A65				5													
A75	10			10			2				4						
A85	6			12		16	126	9	0	1	2	2					
A95	48	51		438	0	59	372	30	14	5	29	3		34			18
A105	22	59		40			8	70		73	7	5		9			9
A115	7	5		4				23		5		1		37	9		0
A125	2	4		9				3				0		13	2		11
A135				0								1		3	0		0
A145	1											1			19		
A155															17		
A165		0													1		
A175																	
A185															1		
A195															1		
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	95	119	0	518	0	76	508	199	15	84	41	12	0	95	50	0	38

Total: 1,851

Renewal Area by Treatment Type Term 1

	Total	Natural	Plant	Seed
BFM	94	28	66	-
CMX	118	-	-	118
CMXC	-	-	-	-
HMX	513	418	94	-
HRDA	0	0	-	-
HRDB	75	75	-	-
HRD	503	503	-	-
PJDD	197	-	197	-
PJDS	14	4	4	6
PJM	83	-	-	83
POD	41	41	-	-
PRWR	12	-	12	-
PRWW	-	-	-	-
SBD	94	-	-	94
SBL	49	49	-	-
SBLC	-	-	-	-
SBM	38	-	-	38
	1,833	**1,119**	**374**	**339**
	Renewal:	**61%**	**20%**	**19%**

Available Harvest Area by Analysis Unit

Forest Unit: (Analysis Unit)

Term	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
T1	95	119		518	0	76	508	199	15	84	41	12		95	50		38
T2	50	154		499	0	103	168	259	19	105	233			124	50	88	50
T3	3	201	68	252	0	75	497	337	25	131	38	35	13	161	55	25	65
T4	9	261	18	202	0	7	123	400	32	164	190	5	9	210	61	16	84
T5	16	339	11	59	0	15	132	280	41	205	158	4	2	273	62		109
T6	4	399	5	175	0	17	105	196	54	256	71	3	2	354	56		142
T7	11	279	2	83	0	15	188	199	70	189	58		5	461	50		185
T8	23	195	1	8	0	3	10	259	83	196	255			472	45		129
T9	9	137		351	0	4	82	336	58	164	133			330	41		91
T10	113	114	4	178	0	12	204	384	41	205	223			231	37		63
T11	59	149	2	141	0	17	66	499	28	176	322			162	33		48
T12	41	144	1	86	0	0	2	648	20	220	301			113	30		62
T13	11	139	1	32	0	3	63	843	24	154	210			79	33		81
T14		181	0	32	0	0	8	758	22	108	214	0		56	36		105
T15	17	147	0	128	0	2	65	576	15	75	196	1		39	39	10	136
T16	33	143	0	309	0	2	68	403	11	53	142			27	43	5	177

WHISKEY JACK FOREST 2024 FMP	**SUMMARY of SFMM INVESTIGATION**

Case Name: LTMD-01 **Date:** May 9, 2023.

Purpose: LTMD run selected as a reasonable balance of forest diversity indicators and other objective achievement through time (was previously named 26-Bal-SBL-PRW). Includes projected operations in only SMZ CAR2 and SMZB, as per MNRF direction.

Specific Inputs: Run 26-Bal-SBL-PRW that includes operational limits for certain forest unit harvest areas, and operational harvest area and volume flow controls (in addition to BLG targets).

Group:	Mm3/yr	Mm3/yr	Vol. Flow
SPF	100,000	100,000	+/-10%
PO	70,000	70,000	+/-20%
BW			
TOTAL	170,000	170,000	
	T1	T2	

Same as Run 26
Added "products" for Under and Defct (Defect) to summarize Biomass Volumes. Do not contribute to net merch volumes.
Same results as Run 26-Bal-SBL-PRW

RESULTS: Where projections in the following tables fall below lower targets, the data is shaded yellow; where projections exceed upper targets, the data is shaded green.

FOREST CONDITION RESULTS

Used similar / relaxed BLG targets for wood supply investigations

Implications on Forest Condition - Same as other runs - Very good (or above upper IQR) BLG indicator achievement for all Mature-Late classes. Similar for Old Growth T1-5, but improves as area ages. Upland Conifer increases but never reaches lower IQR. Young Forest never reaches lower IQR but relatively stable through time. Slow creation of all-ages PRW, but OG PRW increases. Caribou habitats improve (to T3) and overachieve by T4-T5 (same as BLG-Max).

(2a) Area by Landscape Class (Productive ha)

Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	81,424	186,273	66,561	14,802	243,544	143,145	46,587
T2	42,339	222,608	60,703	15,722	250,806	142,421	47,513
T3	61,696	211,214	42,322	17,982	250,263	152,961	45,462
T4	80,052	121,942	45,846	22,424	313,903	149,976	47,750
T5	97,601	78,888	49,061	24,298	335,079	149,227	47,727
T6	98,703	56,265	52,465	28,869	356,257	142,336	46,890
T7	100,957	67,954	58,094	34,027	341,632	133,701	45,378
T8	102,240	85,316	60,011	45,036	318,851	126,294	43,791
T9	102,460	102,776	55,647	49,720	310,947	117,634	42,302
T10	102,417	106,069	52,092	52,846	322,499	102,366	43,095
T11	101,794	107,874	51,446	54,556	337,819	84,394	43,470
T12	100,777	108,939	51,711	54,887	346,207	74,959	43,839
T13	100,943	108,210	51,283	58,075	349,019	69,647	44,119
T14	101,767	107,747	50,013	59,436	353,359	64,657	44,313
T15	102,557	107,412	47,806	60,911	355,679	62,493	44,426
T16	102,327	108,057	44,040	60,242	361,383	60,870	44,365
T17	100,006	110,565	40,973	58,761	367,837	58,853	44,279
BLG Upper	263,084	228,782	63,469	16,237	269,185	65,739	16,276
BLG Lower	143,268	103,333	36,052	8,706	178,461	43,021	12,845

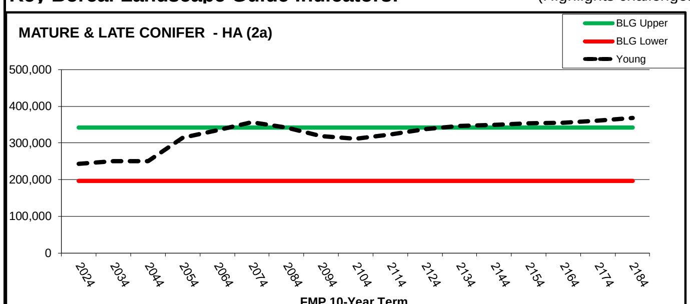
(2b) Old Growth by Grouping (Prod. ha) / **(2d)** / **(2e)**

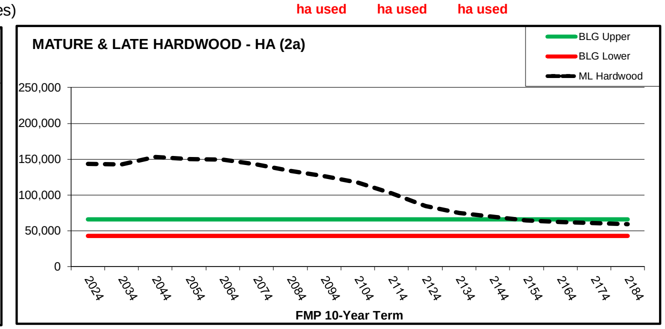
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs
T1	23,536	1,071	22,603	30	359,248	136,124
T2	62,957	1,693	67,865	125	360,810	88,454
T3	103,413	1,803	119,874	296	365,455	87,058
T4	132,861	4,333	140,600	522	373,957	111,439
T5	136,892	7,152	156,383	914	377,979	135,923
T6	142,815	12,825	163,601	1,504	382,769	145,814
T7	185,558	19,862	172,092	1,638	388,407	144,997
T8	195,793	27,951	186,943	1,719	392,460	144,218
T9	211,426	30,147	185,520	1,740	404,844	143,494
T10	215,796	30,972	188,015	1,694	411,320	143,142
T11	222,701	30,567	180,654	1,643	417,949	143,140
T12	218,426	29,862	172,183	1,594	422,418	142,786
T13	218,175	31,856	169,534	1,695	424,970	142,366
T14	222,098	32,150	165,723	1,678	431,222	141,427
T15	224,291	32,365	163,845	1,643	435,463	139,206
T16	225,705	31,478	161,413	1,767	440,474	136,965
T17	226,313	30,424	160,028	1,820	444,388	134,632
BLG Upper	82,642	6,477	58,909		497,902	342,348
BLG Lower	51,310	4,282	35,996	1,500	475,260	196,754
			Model:	1,500 ha used	400,000 ha used	130,000 ha used

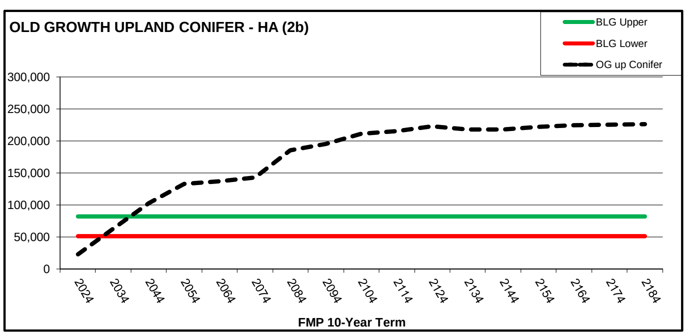
(6a) Available Forest:

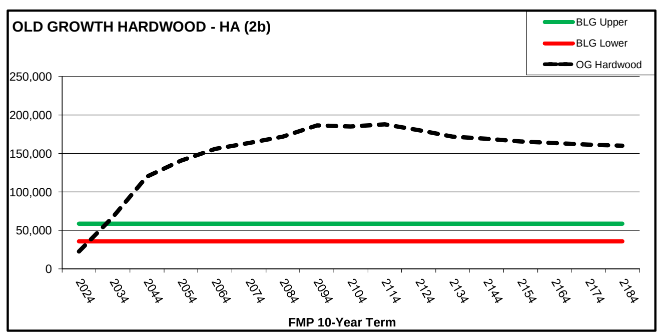
Term	
T1	196,134
T2	195,242
T3	194,350
T4	194,350
T5	194,350
T6	194,350
T7	194,350
T8	194,350
T9	194,350
T10	194,350
T11	194,350
T12	194,350
T13	194,350
T14	194,350
T15	194,350
T16	194,350
T17	194,350

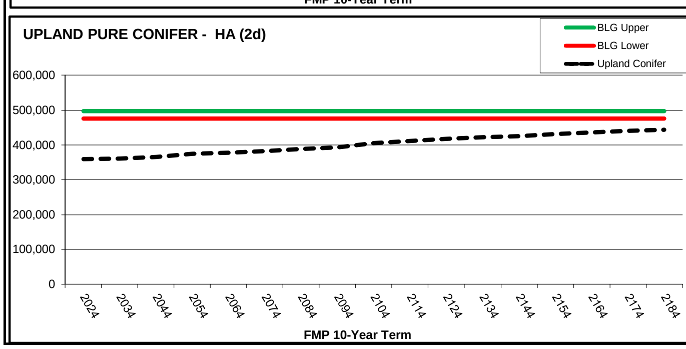
Key Boreal Landscape Guide Indicators: (Highlights challenges)

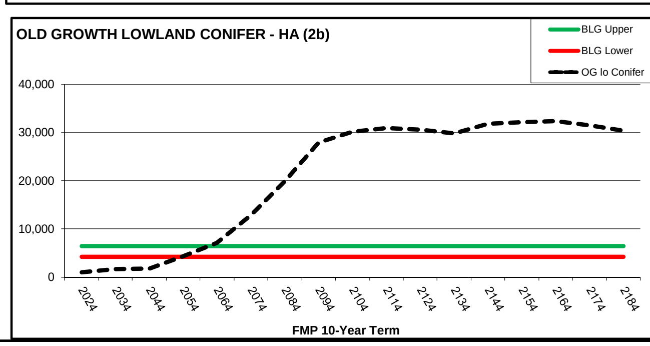












WHISKEY JACK FOREST 2024 FMP **SUMMARY of SFMM INVESTIGATION**

Case Name: **LTMD-01** **Date:** May 9, 2023.

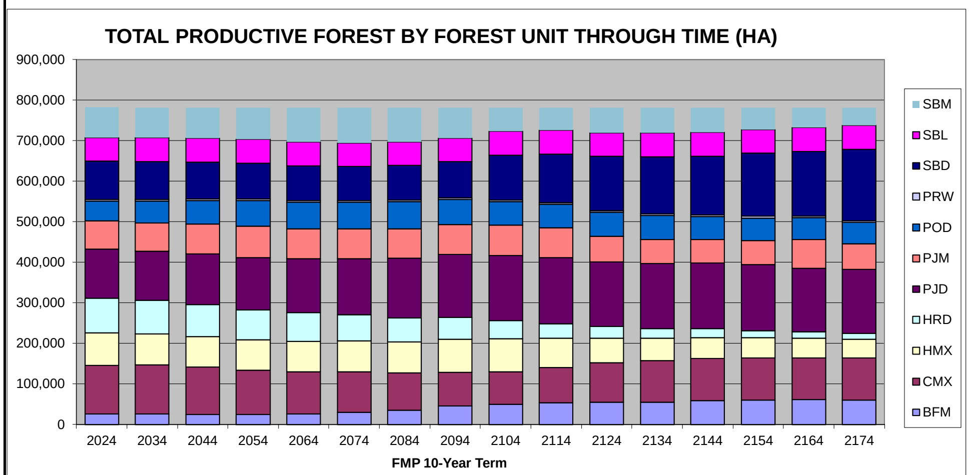
FMP 10-Year Term

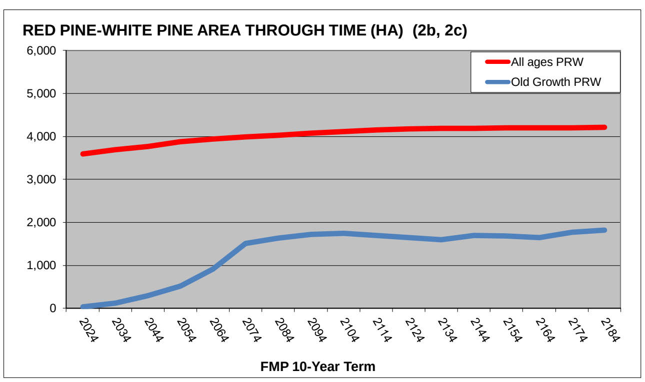
Productive Forest Area Through Time Data (hectares): by Forest Unit

Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW (Indicator (2c))	SBD	SBL	SBM
T1	782,337	26,616	119,352	80,207	85,706	120,245	70,531	48,642	3,587	94,413	58,977	74,058
T2	782,112	25,901	120,770	77,215	81,792	121,673	70,474	52,964	3,687	93,903	58,972	74,760
T3	781,899	24,974	117,390	74,977	79,019	124,960	73,452	57,358	3,768	91,251	58,959	75,793
T4	781,894	25,129	109,293	74,651	73,151	129,099	77,893	62,878	3,876	88,374	58,959	78,590
T5	781,881	25,834	104,119	74,903	70,682	133,417	74,303	65,471	3,935	85,710	58,959	84,549
T6	781,785	30,260	99,345	76,257	64,639	139,004	73,539	65,574	3,983	83,446	58,959	86,779
T7	781,742	34,977	92,012	76,353	59,912	147,199	72,370	67,099	4,024	84,819	58,959	84,019
T8	781,539	45,810	82,844	81,497	54,680	155,209	73,196	61,214	4,076	89,373	58,959	74,682
T9	781,487	50,314	79,283	82,419	43,635	161,120	75,359	57,917	4,116	109,997	58,959	58,368
T10	781,384	53,364	87,215	71,912	36,134	163,546	72,643	58,326	4,153	120,077	58,959	55,054
T11	781,353	55,058	97,474	60,976	27,958	159,901	63,331	58,802	4,178	133,467	58,959	61,250
T12	781,319	55,387	102,600	55,101	23,702	159,933	60,048	58,964	4,188	141,027	58,959	61,409
T13	781,297	58,528	103,934	52,343	21,914	161,132	58,819	56,461	4,188	144,174	58,959	60,845
T14	781,292	59,864	103,923	49,876	17,536	162,923	59,805	55,718	4,194	155,262	58,959	53,231
T15	781,286	61,332	103,224	47,909	16,114	157,222	69,990	54,090	4,195	159,677	58,959	48,574
T16	781,284	60,627	103,724	45,457	14,963	157,746	62,717	52,880	4,200	176,317	58,959	43,694
T17	781,275	59,157	105,682	40,630	14,391	147,779	72,111	53,861	4,205	181,243	58,959	43,255

(Obj. 1) Caribou Habitat (Caribou Zone):

Term	Refuge (1b)	Winter (1a)
T1	132,854	86,255
T2	146,188	103,992
T3	156,292	111,036
T4	162,981	114,479
T5	166,030	120,540
T6	166,380	119,203
T7	167,928	121,767
T8	168,871	122,522
T9	170,502	124,845
T10	172,753	126,952
T11	175,033	128,055
T12	175,430	125,345
T13	176,127	124,564
T14	178,223	126,256
T15	180,093	127,590
T16	181,920	131,133
T17	182,898	132,118
BLG Upper	161,804	115,633
BLG Lower	147,605	63,721





All ages PRW
- desirable level "to increase"

Old Growth PRW
- desirable level "to increase"

Improved achievement through addition of slightly higher target T17.

WHISKEY JACK FOREST 2024 FMP **SUMMARY of SFMM INVESTIGATION**

Case Name: LTMD-01 **Date:** May 9, 2023.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply -

Similar volumes to Run 21-24: Underachieve PO commitment T1-2 (70 vs 100K) but stable for 20 years, SPF met (over) in all terms. PO decreases 6-7 terms. Harvest is relatively stable for 40 years, then decreases slightly. TOTAL volumes sustainable at 170,000+ m3 except T14-16 (150K). Harvest shifts from poplar dominated to conifer through time (as expected). Improved balance of forest unit harvest area and volume. SBL harvest area at acceptable level.
Renewal - good balance of Natural, Plant, Seed. Future PRW area may be increased somewhat through operational treatments.

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

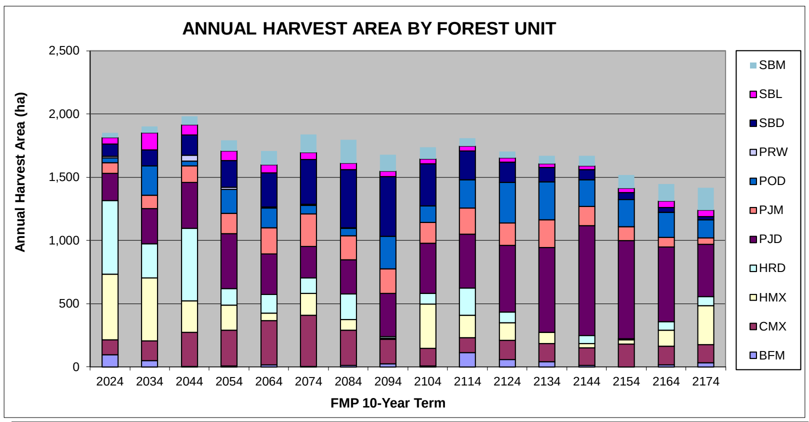
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 5b)	1,851	95	119	518	584	214	84	41	12	95	50	38
T2	1,902	50	154	499	271	278	105	233	0	124	138	50
T3	1,980	3	269	252	572	361	131	38	48	161	80	65
T4	1,791	9	279	202	130	431	164	190	14	210	76	84
T5	1,707	16	351	59	146	321	205	158	6	273	62	109
T6	1,837	4	403	175	121	250	256	71	5	354	56	142
T7	1,795	11	281	83	203	269	189	58	5	461	50	185
T8	1,678	23	196	8	13	342	196	255	0	472	45	129
T9	1,737	9	137	351	86	394	164	133	0	330	41	91
T10	1,810	113	118	178	216	424	205	223	0	231	37	63
T11 (5b)	1,702	59	151	141	83	527	176	322	0	162	33	48
T12	1,669	41	145	86	2	668	220	301	0	113	30	62
T13	1,672	11	140	32	65	867	154	210	0	79	33	81
T14	1,519	0	181	32	8	780	108	214	0	56	36	105
T15	1,447	17	147	128	67	591	75	196	1	39	50	136
T16	1,417	33	143	309	70	414	53	142	0	27	49	177

Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	%Small	%Large
T1 (5c)	196.9	100.0	70.0	24.2	2.2	0.99	0.01
T2	190.2	101.8	70.0	17.0	0.0	0.94	0.06
T3	197.4	112.0	56.0	20.9	7.5	0.97	0.03
T4	182.7	123.2	44.8	11.8	2.0	0.94	0.06
T5	170.0	121.7	35.8	10.9	0.8	0.95	0.05
T6	170.0	129.1	28.7	10.8	0.7	0.98	0.02
T7	170.0	132.6	25.5	10.6	0.6	0.97	0.03
T8	170.0	132.0	30.6	6.8	0.0	0.97	0.03
T9	170.0	123.0	36.8	9.8	0.0	0.99	0.01
T10	170.0	115.2	44.1	10.2	0.0	0.98	0.02
T11 (5c)	170.0	111.0	49.3	9.3	0.0	0.92	0.08
T12	170.0	122.1	41.6	6.0	0.0	0.90	0.10
T13	170.0	130.4	33.2	5.9	0.0	0.91	0.09
T14	153.0	117.4	29.9	5.1	0.1	0.91	0.09
T15	150.0	105.6	35.9	7.6	0.2	0.91	0.09
T16	150.0	100.0	39.4	10.0	0.0	0.94	0.06
Average	171.9	117.3	42.0	11.1	0.9		

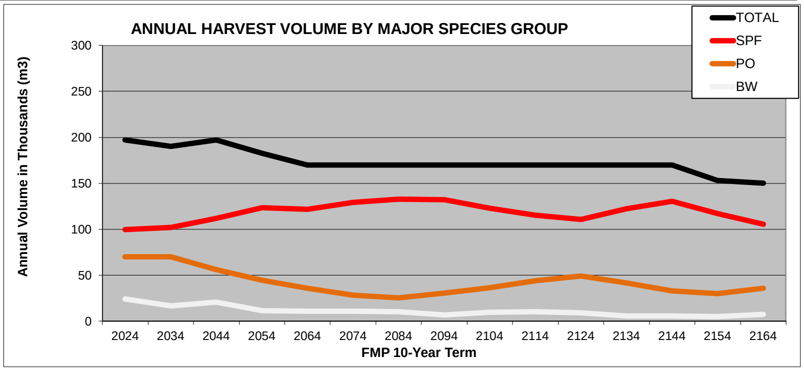
Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal Total ha	Natural ha	Plant ha	Seed ha
T1	756	756	0	1,833	1,119	374	339
T2	745	745	0	1,883	1,127	319	437
T3	863	863	0	1,980	950	303	728
T4	861	861	0	1,791	601	250	940
T5	830	830	0	1,707	430	183	1,094
T6	867	867	0	1,837	424	152	1,262
T7	884	884	0	1,795	377	190	1,228
T8	876	876	0	1,678	318	219	1,141
T9	829	829	0	1,737	523	240	973
T10	788	788	0	1,810	609	170	1,030
T11	766	741	0	1,702	511	136	1,055
T12	824	757	0	1,669	367	93	1,209
T13	867	813	0	1,672	246	104	1,321
T14	781	754	0	1,519	191	100	1,229
T15	719	714	0	1,447	294	164	989
T16	688	649	0	1,417	440	163	814



TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
CAR2	112	543		
DEA1	301	186	248	198
H105	664	528	794	661
LLP1			25	26
LLP2			59	21
LLP3	170			
LOTW	362	474	551	678
MEA1	77	39	131	88
MEA2	122	94	104	85
MEA3	43	38	68	33
CAR1				
SMZA				
TOTAL	1,851	1,902	1,980	1,791



WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: LTMD-01 **Date:** May 9, 2023.

Breakdown of PLANFU Available Harvest Area by Analysis Unit and Age Class TERM 1

	Forest Unit:		(Analysis Unit)														
	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
A5	0																
A15																	
A25																	
A35																	
A45								58									
A55								6									
A65				5													
A75	10			10			2				4						
A85	6			12		16	126	9	0	1	2	2					
A95	48	51		438	0	59	372	30	14	5	29	3		34			18
A105	22	59		40			8	70		73	7	5		9			9
A115	7	5		4				23		5		1		37	9		0
A125	2	4		9				3				0		13	2		11
A135				0								1		3	0		0
A145	1											1			19		
A155															17		
A165		0													1		
A175																	
A185															1		
A195															1		
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	95	119	0	518	0	76	508	199	15	84	41	12	0	95	50	0	38
																Total:	**1,851**

Renewal Area by Treatment Type Term 1

	Total	Natural	Plant	Seed
BFM	94	28	66	-
CMX	118	-	-	118
CMXC	-	-	-	-
HMX	513	418	94	-
HRDA	0	0	-	-
HRDB	75	75	-	-
HRD	503	503	-	-
PJDD	197	-	197	-
PJDS	14	4	4	6
PJM	83	-	-	83
POD	41	41	-	-
PRWR	12	-	12	-
PRWW	-	-	-	-
SBD	94	-	-	94
SBL	49	49	-	-
SBLC	-	-	-	-
SBM	38	-	-	38
	1,833	**1,119**	**374**	**339**
	Renewal:	**61%**	**20%**	**19%**

Available Harvest Area by Analysis Unit

	Forest Unit:		(Analysis Unit)														
Term	BFM	CMX	CMXC	HMX	HRDA	HRDB	HRD	PJDD	PJDS	PJM	POD	PRWR	PRWW	SBD	SBL	SBLC	SBM
T1	95	119		518	0	76	508	199	15	84	41	12		95	50		38
T2	50	154		499	0	103	168	259	19	105	233			124	50	88	50
T3	3	201	68	252	0	75	497	337	25	131	38	35	13	161	55	25	65
T4	9	261	18	202	0	7	123	400	32	164	190	5	9	210	61	16	84
T5	16	339	11	59	0	15	132	280	41	205	158	4	2	273	62		109
T6	4	399	5	175	0	17	105	196	54	256	71	3	2	354	56		142
T7	11	279	2	83	0	15	188	199	70	189	58		5	461	50		185
T8	23	195	1	8	0	3	10	259	83	196	255			472	45		129
T9	9	137		351	0	4	82	336	58	164	133			330	41		91
T10	113	114	4	178	0	12	204	384	41	205	223			231	37		63
T11	59	149	2	141	0	17	66	499	28	176	322			162	33		48
T12	41	144	1	86	0	0	2	648	20	220	301			113	30		62
T13	11	139	1	32	0	3	63	843	24	154	210			79	33		81
T14		181	0	32	0	0	8	758	22	108	214	0		56	36		105
T15	17	147	0	128	0	2	65	576	15	75	196	1		39	39	10	136
T16	33	143	0	309	0	2	68	403	11	53	142			27	43	5	177

Appendix 8

Summary of Long-term Management Direction Results
LTMD-01

WHISKEY JACK FOREST 2024 FMP	SUMMARY of SFMM INVESTIGATION

Case Name: LTMD-01 **Date:** May 9, 2023.

Purpose: LTMD run selected as a reasonable balance of forest diversity indicators and other objective achievement through time (was previously named 26-Bal-SBL-PRW). Includes projected operations in only SMZ CAR2 and SMZB, as per MNRF direction.

Specific Inputs: Run 26-Bal-SBL-PRW that includes operational limits for certain forest unit harvest areas, and operational harvest area and volume flow controls (in addition to BLG targets).

Group:	Mm3/yr	Mm3/yr	Vol. Flow
SPF	100,000	100,000	+/-10%
PO	70,000	70,000	+/-20%
BW			
TOTAL	170,000	170,000	
	T1	T2	

Same as Run 26
Added "products" for Under and Defct (Defect) to summarize Biomass Volumes. Do not contribute to net merch volumes.
Same results as Run 26-Bal-SBL-PRW

RESULTS: Where projections in the following tables fall below lower targets, the data is shaded yellow; where projections exceed upper targets, the data is shaded green.

FOREST CONDITION RESULTS

Used similar / relaxed BLG targets for wood supply investigations

Implications on Forest Condition - Same as other runs - Very good (or above upper IQR) BLG indicator achievement for all Mature-Late classes. Similar for Old Growth T1-5, but improves as area ages. Upland Conifer increases but never reaches lower IQR. Young Forest never reaches lower IQR but relatively stable through time. Slow creation of all-ages PRW, but OG PRW increases. Caribou habitats improve (to T3) and overachieve by T4-T5 (same as BLG-Max).

(2a) Area by Landscape Class (Productive ha)

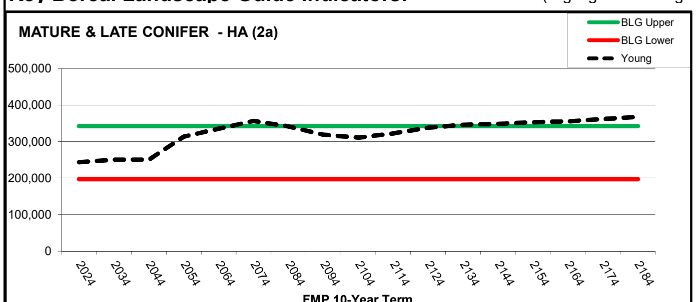
Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	81,424	186,273	66,561	14,802	243,544	143,145	46,587
T2	42,339	222,608	60,703	15,722	250,806	142,421	47,513
T3	61,696	211,214	42,322	17,982	250,263	152,961	45,462
T4	80,052	121,942	45,846	22,424	313,903	149,976	47,750
T5	97,601	78,888	49,061	24,298	335,079	149,227	47,727
T6	98,703	56,265	52,465	28,869	356,257	142,336	46,890
T7	100,957	67,954	58,094	34,027	341,632	133,701	45,378
T8	102,240	85,316	60,011	45,036	318,851	126,294	43,791
T9	102,460	102,776	55,647	49,720	310,947	117,634	42,302
T10	102,417	106,069	52,092	52,846	322,499	102,366	43,095
T11	101,794	107,874	51,446	54,556	337,819	84,394	43,470
T12	100,777	108,939	51,711	54,887	346,207	74,959	43,839
T13	100,943	108,210	51,283	58,075	349,019	69,647	44,119
T14	101,767	107,747	50,013	59,436	353,359	64,657	44,313
T15	102,557	107,412	47,806	60,911	355,679	62,493	44,426
T16	102,327	108,057	44,040	60,242	361,383	60,870	44,365
T17	100,006	110,565	40,973	58,761	367,837	58,853	44,279
BLG Upper	263,084	228,782	63,469	16,237	269,185	65,739	16,276
BLG Lower	143,268	103,333	36,052	8,706	178,461	43,021	12,845

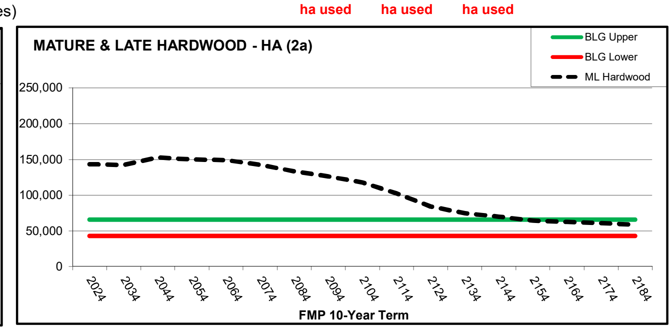
(2b) Old Growth by Grouping (Prod. ha)	Lower Old Growth Age (Years):				(2d)	(2e)
Term:	OGupC	OGloC	OGhmx	OGprw	Upland Conifer	Young <36 yrs
T1	23,536	1,071	22,603	30	359,248	136,124
T2	62,957	1,693	67,865	125	360,810	88,454
T3	103,413	1,803	119,874	296	365,455	87,058
T4	132,861	4,333	140,600	522	373,957	111,439
T5	136,892	7,152	156,383	914	377,979	135,923
T6	142,815	12,825	163,601	1,504	382,769	145,814
T7	185,558	19,862	172,092	1,638	388,407	144,997
T8	195,793	27,951	186,943	1,719	392,460	144,218
T9	211,426	30,147	185,520	1,740	404,844	143,494
T10	215,796	30,972	188,015	1,694	411,320	143,142
T11	222,701	30,567	180,654	1,643	417,949	143,140
T12	218,426	29,862	172,183	1,594	422,418	142,786
T13	218,175	31,856	169,534	1,695	424,970	142,366
T14	222,098	32,150	165,723	1,678	431,222	141,427
T15	224,291	32,365	163,845	1,643	435,463	139,206
T16	225,705	31,478	161,413	1,767	440,474	136,965
T17	226,313	30,424	160,028	1,820	444,388	134,632
BLG Upper	82,642	6,477	58,909		497,902	342,348
BLG Lower	51,310	4,282	35,996	1,500	475,260	196,754
			Model:	1,500 ha used	400,000 ha used	130,000 ha used

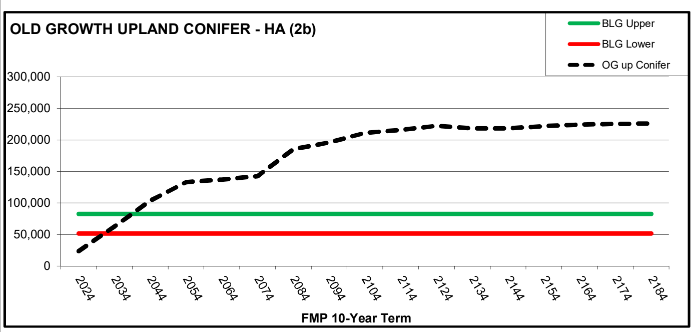
(6a) Available Forest: Term	
T1	196,134
T2	195,242
T3	194,350
T4	194,350
T5	194,350
T6	194,350
T7	194,350
T8	194,350
T9	194,350
T10	194,350
T11	194,350
T12	194,350
T13	194,350
T14	194,350
T15	194,350
T16	194,350
T17	194,350

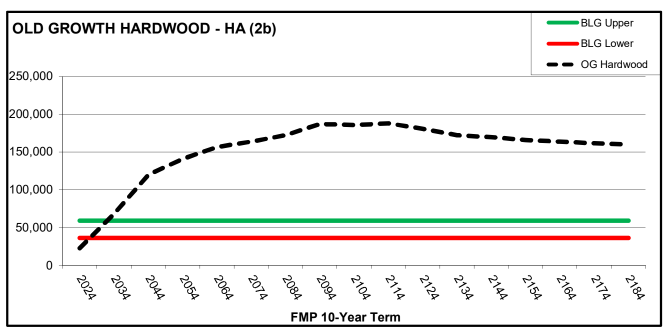
Key Boreal Landscape Guide Indicators:

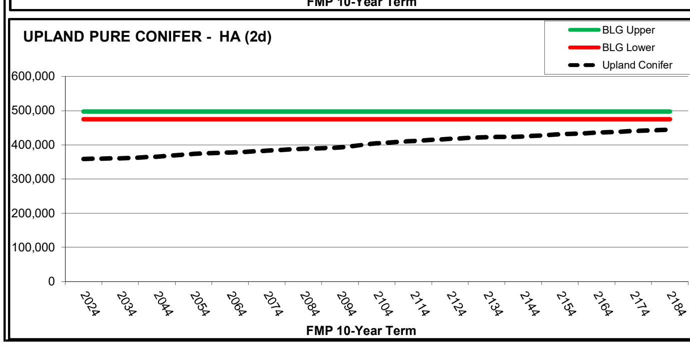
(Highlights challenges)

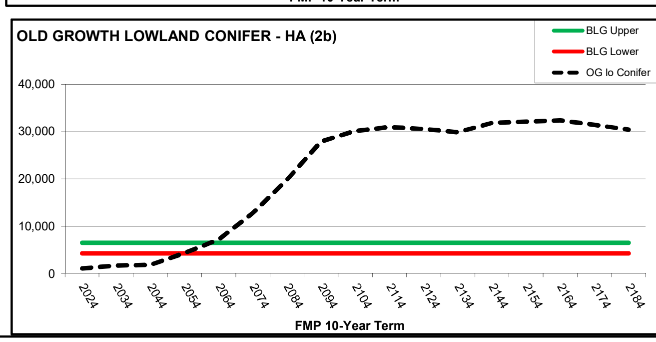












WHISKEY JACK FOREST 2024 FMP	SUMMARY of SFMM INVESTIGATION
Case Name: LTMD-01	Date: May 9, 2023.

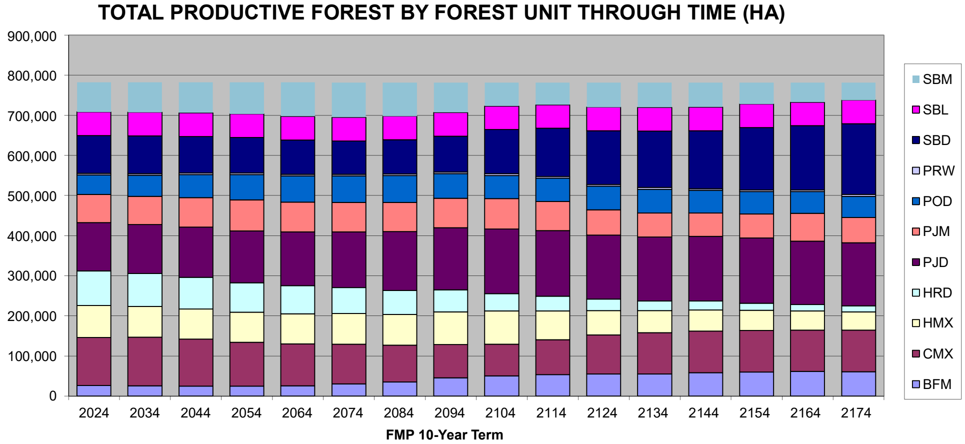
Productive Forest Area Through Time Data (hectares): by Forest Unit — Indicator (2c)

Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1	782,337	26,616	119,352	80,207	85,706	120,245	70,531	48,642	3,587	94,413	58,977	74,058
T2	782,112	25,901	120,770	77,215	81,792	121,673	70,474	52,964	3,687	93,903	58,972	74,760
T3	781,899	24,974	117,390	74,977	79,019	124,960	73,452	57,358	3,768	91,251	58,959	75,793
T4	781,894	25,129	109,293	74,651	73,151	129,099	77,893	62,878	3,876	88,374	58,959	78,590
T5	781,881	25,834	104,119	74,903	70,682	133,417	74,303	65,471	3,935	85,710	58,959	84,549
T6	781,785	30,260	99,345	76,257	64,639	139,004	73,539	65,574	3,983	83,446	58,959	86,779
T7	781,742	34,977	92,012	76,353	59,912	147,199	72,370	67,099	4,024	84,819	58,959	84,019
T8	781,539	45,810	82,844	81,497	54,680	155,209	73,196	61,214	4,076	89,373	58,959	74,682
T9	781,487	50,314	79,283	82,419	43,635	161,120	75,359	57,917	4,116	109,997	58,959	58,368
T10	781,384	53,364	87,215	71,912	36,134	163,546	72,643	58,326	4,153	120,077	58,959	55,054
T11	781,353	55,058	97,474	60,976	27,958	159,901	63,331	58,802	4,178	133,467	58,959	61,250
T12	781,319	55,387	102,600	55,101	23,702	159,933	60,048	58,964	4,188	141,027	58,959	61,409
T13	781,297	58,528	103,934	52,343	21,914	161,132	58,819	56,461	4,188	144,174	58,959	60,845
T14	781,292	59,864	103,923	49,876	17,536	162,923	59,805	55,718	4,194	155,262	58,959	53,231
T15	781,286	61,332	103,224	47,909	16,114	157,222	69,990	54,090	4,195	159,677	58,959	48,574
T16	781,284	60,627	103,724	45,457	14,963	157,746	62,717	52,880	4,200	176,317	58,959	43,694
T17	781,275	59,157	105,682	40,630	14,391	147,779	72,111	53,861	4,205	181,243	58,959	43,255

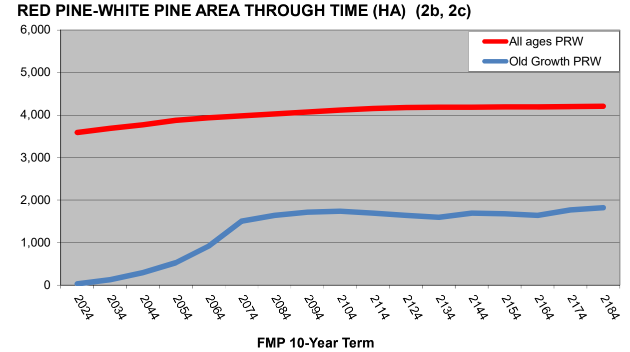
(Obj. 1) Caribou Habitat (Caribou Zone):

Term	Refuge (1b)	Winter (1a)
T1	132,854	86,255
T2	146,188	103,992
T3	156,292	111,036
T4	162,981	114,479
T5	166,030	120,540
T6	166,380	119,203
T7	167,928	121,767
T8	168,871	122,522
T9	170,502	124,845
T10	172,753	126,952
T11	175,033	128,055
T12	175,430	125,345
T13	176,127	124,564
T14	178,223	126,256
T15	180,093	127,590
T16	181,920	131,133
T17	182,898	132,118
BLG Upper	161,804	115,633
BLG Lower	147,605	63,721

TOTAL PRODUCTIVE FOREST BY FOREST UNIT THROUGH TIME (HA)



RED PINE-WHITE PINE AREA THROUGH TIME (HA) (2b, 2c)



All ages PRW
- desirable level "to increase"

Improved achievement through addition of slightly higher target T17.

Old Growth PRW
- desirable level "to increase"

WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: LTMD-01 **Date:** May 9, 2023.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - Similar volumes to Run 21-24: Underachieve PO commitment T1-2 (70 vs 100K) but stable for 20 years, SPF met (over) in all terms. PO decreases 6-7 terms. Harvest is relatively stable for 40 years, then decreases slightly. TOTAL volumes sustainable at 170,000+ m3 except T14-16 (150K). Harvest shifts from poplar dominated to conifer through time (as expected). Improved balance of forest unit harvest area and volume. SBL harvest area at acceptable level.
Renewal - good balance of Natural, Plant, Seed. Future PRW area may be increased somewhat through operational treatments.

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

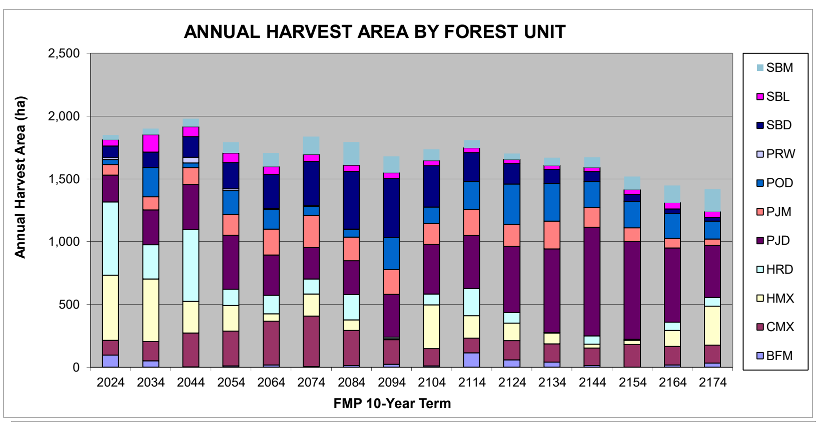
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 5b)	1,851	95	119	518	584	214	84	41	12	95	50	38
T2	1,902	50	154	499	271	278	105	233	0	124	138	50
T3	1,980	3	269	252	572	361	131	38	48	161	80	65
T4	1,791	9	279	202	130	431	164	190	14	210	76	84
T5	1,707	16	351	59	146	321	205	158	6	273	62	109
T6	1,837	4	403	175	121	250	256	71	5	354	56	142
T7	1,795	11	281	83	203	269	189	58	5	461	50	185
T8	1,678	23	196	8	13	342	196	255	0	472	45	129
T9	1,737	9	137	351	86	394	164	133	0	330	41	91
T10	1,810	113	118	178	216	424	205	223	0	231	37	63
T11 (5b)	1,702	59	151	141	83	527	176	322	0	162	33	48
T12	1,669	41	145	86	2	668	220	301	0	113	30	62
T13	1,672	11	140	32	65	867	154	210	0	79	33	81
T14	1,519	0	181	32	8	780	108	214	0	56	36	105
T15	1,447	17	147	128	67	591	75	196	1	39	50	136
T16	1,417	33	143	309	70	414	53	142	0	27	49	177

Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	% Small	% Large
T1 (5c)	196.9	100.0	70.0	24.2	2.2	0.99	0.01
T2	190.2	101.8	70.0	17.0	0.0	0.94	0.06
T3	197.4	112.0	56.0	20.9	7.5	0.97	0.03
T4	182.7	123.2	44.8	11.8	2.0	0.94	0.06
T5	170.0	121.7	35.8	10.9	0.8	0.95	0.05
T6	170.0	129.1	28.7	10.8	0.7	0.98	0.02
T7	170.0	132.6	25.5	10.6	0.6	0.97	0.03
T8	170.0	132.0	30.6	6.8	0.0	0.97	0.03
T9	170.0	123.0	36.8	9.8	0.0	0.99	0.01
T10	170.0	115.2	44.1	10.2	0.0	0.98	0.02
T11 (5c)	170.0	111.0	49.3	9.3	0.0	0.92	0.08
T12	170.0	122.1	41.6	6.0	0.0	0.90	0.10
T13	170.0	130.4	33.2	5.9	0.0	0.91	0.09
T14	153.0	117.4	29.9	5.1	0.1	0.91	0.09
T15	150.0	105.6	35.9	7.6	0.2	0.91	0.09
T16	150.0	100.0	39.4	10.0	0.0	0.94	0.06
Average	171.9	117.3	42.0	11.1	0.9		

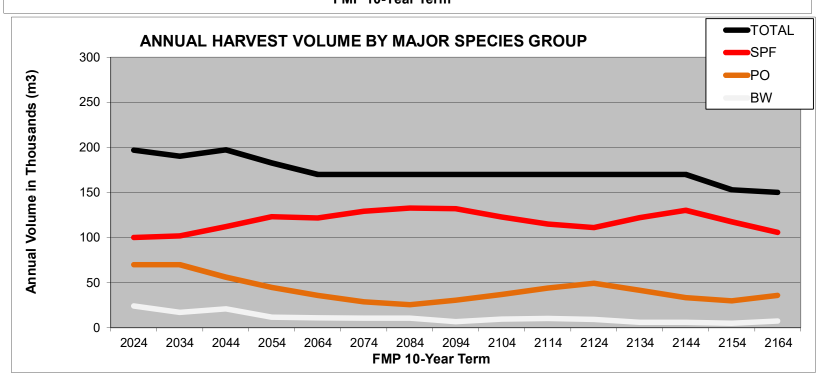
Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal Total ha	Natural ha	Plant ha	Seed ha
T1	756	756	0	**1,833**	1,119	374	339
T2	745	745	0	**1,883**	1,127	319	437
T3	863	863	0	**1,980**	950	303	728
T4	861	861	0	**1,791**	601	250	940
T5	830	830	0	**1,707**	430	183	1,094
T6	867	867	0	**1,837**	424	152	1,262
T7	884	884	0	**1,795**	377	190	1,228
T8	876	876	0	**1,678**	318	219	1,141
T9	829	829	0	**1,737**	523	240	973
T10	788	788	0	**1,810**	609	170	1,030
T11	766	741	0	**1,702**	511	136	1,055
T12	824	757	0	**1,669**	367	93	1,209
T13	867	813	0	**1,672**	246	104	1,321
T14	781	754	0	**1,519**	191	100	1,229
T15	719	714	0	**1,447**	294	164	989
T16	688	649	0	**1,417**	440	163	814



TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
CAR2	112	543		
DEA1	301	186	248	198
H105	664	528	794	661
LLP1			25	26
LLP2			59	21
LLP3	170			
LOTW	362	474	551	678
MEA1	77	39	131	88
MEA2	122	94	104	85
MEA3	43	38	68	33
CAR1				
SMZA				
TOTAL	1,851	1,902	1,980	1,791



WHISKEY JACK FOREST 2024 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: **LTMD-01** **Date:** May 9, 2023.

Breakdown of PLANFU Available Harvest Area by Analysis Unit and Age Class TERM 1

Forest Unit: (Analysis Unit)

	BFM_	CMX_	CMXC	HMX_	HRDA	HRDB	HRD_	PJDD	PJDS	PJM_	POD_	PRWR	PRWW	SBD_	SBL_	SBLC	SBM
A5	0																
A15																	
A25																	
A35																	
A45								58									
A55								6									
A65				5													
A75	10			10			2				4						
A85	6			12		16	126	9	0	1	2	2					
A95	48	51		438	0	59	372	30	14	5	29	3		34			18
A105	22	59		40			8	70		73	7	5		9			9
A115	7	5		4				23		5		1		37	9		0
A125	2	4		9				3				0		13	2		11
A135				0								1		3	0		0
A145	1											1			19		
A155															17		
A165		0													1		
A175																	
A185															1		
A195															1		
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	95	119	0	518	0	76	508	199	15	84	41	12	0	95	50	0	38
																Total:	**1,851**

Renewal Area by Treatment Type Term 1

	Total	Natural	Plant	Seed
BFM	94	28	66	-
CMX	118	-	-	118
CMXC	-	-	-	-
HMX	513	418	94	-
HRDA	0	0	-	-
HRDB	75	75	-	-
HRD	503	503	-	-
PJDD	197	-	197	-
PJDS	14	4	4	6
PJM	83	-	-	83
POD	41	41	-	-
PRWR	12	-	12	-
PRWW	-	-	-	-
SBD	94	-	-	94
SBL	49	49	-	-
SBLC	-	-	-	-
SBM_	38	-	-	38
	1,833	**1,119**	**374**	**339**
	Renewal:	**61%**	**20%**	**19%**

Available Harvest Area by Analysis Unit

Forest Unit: (Analysis Unit)

Term	BFM_	CMX_	CMXC	HMX_	HRDA	HRDB	HRD_	PJDD	PJDS	PJM_	POD_	PRWR	PRWW	SBD_	SBL_	SBLC	SBM
T1	95	119		518	0	76	508	199	15	84	41	12		95	50		38
T2	50	154		499	0	103	168	259	19	105	233			124	50	88	50
T3	3	201	68	252	0	75	497	337	25	131	38	35	13	161	55	25	65
T4	9	261	18	202	0	7	123	400	32	164	190	5	9	210	61	16	84
T5	16	339	11	59	0	15	132	280	41	205	158	4	2	273	62		109
T6	4	399	5	175	0	17	105	196	54	256	71	3	2	354	56		142
T7	11	279	2	83	0	15	188	199	70	189	58		5	461	50		185
T8	23	195	1	8	0	3	10	259	83	196	255			472	45		129
T9	9	137		351	0	4	82	336	58	164	133			330	41		91
T10	113	114	4	178	0	12	204	384	41	205	223			231	37		63
T11	59	149	2	141	0	17	66	499	28	176	322			162	33		48
T12	41	144	1	86	0	0	2	648	20	220	301			113	30		62
T13	11	139	1	32	0	3	63	843	24	154	210			79	33		81
T14		181	0	32	0	0	8	758	22	108	214	0		56	36		105
T15	17	147	0	128	0	2	65	576	15	75	196	1		39	39	10	136
T16	33	143	0	309	0	2	68	403	11	53	142			27	43	5	177