SUPPLEMENTARY DOCUMENTATION

B

Analysis Package

The Analysis Package is contained in a separate electronic FMP file:

MU644_2022_FMP_TXT_AnPack.PDF (Final Plan)

Remainder of FMP Supplementary Documentation is in file:

MU644_2022_FMP_TXT_SuppDoc.PDF

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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 Kenora Forest 2022-2032 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 Sustainable Forest Licence holder, Miitigoog LP, and staff from the Kenora District and the Northwest Region NDMNRF offices.

2.0 Analytical Tools

The following tools were used during the development of the LTMD for the 2022-2032 Forest Management Plan for the Kenora 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, deer and elk) 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 Kenora 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 NDMNRF-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 NDMNRF 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 2022-2032 Kenora 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 (2017).*

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 Oct. 2, 2019);
2. Current Forest Condition (approved April 8, 2020);
3. Base Model Inventory and Base Model (approved June 10, 2020);
4. Management Objectives (approved May 12, 2020);
5. Proposed Long-term Management Direction (approved June 22, 2020); and
6. Preliminary Endorsement of Long-term Management Direction (Sept. 10, 2020).

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 (March 2017)* and *FIM Forest Management Planning Technical Specifications (2018)*. 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, 2018 to the April 1, 2022 plan start. The forecast depletions layer consists of those depletions not cut in the last actual reported depletions (2017/2018 AR) to the end of the 2022 (2012-2022 FMP) not yet depleted and recorded.

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 2017)*
- *Forest Management Planning Technical Specifications (FIM Tech. Specs. 2018)*
- *Ontario Forest Resources Inventory*
- *Photo Interpretation Specifications, Revised Specifications March 1, 2012*

The planning composite was developed using GIS datasets approved by NDMNRF. 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 2018.

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 NDMNRF 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 of the Kenora Forest Management Unit (644) - provided by NDMNRF	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 on digital 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 provincial park or reserves. Provided by the NDMNRF via 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.
Non- productive forest area and water	Contains polygons that are identified as wetlands, water and other non-productive land types. 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 land ownership (i.e. crown, patent, federal, crown patent). Base coverages provided by the NDMNRF 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 2019 by NDMNRF Regional Office to look at photos to help determine boundaries.

Dataset Name	Description	Feature Type	Use	Vintage
Depletion	Contains polygons that document and track harvest and AOC reserve areas and resulting forest descriptions. Maintained by the SFL.	polygon	Used to update forest inventory, stand descriptions and reserve status.	Updated annually - also used in annual reports
Silviculture	Contains polygons that document and track areas where silvicultural operations have occurred. Maintained by the SFL.	polygon	Used to update forest inventory, stand descriptions.	Updated annually - also used in annual reports
Assessments (FTG)	Contains polygons that document and track areas where Assessments (FTG) surveys have occurred. Maintained by the SFL.	polygon	Used to update forest inventory, stand descriptions.	Updated annually - also used in annual reports
Roads	Shows all roads in the management unit. Maintained jointly by the NDMNRF and SFL.	line	Major road areas and recent 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 2009imagery

The first step in developing the PCI from the eFRI was to create a 2017 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 (2022).

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. The majority of stands have a VERT description of SI (single canopy), however, 1,596 stands have a TU or MU 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 occurred since eFRI image acquisition began in 2009, have been updated into the inventory, up to and including depletions from the 2017-2018 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.

Since 2009 when eFRI imagery was flown, there was one large fire on the Kenora Forest in 2018 (Kenora 71, 10,684 ha). The recently depleted area of this fire was updated in the Planning Composite Inventory, prior to approval for Progress Checkpoint #1. The natural depletion, year of origin, stand age, height, etc. was updated however in the absence of confirmed stand composition surveys, the original pre-fire stand composition was carried forward in the PCI.

The forest was then grown to the start of the planning period (2022) which involved altering the stand age and height information based on accepted regional growth algorithms.

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 2017-2018 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 2020-2021 fiscal year. This was done to avoid having a modelled forecast that is unrealistically high. A FYRDEP of 2020 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 Nov. 1, 2019 (effective date Oct. 2, 2019) via email from Mitchell Legros, R.P.F., Regional Planning Forester to Kurt Pochailo, R.P.F., Plan Author, SFL 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 Kenora Forest Management Plan 2022:

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. <u>Regional standard forest units</u> are the foundation, and may be rolled up into to landscape guide forest units or into 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 NDMNRF 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)

Table 3 Area-Weighted Average Condition by NW SFU

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1	BfMx1	36159	54	10.6	60.98	1.4	0.6	11.1	9.9	0.7	1.6	19.4	7.0	0.0	1.2	38.8	10.0	0.1	0.2	0.0
2	BfPur	2456	34	7.7	61.15	0.9	0.6	6.8	1.1	0.1	0.2	5.2	1.5	0.0	0.3	74.5	9.9	0.1	0.3	0.0
3	BwDee	3730	55	13.8	70.41	2.3	0.7	13.2	1.7	0.5	0.6	5.6	3.5	0.0	1.0	6.1	65.5	0.9	1.5	0.0
4	BwSha	191	42	9.7	41.75	2.7	0.5	17.9	9.4	0.0	0.0	2.7	2.3	0.0	0.0	3.3	63.3	0.7	0.3	0.0
5	ConMx	93845	62	13.0	62.85	1.9	0.6	19.6	30.1	1.0	1.6	19.8	2.4	0.1	0.9	12.0	12.2	0.1	0.2	0.0
6	HrdMw	85766	60	17.2	65.31	2.3	0.7	38.7	9.7	0.9	2.1	10.3	4.6	0.0	1.7	14.9	15.4	0.4	1.1	0.0
7	HrDom	80880	62	18.7	68.45	2.4	0.7	50.8	4.1	0.4	0.9	5.4	3.8	0.0	0.6	9.4	20.3	0.7	3.7	0.0
8	OCLow	10071	103	12.0	68.07	2.5	0.8	1.4	0.1	0.0	0.2	18.1	0.1	18.6	47.0	1.0	3.0	0.0	10.5	0.0
9	OthHd	22751	75	17.0	72.84	2.4	0.8	20.1	0.3	0.1	0.9	3.8	2.3	0.5	3.5	5.0	8.2	11.8	43.2	0.0
10	PjDee	87935	49	11.9	71.50	2.3	0.8	5.7	82.7	0.1	0.0	8.3	0.1	0.0	0.0	0.6	2.4	0.0	0.0	0.0
11	PjMx1	42091	72	14.8	60.23	2.5	0.6	7.1	53.9	1.3	1.0	28.0	0.8	0.0	0.1	3.1	4.7	0.1	0.0	0.0
12	PjSha	66174	54	11.4	49.55	2.8	0.6	3.8	83.6	0.1	0.1	9.0	0.1	0.0	0.0	0.6	2.8	0.0	0.0	0.0
13	PoDee	64057	51	16.5	70.73	2.1	0.7	78.6	3.6	0.1	0.2	2.9	2.2	0.0	0.2	5.0	5.9	0.1	1.3	0.0
14	PoSha	1011	29	8.9	47.05	2.7	0.4	79.4	9.0	0.0	0.0	3.1	1.4	0.0	0.5	1.7	4.9	0.0	0.1	0.0
15	PrDom	1608	56	13.2	75.42	1.5	0.7	4.1	3.1	80.6	3.5	2.3	0.3	0.0	0.0	2.6	3.2	0.2	0.0	0.0
16	PrwMx	9968	83	17.9	68.73	2.0	0.7	14.3	7.9	35.4	16.3	6.3	1.2	0.0	1.5	7.3	9.1	0.4	0.2	0.0
17	PwDom	9053	96	19.5	65.78	2.1	0.7	12.2	2.5	8.3	51.2	3.7	1.4	0.0	1.9	8.5	9.1	0.9	0.3	0.0
18	SbDee	15298	68	11.6	66.65	1.4	0.6	2.9	13.5	0.0	0.1	75.9	1.2	0.1	0.0	2.8	3.5	0.0	0.0	0.0
19	SbLow	39022	92	9.9	58.64	2.8	0.6	0.8	2.9	0.0	0.0	83.2	0.1	9.5	0.9	0.4	1.0	0.0	1.3	0.0
20	SbMx1	31516	75	12.2	62.02	1.6	0.6	5.2	26.6	0.6	0.5	52.4	4.5	0.0	0.2	4.1	5.6	0.0	0.1	0.0
21	SbSha	6355	82	11.8	52.68	2.0	0.5	0.9	17.7	0.0	0.0	75.5	0.4	0.2	0.0	2.5	2.8	0.0	0.0	0.0
22	UplCe	9145	97	13.8	78.00	1.9	0.8	11.9	0.6	0.7	3.2	6.4	1.6	0.1	53.8	5.9	10.9	0.1	4.8	0.0

22 rows.

- 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

5.1.2 Boreal Landscape Guide Forest Units (LGFU)

Landscape guide forest units 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 NDMNRF NW Region (see Table 4 for classification script). LGFUs are management decisions classified in the Planning Inventory and in Base Model Inventory.

Table 4 Landscape Guide Forest Units (LGFU)

#	Code	Name	Included Regional NWSFUs	Area (Ha)
1	**PrwMx**	Red Pine and White Pine Mix	PwDom, PrDom, PrwMx	20,629
2	**OCLow**	Other Conifer Lowland	OCLow	10,071
3	**SbLow**	Black Spruce Lowland	SbLow	30,922
4	**SbDom**	Black Spruce Dominant	SbSha, SbDee	21,653
5	**PjDom**	Jack Pine Dominant	PjSha, PjDee	154,109
6	**PoDom**	Poplar Dominant	PoSha, PoDee	65,068
7	**BwDom**	Birch Dominant	BwSha, BwDee	3,921
8	**OthHd**	Other Hardwood	OthHd	22,751
9	**SbMx1**	Black Spruce Dominant Conifer Mix	SbMx1	31,516
10	**PjMx1**	Jack Pine Dominant Conifer Mix	PjMx1	42,091
11	**BfDom**	Balsam Fir Dominant	BfPur, BfMx1	38,615
12	**HrDom**	Hardwood Dominant	HrDom	80,880
13	**HrdMw**	Hardwood Mix	HrdMw	85,766
14	**ConMx**	Conifer Hardwood Mix	ConMx, UplCe	102,990

Landscape classes are groupings of forest units by development stage, 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 NDMNRF's approved forest management guide(s) relating to landscape pattern and structure. See Section 6.2.1.1 for the classification of Landscape Classes.

Landscape Guide forest unit groupings (by forest type and age in 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.

5.1.3 Plan Forest Units (PLANFU)

The Kenora 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 Kenora Forest, as well as amount of SFU areas (rationale to manage separately or in combination with other SFUs).

The 2012-2022 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 Kenora Forest 2022-2032 FMP.

General PLANFU Requirements *(FMPM and FMP training)*:

- PLANFUs are to be consistent (as is practical) with the Northwest Region standard forest units (NWSFUs) for roll up (recommended) or splitting (not recommended, rationale required) into PLANFUs.
- 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 must be as consistent as possible for operational understanding and for accurate reporting and trend analyses.
- Classification script is determined by Planning Team (documented in Table FMP-2).
- PLANFUs are management decisions tagged in the 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*.

Kenora Forest 2022 FMP PLANFU Development:

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

Kenora 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 2022 PLANFUs, with some changes as rationalized below:

PrwMx LGFU - contains PwDom (9,053 ha), PrwMx (9,968 ha) and PrDom (1,608 ha) NWSFUs

- Red Pine and White Pine are locally significant, totalling 20,629 ha, so warrant 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).
- Keep the LGFU as the **PRW** PLANFU.

OCLow LGFU – includes the lowland cedar (OCLow, 10,071 ha) NWSFU.

- OCLow NWSFU – Lowland cedar makes up the OCLow LGFU, and will be managed with the SbLow LGFU in a **SBL** PLANFU. This approach was regionally supported as it was based on specific considerations for conifer-dominated lowland ecosites.
- OCLow area will be identified by an Analysis Units in the modelling, with applicable management inputs or constraints, if needed.

SbLow LGFU – contains SbLow NWSFU (39,022 ha). Lowland ecosites.

- Keep the LGFU as the **SBL** PLANFU
- Will be managed with OCLow NWSFU area (as decided above).

SbDom LGFU – contains SbSha (6,355 ha) and SbDee (15,298 ha) NWSFUs.

- Less shallow sites, mostly good soils. Smaller area than other NWR forests.
- Keep the LGFU as the **SBD** PLANFU

PjDom LGFU - contains PjSha (66,174 ha) and PjDee (87,935 ha) NWSFUs.

- Keep the LGFU as the **PJD** PLANFU
- For modelling, the deep-soiled and shallow-soiled components can be tracked separately as they may have different associated columns and operational considerations.

PoDom LGFU - contains PoSha (1,011 ha) and PoDee (64,057 ha) NWSFUs.

- Keep the LGFU as the **POD** PLANFU

BwDom LGFU - contains BwSha (191 ha) and BwDee (3,730 ha) NWSFUs.

- Discussed combining in HRD or HMX PLANFUs since small area
- Included LGFU in the **HRD** PLANFU since it was not a true mix condition.
- Can be tracked within modelling as an analysis unit, in case LGFU is needed to be rolled up.

OthHd LGFU – contains OthHd NWSFU (22,751 ha).

- Small area, but locally significant. Can have an analysis unit for modelling.
- Discussed combining in HRD PLANFU since reflect a purer hardwood condition.
- Manage in the **HRD** PLANFU.

SbMx1 LGFU – contains SbMx1 NWSFU (31,516 ha)

- Keep the LGFU as the **SBM** PLANFU

PjMx1 LGFU – contains PjMx1 NWSFU (42,091 ha)

- Keep the LGFU as the **PJM** PLANFU

BfDom LGFU – contains BfPur (2,456 ha) and BfMx1 (36,159 ha) NWSFUs

- Discussion that this could be grouped with ConMx, but in the end, the amount of Balsam Fir on the Kenora Forest warranted a separate forest unit to allow for specific management strategy and modelling inputs.
- Keep the LGFU as the **BFM** PLANFU.

HrDom LGFU – contains HrDom NWSFU (80,880 ha).

- Keep the LGFU as the **HRD** PLANFU
- Will be managed with BwSha, BwDee, and OthHd NWSFU area (as decided above).

HrdMw LGFU – contains HrdMw NWSFU (85,766 ha).

- Keep the LGFU as the **HMX** PLANFU
- Code is consistent with SFL data system and 2012 FMP label.

ConMx LGFU – contains both ConMx (93,845 ha) and upland cedar (UplCe, 9,145 ha) NWSFUs.

- UplCe NWSFU will be identified as an analysis unit in the strategic modelling, separate from the ConMx analysis unit.
- Keep the LGFU as the **CMX** PLANFU.

Decision: With above LTMD Task Team consensus, the Kenora Forest 2022 FMP will use 11 PLAN Forest Units (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 2012-2022 FMP.

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 Kenora Forest 2022 FMP

Kenora 2022 - PLANFUs Version 2

PLANFU		NWSFUs	Ha	
BFM	Balsam Fir Mix	bfpur, bfmx1	38,615	5%
CMX	Conifer Mix	conmx, uplce	102,990	14%
HMX	Hardwood Mix	hrdmw	85,766	12%
HRD	Hardwood Dominant	hrdom, othhd, bwdee, bwsha	107,552	15%
PJD	Jack Pine Dominant	pjdee, pjsha	154,109	21%
PJM	Jack Pine Mix	pjmx1	42,091	6%
POD	Poplar Dominant	podee, posha	65,068	9%
PRW	Red Pine and White Pine Mix	prwmx, prdom, pwdom	20,629	3%
SBD	Spruce Dominant	sbdee, sbsha	21,653	3%
SBL	Spruce Lowland	sblow, oclow	49,093	7%
SBM	Spruce Mix	sbmx1	31,516	4%
		(ownership 1)	719,082	100%

Table 6 Correlation Between NWSFUs – LGFUs – and Kenora 2022 FMP PLANFUs:

Regional Standard Forest Units (22) (specific sort order)			Landscape Guide FU (14)			2022 Plan Forest Units PLANFU (11)		
SFU	Name	Crown, Managed Area (ha)	LGFU	Name	Crown, Managed Area (ha)	PLANFU	Crown, Managed Area (ha)	
PwDom	White Pine Dominant	9,053	PrwMx	Red Pine and White Pine Mix	20,629	PRW	20,629	3%
PrDom	Red Pine Dominant	1,608						
PrwMx	Red and White Pine Mix	9,968						
ConMx	Conifer Hardwood Mix	93,845	ConMx	Conifer Hardwood Mix	102,990	CMX	102,990	14%
UplCe	Upland Cedar	9,145						
OCLow	Other Conifer Lowland	10,071	OCLow	Other Conifer Lowland	10,071	SBL	49,093	7%
SbLow	Black Spruce Lowland	39,022	SbLow	Black Spruce Lowland	39,022			
SbSha	Black Spruce Shallow	6,355	SbDom	Black Spruce Dominant	21,653	SBD	21,653	3%
SbDee	Black Spruce Deep	15,298						
PjSha	Jack Pine Shallow	66,174	PjDom	Jack Pine Dominant	154,109	PJD	154,109	21%
PjDee	Jack Pine Deep	87,935						
PoSha	Poplar Shallow	1,011	PoDom	Poplar Dominant	65,068	POD	65,068	9%
PoDee	Poplar Deep	64,057						
SbMx1	Black Spruce Dominant Conifer Mix	31,516	SbMx1	Black Spruce Dominant Conifer Mix	31,516	SBM	31,516	4%
PjMx1	Jack Pine Dominant Conifer Mix	42,091	PjMx1	Jack Pine Dominant Conifer Mix	42,091	PJM	42,091	6%
BfPur	Balsam Fir Pure	2,456	BfDom	Balsam Fir Dominant	38,615	BFD	38,615	5%
BfMx1	Balsam Fir Conifer Mix	36,159						
BwSha	Birch Shallow	191	BwDom	Birch Dominant	3,921	HRD	107,552	15%
BwDee	Birch Deep	3,730						
OthHd	Other Hardwood	22,751	OthHd	Other Hardwood	22,751			
HrDom	Hardwood Dominant	80,880	HrDom	Hardwood Dominant	80,880			
HrdMw	Hardwood Mix	85,766	HrdMw	Hardwood Mix	85,766	HMX	85,766	12%
		719,082			719,082	red matches LGFU	719,082	100%

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 PCI inventory and Base Model Inventory.

Strategic management zones were used to identify the wildlife emphasis areas on the Kenora Forest for caribou, moose, deer and elk. The development of these wildlife emphasis areas are detailed in the following appendices to this Analysis Package:

Appendix 1 – Caribou Habitat Analyses, includes:
Caribou Habitat Tract Analysis, and
Development of the Dynamic Caribou Habitat Schedule
Appendix 2 – Moose Emphasis Area Delineation
Appendix 3 – Deer Emphasis Area Delineation and Identification of Critical Thermal Cover
Appendix 4 – Elk Emphasis Area Delineation

Candidate emphasis areas (the DCHS, MEAs, the DEA and the elk emphasis area) were further refined during development of the LTMD Management as described in Section 9.2, and Appendices 1-4. The SMZs for wildlife habitat emphasis used in this FMP are:

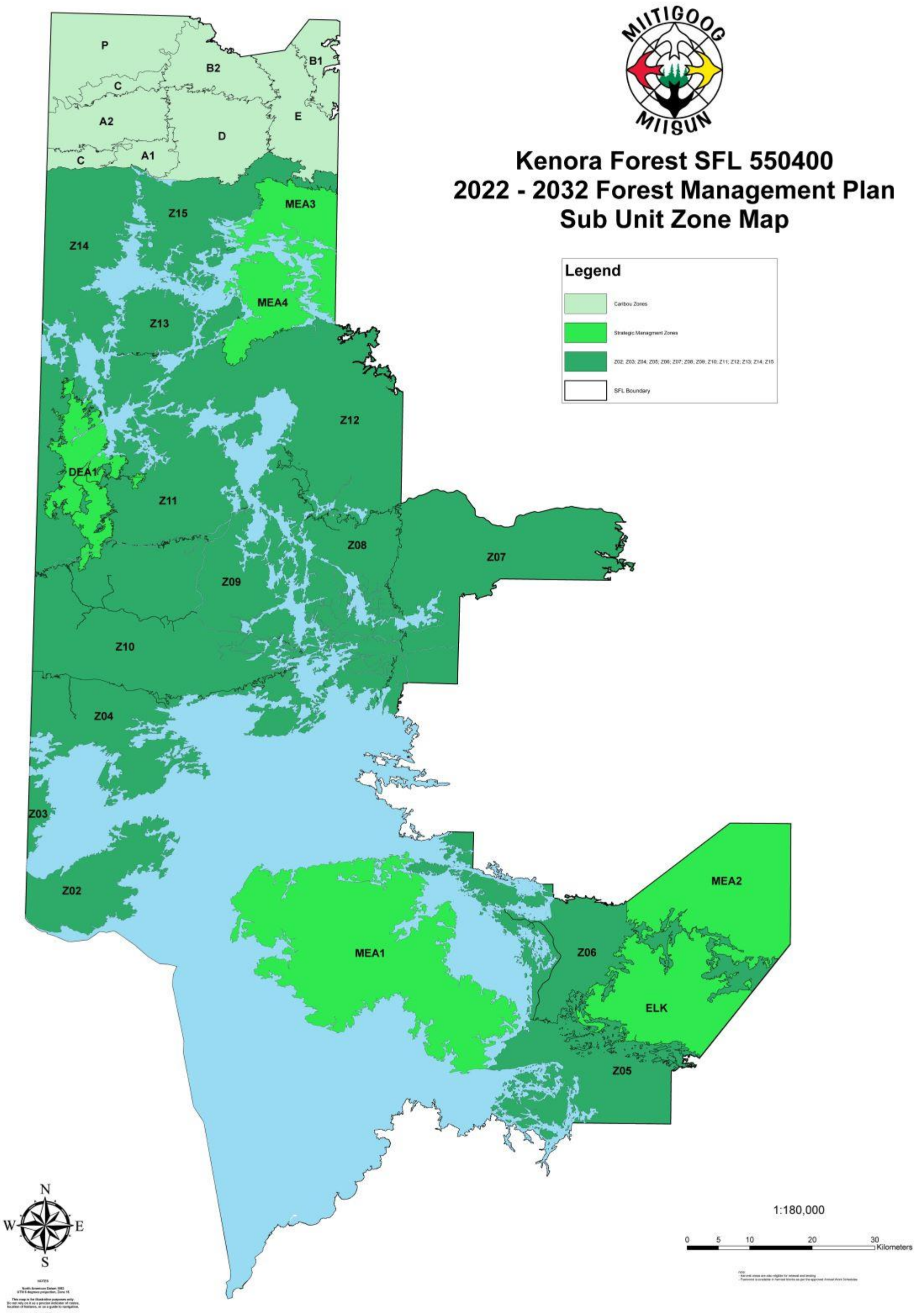
Caribou Zone DCHS Blocks:	A1, A2, B1, B2, C, D, E, P
Moose Emphasis Areas:	MEA1 – Aulneau Peninsula
	MEA2 - Maybrun
	MEA3 – North English River
	MEA4 – South English River
Deer Emphasis Area:	DEA1
Elk Emphasis Area:	ELK

Operational management zones (OMZ) represent areas distinct operating zones of the Kenora Forest. OMZs may also have operational constraints (e.g., accessibility, wildlife, fisheries or other constraints on forest operations). OMZs also aid in the graphic portrayal of main harvest areas for the next 40 years, a requirement of the FMPM 2017. Fifteen (15) operational zones were identified and are included in the BMI and OPI inventories in the OMZ field. OMZs are labelled Z01 to Z15.

Planning Team also recognized the requirement for current and future Large Landscape Patches (LLPs) in accordance with the Stand and Site Guide. The implementation of the DCHS in the caribou zone, and the abundance of high concentrations of mature and old forest in the non-caribou areas did not necessitate the delineation of additional LLPs on the Kenora Forest.

Subunits - Every stand on the forest was classified uniquely into an SMZ or an OMZ, and both fields were combined into a single user-defined subunit field "SU" in the BMI and OPI. Subunits used in the 2022-2032 FMP are illustrated in Figure 1. Map colour coding indicates the caribou SMZs (DCHS)(light blue), the other SMZs for wildlife habitat management emphasis (light green), and the operational management zones (dark green).

Figure 1 Subunits on the Kenora 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 2012-2022 FMP, is referred to as YIELD in the BMI, and throughout this 2022-2032 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.

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 definitions by PLANFU.

Table 7 Forest Productivity YIELD Definitions

There are four (4) YIELDS used for this 2022 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, 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.

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

YIELD SORT SCRIPT: Ver5 Sort by Site Class, adjustments to delete (new) invalid YIELDs or change SC split level.

```
'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 m_PJ >= (m_SB + m_SW) and YIELD = '-' "
DoCmd.RunSQL "update INVENTORY set YIELD = 'LOW' where PLANFU = 'CMX' and m_PJ < (m_SB + m_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	m_PJ >= (m_SB + m_SW) and YIELD = '-' "
17	LOW	CMX	m_PJ < (m_SB + m_SW) and YIELD = '-' "
18	ZZZZ	*Any unclassified*	*YIELD = 'ZZZZ' where YIELD = '-' "*

Table 8 YIELD BMI Sort Criteria and Definitions by PLANFU

FOREST UNIT		YIELD - Silvicultural Intensity				
		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)	(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 - Silvicultural Intensity				
		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 class 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 Stephen Yeung, R.P.F., Regional Planning Forester to Kurt Pochailo, R.P.F., Plan Author, SFL Lead, on April 8, 2020.

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 Kenora 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) 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 (2018)* 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 Kenora Forest was created through updating information in the forest classification fields in the approved Planning Inventory (Planning Composite and Forecast Depletion Layer (MU644_22PCM00 & MU644_22FDP00) 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 2022 - 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.

- 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 (nwrau).
- 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 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 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 2022-2032 FMP analysis units (AUs) and the NWR analysis units (NWRAUs) is recorded in Table 10**.**

Table 9 Relationship of Analysis Units to Plan Forest Units

Kenora Forest 2022 FMP PLANFUs:			**Kenora Forest 2022 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_**	(same as PLANFU)
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_**	(same as PLANFU)
7	**POD**	**Poplar Dominant**	**11**	**POD_**	(same as PLANFU)
8	**PRW**	Red Pine and White Pine Mix	12	**PRWR**	Red Pine component
			13	**PRWW**	White Pine component
9	**SBD**	Spruce Dominant	14	**SBD_**	(same as PLANFU)
10	**SBL**	Spruce Lowland	15	**SBL_**	Lowland Spruce component
			16	**SBLC**	Lowland Cedar component
11	**SBM**	Spruce Mix	17	**SBM_**	(same as PLANFU)

Table 10 Plan Analysis Unit to NWR Analysis Unit Relationship

Kenora FMP Analysis Unit	NWR Region Analysis Unit
BFM_	bfmx1_bf
	bfmx1_dee
	bfmx1_sha
	bfpur_all
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_	hrdmw_bfdee
	hrdmw-bfsha
	hrdmw_mixdee
	hrdmw_mixsha
	hrdmw_sbdee
	hrdmw-sbsha
HRD_	hrdom_bfdee
	hrdom-bfsha
	hrdom_hwddee
	hrdom_hwdsha
HRDA	othhd-ab
	othhd_other
	othhd-pb

Kenora FMP Analysis Unit	NWR Region Analysis Unit
HRDB	bwdee_bwpure
	bwdee_conif
	bwdee_hwdpure
	bwdee-othhd
	bwsha-bwpure
	bwsha-conif
	bwsha-hwdpure
PJDD	pjdee_bf
	pjdee_bfmix
	pjdee_hwdlimit
	pjdee-pjlt70
	pjdee-pjlt70sb
	pjdee-pjmix
	pjdee_pure
	pjdee_sbmix
PJDS	pjsha-bf
	pjsha-bfmix
	pjsha-pjlt70
	pjsha-pjlt70sb
	pjsha-pjmix
	pjsha-pure
	pjsha_sbmix
PJM_	pjmx1_bfdee
	pjmx1_bfsha
	pjmx1_conifmixdee
	pjmx1_conifmixsha
	pjmx1_sbmixdee
	pjmx1_sbmixsha
POD_	podee-abothhd
	podee_conif
	podee_hwd
	podee_purenmst
	posha-conif
	posha-hwd
	posha-pure

Kenora FMP Analysis Unit	NWR Region Analysis Unit
PRWR	prdom-all
	prwmx-prw
	prwmx-prwlimitdee
	prwmx-prwlimitsha
PRWW	pwdom-pw
	pwdom-pwlimitdee
	pwdom-pwlimitsha
SBD_	sbdee_bf
	sbdee_conif
	sbdee_hwd
	sbdee_pure
	sbsha-bf
	sbsha_conif
	sbsha_hwd
	sbsha_pure
SBL_	sblow_all
SBLC	oclow-ab
	oclow-cw
	oclow_misc
	oclow_oclate
	oclow-sb50la50
	oclow-sbla
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 NDMNRF's digital terrain model.

Methodology Used:

-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 (split in 2 on the bottom end of the Kenora Forest). The cells/grids are in meters (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 contains the geodatabase (3 shape files – Kenora North, Kenora South, and Whiskey Jack) and a layer file (symbology based on the stand and site guide quality reserve classifications).

-There is a bit of overlap between the Kenora north and Kenora south shapefile, creating some difference in the elevation between some of the overlapping cell grids. Where there was a difference, the higher elevation was used to calculate the buffer.

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.

6.1.3 Small Polygons

In strategic modelling, the size and location of stands or polygons are not directly represented in the initial land base. Location of polygons is indirectly accommodated, semi-spatially, through use of strategic and operational management zones (Section 5.2.1).

In both spatial and non-spatial modelling, model calculations to achieve specifically defined targets can cause unintended results of projecting harvest in small areas that would not operationally (or economically) be allocated for harvest, unless they were adjacent to other stands also allocated for harvest.

In order to avoid the contribution of small stands, that are less likely to be planned for harvest, to a strategic model solution, the Task Team classified very small stands as a “reserve” type call “Small”. All available forest polygons less than 0.4 hectares in size were classified as “Small” reserve area, unless otherwise classified as a different reserve type. “Small” areas could not strategically contribute to harvest area and volumes targets, but do contribute to other biological targets, the same as other reserve area. “Small” reserve area totaled 229 ha.

6.1.4 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 age class attributes are used in the production of FMP tables and ease of use for operations and summarizing data, and both 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 (2022).

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, 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, as the Kenora Forest is northerly, with all wood deliveries heading south and is managed under a Dynamic Caribou Habitat Schedule. Therefore there are not strategic options to manage wood flow geographically.

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 and OLT 2022 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 2022 Kenora 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 Kenora Forest. This ground work in Base Model development set the platform on which to build strategic modelling of objective achievement for this 2022-2032 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).

<u>Ownership:</u>
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).

<u>BMI Classifications:</u>
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).

<u>Wildlife Habitat Types:</u>
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 Kenora 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)
Ripar – Estimated Riparian Reserve – used (imported from BMI)
IsInd – Forested Islands – none in BMI
MgRes – Management Reserve – none in BMI
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	**RCK** – Rock
DAL – Agricultural Land	**TMS** – Treed Muskeg
GRS – Grass	**UCL** – Unclassified Land
ISL – Islands	**WAT** – Water
OMS – Open Muskeg	**RdLnd** – Roads and Landings

Other SFMM Base Model Information:

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

- Plan Start year of 2022
- Model set for 16 ten-year planning periods, called "terms" in SFMM. "Term 1" equals the FMP 2022-2032 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 Kenora Forest land base into SFMM for strategic analysis. The SFMM initial Term 1 (2022) 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 not used for the Kenora FMP 2022:

- Natural rehabilitation of non-forest to forest (no forecast natural afforestation)
- Natural disturbance (including fire cycles and forest unit transitions)(no direct model assumptions / inputs used, as per regional direction. Results of natural disturbance will be updated in the planning inventory for the next FMP.)
- 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.

Methodology

1. Inputs were collaboratively developed by SFL and NDMNRF 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 Kenora Forest Crown land analysis unit (AU) by NWR_AU was calculated (Table 11, left side, same as Table 10).
4. The KF 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 10 m3/ha (a decrease was considered acceptable as projected stand age was given greater consideration). Most natural succession rules reflected less than a 5 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;
    e. Succession yield curves were developed for SBD and SBM to mitigate volume increases (see Section 6.2.2.4); and
    f. 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 YIIELDs also.

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	Future Age	Future AU	Rule %	Rule %	AU	Age	NAT Vol.	AU	Age	NAT Vol.	Diff.	
BFM	10,425	BFM_	bfmx1_bf	130	bfpur-all	125	175	younger (-40)	155	BFM_	30%								-	
	19,353	BFM_	bfmx1_dee	Long Tail	n/a	end		younger	215	BFM_	55%	100%	BFM_	255	65	BFM_	205	66	1	
	2,865	BFM_	bfmx1_sha	Long Tail	n/a	end		younger		BFM_	8%								-	
	2,298	BFM_	bfpur_all	Long Tail	n/a	end		younger		BFM_	7%								-	
	34,940		BFM AUs transition back to BFM analysis units during natural succession									100%								
CMX	22,487	CMX_	conmx_bfmixdee	160	bfmx1-dee	95	165	same	165	BFM_	26%	31%	CMX_	155	95	BFM_	155	92	- 3	
	4,544	CMX_	conmx_bfmixsha	140	bfmx1-sha	95	165	same	145	BFM_										
	2,803	CMX_	conmx_bfpure	100	bfpur-all	95	165	same	105	BFM_	3%	3%	CMX_	115	105	BFM_	115	91	- 14	
	10,326	CMX_	conmx_mixdee	Long Tail	n/a	end		younger	225	CMX_	12%	14%	CMX_	255	75	CMX_	215	76	1	
	1,828	CMX_	conmx_mixsha	Long Tail	n/a	end		younger		CMX_	2%								-	
	4,182	CMX_	conmx_pjdee	140	pjmx1-staticdee	95	115	same	145	PJM_	5%	5%	CMX_	145	101	PJM_	145	70	- 31	
	17,251	CMX_	conmx_pjmixdee	120	pjmx1-sbmixdee	95	115	same	120	PJM_	20%	30%	CMX_	115	105	PJM_	115	76	- 29	
	6,581	CMX_	conmx_pjmixsha	110	pjmx1-sbmixsha	95	115	same	115	PJM_	8%								-	combine
	1,740	CMX_	conmx_pjsha	130	pjmx1-staticsha	95	115	same		PJM_	2%								-	
	2,356	CMX_	conmx_sbdee	150	sbdee-pure	75	135	same	155	SBD_	3%								-	
	9,921	CMX_	conmx_sbmixdee	160	sbdee-conif	65	135	same	165	SBD_	12%	17%	CMX_	155	98	SBD_	165	102	4	combine
	1,655	CMX_	conmx_sbmixsha	150	sbsha-conif	65	135	same		SBD_	2%								-	
	205	CMX_	conmx_sbsha	150	sbsha-pure	65	135	same		SBD_	0%								-	
	85,878											100%							-	
	7,809	CMXC	uplce-all	Long Tail	n/a	end		younger	215	CMXC	100%		CMXC	255	75	CMXC	215	76	1	
	7,809											0%							-	
HMX	38,650	HMX_	hrdmw_bfdee	150	bfmx1-dee	125	195	younger (-30)	135	BFM_	52%	54%	HMX_	155	105	BFM_	145	97	- 8	
	2,336	HMX_	hrdmw-bfsha	120	bfmx1-sha	125	195	younger (-30)	115	BFM_	3%								-	
	28,271	HMX_	hrdmw_mixdee	200	conmx-mixdee	95	175	same		CMX_	38%	42%	HMX_	155	105	CMX_	155	98	- 7	
	3,267	HMX_	hrdmw_mixsha	180	conmx-mixsha	95	175	same		CMX_	4%								-	
	1,961	HMX_	hrdmw_sbdee	160	sbdee-conif	95	175	same		SBD_	3%	3%	HMX_	165	95	SBD_	175	98	3	
	61	HMX_	hrdmw-sbsha	160	sbsha-conif					SBD_	0%	1%	HMX_	215	60	CMX_	215	76	16	ADD rule
	74,545											100%								
HRD	16,514	HRD_	hrdom_bfdee	130	bfmx1-dee	115	125	same (-40)		BFM_	25%	26%	HRD_	135	121	BFM_	135	96	- 25	
	800	HRD_	hrdom-bfsha	110	bfmx1-sha	115	125	same (-40)		BFM_	1%									
	47,456	HRD_	hrdom_hwddee	170	conmx-mixdee	115	125	same (-40)		CMX_	71%	74%	HRD_	165	90	CMX_	175	91	1	
	1,975	HRD_	hrdom_hwdsha	160	conmx-mixsha	115	125	same (-40)		CMX_	3%									
	66,745											100%								
	9,780	HRDA	othhd-ab	Long Tail	n/a	end		younger		HRDA	54%	100%	HRDA	255	60	HRDA	205	60	-	
	8,240	HRDA	othhd_other	Long Tail	n/a	end		younger		HRDA	46%									
	61	HRDA	othhd-pb	120	conmx-mixdee					HRDA	0%									
	18,081											100%								
	1,079	HRDB	bwdee_bwpure	150	hrdmw-mixdee	95	105	same age		HMX_	32.3%	34%	HRDB	155	104	HMX_	155	105	1	
	1,173	HRDB	bwdee_conif	180	bfmx1-dee	95	105	same age		BFM_	35.1%	36%	HRDB	175	80	BFM_	180	80	-	
	882	HRDB	bwdee_hwdpure	120	hrdmw-mixdee	95	105	same age		HMX_	26.4%	30%	HRDB	125	124	HMX_	125	122	- 2	
	38	HRDB	bwdee-othhd	110	othhd-other					HRDA	1.1%								-	
	46	HRDB	bwsha-bwpure	150	hrdmw-mixsha	95	105	same age		HMX_	1.4%									
	32	HRDB	bwsha-conif	180	bfmx1-sha					BFM_	1.0%									
	92	HRDB	bwsha-hwdpure	100	hrdmw-mixsha	95	105	same age		HMX_	2.7%								-	
	3,341											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	Future Age	Future AU	Rule %	Rule %	AU	Age	NAT Vol.	AU	Age	NAT Vol.	Diff.	
PJD	489	PJDD	pjdee_bf	110	bfmx1-dee					BFM_	0.6%	2%	PJDD	115	96	BFM_	115	91	- 5	
	920	PJDD	pjdee_bfmix	110	bfmx1-dee			younger?		BFM_	1.1%									
	8,130	PJDD	pjdee_hwdlimit	170	pjmx1-staticdee	105	185	same?		PJM_	9.5%	9%	PJDD	175	75	PJM_	175	70	- 5	
	1,026	PJDD	pjdee-pjlt70	180	sbdee-pure				create	SBD_	1.2%	1%	PJDD	175	75	SBD_	195	58	- 17	low percentage
	538	PJDD	pjdee-pjlt70sb	130	sbdee-conif				SUCCN	SBD_	0.6%	1%	PJDD	135	75	SBD_	135	60	- 15	SBD tails at 85 m3/l
	1,261	PJDD	pjdee-pjmix	190	pjmx1-staticdee	105	185	same	curve	PJM_	1.5%									
	62,285	PJDD	pjdee_pure	190	pjmx1-staticdee	105	185	same		PJM_	72.7%	74%	PJDD	195	75	PJM_	195	70	- 5	combine
	11,054	PJDD	pjdee_sbmix	130	sbmx1-mixdee			same		SBM_	12.9%	13%	PJDD	135	84	SBM_	135	55	- 29	change future, as is
	85,704											100%								
	212	PJDS	pjsha-bf	110	bfmx1-sha					BFM_	0.3%								-	problem
	744	PJDS	pjsha-bfmix	110	bfmx1-sha					BFM_	1.2%	1%	PJDS	115	66	BFM_	115	91	25	leave as is, accept v
	401	PJDS	pjsha-pjlt70	120	sbsha-pure					SBD_	0.6%								-	
	509	PJDS	pjsha-pjlt70sb	130	sbsha-conif					SBD_	0.8%	2%	PJDS	135	55	SBD_	135	50	- 5	problem
	4,929	PJDS	pjsha-pjmix	180	pjmx1-staticsha					PJM_	7.7%								-	problem
	48,217	PJDS	pjsha-pure	180	pjmx1-staticsha			same?		PJM_	75.1%	83%	PJDS	185	40	SBD_	185	50	10	
	9,222	PJDS	pjsha_sbmix	130	sbmx1-mixsha					SBM_	14.4%	14%	PJDS	135	55	SBM_	135	60	5	problem
	64,234											100%								
PJM	3,334	PJM_	pjmx1_bfdee	120	bfmx1-dee					BFM_	8%	13%	PJM_	125	72	BFM_	165	85	13	chg artifically older t
	2,148	PJM_	pjmx1_bfsha	120	bfmx1-sha					BFM_	5%								-	
	6,534	PJM_	pjmx1_conifmixdee	120	sbmx1-mixdee	105	175	younger (-30)		SBM_	16%	24%	PJM_	125	72	SBM_	125	60	- 12	go to SBM SUCCN
	2,600	PJM_	pjmx1_conifmixsha	110	sbmx1-mixsha					SBM_	7%								-	problem
	14,787	PJM_	pjmx1_sbmixdee	180	sbdee-conif					SBD_	37%	37%	PJM_	185	70	SBD_	185	50	- 20	go to SBM SUCCN
	10,556	PJM_	pjmx1_sbmixsha	140	sbsha-conif					SBD_	26%	26%	PJM_	145	70	SBD_	145	50	- 20	go to SBM SUCCN
	39,959											100%								
POD	103	POD_	podee-abothhd	110	othhd-ab					HRDA	0.2%									
	8,484	POD_	podee_conif	130	conmx-bfmixdee					CMX_	15.3%	16%	POD_	135	102	CMX_	135	103	1	
	18,633	POD_	podee_hwd	140	hrdmw-mixdee	115	145	same		HMX_	33.6%								-	problem
	27,296	POD_	podee_purenmst	150	hrdmw-mixdee	115	145	same		HMX_	49.2%	83%	POD_	155	70	HMX_	185	74	4	problem
	206	POD_	posha-conif	100	conmx-bfmixsha					CMX_	0.4%									
	315	POD_	posha-hwd	100	hrdmw-mixsha	115	145	same		HMX_	0.6%									
	443	POD_	posha-pure	100	hrdmw-mixsha	115	145	same		HMX_	0.8%	1%	POD_	115	133	HMX_	115	121	- 12	
	55,481											100%								
PRW	1,553	PRWR	prdom-all	Long Tail	n/a	end		younger		PRWR	15%	100%	PRWR	255	330	PRWR	205	318	- 12	
	8,380	PRWR	prwmx-prw	Long Tail	n/a	end		younger		PRWR	79%									
	637	PRWR	prwmx-prwlimitdee	Long Tail	n/a	end		younger		PRWR	6%									
	98	PRWR	prwmx-prwlimitsha	Long Tail	n/a	end		younger		PRWR	1%									
	10,668											100%								
	7,398	PRWW	pwdom-pw	Long Tail	n/a	end		younger		PRWW	95%	100%	PRW	255	190	PRWW	195	191	1	
	317	PRWW	pwdom-pwlimitdee	Long Tail	n/a	end		younger		PRWW	4%									
	105	PRWW	pwdom-pwlimitsha	Long Tail	n/a	end		younger		PRWW	1%									
	7,820											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	Future Age	Future AU	Rule %	Rule %	AU	Age	NAT Vol.	AU	Age	NAT Vol.	Diff.	
SBD	1,032	SBD_	sbdee_bf	150	bfmx1-dee	115	155	same		BFM_	5%	6%	SBD_	155	104	BFM_	145	97	- 7	combine with BFM r
	6,206	SBD_	sbdee_conif	Long Tail	n/a	end		younger		SBD_	30%	94%	SBD_	255	85	SBD_	195	90	5	
	1,476	SBD_	sbdee_hwd	Long Tail	n/a	end		younger		SBD_	7%								-	combine
	6,110	SBD_	sbdee_pure	Long Tail	n/a	end		younger		SBD_	29%								-	
	249	SBD_	sbsha-bf	150	bfmx1-sha	95	125	same		BFM_	1%									
	3,219	SBD_	sbsha_conif	Long Tail	n/a	end		younger		SBD_	15%								-	combine with "Tail" r
	257	SBD_	sbsha_hwd	Long Tail	n/a	end		younger		SBD_	1%									
	2,393	SBD_	sbsha_pure	Long Tail	n/a	end		younger		SBD_	11%								-	combine with "Tail" r
	20,943											100%								
SBL	36,904	SBL_	sblow_all	Long Tail	n/a	end		younger		SBL_	100%	100%	SBL_	255	75	SBL_	205	81	6	
	36,904											100%								
	12	SBLC	oclow-ab	Long Tail	n/a	end		younger		SBLC	0%									
	6,474	SBLC	oclow-cw	Long Tail	n/a	end		younger		SBLC	73%	100%	SBLC	255	75	SBLC	205	81	6	
	4	SBLC	oclow_misc	Long Tail	n/a	end		younger		SBLC	0%									
	228	SBLC	oclow_oclate	Long Tail	n/a	end		younger		SBLC	3%								-	
	159	SBLC	oclow-sb50la50	150	sblow-all	75	95	same		SBL_	2%									
	2,026	SBLC	oclow-sbla	160	sblow-all	75	95	same		SBL_	23%	0%							-	
	8,903			delete rule as per regional direction								100%								
SBM	2,928	SBM_	sbmx1_bfdee	150	bfmx1-dee	95	125	same		BFM_	10%	13%	SBM_	155	105	BFM_	155	92	- 13	
	788	SBM_	sbmx1-bfsha	150	bfmx1-sha	95	125	same		BFM_	3%									
	11,414	SBM_	sbmx1_mixdee	160	sbdee-conif	75	135	same		SBD_	38%	62%	SBM_	165	101	SBD_	165	102	1	combine with 165 ru
	3,057	SBM_	sbmx1-mixsha	150	sbsha-conif	75	135	same		SBD_	10%	25%	SBM_	155	105	SBD_	155	104	- 1	combine with 155 ru
	7,658	SBM_	sbmx1_sbdee	160	sbdee-pure	75	135	same		SBD_	25%		SBM_	165	101	SBD_	165	102	1	
	4,396	SBM_	sbmx1_sbsha	150	sbsha-pure	75	135	same		SBD_	15%		SBM_	155	105	SBD_	155	104	- 1	
	30,241											100%								

1

Table 12 Natural Succession Rules by Analysis Unit

	Pre-succession condition:			Post-succession condition:			%
SU	AU1	Age1	YIELD1	AU2	Age2	YIELD2	Rule
B1	**BFM_**	**255**	**NAT**	**BFM_**	**205**	**NAT**	**1.00**
B1	CMX_	115	NAT	BFM_	115	NAT	0.03
B1	CMX_	115	NAT	PJM_	115	NAT	0.30
B1	CMX_	145	NAT	PJM_	145	NAT	0.07
B1	CMX_	155	NAT	BFM_	155	NAT	0.50
B1	CMX_	155	NAT	SBD_	165	NAT	0.27
B1	CMX_	255	NAT	CMX_	215	NAT	1.00
B1	CMXC	255	NAT	CMXC	215	NAT	1.00
B1	HMX_	155	NAT	BFM_	145	NAT	0.54
B1	HMX_	155	NAT	CMX_	155	NAT	0.42
B1	HMX_	165	NAT	SBD_	175	NAT	0.75
B1	HMX_	215	NAT	CMX_	215	NAT	1.00
B1	HRD_	135	NAT	BFM_	135	NAT	0.26
B1	HRD_	165	NAT	CMX_	175	NAT	1.00
B1	HRDA	255	NAT	HRDA	205	NAT	1.00
B1	HRDB	125	NAT	HMX_	125	NAT	0.30
B1	HRDB	155	NAT	HMX_	155	NAT	0.49
B1	HRDB	175	NAT	BFM_	180	NAT	1.00
B1	PJDD	115	NAT	BFM_	115	NAT	0.02
B1	PJDD	135	NAT	SBD_	135	SUCCN	0.01
B1	PJDD	135	NAT	SBM_	135	SUCCN	0.13
B1	PJDD	175	NAT	PJM_	175	NAT	0.11
B1	PJDD	175	NAT	SBD_	195	SUCCN	0.01
B1	PJDD	195	NAT	PJM_	195	NAT	1.00
B1	PJDS	115	NAT	BFM_	115	NAT	0.01
B1	PJDS	135	NAT	SBD_	135	SUCCN	0.02
B1	PJDS	135	NAT	SBM_	135	SUCCN	0.14
B1	PJDS	185	NAT	SBD_	185	SUCCN	1.00
B1	PJM_	125	NAT	BFM_	165	NAT	0.13
B1	PJM_	125	NAT	SBM_	125	SUCCN	0.24
B1	PJM_	145	NAT	SBD_	145	SUCCN	0.41
B1	PJM_	185	NAT	SBD_	185	SUCCN	1.00
B1	POD_	115	NAT	HMX_	115	NAT	0.01
B1	POD_	135	NAT	CMX_	135	NAT	0.16
B1	POD_	155	NAT	HMX_	185	NAT	1.00
B1	PRWR	255	NAT	PRWR	205	NAT	1.00
B1	PRWW	255	NAT	PRWW	195	NAT	1.00
B1	SBD_	155	NAT	BFM_	145	NAT	0.06
B1	SBD_	255	NAT	SBD_	195	NAT	1.00
B1	SBD_	235	SUCCN	SBD_	235	NAT	1.00
B1	SBL_	255	NAT	SBL_	205	NAT	1.00
B1	SBLC	255	NAT	SBLC	205	NAT	1.00
B1	SBM_	155	NAT	BFM_	155	NAT	0.03
B1	SBM_	155	NAT	SBD_	155	NAT	0.30
B1	SBM_	165	NAT	SBD_	165	NAT	1.00
B1	SBM_	205	SUCCN	SBM_	205	NAT	1.00

Note: same natural succession rules are applied to all subunits and all YIELDs.

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 2012-2022 FMP. This application of a set of proportional disturbance factor does not reflect how natural disturbances actually occur; therefore a refined approach is being implemented for this FMP.

SFMM modelling for the 2022-2032 FMP does not account for natural disturbances as an input in the model. This approach was discussed and supported by the NDMNRF, provided there was some consideration and an approach taken into account for natural disturbances. This refinement in consideration of natural disturbance in strategic modelling was consistent across the region for both non-spatial and spatial models used by various FMP Planning Teams.

While strategic analysis did not specifically include modelling inputs to simulate fire disturbances, the impacts of recent fire were considered in the FMP in three ways:

<u>Natural Fire-Derived Desirable Levels (Simulated Range of Natural Variation)</u>

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 Kenora 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.

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 2018 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 (2032-2042). Any actual natural disturbance would be accounted for through adaptive management with the frequent 10-year planning cycle being implemented.

Assessment of Impacts of Short-term Small Fires:

The consideration in spatial modelling for large, stand replacing fires was discussed above (in the first two points), and further consideration was given to regular, small fires that occur on average on the management unit, and the potential impact of these small fires on the calculated Available Harvest Area.

Without fire suppression, the Kenora Forest is predicted to burn, on average, every 95 years (ranges from 60 – 300 years by forest unit as calculated for the 2012-2022 FMP). On the Kenora Forest, the average fire cycle with fire suppression is 265 years which is the estimated time for 100% of the management unit area to be burned under the current fire suppression strategy. The range of fire disturbance varies by forest unit, ranging from 196-335 years for the Kenora Forest. Hardwood dominated forest and lowland forest have longer suppression fire cycles. This average suppression fire cycle would result in an average of 2,460 ha of productive Crown forest area burning each year, on the entire Kenora Forest. When it is considered that the Managed, available forest makes up 88% of the Crown, productive forest, and large fires likely account for 75% of area burned, the average annual loss to small fires may be closer to 540 ha per year. However, Managed Fire Response (discussed in text Section 4.8) targets all planned harvest areas for priority suppression. Therefore, within the planned harvest areas for the next 20 years, it is likely that the amount of area lost annually to small fires will be less.

As discussed in Section 9.2.4, the actual harvest area on the Kenora Forest has been only 26% of the planned available harvest area for the 2012-2022 period (average under harvest of 3,000 ha per year). It is expected that the recent increased demand for wood fibre from the Kenora Forest will continue, and that the 2012-2022 AHA may still be underutilized an average of 2,000 ha/year for the plan period.

However the under harvest from the 2012-2022 period described above is significantly greater than the estimated area that may result from smaller fires in this plan period (2,000 ha under harvest per year versus 540 ha estimated loss for small fires per year). The area of small regular fires (on average) does not exceed the difference between planned harvest and actual harvest areas (under harvest). Therefore it is concluded that the lack of the fire rate directly incorporated in the model is not significant on the final operational outcome, and therefore is not an impact on the sustainable harvest level.

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, BMI, OPI) and SFMM.

Tree species in the planning composite inventory are listed in Table 13. These tree species were standardized for use in net merchantable and biomass volumes (MIST, SFMM) and for FMP tables for the plan (Table 15**Error! Reference source not found.**).

Table 13 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 **QR** **MS**	Black Ash Oak, Red Maple, Soft	Fraxinus nigra Quercus rubra Acer spp.

Table 14 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 Kenora 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 14.

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 NDMNRF Regional Forest Analyst and NDMNRF science Plan Advisors using the best available science, planning inventory information, operational timber volume data, and comparisons to the 2012 FMP volume data and adjacent Dryden Forest 2021 FMP volume data.

Base Kenora 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 FMP 2022.

C. Natural Productivity Yield Curves (NAT)

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). All NAT (PRSNT) stands were naturally regenerated, and none received any subsequent renewal treatment). Area-weighted average stand conditions were calculated in MIST from the initial Base Model Inventory (sample age range) with PLANFUs and YIELD (NAT) applied (Table 15).

Table 15 Inventory Average Stand Conditions for Each PLANFU NAT Yield Area

PLANFU	YIELD	leadspc	aw_SPCOMP	aw_STKG	aw_SC
BFM	NAT	Bf	Bf 41 Sb 18 Po 11 Bw 10 Pj 9 Sw 7 Pw 1 Pr 1 Ce 1	0.58	1.5
CMX	NAT	Pj	Pj 29 Sb 19 Po 19 Bw 12 Bf 11 Ce 5 Pw 2 Sw 2 Pr 1	0.66	2.0
HMX	NAT	Po	Po 39 Bw 16 Bf 15 Pj 10 Sb 10 Sw 5 Pw 2 Ce 2 Pr 1 Ab 1	0.69	2.5
HRD	NAT	Po	Po 43 Bw 20 Ab 11 Bf 8 Sb 5 Pj 4 Sw 4 Qr 2 Pw 1 Ce 1	0.74	2.5
PJD	NAT	Pj	Pj 83 Sb 8 Po 5 Bw 3 Bf 1	0.72	2.5
PJDD (Deep)	NAT	Pj	Pj 83 Sb 8 Po 6 Bw 2 Bf 1	0.82	2.3
PJDS (Shallow)	NAT	Pj	Pj 84 Sb 9 Po 4 Bw 3 Bf 1	0.60	2.9
PJM	NAT	Pj	Pj 54 Sb 28 Po 7 Bw 5 Bf 3 Pw 1 Pr 1 Sw 1	0.66	2.5
POD	NAT	Po	Po 76 Bw 7 Pj 5 Bf 5 Sb 3 Sw 3 Pw 1 Pr 1 Ab 1	0.79	2.0
PRWR (PR)	NAT	Pr	Pr 38 Pw 16 Po 14 Bw 9 Pj 8 Bf 7 Sb 5 Sw 1 Ce 1	0.71	2.0
PRWW (PW)	NAT	Pw	Pw 51 Po 12 Bf 9 Bw 9 Pr 8 Sb 4 Pj 3 Ce 2 Sw 1 Qr 1	0.69	2.0
SBD	NAT	Sb	Sb 75 Pj 15 Bw 4 Bf 3 Po 2 Sw 1	0.58	1.5
SBL	NAT	Sb	Sb 70 La 12 Ce 9 Pj 3 Ab 3 Bf 1 Po 1 Bw 1	0.63	2.5
SBM	NAT	Sb	Sb 53 Pj 27 Bw 6 Po 5 Sw 4 Bf 4 Pw 1 Pr 1	0.58	1.5

Yield curves for this FMP were derived using the MIST program (Modelling and Inventory Support Tool, version June 10, 2019). The methodology for MIST yield curve development is described below. Based on the forest unit and MIST projections, two slightly different processes resulted in the final NAT yield curves for the FMP. Table 16 identifies which forest units utilized the “Kenora Forest Dataset” steps (Kenora) and which required the “NW Region Dataset” (NWR).

Table 16 MIST Datasets and Age Ranges Used for Each PLANFU NAT Yield

			Sample Age Range					Inventory Age Range		
PLANFU	**stand_cnt**	**SFU**	**minage**	**maxage**	**K0**	**K1**	**K2**	**minage**	**maxage**	**Data Used**
BFM	2,571	BfMx1	25	125	104.06	169.50	251.97	27	156	Kenora1
CMX	6,492	ConMx	25	125	-935.19	1213.41	2844.55	27	153	Kenora1
HMX	5,367	HrdMw	25	125	-5300.08	8937.06	18438.81	26	158	Kenora1
HRD	6,929	HrDom	25	125	94.26	170.46	316.85	25	156	Kenora1
PJD	7,621	PjDee	25	125	-14.25	156.19	332.84	39	153	Kenora1
PJDD (Deep)	4,221	PjDee	25	125	31.63	128.51	276.79	29	153	Kenora2
PJDS (Shallow)	3,400	PjSha	25	125	54.06	90.98	144.63	28	143	Kenora2
PJM	2,369	PjMx1	25	125	67.54	93.60	162.09	28	135	Kenora1
POD	3,946	PoDee	25	125	48.84	92.95	196.31	25	114	Kenora1
PRWR (PR)	738	PrwMx	25	125	99.22	117.94	213.06	27	157	NWR
PRWW (PW)	662	PwDom	25	125	106.98	108.11	188.20	25	157	NWR
SBD	1,013	SbDee	25	125	128.28	170.60	256.47	30	143	Kenora1
SBL	4,914	SbLow	25	125	155.23	181.82	310.64	26	154	Kenora1
SBM	1,608	SbMx1	25	125	88.38	168.29	250.05	25	143	Kenora1
MIST files:	Kenora1	is	kenor_not_c2.db		Used for all forest units, except PJD and PRW					
	Kenora2	is	kenor_PjOth.db		Used for PJD					
	NWR	is	mnw_pw.db		Used for PRW					

Kenora Forest Dataset:

1. The original Kenora Forest dataset for MIST file was generated using an SQL script run by the NWR Regional Forest Analyst. The draft BMI stand attributes were manipulated to ensure that they would be compatible with MIST structures (vertical structures considered for example).
2. The resulting Kenora Forest dataset was imported by the NDMNRF advisor and was used for the management unit specific MIST dataset (KenoraMU MIST data file).
3. The MIST default sample age range of 25 – 125 years was selected for all forest units. The Task team decided to use the default age ranges as 1) the default rages 25 to 125 represented the Kenora 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 Kenora Forest data was recorded (Table 15).
5. “Variable” stocking profile was used to generate NAT yield curves for all forest units (Table 16).
6. The projected MIST PRSNT yield curves (called “NAT” YIELD in FMP) for the Kenora Forest, where applicable, were compared to:
   - nm volumes from Kenora Forest 2012 FMP by forest unit
   - nm volumes from adjacent Dryden Forest 2021 FMP (some average stand attributes differ from the Kenora Forest).

Implementation of seven years of the 2012 FMP has resulted in harvested volumes by block that generally approximated the projected volumes (estimated at 90-110%). Overall average harvest volumes per hectare are approximately 108 m3/ha and are similar to or slightly lower than total volumes predicted in the 2012 FMP. 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).

The resulting comparison to the 2012 FMP yield curves confirmed that yields developed for NAT with Kenora Forest data was reasonable comparable to actual yields and those used in the 2012 FMP for all forest units except PRW, primarily due to the limited sample size of PRW on the Kenora Forest.

Northwest Region Dataset (NWR):

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 based data variable stocking profile as a surrogate for the management unit.

1. For the remaining PRW forest unit, the Kenora Forest initial NAT yield calculation was limited by small area sample size 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.
2. 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 Kenora Forest stand attributes (from step 4 of Kenora Forest Dataset) for species composition, stocking and site class was included into larger regional red pine – white pine dataset by FMP analysis unit to reflect average local Kenora Forest conditions for the PRW forest unit.
   (Note: The regional red pine and white pine stand data is still relatively limited and may receive additional regional enhancement prior to the next KF FMP 2032.)
3. The MIST default sample age range of 25 – 125 years was selected for the PRW forest unit.
4. “Fixed” stocking profile used to generate NAT yield curves for the PRW forest unit (regional direction).
5. The projected MIST PRSNT yield curves for the Kenora Forest were compared to:
   - nm volumes from Kenora Forest 2012 FMP by forest unit
   - nm volumes from adjacent Dryden Forest 2021 FMP.

The resulting comparison to the 2012 FMP yield curves and adjacent Dryden Forest data confirmed that yields developed for NAT with NWR regional data, using average stand attributes for the Kenora Forest, was reasonable comparable to actual yields and those used in the 2012 FMP for the PRW forest unit (and following discussion). The MIST curves for PRW were further adjusted to lower the continuing increase in volumes to better reflect the expected growth and yield on the Kenora Forest.

NAT Discussion by Forest Unit:

A discussion of Kenora Forest FMP 2022 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 Kenora Forest data is included for PRW, as well as the comparison of total volumes per hectare to the adjacent Dryden Forest 2021 FMP (Table 17). It should be noted that the yield curve peak information for the Dryden 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 17 Comparison of Yield Curve Peak Volumes by Forest Unit

	Kenora 2022 FMP Volume		Kenora 2012 FMP Volume		Dryden 2021 FMP Volume	
PLANFU	Peak Vol.	Age of peak	Peak Vol.	Age of peak	Peak Vol.	Age of peak
BFM	**97**	**145**	95	95	77	135
CMX	**105**	**115**	103	95	120	85
HMX	**123**	**135**	114	75	150	85
HRD	**124**	**125**			141	85
PJD	**89**	**95**	119	75	125	85
PJDD (Deep)	**101**	**85**				
PJDS (Shallow)	**70**	**95**				
PJM	**81**	**95**	102	85	118	85
POD	**143**	**95**	143	75	157	95
PRWR (PR)	**479**	**255**	152	105	250	145
PRWW (PW)	**280**	**175**				
SBD	**104**	**155**	149	105	128	115
SBL	**81**	**205**	85	125	87	135
SBM	**108**	**135**	121	105	131	105

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.

BFM – Balsam Fir Dominant Forest Unit:

- Kenora dataset used, standard age range, variable stocking profile
- Comparable volumes to 2012 FMP, as supported by plan implementation volumes
- Balsam fir on the Dryden Forest was a very small forest unit with less reliable data.
- Will need tail adjustment for compatibility with old age natural succession inputs.

CMX – Conifer Mix Forest Unit:

- Conifer Mix on the Kenora Forest is Jack Pine leading, not spruce. Breakdown of leading species is 47% pine, 27% spruce, 9% balsam fir, 9% cedar and 7% hardwood.
- Kenora dataset used, standard age range, variable stocking profile

- Similar plan implementation harvest volumes realized as compared to 2012 FMP projections.
- Projected harvest volumes for CMX tend to be lower for all management units across the region, as compared to earlier FMPs, therefore slightly lower volumes expected in MIST for this plan. Volume reductions result from additional actual science-based data.
- Investigated both Kenora MU sample age range change and use of regional dataset (with average Kenora Forest stand parameters), but neither approach resulted in increased volumes so used KF data.
- Will need tail adjustment for compatibility with old age natural succession inputs.

<u>HMX – Hardwood Mix Forest Unit:</u>

- Kenora dataset used, standard age range, variable stocking profile
- Comparable volumes to 2012 FMP, as supported by plan implementation volumes
- Will need tail adjustment for compatibility with old age natural succession inputs.
- KF has few old HMX stands. Adjustment downward to the NAT yield curve after the peak of 85-120 years is locally considered to be more appropriate representation of volume.

<u>HRD – Hardwood Dominant Forest Unit:</u>

- Kenora dataset used, standard age range, variable stocking profile
- Now HRD includes the HrDom SFU and includes White Birch SFUs and Other Hardwood (Black Ash) area. More productive forest area.
- Comparable volumes to 2012 FMP, as supported by plan implementation volumes
- HRD contains more Po than HMX and 2012 HMX, therefore higher average volumes are expected.
- KF has few old HRD stands. Adjustment downward to the NAT yield curve after the peak of 85-120 years is locally considered to be more appropriate representation of volume.
- The Task Team wondered if the OTTHD SFU component of HRD (21%, 22751 ha) could be artificially increasing HRD NAT volume. Further review of MIST NAT curve with the Kenora Forest stocking profile showed total volume of 54 m3/ha at peak of 155 years. Therefore, it is expected that the OTHHD component is not boosting HRD NAT volumes.

<u>PJD – Jack Pine Dominant Forest Unit:</u>

- Kenora dataset used, standard age range, variable stocking profile
- Lower volumes as compared to 2012 FMP and plan implementation volumes.
- PJD includes PjDee (57%) and PjSha (43%) SFUs, therefore slightly lower volumes were expected.
- The amount of PJD forest unit area increased significantly from the 2012 plan (68,287 ha, of which 75% was shallow) to the 2022 plan (154,109 ha, of which 43% is shallow). This was the result of a reinventory of the Kenora Forest which included 60,000+ ha of previously unproductive rock area being reclassified as productive forest area.
- Investigated both Kenora MU sample age range change and use of regional dataset (with average Kenora Forest stand parameters), but neither approach resulted in increased volumes.

- 2012 FMP PJD yield curve had slightly higher stocking of 76% (2022 is 72%) and the increase in shallow, less productive sites, both contributed to the new curve being 25% lower. A variance in fixed versus variable stocking used to calculate the curves may also be a factor in the change. Revised and improved calculation within MIST also account for a component of the difference, however the increase in shallow sites likely accounted for the majority of the difference.
- Will need tail adjustment for compatibility with old age natural succession inputs.
- Task Team investigated the difference in yields in the 2 components of PJD forest unit (PJDD deep SFU and PJDS shallow SFU).
- The splitting of this forest unit into separate YC's this will not affect the regulated PJD PLANFU, which includes both deep and shallow components. PJD it was felt that this split was required for tracking purposes in the model and was operationally important due to the significant differences in associated harvest volumes. The two AUs will use the same suite of managed yield curves and many of the same modelling inputs. Old age Natural Succession will be varied for deep and shallow to reflect maintenance of a soil depth during the forest aging process.
- <u>Decision</u>: The variance in total yields (PJDD 101 versus PJDS 70 m3/ha at the peaks) provided justification to the Task Team to use the 2 (split) NAT PJD curves for FMP modelling. This was a better representation of the harvest volumes expected from shallow sites.

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

- Kenora dataset used, standard age range, variable stocking profile
- Lower volumes as compared to 2012 FMP and plan implementation volumes
- Investigated both Kenora MU sample age range change and use of regional dataset (with average Kenora Forest stand parameters), but neither approach resulted in increased volumes.
- 2012 FMP PJM yield curve had similar stocking as 2022 FMP (65-66%), however revised and improved calculation within MIST account for the difference.
- Will need tail adjustment for compatibility with old age natural succession inputs.

<u>POD – Poplar Dominant Forest Unit:</u>

- Kenora dataset used, standard age range, variable stocking profile
- Matched volumes from 2012 FMP, as supported by plan implementation volumes
- Good consistency between FMPs
- KF tends to have a quicker stand break up than other management units. Adjustment downward to the NAT yield curve after the peak (from 125 years) is locally considered to be more appropriate representation of volume.

PRW – Red Pine and White Pine Mix Forest Unit:

- Minimal PRW harvest area on the Kenora Forest.
- Poor correlation to variable stocking profile with Kenora Forest dataset.
- Previous decision to include one plan analysis unit for red pine SFUs and another for the white pine SFU. Decision also included separate curve for white pine for managed stands. Task team discussion on having 2 NAT curves also. Two curves developed to facilitate the discussion.

Red Pine (PRWR = red pine):

  - Northwest Region dataset used (with average Kenora Forest stand parameters), standard age range, fixed stocking profile.
  - Volumes higher than previous KF 2012 FMP, however regional data is now more reliable.

- Good correlation to adjacent Dryden Forest YC
- Expect that total volumes would level off at approx. 400 m3/ha, adjust to lower MIST curves and level off volumes.
- Decision to use the above regional dataset curve for PRWR, but to adjust the tail of the curve to maintain steady volume from approx. age 135 to end of yield curve age 255. At approx. 400. Revised curves were lower, therefore tail levelled at 330 m3/ha (at 255 yrs)

White Pine (PRWW = white pine):

  - Northwest Region dataset used (with average Kenora Forest stand parameters), standard age range, fixed stocking profile.
  - Volumes based on reliable regional data – no Pw yield curve in 2012 FMP.

- The Task Team and regional advisors discussed the PRW curve further, noting that volumes continued to increase through 255 years, likely due to limited data available regionally for PRW in the variable stocking profiles.
- Regional data still had limited data, therefore fixed stocking profile recommended by region for the curves (PRWR and PRWW). At this time using a fixed stocking approach is appropriate and supported by the region.
- Expect that total volumes would level off at approx. 250 m3/ha, adjust to lower MIST curves.
- Decision to use the above regional dataset curve for PRWW, but to adjust the tail of the curve to maintain steady volume from approx. age 135 to end of yield curve age 255. At approx. 250. Revised curves were lower, therefore tail levelled at 190 m3/ha.
- Curves will need tail adjustment (flatten out to accommodate natural succession rules)
- Decision: Use the adjusted PRWR and PRWW NAT curves for the FMP modelling.

SBD – Spruce Dominant Forest Unit:

- Kenora dataset used, standard age range, variable stocking profile
- 2022 SBD (21,653 ha) includes SbDee (71%) and SbSha (29%)
- 2012 SBD (24,045 ha) included proportionately less deep, more productive sites (65%) and more shallow SbSha (35%).
- Lower plan implementation volumes as compared to 2012 FMP.
- Projected harvest volumes for SBD tend to be lower for all management units across the region, as compared to earlier FMPs, therefore slightly lower volumes expected in MIST for this plan. Volume reductions result from additional actual science-based data.

- Investigated both Kenora MU sample age range change and use of regional dataset (with average Kenora Forest stand parameters), but neither approach resulted in increased volumes.
- 2012 FMP SBD yield curve had slightly higher stocking of 64% (2022 is 58%), contributing to the reason for the new curve being 30% lower. Revised and improved calculation within MIST account for the majority of the difference.
- Will need tail adjustment for compatibility with old age natural succession inputs.

SBL – Spruce Lowland Forest Unit:

- Kenora dataset used, standard age range, variable stocking profile
- Comparable volumes to 2012 FMP and plan implementation volumes
- Will need tail adjustment for compatibility with old age natural succession inputs. Level off at 65 m3/ha.

SBM – Spruce Mix Forest Unit:

- Kenora dataset used, standard age range, variable stocking profile
- Slightly lower volumes as compared to 2012 FMP and plan implementation volumes
- Investigated both Kenora MU sample age range change and use of regional dataset (with average Kenora Forest stand parameters), but neither approach resulted in increased volumes.
- Will need tail adjustment for compatibility with old age natural succession inputs. Level off at 80 m3/ha.

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 18. 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 18 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	7	3	1	9	3	8	3	5	3	1	1	1
25	7	22	14	8	27	12	22	18	19	16	5	3	7
35	17	39	31	24	46	24	37	42	40	37	13	8	19
45	30	56	51	44	64	37	51	70	65	63	24	13	36
55	42	70	69	66	79	48	62	97	93	87	38	20	53
65	54	82	85	85	89	58	71	118	121	109	51	27	68
75	64	91	97	99	97	64	77	133	147	128	63	34	80
85	73	97	106	110	101	68	80	141	172	144	73	41	90
95	80	102	113	117	102	70	81	143	195	156	82	47	97
105	86	104	118	121	100	69	80	140	216	167	89	53	103
115	91	105	121	124	96	66	76	133	234	175	95	59	106
125	94	105	122	124	90	61	71	123	250	181	99	63	108
135	96	103	123	123	84	55	65	112	264	185	102	68	108
145	97	101	123	121	76	49	59	100	276	188	103	71	107
155	97	98	121	118	68	42	52	87	287	191	104	74	105
165	96	95	120	114	60	36	45	75	295	192	103	77	101
175	94	91	118	109	52	30	38	63	303	192	102	78	97
185	92	87	115	104	45	25	32	53	309	192	100	80	93
195	89	83	112	98	38	20	26	43	314	191	98	81	88
205	85	79	109	92	32	16	21	35	318	190	95	81	82
215	81	75	106	86	27	12	17	28	322	188	91	81	77
225	77	72	103	80	22	9	14	22	325	186	88	80	72
235	73	68	100	74	18	7	11	17	327	184	84	79	66
245	69	65	97	69	15	5	8	13	329	181	80	78	61
255	64	61	94	63	12	4	6	10	330	178	76	77	56

Summary of Total nm Volume/Hectare - With 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	7	3	1	9	3	8	3	5	3	1	1	1
25	7	22	14	8	27	12	22	18	19	16	5	3	7
35	17	39	31	24	46	24	37	42	40	37	13	8	19
45	30	56	51	44	64	37	51	70	65	63	24	13	36
55	42	70	69	66	79	48	62	97	93	87	38	20	53
65	54	82	85	85	89	58	71	118	121	109	51	27	68
75	64	91	97	99	97	64	77	133	147	128	63	34	80
85	73	97	106	110	101	68	80	141	172	144	73	41	90
95	80	102	113	117	102	70	81	143	195	156	82	47	97
105	86	104	118	121	100	69	80	140	216	167	89	53	103
115	91	105	121	124	96	66	76	133	234	175	95	59	106
125	94	105	122	124	90	61	72	118	250	181	99	63	108
135	96	103	123	121	84	55	70	102	264	185	102	68	108
145	97	101	117	115	78	49	70	85	276	188	103	71	107
155	92	98	105	104	75	43	70	70	287	191	104	74	105
165	85	95	95	90	75	40	70	60	295	192	102	77	101
175	75	91	86	80	75	40	70	54	303	192	98	78	97
185	70	87	74	70	75	40	70	50	309	192	93	80	93
195	67	83	65	65	75	40	70	50	314	191	90	81	88
205	66	79	60	60	75	40	70	50	318	190	87	81	83
215	65	76	60	60	75	40	70	50	322	190	85	78	80
225	65	75	60	60	75	40	70	50	325	190	85	77	80
235	65	75	60	60	75	40	70	50	327	190	85	76	80
245	65	75	60	60	75	40	70	50	329	190	85	75	80
255	65	75	60	60	75	40	70	50	330	190	85	75	80
Cut Old?	No	Yes	No	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Tail Vol	65	75	60	60	75	40	70	50	330	190	85	75	80
MinAge	80	60	60	60	50	60	60	50	80	60	90	110	75
MinVol	70	75	70	80	75	60	70	80	250	150	80	60	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 19.

2. These Kenora 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:	Kenora1	is	kenor_not_c2.db	Used for all forest units, except PJD and PRW
	Kenora2	is	kenor_PjOth.db	Used for PJD
	NWR	is	mnw_pw.db	Used for PRW

   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.

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 certain forest unit managed yield curve tails, as was required for certain yield curves.

1 **Table 19** **Future Managed Stand Attributes and Strategic Renewal Assumptions**
2 (OWNER=1,3,5, all ages from BMI sort)

YIELD ver 5 with only managed sort for Site Class, certain yields dropped or SC split change from version 4.

			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.																Peak m3/ha	MIST Curve
PLANFU	YIELD	Descript	SumOfHA	aw SC	awSTKG	awPW	awPR	awPJ	awSB	awSW	awBF	awCE	awLA	awPO	awBW	awMH	awUH	awLH	total		
BFM	NAT	(aw BMI)	1,854	1.7	0.40	0	0	13	26	7	39	0	0	7	9		-	0	100		KF
BFM	NAT-MIST	(MIST sample)		1.5	0.58	1	1	9	19	7	41	1	-	11	10	-	-	-	100	97	Prsnt
BFM	MED	BMI	28,513	1.3	0.58	1	1	9	18	7	41	1	0	11	10		0	0	100		
BFM	MED	MIST		1.3	0.65			10	20	5	44			11	10				100	114	Bb
CMX	NAT	(aw BMI)	23,361	2.1	0.70	0	0	51	12	1	3	0	0	22	11		-	0	100		KF
CMX	NAT-MIST	(MIST sample)		2.0	0.66	2	1	29	19	2	11	5	-	19	12	-	-	-	100	105	Prsnt
CMX	LOW	BMI: SP>PJ	31,653	1.5	0.63	2	1	8	32	4	16	6	0	17	13		0	1	100		
CMX	LOW	MIST		1.5	0.70	2	1	8	32	5	16	6		17	13				100	86	Aa
CMX	MED	BMI: PJ>=SP	27,123	2.1	0.65	2	1	37	11	1	11	5	0	19	12		0	0	100		
CMX	MED	MIST		2.1	0.70	2	1	37	11	1	11	5		20	12				100	110	Bb
HMX	NAT	(aw BMI)	13,043	2.3	0.72	0	1	26	10	2	5	0	0	43	12		-	0	100		KF
HMX	NAT-MIST	(MIST sample)		2.5	0.69	2	1	10	10	5	15	2	-	39	16	-	-	1	101	123	Prsnt
HMX	MED	BMI	48,628	2.2	0.67	2	1	7	12	5	16	1	0	39	15		0	1	100		
HMX	MED	MIST		2.2	0.75			10	15	5	15			40	15				100	147	Bb
HRD	NAT	(aw BMI)	16,372	2.3	0.74	0	0	11	6	2	4	0	0	50	21		0	5	100		KF
HRD	NAT-MIST	(MIST sample)		2.5	0.74	1	-	4	5	4	8	1	-	43	20	-	3	11	100	124	Prsnt
HRD	MED	BMI	48,959	2.3	0.72	1	0	2	6	4	9	1	0	45	19		2	11	100		
HRD	MED	MIST		2.3	0.80			10	15	5	15			40	15				100	145	Bb
PJDD	NAT	(aw BMI)	60,685	2.3	0.81	0	0	84	7	0	0	0	0	6	2		-	0	100		KF-PjDee
PJDD	NAT-MIST	(MIST sample)		2.3	0.82			83	8		1			6	2				100	102	Prsnt
PJDS	NAT	(aw BMI)	44,146	2.7	0.59	0	0	85	8	0	0	-	-	4	3		-	0	100		KF-PjSha
PJDS	NAT-MIST	(MIST sample)		2.9	0.60			84	9		-			4	3				100	70	Prsnt
PJD	LOW	BMI (incl PJDS)	17,906	2.8	0.58	0	0	78	12	0	1	0	-	4	3		0	0	100		KF-PJD
PJD	LOW	MIST		2.8	0.65			80	12		1			4	3				100	73	Aa
PJD	MED	BMI	12,725	2.0	0.63	0	0	78	12	0	2	0	0	5	3		-	0	100		
PJD	MED	MIST		2.0	0.75			78	12		2			5	3				100	109	Bb
PJD	HIGH	BMI	2,535	0.9	0.70	0	0	78	8	0	2	-	-	6	4		-	-	100		
PJD	HIGH	MIST		0.9	0.75			80	8		2			6	4				100	149	Cc
PJM	NAT	(aw BMI)	11,987	2.6	0.64	0	1	56	30	0	2	-	0	7	4		-	0	100		KF
PJM	NAT-MIST	(MIST sample)		2.5	0.66	1	1	54	28	1	3	-	-	7	5	-	-	-	100	81	Prsnt
PJM	LOW	BMI	10,817	3.0	0.61	1	1	54	28	1	4	0	0	6	5		0	0	100		
PJM	LOW	MIST		3.0	0.65	1	1	54	28	1	4			6	5				100	68	Aa
PJM	MED	BMI	12,601	1.8	0.63	1	2	53	26	1	4	0	0	8	5		0	0	100		
PJM	MED	MIST		1.8	0.70	1	2	53	26	1	4			8	5				100	104	Bb

3

YIELD ver 5 with only managed sort for Site Class, certain yields dropped or SC split change from version 4.																					
			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	awMH	awUH	awLH	total	Peak m3/ha	MIST Curve
POD	NAT	(aw BMI)	19,515	2.1	0.82	0	0	8	3	1	2	0	-	78	7		0	1	100		KF
POD	NAT-MIST	(MIST sample)		2.0	0.79	-	-	5	3	3	5	-	-	76	7	-	-	1	100	143	Prsnt
POD	MED	BMI	6,896	3.0	0.68	0	0	2	3	3	6	0	0	78	6		0	1	100		
POD	MED	MIST		3.0	0.75			2	3	3	6			80	6				100	95	Bb
POD	HIGH	BMI	25,483	1.9	0.63	0	0	2	3	2	6	0	0	80	4		0	1	100		
POD	HIGH	MIST		1.9	0.80			2	3	2	6			81	5			1	100	148	Cc
PRWR	NAT	(aw BMI)	678	2.2	0.63	6	55	12	6	1	2	-	-	12	6		-	0	100		nwrPRal
PRWR	NAT-MIST	(MIST sample)		2.0	0.71	16	39	8	5	1	7	1	-	14	9	-	-	-	100	330	Aa
PRWW	NAT	(aw BMI)	137	2.2	0.71	43	14	8	1	2	4	3	-	14	11		-	-	100		nwrPW
PRWW	NAT-MIST	(MIST sample)		2.0	0.69	51	8	3	4	1	9	2	-	12	9	-	1	-	100	192	Bb
PRW	LOW	BMI - PW curve	5,242	2.1	0.69	51	9	3	4	1	9	3	-	11	9		1	0	100		nwrPW
	LOW	MIST		2.1	0.70	50	10	5	5		10			10	10				100	187	Aa
PRW	MED	BMI - PR curve	6,519	2.2	0.66	15	40	8	7	1	7	2	-	12	8		0	0	100		nwrPRal
	MED	MIST		2.2	0.75	15	40	10	8		7			12	8				100	328	Bb
PRW	HIGH	BMI - PR curve	1,461	0.6	0.74	7	53	5	4	1	10	0	-	13	6		0	0	100		nwrPRal
	HIGH	MIST		0.6	0.85	7	53	5	5		10			15	5				100	639	Cc
SBD	NAT	(aw BMI)	4,810	1.8	0.40	-	0	18	77	0	1	-	0	2	2		-	0	100		KF
SBD	NAT-MIST	(MIST sample)		1.5	0.58	-	-	15	75	1	3	-	-	2	4	-	-	-	100	104	Prsnt
SBD	LOW	BMI	3,692	2.1	0.50	0	-	17	75	1	3	-	-	1	3		-	-	100		
SBD	LOW	MIST (not used)		2.1	0.55			17	75	1	3			1	3				100	76	Aa
SBD	MED	BMI	11,364	1.3	0.61	0	0	12	76	1	3	0	0	3	4		-	0	100		
SBD	MED	MIST (not used)		1.3	0.70			12	77	1	3			3	4				100	134	Bb
SBD	MED	BMI	15,056	1.5	0.58	0	0	14	76	1	3	0	0	2	4		-	0	100		
SBD	MED	MIST (not used)		1.5	0.65			14	76	1	3			2	4				100	117	Dd
SBD	MED	MIST		1.7	0.70			14	76	1	3			2	4				100	117	Cc
SBL	NAT	(aw BMI)	6,983	2.5	0.49	-	-	9	78	0	0	3	8	1	1		-	1	100		KF
SBL	NAT-MIST	(MIST sample)		2.5	0.63	-	-	3	70	-	1	9	12	1	1	-	-	3	100	81	Prsnt
SBL	LOW	BMI	28,346	2.5	0.66	0	0	1	69	0	1	12	11	1	2		-	4	100		
SBL	LOW	MIST		2.5	0.70				70			12	11		2			5	100	93	Aa
SBM	NAT	(aw BMI)	5,158	1.7	0.47	0	0	32	56	2	2	-	0	6	3		0	-	100		KF
SBM	NAT-MIST	(MIST sample)		1.5	0.58	1	1	27	53	4	4	-	-	5	6	-	-	-	101	108	Prsnt
SBM	MED	BMI	11,260	2.1	0.57	1	1	28	52	3	5	0	0	4	6		0	0	100		
SBM	MED	MIST		2.1	0.65		2	28	52	3	5			4	6				100	101	Bb
SBM	HIGH	BMI	11,214	0.8	0.55	0	0	23	51	7	5	0	0	6	6		-	0	100		
SBM	HIGH	MIST (not used)		0.8	0.65	1		23	51	7	5			6	7				100	144	Cc
SBM	HIGH	MIST		1.0	0.70	1		23	51	7	5			6	7				100		Aa

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6.2.2.5 Timber Product Proportions in Even-aged Forest

Strategic modelling includes projections for broad product size in accordance with the FMPM 2017. Two product sizes were determined for harvest volumes originating from the Kenora 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 20 (illustrating CMX NAT proportions per 10-year age class):

Table 20 Example of SFMM Inputs for Volume Proportion by Broad Size Class

FU	AC10	avDBH	Small	Large
CMX NAT	5	0	1.00	
CMX NAT	15	5.6	1.00	
CMX NAT	25	7.9	1.00	
CMX NAT	35	9.7	1.00	
CMX NAT	45	11.2	1.00	
CMX NAT	55	12.5	1.00	
CMX NAT	65	13.6	1.00	
CMX NAT	75	14.7	1.00	
CMX NAT	85	15.7	1.00	
CMX NAT	95	16.6	1.00	
CMX NAT	105	17.5	1.00	
CMX NAT	115	18.3	1.00	
CMX NAT	125	19.1	1.00	
CMX NAT	135	19.9	1.00	
CMX NAT	145	20.6	0.80	0.20
CMX NAT	155	21.3	0.80	0.20
CMX NAT	165	22	0.80	0.20
CMX NAT	175	22.6	0.80	0.20
CMX NAT	185	23.2	0.80	0.20
CMX NAT	195	23.8	0.80	0.20
CMX NAT	205	24.4	0.80	0.20
CMX NAT	215	25	0.80	0.20
CMX NAT	225	25.6	0.80	0.20
CMX NAT	235	26.1	0.80	0.20
CMX NAT	245	26.6	0.80	0.20
CMX NAT	255	27.1	0.80	0.20

6.2.2.6 Undersized and Defect Volumes

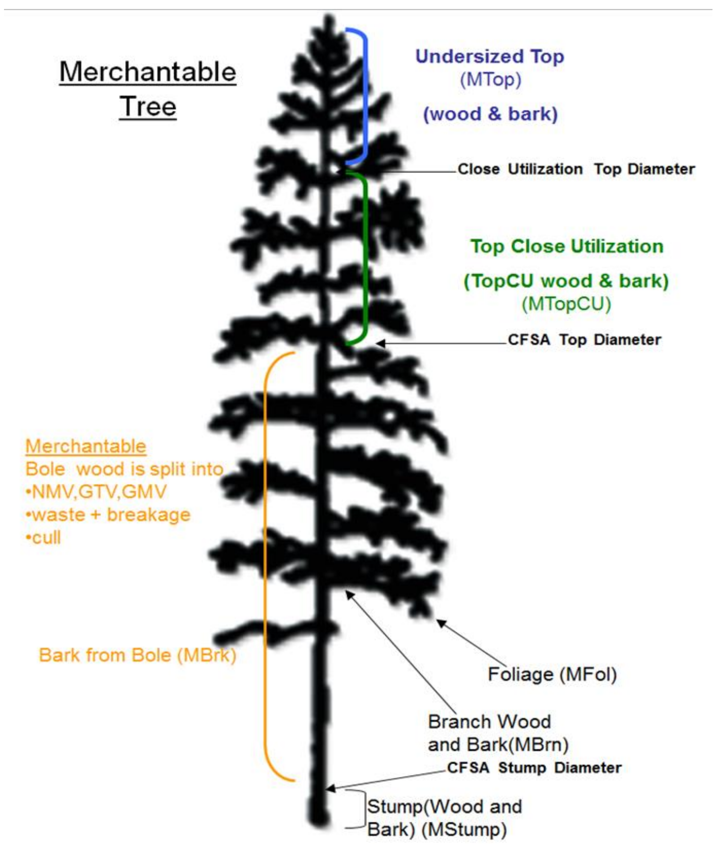
The FMPM requires that biomass volumes be projected for the LTMD and reported for planned harvest in the FMP. The FMPM defines biomass volumes as: *Timber or a tree that is not merchantable, including undersize material and defects, as defined in the Scaling Manual.* “

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 2):

- 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, MBrn & MBrk)
- 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 2 Merchantable Parts of a Tree



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),
- Old Growth forest (4 groupings: OGupC, OGhmx, OGloC)(OGpwr),
- Caribou Habitat (2 types: refuge, winter-combined);
- Upland Conifer (UpCon);
- All ages Red Pine – White Pine;
- Young Forest (Young); and
- Moose Habitat (3 types: Browse, Mature Conifer, Hardwood/Mix).

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.

An example of Generic Yield Curve Inputs for the PJDD (Deep soiled analysis unit within the PJD forest unit) follows as Table 21. The "1"s in the inputs track one hectare of the class area for each hectare in the land base. 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 22. The oldest age in the strategic modelling is represented by 260; actual tree age may be older.

Table 21 Example Generic Yield Curve Data for PJDD NAT

		Landscape Classes:																	
		Pre-Sap	ImmCon	ImmHwd	MLbf	MLupC	MLHmx	MLloC	OGupCon	OGloC	OGhwd	OGprw	UpCon	Young	Refuge	Winter	Browse	MatCon	HwdMx
FU	AC10	PSp	Icn	Ihd	Mature+Older Forest				Old Growth				Forest Area		Caribou Habitat		Moose Habitat		
PJDD NAT	5	1											1	1	1		1		
PJDD NAT	15	1											1	1	1		1		
PJDD NAT	25	1											1	1	1		1		
PJDD NAT	35		1										1	0.5	1		0.5		
PJDD NAT	45		1										1		1	1			
PJDD NAT	55		1										1		1	1			
PJDD NAT	65		1										1		1	1			
PJDD NAT	75					1							1		1	1		1	
PJDD NAT	85					1							1		1	1		1	
PJDD NAT	95					1							1		1	1		1	
PJDD NAT	105					1			1				1		1	1		1	
PJDD NAT	115					1			1				1		1	1		1	
PJDD NAT	125					1			1				1		1	1		1	
PJDD NAT	135					1			1				1		1	1		1	
PJDD NAT	145					1			1				1		1	1		1	
PJDD NAT	155					1			1				1		1	1		1	
PJDD NAT	165					1			1				1		1	1		1	
PJDD NAT	175					1			1				1		1	1		1	
PJDD NAT	185					1							1		1	1		1	
PJDD NAT	195					1							1		1	1		1	
PJDD NAT	205					1							1		1	1		1	
PJDD NAT	215					1							1		1	1		1	
PJDD NAT	225					1							1		1	1		1	
PJDD NAT	235					1							1		1	1		1	
PJDD NAT	245					1							1		1	1		1	
PJDD NAT	255					1							1		1	1		1	

Table 22 SFMM Boreal Landscape Guide Indicator and Wildlife Habitat Indicator Input Age Criteria by Analysis Unit

	Class:	Pre-/Sapling	Imm Con	Imm Hwd	Mature+Older Forest				Old Growth				Forest Area		Caribou Habitat		Moose Habitat		
Analysis Unit:	Code:	PSp	Icn	Ihd	MLb	MLc	MLh	MLl	OGupC	OGloC	OGhmx	OGprw	PurCn	Young	Cr	Cw	Mb	Mmc	Mhmx
BFM_	Onset:	1	11	na	61	na	na	na	na	na	81	na	na	1	61	na	na	61	na
	Duration/End:	10	60		260						150			<36	260			260	
CMX_	Onset:	0	31	na	na	71	na	na	na	na	111	na	na	1	71	na	1	na	36
	Duration	30	70			260					170			<36	260		35		260
CMXC	Onset:	1	31	na	na	71	na	na	na	na	101	na	na	1	71	na	1	71	na
	Duration	30	70			260					190			<36	260		35	260	
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			<36			35		260
HRDA	Onset:	1	na	11	na	na	51	na	na	na	111	na	na	1	na	na	1	na	36
	Duration	10		60			260				150			<36			35		260
HRDB	Onset:	1	na	11	na	na	51	na	na	na	111	na	na	1	na	na	1	na	36
	Duration	10		60			260				150			<36			35		260
HRD_	Onset:	1	na	11	na	na	51	na	na	na	111	na	na	1	na	na	1	na	36
	Duration	10		60			260				150			<36			35		260
PJDD	Onset:	1	31	na	na	71	na	na	101	na	na	na	all	1	always	41	na	71	na
	Duration	30	70			260			180					<36		260		260	
PJDS	Onset:	1	31	na	na	71	na	na	101	na	na	na	all	1	always	41	na	71	na
	Duration	30	70			260			180					<36		260		260	
PJM_	Onset:	1	31	na	na	71	na	na	101	na	na	na	all	1	41	41	na	71	na
	Duration	30	70			260			170					<36	260	260		260	
POD_	Onset:	1	na	11	na	na	61	na	na	na	101	na	na	1	na	na	1	na	36
	Duration	10		60			260				170			<36			35		260
PRWR	Onset:	1	21	na	na	81	na	na	na	na	na	141	na	1	na	na	na	81	na
	Duration	20	80			260						260		<36				260	
PRWW	Onset:	1	21	na	na	81	na	na	na	na	na	131	na	1	na	na	na	81	na
	Duration	20	80			260						260		<36				260	
SBD_	Onset:	1	31	na	na	71	na	na	121	na	na	na	all	1	41	61	na	71	na
	Duration	30	70			260			200					<36	260	260		260	
SBL_	Onset:	1	31	na	na	na	na	71	na	161	na	na	na	1	always	41	na	71	na
	Duration	30	70					260		260				<36		260		260	
SBLC	Onset:	1	31	na	na	na	na	71	na	161	na	na	na	1	always	51	na	71	na
	Duration	30	70					260		260				<36		260		260	
SBM_	Onset:	1	31	na	na	71	na	na	111	na	na	na	all	1	41	61	na	71	na
	Duration	30	70			260			190					<36	260	260		260	

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 model. These ranges are set as a constant though the planning horizon and are revisited and validated every 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 Kenora 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 23.

- **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 23 Clearcut Harvest Operability Ages

	YIELD:	**NAT**		**LOW**		**MED**		**HIGH**		**SUCCN**	
Forest Unit	Analysis Unit	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
BFM	**all**	60	inf			55	inf				
CMX	**all**	65	inf	80	inf	65	inf				
HMX	**all**	55	inf			55	inf				
HRD	**all**	60	inf			55	inf				
PJD	**PJDD**	55	inf	65	inf	50	inf	45	inf		
	PJDS	65	inf	65	inf	50	inf	45	inf		
PJM	**all**	65	inf	80	inf	55	inf				
POD	**all**	55	inf			65	inf	55	inf		
PRW	**all**	85	inf	85	inf	85	inf	60	inf		
SBD	**all**	85	inf			80	inf			85	inf
SBL	**all**	100	inf	100	inf						
SBM	**all**	75	inf			85	inf	65	inf	75	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, other hardwood).

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. 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.
50% of Cedar and Larch trees to be retained.

Wabaseemoong Stewardship Area Agreement

In addition to the SSG requirement for wildlife tree retention described above, requirements for wildlife trees per hectare and retention of white pine, red pine, cedar and larch trees in the Wabaseemoong Stewardship Area is recognized and planned for in this FMP:

Wildlife tree requirement - 36 trees per ha
10 large diameter, 20 other live trees, 6 dead/dying trees. (30 live trees).
All (100%) of Red Pine, White Pine, 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 reserves (approx. 0-1% unharvested) in non-caribou zone.

Although the SSG only requires 5 to be living and living trees be retained, the general operational assumption in this input is that 30 large living (full crowns) trees/ha will be left after harvest in the Wabaseemoong Stewardship Area, and 20 large living (full crowns) trees/ha will be left after harvest in the Non-Stewardship Area. 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. Stubbing is not currently practiced on the Kenora Forest.

Of the 10-20 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 20-30 live trees unharvested per hectare is an increase from the 15 live trees estimated to meet this requirement in the 2012 FMP. This model input was included for this 2022 FMP to recognize the Wabaseemoong Stewardship Agreement, and to better reflect general operational practices on the Kenora Forest.

Similar to the 2012-2022 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.

Table 24 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 25 summarizes these proportions by Analysis Unit used in the strategic modelling. This approach is consistent with the methodology used in the 2012-2022 Kenora Forest Management Plan.

Table 24 Determination of Volume Proportions Left Unharvested

Wabaseemoong Stewardship Area:															
average m3/tree/spp=	0.22	0.21	0.17	0.13	0.18	0.15	0.04	0.09	0.37	0.11	0.10	0.10			
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=>)	1	2	12	11	5	20	1	0	9	3	0	0	64	75	Bf 39 Sb 26 Pj 13 Bw 9 Sw 7 Po 6
Live w ildlife trees left:	5	8	2	10	4				1	1			31	5.6	m3/ha
Wildlife Trees % of Volume:	0%	0%	1%	2%	1%	0%	0%	0%	1%	0%	0%	0%		**<== Represents volume of 35 wildlife trees per ha (30 live)**	
Pw/Pr/Ce/La Protection %	100%	100%	0%	0%	0%	0%	100%	100%	0%	0%	0%	0%		(% included below for incidental species not in yield curve)	
Residual/Bypass %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%		<== Bypass percentage expected to be left unharvested	
Total Unharvested Volume %:	100%	100%	1%	2%	1%	0%	100%	100%	1%	0%	100%	100%		<== Total unharvested volume percentage by tree species	
Total Unharvested m3/ha=>	1.0	2.0	0.1	0.2	0.1	0.0	1.0	0.0	0.1	0.0	0.0	0.0	4.4	<== Total unharvested volume per hectare	
								Overall average Net-down Loss:					***7%***		
SFMM Modelling Input:	**100%**	**100%**	**1%**	**2%**	**1%**	**1%**	**100%**	**100%**	**1%**	**0%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	
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=>)	2	1	43	12	2	5	3	0	18	5	0	0	91	75	Pj 51 Po 22 Sb 12 Bw 11 Bf 3 Sw 1
Live w ildlife trees left:	7	4	5	6			5		1	2			30	4.6	m3/ha
Wildlife Trees % of Volume:	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%			
Pw/Pr/Ce/La Protection %	100%	100%	0%	0%	0%	0%	100%	100%	0%	0%	0%	0%			
Residual/Bypass %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%			
Total Unharvested Volume %:	100%	100%	1%	1%	0%	0%	100%	100%	0%	0%	100%	100%			
Total Unharvested m3/ha=>	2.0	1.0	0.4	0.1	0.0	0.0	3.0	0.0	0.1	0.0	0.0	0.0	6.6		
								Overall average Net-down Loss:					***7%***		
SFMM Modelling Input:	**100%**	**100%**	**1%**	**1%**	**1%**	**1%**	**100%**	**100%**	**0%**	**0%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	
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=>)	2	1	15	7	4	8	1	0	39	8	0	0	85	65	Po 43 Pj 26 Bw 12 Sb 10 Bf 5 Sw 2 Pr 1
Live w ildlife trees left:	7	4	3	6	3		3		3	1			30	5.4	m3/ha
Wildlife Trees % of Volume:	0%	0%	1%	1%	1%	0%	0%	0%	1%	0%	0%	0%			
Pw/Pr/Ce/La Protection %	100%	100%	0%	0%	0%	0%	100%	100%	0%	0%	0%	0%			
Residual/Bypass %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%			
Total Unharvested Volume %:	100%	100%	1%	1%	1%	0%	100%	100%	1%	0%	100%	100%			
Total Unharvested m3/ha=>	2.0	1.0	0.1	0.1	0.0	0.0	1.0	0.0	0.5	0.0	0.0	0.0	4.7		
								Overall average Net-down Loss:					***6%***		
SFMM Modelling Input:	**100%**	**100%**	**1%**	**1%**	**1%**	**1%**	**100%**	**100%**	**1%**	**0%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	
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=>)	2	0	8	4	4	5	1	0	58	12	2	3	99	75	Po 50 Bw 21 Pj 11 Sb 6 Ab 5 Bf 4 Sw 2
Live w ildlife trees left:	7		5	8	4				3	3			30	5.6	m3/ha
Wildlife Trees % of Volume:	0%	0%	1%	1%	1%	0%	0%	0%	1%	0%	0%	0%			
Pw/Pr/Ce/La Protection %	100%	100%	0%	0%	0%	0%	100%	100%	0%	0%	0%	0%			
Residual/Bypass %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%			
Total Unharvested Volume %:	100%	100%	1%	1%	1%	0%	100%	100%	1%	0%	100%	100%			
Total Unharvested m3/ha=>	2.0	0.0	0.1	0.0	0.0	0.0	1.0	0.0	0.7	0.0	2.0	3.0	8.8		
								Overall average Net-down Loss:					***9%***		
SFMM Modelling Input:	**100%**	**100%**	**1%**	**1%**	**1%**	**1%**	**100%**	**100%**	**1%**	**0%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	

Wabaseemoong Stewardship Area:

average m3/tree/spp=	0.22	0.21	0.17	0.13	0.18	0.15	0.04	0.09	0.37	0.11	0.10	0.10			
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	76	4	0	0	0	0	3	1	0	0	84	75	Pj 84 Sb 7 Po 5 Bw 3
Live wildlife trees left:			20	6					2	2			30	5.1	m3/ha
Wildlife Trees % of Volume:	0%	0%	4%	1%	0%	0%	0%	0%	1%	0%	0%	0%			
Pw/Pr/Ce/La Protection %	100%	100%	0%	0%	0%	0%	100%	100%	0%	0%	0%	0%			
Residual/Bypass %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%			
Total Unharvested Volume %:	100%	100%	4%	1%	0%	0%	100%	100%	1%	0%	100%	100%			
Total Unharvested m3/ha=>	0.0	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1		
								Overall average Net-down Loss:					***4%***		
SFMM Modelling Input:	**100%**	**100%**	**4%**	**1%**	**1%**	**1%**	**100%**	**100%**	**1%**	**0%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	
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=>)	1	1	54	12	1	1	0	0	5	2	0	0	77	75	Pj 56 Sb 30 Po 7 Bw 4 Bf 2 Sw 1 Pr 1
Live wildlife trees left:	3	3	10	8	2				2	2			30	5.4	m3/ha
Wildlife Trees % of Volume:	0%	0%	2%	1%	0%	0%	0%	0%	1%	0%	0%	0%			
Pw/Pr/Ce/La Protection %	100%	100%	0%	0%	0%	0%	100%	100%	0%	0%	0%	0%			
Residual/Bypass %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%			
Total Unharvested Volume %:	100%	100%	2%	1%	0%	0%	100%	100%	1%	0%	100%	100%			
Total Unharvested m3/ha=>	1.0	1.0	1.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4		
								Overall average Net-down Loss:					***4%***		
SFMM Modelling Input:	**100%**	**100%**	**2%**	**1%**	**0%**	**1%**	**100%**	**100%**	**1%**	**0%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	
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	10	2	3	3	0	0	96	4	0	0	118	65	Po 78 Pj 8 Bw 7 Sb 3 Bf 2 Sw 1 Ab 1
Live wildlife trees left:			5	6	5				9	5			30	6.4	m3/ha
Wildlife Trees % of Volume:	0%	0%	1%	1%	1%	0%	0%	0%	3%	0%	0%	0%			
Pw/Pr/Ce/La Protection %	100%	100%	0%	0%	0%	0%	100%	100%	0%	0%	0%	0%			
Residual/Bypass %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%			
Total Unharvested Volume %:	100%	100%	1%	1%	1%	0%	100%	100%	3%	0%	100%	100%			
Total Unharvested m3/ha=>	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	2.8		
								Overall average Net-down Loss:					***2%***		
SFMM Modelling Input:	**100%**	**100%**	**1%**	**1%**	**1%**	**1%**	**100%**	**100%**	**3%**	**0%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	
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=>)	45	84	18	5	1	5	1	0	21	8	0	0	188	95	Pr 55 Pj 11 Po 11 Pw 10 Sb 4 Bf 2
Live wildlife trees left:	6	10	3	7					2	2			30	5.8	m3/ha
Wildlife Trees % of Volume:	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
Pw/Pr/Ce/La Protection %	0%	0%	0%	0%	0%	0%	100%	100%	0%	0%	0%	0%			
Residual/Bypass %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%			
Total Unharvested Volume %:	1%	1%	0%	0%	0%	0%	100%	100%	0%	0%	100%	100%			
Total Unharvested m3/ha=>	0.3	0.9	0.0	0.0	0.0	0.0	1.2	0.0	0.1	0.0	0.2	0.0	2.8		
								Overall average Net-down Loss:					***1%***		
SFMM Modelling Input:	**1%**	**1%**	**0%**	**0%**	**1%**	**1%**	**100%**	**100%**	**0%**	**0%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	

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Wabaseemoong Stewardship Area:

	PW	PR	PJ	SB	SW	BF	CE	LA	PO	BW	UH	LH	Total		
average m3/tree/spp=	0.22	0.21	0.17	0.13	0.18	0.15	0.04	0.09	0.37	0.11	0.10	0.10			
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	24	52	1	1	0	0	2	2	0	0	82	95	Sb 77 Pj 18 Po 2 Bw 2 Bf 1
Live wildlife trees left:	0	0	6	16	5				1	2			30	4.6	m3/ha
Wildlife Trees % of Volume:	0%	0%	1%	3%	1%	0%	0%	0%	0%	0%	0%	0%			
Pw/Pr/Ce/La Protection %	100%	100%	0%	0%	0%	0%	100%	100%	0%	0%	0%	0%		Pr, Pw netdown reduced to 2% in PRWMX	
Residual/Bypass %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%			
Total Unharvested Volume %:	100%	100%	1%	3%	1%	0%	100%	100%	0%	0%	100%	100%			
Total Unharvested m3/ha=>	0.0	0.0	0.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6		
								Overall average Net-down Loss:					***2%***		
SFMM Modelling Input:	**100%**	**100%**	**1%**	**3%**	**1%**	**1%**	**100%**	**100%**	**0%**	**0%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	
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	3	38	0	0	5	6	1	0	0	0	53	105	Sb 78 Pj 9 La 8 Ce 3 Po 1 Bw 1
Live wildlife trees left:			0	8			12	10					30	1.9	m3/ha
Wildlife Trees % of Volume:	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%			
Pw/Pr/Ce/La Protection %	100%	100%	0%	0%	0%	0%	100%	100%	0%	0%	0%	0%			
Residual/Bypass %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%		Ce, La netdown reduced to 1% in SBL	
Total Unharvested Volume %:	100%	100%	0%	2%	0%	0%	100%	100%	0%	0%	100%	100%			
Total Unharvested m3/ha=>	0.0	0.0	0.0	0.7	0.0	0.0	5.0	6.0	0.0	0.0	0.0	0.0	11.7		
								Overall average Net-down Loss:					***22%***		
SFMM Modelling Input:	**100%**	**100%**	**1%**	**2%**	**1%**	**1%**	**100%**	**100%**	**1%**	**1%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	
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=>)	1	1	40	35	3	2	0	0	5	3	0	0	90	85	Sb 56 Pj 32 Po 6 Bw 3 Sw 3 Bf 3
Live wildlife trees left:	4	4	5	10	5				1	1			30	5.3	m3/ha
Wildlife Trees % of Volume:	1%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%			
Pw/Pr/Ce/La Protection %	100%	100%	0%	0%	0%	0%	100%	100%	0%	0%	0%	0%			
Residual/Bypass %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%			
Total Unharvested Volume %:	100%	100%	1%	1%	1%	0%	100%	100%	0%	0%	100%	100%			
Total Unharvested m3/ha=>	1.0	1.0	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9		
								Overall average Net-down Loss:					***3%***		
SFMM Modelling Input:	**100%**	**100%**	**1%**	**1%**	**1%**	**1%**	**100%**	**100%**	**0%**	**0%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	

Non-Stewardship Area:

average m3/tree/spp=	0.22	0.21	0.17	0.13	0.18	0.15	0.04	0.09	0.37	0.11	0.10	0.10			
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=>)	1	2	12	11	5	20	1	0	9	3	0	0	64	75	Bf 39 Sb 26 Pj 13 Bw 9 Sw 7 Po 6
Live wildlife trees left:	4	8		5	2					1			20	3.7	m3/ha
Wildlife Trees % of Volume:	0%	3%	0%	1%	1%	0%	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%	1%	1%	0%	50%	50%	0%	0%	100%	100%		<== Total unharvested volume percentage by tree species	
Total Unharvested m3/ha=>	1.0	2.0	0.0	0.1	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	3.6	<== Total unharvested volume per hectare	
							Overall average Net-down Loss:						***6%***		
SFMM Modelling Input:	**100%**	**100%**	**1%**	**1%**	**1%**	**1%**	**50%**	**50%**	**1%**	**0%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	
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=>)	2	1	43	12	2	5	3	0	18	5	0	0	91	75	Pj 51 Po 22 Sb 12 Bw 11 Bf 3 Sw 1
Live wildlife trees left:	7	2	1	7			1		1	1			20	3.5	m3/ha
Wildlife Trees % of Volume:	2%	0%	0%	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%	0%	1%	0%	0%	50%	50%	0%	0%	100%	100%			
Total Unharvested m3/ha=>	2.0	1.0	0.1	0.1	0.0	0.0	1.5	0.0	0.1	0.0	0.0	0.0	4.8		
							Overall average Net-down Loss:						***5%***		
SFMM Modelling Input:	**100%**	**100%**	**0%**	**1%**	**1%**	**1%**	**50%**	**50%**	**0%**	**0%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	
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=>)	2	1	15	7	4	8	1	0	39	8	0	0	85	65	Po 43 Pj 26 Bw 12 Sb 10 Bf 5 Sw 2 Pr 1
Live wildlife trees left:	7	2	2	2			2		2	3			20	3.6	m3/ha
Wildlife Trees % of Volume:	0%	0%	0%	0%	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%	0%	0%	0%	0%	50%	50%	1%	0%	100%	100%			
Total Unharvested m3/ha=>	2.0	1.0	0.1	0.0	0.0	0.0	0.5	0.0	0.3	0.0	0.0	0.0	4.0		
							Overall average Net-down Loss:						***5%***		
SFMM Modelling Input:	**100%**	**100%**	**0%**	**0%**	**1%**	**1%**	**50%**	**50%**	**1%**	**0%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	
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=>)	2	0	8	4	4	5	1	0	58	12	2	3	99	75	Po 50 Bw 21 Pj 11 Sb 6 Ab 5 Bf 4 Sw 2
Live wildlife trees left:	5		2	4	3				2	3			19	3.6	m3/ha
Wildlife Trees % of Volume:	0%	0%	0%	1%	1%	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%	0%	1%	1%	0%	50%	50%	1%	0%	100%	100%			
Total Unharvested m3/ha=>	2.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.4	0.0	2.0	3.0	8.0		
							Overall average Net-down Loss:						***8%***		
SFMM Modelling Input:	**100%**	**100%**	**0%**	**1%**	**1%**	**1%**	**50%**	**50%**	**1%**	**0%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	

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Non-Stewardship Area:

	PW	PR	PJ	SB	SW	BF	CE	LA	PO	BW	UH	LH	Total	Avg AHA Age	Average FU Species Composition
average m3/tree/spp=	0.22	0.21	0.17	0.13	0.18	0.15	0.04	0.09	0.37	0.11	0.10	0.10			
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	76	4	0	0	0	0	3	1	0	0	84	75	Pj 84 Sb 7 Po 5 Bw 3
Live wildlife trees left:			12	3					3	2			20	3.8	m3/ha
Wildlife Trees % of Volume:	0%	0%	2%	0%	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%	0%	0%	0%	50%	50%	1%	0%	100%	100%			
Total Unharvested m3/ha=>	0.0	0.0	1.9	0.0	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%**	**2%**	**0%**	**1%**	**1%**	**50%**	**50%**	**1%**	**0%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	
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=>)	1	1	54	12	1	1	0	0	5	2	0	0	77	75	Pj 56 Sb 30 Po 7 Bw 4 Bf 2 Sw 1 Pr 1
Live wildlife trees left:	4	4	7	3					1	1			20	3.8	m3/ha
Wildlife Trees % of Volume:	1%	1%	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=>	1.0	1.0	0.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9		
Overall average Net-down Loss:													***4%***		
SFMM Modelling Input:	**100%**	**100%**	**2%**	**1%**	**1%**	**1%**	**50%**	**50%**	**0%**	**0%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	
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	10	2	3	3	0	0	96	4	0	0	118	65	Po 78 Pj 8 Bw 7 Sb 3 Bf 2 Sw 1 Ab 1
Live wildlife trees left:			4	3	1				11	1			20	5.4	m3/ha
Wildlife Trees % of Volume:	0%	0%	1%	0%	0%	0%	0%	0%	3%	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%	0%	0%	0%	50%	50%	3%	0%	100%	100%			
Total Unharvested m3/ha=>	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	3.4		
Overall average Net-down Loss:													***3%***		
SFMM Modelling Input:	**100%**	**100%**	**1%**	**0%**	**0%**	**1%**	**50%**	**50%**	**3%**	**0%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	
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=>)	45	84	18	5	1	5	1	0	21	8	0	0	188	95	Pr 55 Pj 11 Po 11 Pw 10 Sb 4 Bf 2
Live wildlife trees left:	5	6	2	5					1	1			20	3.8	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=>	0.3	0.6	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.2	0.0	1.7		
Overall average Net-down Loss:													***1%***		
SFMM Modelling Input:	**1%**	**1%**	**0%**	**0%**	**1%**	**1%**	**50%**	**50%**	**0%**	**0%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	

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Non-Stewardship Area:

	PW	PR	PJ	SB	SW	BF	CE	LA	PO	BW	UH	LH	Total		
average m3/tree/spp=	0.22	0.21	0.17	0.13	0.18	0.15	0.04	0.09	0.37	0.11	0.10	0.10			
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	24	52	1	1	0	0	2	2	0	0	82	95	Sb 77 Pj 18 Po 2 Bw 2 Bf 1
Live wildlife trees left:	0	0	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	0.2	1.2	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%**	**0%**	**0%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	

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	3	38	0	0	5	6	1	0	0	0	53	105	Sb 78 Pj 9 La 8 Ce 3 Po 1 Bw 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	1.2	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	1.4		
							Overall average Net-down Loss:						***3%***		
SFMM Modelling Input:	**100%**	**100%**	**0%**	**3%**	**1%**	**1%**	**1%**	**2%**	**1%**	**1%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	

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=>)	1	1	40	35	3	2	0	0	5	3	0	0	90	85	Sb 56 Pj 32 Po 6 Bw 3 Sw 3 Bf 3
Live wildlife trees left:	3	4	3	8	1				1				20	3.6	m3/ha
Wildlife Trees % of Volume:	1%	1%	1%	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%	1%	1%	0%	0%	50%	50%	0%	0%	100%	100%			
Total Unharvested m3/ha=>	1.0	1.0	0.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7		
							Overall average Net-down Loss:						***3%***		
SFMM Modelling Input:	**100%**	**100%**	**1%**	**1%**	**0%**	**1%**	**50%**	**50%**	**0%**	**1%**	**100%**	**100%**		<== Unharvested percentage above, with "0s" for species not in yield curve filled in with 1% in case is in YC at a different age.	

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Table 25 Summary of Clearcut Growing Stock Left Unharvested

Wabaseemoong Stewardship Area:

AU / species:	Pj	Sw	Sb	Bf	Pw	Pr	Ce	La	Po	Bw	UH	LH
BFM_ NAT	0.01	0.01	0.02	0.01	1.00	1.00	1.00	1.00	0.01	0.00	1.00	1.00
CMX_ NAT	0.01	0.01	0.01	0.01	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
CMXC NAT	0.01	0.01	0.01	0.01	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
HMX_ NAT	0.01	0.01	0.01	0.01	1.00	1.00	1.00	1.00	0.01	0.00	1.00	1.00
HRDA NAT	0.01	0.01	0.01	0.01	1.00	1.00	1.00	1.00	0.01	0.00	1.00	1.00
HRDB NAT	0.01	0.01	0.01	0.01	1.00	1.00	1.00	1.00	0.01	0.00	1.00	1.00
HRD_ NAT	0.04	0.01	0.01	0.01	1.00	1.00	1.00	1.00	0.01	0.00	1.00	1.00
PJDD NAT	0.04	0.01	0.01	0.01	1.00	1.00	1.00	1.00	0.01	0.00	1.00	1.00
PJDS NAT	0.02	0.00	0.01	0.01	1.00	1.00	1.00	1.00	0.01	0.00	1.00	1.00
PJM_ NAT	0.02	0.00	0.01	0.01	1.00	1.00	1.00	1.00	0.01	0.00	1.00	1.00
POD_ NAT	0.01	0.01	0.01	0.01	1.00	1.00	1.00	1.00	0.03	0.00	1.00	1.00
PRWR NAT	0.00	0.01	0.00	0.01	0.01	0.01	1.00	1.00	0.00	0.00	1.00	1.00
PRWW NAT	0.01	0.01	0.03	0.01	1.00	1.00	1.00	1.00	0.01	0.01	1.00	1.00
SBD_ NAT	0.01	0.01	0.03	0.01	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
SBL_ NAT	0.01	0.01	0.02	0.01	1.00	1.00	1.00	1.00	0.01	0.01	1.00	1.00
SBLC NAT	0.01	0.01	0.02	0.01	1.00	1.00	1.00	1.00	0.01	0.01	1.00	1.00
SBM_ NAT	0.01	0.01	0.01	0.01	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00

Non-Stewardship Area:

AU / species:	Pj	Sw	Sb	Bf	Pw	Pr	Ce	La	Po	Bw	UH	LH
BFM_ NAT	0.00	0.01	0.01	0.00	1.00	1.00	0.50	0.50	0.00	0.00	1.00	1.00
CMX_ NAT	0.00	0.00	0.01	0.00	1.00	1.00	0.50	0.50	0.00	0.00	1.00	1.00
CMXC NAT	0.00	0.00	0.01	0.00	1.00	1.00	0.50	0.50	0.00	0.00	1.00	1.00
HMX_ NAT	0.00	0.00	0.00	0.00	1.00	1.00	0.50	0.50	0.01	0.00	1.00	1.00
HRDA NAT	0.00	0.01	0.01	0.00	1.00	1.00	0.50	0.50	0.01	0.00	1.00	1.00
HRDB NAT	0.00	0.01	0.01	0.00	1.00	1.00	0.50	0.50	0.01	0.00	1.00	1.00
HRD_ NAT	0.02	0.00	0.00	0.00	1.00	1.00	0.50	0.50	0.01	0.00	1.00	1.00
PJDD NAT	0.02	0.00	0.00	0.00	1.00	1.00	0.50	0.50	0.01	0.00	1.00	1.00
PJDS NAT	0.02	0.00	0.01	0.00	1.00	1.00	0.50	0.50	0.00	0.00	1.00	1.00
PJM_ NAT	0.02	0.00	0.01	0.00	1.00	1.00	0.50	0.50	0.00	0.00	1.00	1.00
POD_ NAT	0.01	0.00	0.00	0.00	1.00	1.00	0.50	0.50	0.03	0.00	1.00	1.00
PRWR NAT	0.00	0.00	0.00	0.00	0.01	0.01	0.50	0.50	0.00	0.00	1.00	1.00
PRWW 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
SBD_ NAT	0.01	0.00	0.02	0.00	1.00	1.00	0.50	0.50	0.00	0.00	1.00	1.00
SBL_ NAT	0.00	0.00	0.03	0.00	1.00	1.00	0.01	0.02	0.00	0.00	1.00	1.00
SBLC NAT	0.00	0.00	0.03	0.00	1.00	1.00	0.01	0.02	0.00	0.00	1.00	1.00
SBM_ NAT	0.01	0.00	0.01	0.00	1.00	1.00	0.50	0.50	0.00	0.00	1.00	1.00

6.2.3.3 Clearcut Post-Renewal Forest Succession and Costs

Clearcut Post-Renewal Forest Succession rules, also called Post-Harvest Renewal Transitions (PHRT) rules are set to strategically model renewal pathways post-harvest. Succession is associated with two pathways; the natural succession pathway, by means of natural processes, 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 2022 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 2022 FMP.

In short, the renewal data was prepared (subsection A), then the data was sorted and analyzed, including data enrichment with regional data, if warranted (subsection B, enrichment was not required) resulting in Default Post-harvest Renewal Transition Rules by forest unit (Table FMP-5). Next default PHRT rules were further revised to reflect specific strategic silvicultural strategies by analysis unit, with the revised transitions finalized for use in SFMM strategic modelling (subsection C). These revisions 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 Base Model 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 Base Model Inventory was used, which was built from the Planning Composite Inventory with additional management fields added for (2022) PLANFU, YIELD, regional 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 BMI fields. This subset since 2001 was considered appropriate as it encompassed the last 20 years in which good quality silvicultural effectiveness information was recorded.

2. This partial BMI was updated with additional Miisun information for renewal treatments applied and establishment survey timing and establishment results. The draft BMI contained DEVSTAGE which identified the broad treatment type applied to the established stands (e.g. EST<u>NAT</u>, EST<u>PLANT</u>, EST<u>SEED</u>). The SFL renewal treatment (Free-To-Grow database) included additional information on treatment applied (Natural, Plant, Seed) which was considered more reliable than the DEVSTAGE information provided for the 2022 FMP PCI. Information for the broad renewal treatments applied, establishment success, and current forest condition (e.g. post-harvest and renewal condition by PLANFU and YIELD) was ready.

Next the pre-harvest condition was assembled.

Significant GIS work was conducted to link the “pre-harvest” forest condition of the established areas to the respective 2022 PLANFUs. It is noted that PLANFU definitions in the 2001, 2006 and 2012 FMPs for the Kenora Forest all used different forest unit definitions as compared to this 2022 FMP. By reclassifying the “pre-harvest stand conditions” according to the 2022 FMP PLANFUs, meaningful analysis for renewal transitions was possible.

3. The Stewardship Inventory from the 2001 FMP included the “pre-harvest” condition for all stands established since 2001, as they had not being harvested in 2001. This inventory was processed to add NWR_SFU standard forest unit and NWR_AU analysis unit classifications for stands according to the 2022 definitions.

The current NWR_SFU script was used to determine the current regional standard forest units of the past inventory (2001). This was done using the native attributes of the 2001 inventory with the exception of the ecosite which was not in the inventory.

Rather, the Northwestern Ontario Ecological Classification System classes (used in 2001 inventory) were related to the approximate Provincial Ecosite class (used in the 2022 inventory). This reclassification of SFUs in the 2001 inventory was conducted by the Regional Forest Analyst, for use in this analysis.

4. Using the NWR_SFU, the 2022 PLANFU (described in Table FMP-2) was assigned to the 2001 inventory as a “pre-harvest” forest condition classification. This provided a 2022 PLANFU classification for the pre-harvest condition for stands later harvested, renewed and declared as successfully Free-To-Grow / Established. The “pre-harvest” YIELD was also assigned according to 2022 FMP definitions.

The “pre-harvest” and “post-harvest” 2022 PLANFU classifications were intersected into the renewal dataset for this analysis:

5. The “pre-harvest” 2022 forest units and analysis units were spatially appended to the existing KF renewal database for stands harvested and established since 2001. This Established (FTG) database contained draft 2022 BMI fields for all verified renewal areas (reported in Annual Report). Together, this database recorded the 2001 pre-harvest condition, broad renewal treatment applied (natural, plant, seed), and resulting 2022 stand condition.

6. The Established database areas were rounded to the nearest 0.1 hectare (HA column) to aid the analysis summaries. Areas without a 2001 PLANFU were 2001 non-forested areas, but are classified as "forested" in 2022 FRI. These areas were deleted in dataset (2,275 ha).

7. The resulting data set was sorted to identify those that received renewal treatments and that had been declared established (free-to-grow) in Annual Reports. The established stand conditions were classified based on attributes in the eFRI (PCI). These eFRI attributes were used to classify the young stands into the correct forest unit – yield combination (silvicultural stratum) for this 2022 FMP.

8. The dataset was also sorted by Miisun renewal database “Treatment Method1” to reflect broad treatment types applied to these areas (Natural, Plant, Seed).

The processing of the 2001 inventory data with recently established stands (since 2001) by 2022 PLANU and broad treatment type was complete. This resulted in over 10,800 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 2022 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 starting, pre-harvest forest unit was compared against the broad renewal treatment applied and the resulting (post-harvest renewal) forest unit. Table 26 documents the PLANFU transitions by broad renewal treatment type using Kenora Forest data. Overall, the data set created using the 2001 and 2022 inventories generally had good data so minimal data clean up and enhancement was needed.

The results of the analysis of past silviculture performance were reviewed by the LTMD Task Team and plan advisors. One anomaly 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 and/or a change in management intents.

The highlighted cells in Table 26 represent actual data area transitions (PLANFU to PLANFU-YIELD by broad treatment type) that were adjusted during three rounds 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 Plan Advisor discussions and agreements during each step.

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 27, and in Table FMP-5.

Data Enrichment was not required for Default Post-Harvest Renewal Transition Rules, however some poor transitions were addressed (not "adjusted") during development of the strategic modelling inputs, based on default renewal transitions (subsection C). Subsection C summarizes development of SFMM strategic modelling inputs including key strategic silvicultural strategies (and resulting transitions) by analysis unit.

Strategic silvicultural options are similar to those incorporated into the 2012 FMP, and implemented 2012-2022, with one notable exception. The amount of chemical tending has increased in recent years (leading up to 2022 plan preparation) in comparison to the 2001-2018 period from which the establishment renewal dataset is derived. The increase in chemical tending influences the strategic post-harvest renewal transitions with more conifer projected for establishment and a reduction in resulting mixedwood or hardwood establishment on certain sites (discussed in subsection C).

Table 26 Key:

General Order of Application:	
Not Valid	Denotes a future forest condition that is not valid according to 2022 PLANFU-YIELD combinations (YIELD correct in FTG dataset, no changes needed).
Poor Data	Kenora Forest transitions do not accurately reflect maintenance of certain ecosite characteristics (cannot change lowland to upland through renewal, etc.). Areas are shifted to next appropriate forest unit in subsequent (lower) table.
Clean/Little	Delete all cells with "0" ha (or less than 1% of area treated), and add to PLANFU with largest area in same row (same treatment and future yield)
	Areas by PLANFU on the Kenora Forest were too small to accurately reflect renewal transitions. Area added with similar transition. Then transitions with smaller areas were simplified a second time for strategic level transitions.
Other	Other questions and adjustments as noted (e.g. loss of PRW area, area seeded to PJ resulting in SBD, typically small areas) Would a broad treatment type be strategcally conducted? If not, delete it.
Enrich	No good Kenora Forest data to support PHRT. Transitions enriched from regional science data.

Table 26 Analysis of Past Silviculture Performance

STEP 1:

PROPOSED CHANGES for Poor and Clean / Little data

Future Forest Unit and YIELD:

Pre-harvest Forest Unit	Regen Type	BFM Ha	BFM YIELD	CMX Ha	CMX YIELD	HMX Ha	HMX YIELD	HRD Ha	HRD YIELD	PJD Ha	PJD YIELD	PJM Ha	PJM YIELD	POD Ha	POD YIELD	PRW Ha	PRW YIELD	SBD Ha	SBD YIELD	SBL Ha	SBL YIELD	SBM Ha	SBM YIELD	Area By Treatment
BFM	Natural		LOW	53	LOW		LOW		LOW	1	LOW	2	LOW		LOW	1	LOW		LOW	7	LOW		LOW	515
		19	MED	44	MED	83	MED	153	MED	7	MED	57	MED	13	MED	1	MED	1	MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	57	HIGH	1	HIGH		HIGH		HIGH	17	HIGH	
	Plant		LOW	2	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	0	LOW		LOW	8
		0	MED		MED		MED		MED	4	MED		MED		MED		MED		MED		MED	0	MED	
			HIGH		HIGH		HIGH		HIGH	1	HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	0	HIGH	
	Seed		LOW	0	LOW		LOW		LOW	10	LOW	0	LOW		LOW		LOW		LOW		LOW		LOW	181
			MED	23	MED	13	MED	1	MED	48	MED	16	MED		MED		MED	72	MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	0	HIGH		HIGH		HIGH		HIGH		HIGH	
CMX	Natural		LOW	80	LOW		LOW		LOW	10	LOW	0	LOW		LOW	1	LOW		LOW	14	LOW		LOW	855
		112	MED	125	MED	75	MED	77	MED	12	MED	26	MED	28	MED	9	MED	13	MED		MED	4	MED	
			HIGH		HIGH		HIGH		HIGH	11	HIGH		HIGH	212	HIGH	18	HIGH		HIGH		HIGH	28	HIGH	
	Plant		LOW	54	LOW		LOW		LOW	79	LOW		LOW		LOW		LOW		LOW	7	LOW		LOW	743
		21	MED	15	MED	15	MED	21	MED	98	MED	33	MED	4	MED	155	MED	102	MED		MED	57	MED	
			HIGH		HIGH		HIGH		HIGH	18	HIGH		HIGH	5	HIGH	9	HIGH		HIGH		HIGH	50	HIGH	
	Seed		LOW	5	LOW		LOW		LOW	19	LOW	0	LOW		LOW		LOW		LOW	5	LOW		LOW	239
		0	MED	51	MED	53	MED	12	MED	44	MED	21	MED		MED		MED	2	MED		MED	0	MED	
			HIGH		HIGH		HIGH		HIGH	28	HIGH		HIGH	0	HIGH		HIGH		HIGH		HIGH		HIGH	
HMX	Natural		LOW	109	LOW		LOW		LOW	11	LOW	3	LOW		LOW	4	LOW		LOW	18	LOW		LOW	1,205
		94	MED	84	MED	102	MED	167	MED	17	MED	54	MED	42	MED	2	MED	37	MED		MED	7	MED	
			HIGH		HIGH		HIGH		HIGH	21	HIGH		HIGH	378	HIGH	3	HIGH		HIGH		HIGH	53	HIGH	
	Plant		LOW	37	LOW		LOW		LOW	3	LOW	9	LOW		LOW		LOW		LOW	6	LOW		LOW	495
		19	MED	21	MED	18	MED	5	MED	18	MED	190	MED		MED	9	MED	20	MED		MED	6	MED	
			HIGH		HIGH		HIGH		HIGH	8	HIGH		HIGH	10	HIGH	7	HIGH		HIGH		HIGH	109	HIGH	
Decision?:	Seed		LOW	3	LOW		LOW		LOW	3	LOW	0	LOW		LOW		LOW		LOW	2	LOW		LOW	291
Not a valid		12	MED	10	MED	67	MED	6	MED	76	MED	20	MED		MED		MED	8	MED		MED		MED	
treatment			HIGH		HIGH		HIGH		HIGH	76	HIGH		HIGH	4	HIGH		HIGH		HIGH		HIGH	5	HIGH	
HRD	Natural		LOW	10	LOW		LOW		LOW	8	LOW	0	LOW		LOW	1	LOW		LOW	13	LOW		LOW	718
		17	MED	90	MED	65	MED	108	MED	73	MED	42	MED	97	MED	5	MED	1	MED		MED	6	MED	
			HIGH		HIGH		HIGH		HIGH	20	HIGH		HIGH	160	HIGH	2	HIGH		HIGH		HIGH	3	HIGH	
	Plant		LOW	17	LOW		LOW		LOW		LOW		LOW		LOW	0	LOW		LOW	1	LOW		LOW	212
		17	MED	9	MED	1	MED	3	MED	30	MED	6	MED		MED	1	MED	33	MED		MED	18	MED	
			HIGH		HIGH		HIGH		HIGH	21	HIGH		HIGH		HIGH	36	HIGH		HIGH		HIGH	20	HIGH	
Decision?:	Seed		LOW	5	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	1	LOW		LOW	137
Not a valid		1	MED	15	MED	68	MED	0	MED	21	MED		MED		MED		MED	1	MED		MED		MED	
treatment			HIGH		HIGH		HIGH		HIGH	24	HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	
PJD	Natural		LOW	30	LOW		LOW		LOW	0	LOW	1	LOW		LOW		LOW		LOW	9	LOW		LOW	361
		30	MED	150	MED	28	MED	14	MED	13	MED	21	MED	9	MED	0	MED	1	MED		MED	7	MED	
			HIGH		HIGH		HIGH		HIGH	5	HIGH		HIGH	36	HIGH		HIGH		HIGH		HIGH	6	HIGH	
	Plant		LOW	36	LOW		LOW		LOW	0	LOW	1	LOW		LOW		LOW		LOW	4	LOW		LOW	249
		3	MED	13	MED	13	MED	7	MED	27	MED	25	MED		MED	35	MED	56	MED		MED	16	MED	
			HIGH		HIGH		HIGH		HIGH	8	HIGH		HIGH	2	HIGH		HIGH		HIGH		HIGH	3	HIGH	
	Seed		LOW	5	LOW		LOW		LOW	1	LOW		LOW		LOW		LOW		LOW	0	LOW		LOW	110
		4	MED	0	MED	43	MED	1	MED	19	MED	6	MED		MED		MED	13	MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH	16	HIGH		HIGH	0	HIGH		HIGH		HIGH		HIGH		HIGH	

STEP 1:

PROPOSED CHANGES for Poor and Clean / Little data

Future Forest Unit and YIELD:

Pre-harvest Forest Unit	Regen Type	BFM		CMX		HMX		HRD		PJD		PJM		POD		PRW		SBD		SBL		SBM		Area By Treatment
		Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	
PJM	Natural		LOW	16	LOW		LOW		LOW	2	LOW	3	LOW		LOW		LOW		LOW	4	LOW		LOW	365
		37	MED	88	MED	39	MED	39	MED	3	MED	43	MED	1	MED	3	MED	1	MED		MED	1	MED	
			HIGH		HIGH		HIGH		HIGH	1	HIGH		HIGH	75	HIGH	4	HIGH		HIGH		HIGH	6	HIGH	
	Plant		LOW	16	LOW		LOW		LOW	1	LOW	0	LOW		LOW		LOW		LOW	2	LOW		LOW	139
		25	MED	3	MED	6	MED	6	MED	-	MED	37	MED		MED	6	MED	20	MED		MED	11	MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	2	HIGH		HIGH		HIGH		HIGH	4	HIGH	
	Seed		LOW	0	LOW		LOW		LOW	2	LOW		LOW		LOW		LOW		LOW	0	LOW		LOW	132
		1	MED	54	MED	23	MED	1	MED	33	MED	18	MED		MED		MED		MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH	1	HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	
POD	Natural		LOW	37	LOW		LOW		LOW	7	LOW	1	LOW		LOW	0	LOW		LOW	4	LOW		LOW	649
		34	MED	95	MED	61	MED	37	MED	1	MED	25	MED	39	MED	1	MED	1	MED		MED	2	MED	
			HIGH		HIGH		HIGH		HIGH	1	HIGH		HIGH	227	HIGH	0	HIGH		HIGH		HIGH	79	HIGH	
	Plant		LOW	20	LOW		LOW		LOW		LOW		LOW		LOW	0	LOW		LOW	0	LOW		LOW	173
		9	MED	61	MED	4	MED	28	MED	4	MED	7	MED		MED	2	MED	2	MED		MED	1	MED	
			HIGH		HIGH		HIGH		HIGH	17	HIGH		HIGH	2	HIGH		HIGH		HIGH		HIGH	16	HIGH	
Decision?:	Seed		LOW	1	LOW		LOW		LOW	0	LOW	1	LOW		LOW		LOW		LOW		LOW		LOW	45
Not a valid			MED		MED	1	MED		MED	4	MED	28	MED		MED		MED	5	MED		MED		MED	
treatment			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	6	HIGH	
PRW	Natural		LOW	40	LOW		LOW		LOW		LOW		LOW		LOW	3	LOW		LOW	9	LOW		LOW	312
		25	MED	1	MED	77	MED	30	MED	0	MED	60	MED	17	MED	12	MED		MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	34	HIGH	3	HIGH		HIGH		HIGH	2	HIGH	
	Plant		LOW	2	LOW		LOW		LOW		LOW		LOW		LOW	6	LOW		LOW	1	LOW		LOW	86
		13	MED	6	MED	54	MED	2	MED		MED	1	MED		MED	0	MED		MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	0	HIGH		HIGH		HIGH		HIGH	0	HIGH	
Decision?:	Seed		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	6
Not a valid			MED		MED	4	MED	2	MED		MED		MED		MED		MED		MED		MED		MED	
treatment			HIGH		HIGH		HIGH		HIGH	0	HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	
SBD	Natural		LOW	23	LOW		LOW		LOW	2	LOW		LOW		LOW		LOW		LOW	4	LOW		LOW	257
		21	MED	34	MED	37	MED	3	MED	10	MED	18	MED	3	MED	1	MED	7	MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH	3	HIGH		HIGH	82	HIGH		HIGH		HIGH		HIGH	10	HIGH	
	Plant		LOW	4	LOW		LOW		LOW	0	LOW		LOW		LOW		LOW		LOW	0	LOW		LOW	97
			MED	17	MED	5	MED	1	MED	31	MED	7	MED		MED	6	MED	12	MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH	6	HIGH		HIGH	0	HIGH		HIGH		HIGH		HIGH	7	HIGH	
	Seed		LOW	1	LOW		LOW		LOW	0	LOW	3	LOW		LOW		LOW		LOW	0	LOW		LOW	76
			MED	18	MED	15	MED		MED	8	MED	28	MED		MED		MED	0	MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	0	HIGH		HIGH		HIGH		HIGH	1	HIGH	
SBL	Natural		LOW	168	LOW		LOW		LOW	37	LOW	3	LOW		LOW	4	LOW		LOW	43	LOW		LOW	1,269
		86	MED	84	MED	177	MED	115	MED	48	MED	24	MED	38	MED	10	MED	22	MED		MED	0	MED	enrich?
			HIGH		HIGH		HIGH		HIGH	33	HIGH		HIGH	361	HIGH	1	HIGH		HIGH		HIGH	14	HIGH	
	Plant		LOW	39	LOW		LOW		LOW	2	LOW	0	LOW		LOW	10	LOW		LOW	1	LOW		LOW	299
		36	MED	31	MED	48	MED	7	MED	24	MED	15	MED	0	MED	6	MED	7	MED		MED	4	MED	enrich?
			HIGH		HIGH		HIGH		HIGH	39	HIGH		HIGH	13	HIGH	14	HIGH		HIGH		HIGH	3	HIGH	
Decision?:	Seed		LOW	2	LOW		LOW		LOW	1	LOW		LOW		LOW		LOW		LOW	1	LOW		LOW	103
Not a valid		1	MED	36	MED	7	MED	3	MED	30	MED	10	MED	0	MED		MED		MED		MED	0	MED	
treatment			HIGH		HIGH		HIGH		HIGH	12	HIGH		HIGH	1	HIGH		HIGH		HIGH		HIGH		HIGH	

STEP 1:

PROPOSED CHANGES for Poor and Clean / Little data

Future Forest Unit and YIELD:

Pre-harvest Forest Unit	Regen Type	BFM		CMX		HMX		HRD		PJD		PJM		POD		PRW		SBD		SBL		SBM		Area By Treatment
		Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	
SBM	Natural		LOW	26	LOW		LOW		LOW		LOW	0	LOW		LOW		LOW		LOW	6	LOW		LOW	280
			MED	42	MED	69	MED	62	MED	17	MED	4	MED	7	MED	2	MED		MED		MED	0	MED	
			HIGH		HIGH		HIGH		HIGH	9	HIGH		HIGH	25	HIGH		HIGH		HIGH		HIGH	11	HIGH	
	Plant		LOW	14	LOW		LOW		LOW	1	LOW	7	LOW		LOW		LOW		LOW		LOW		LOW	177
			MED	5	MED	6	MED	1	MED	4	MED	12	MED	0	MED	0	MED	95	MED		MED	3	MED	
			HIGH		HIGH		HIGH		HIGH	22	HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	8	HIGH	
	Seed		LOW		LOW		LOW		LOW	12	LOW	0	LOW		LOW		LOW		LOW	1	LOW		LOW	88
			MED	20	MED	9	MED	0	MED	39	MED		MED		MED		MED		MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH	6	HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	2	HIGH	
GRAND TOTAL		637		2,096		1,285		913		1,379		885		1,982		394		533		163		605		**10,872**
																						ha check:		**10,872**

For broad treatments deemed not appropriate for certain forest units, the whole row will be deleted from Table FMP-5 Default Post-Harvest Renewal Transitions

STEP 2:

Includes above changes for Poor and Clean / Little data

PROPOSED CHANGES for Other and Poor data

Still need to revise down to 1 future yield per PLANFU and Treatment

When done (and any other edits), convert top Percentages by PLANFU-YIELD below.

Can reflect PJD Shallow maintenance by AU is SFMM.

Can reflect PRW LOW/MED difference by AU is SFMM.

Pre-harvest Forest Unit	Regen Type	BFM		CMX		HMX		HRD		PJD		PJM		POD		PRW		SBD		SBL		SBM		Area By Treatment	
		Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD		
BFM	Natural		LOW	53	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	7	LOW		LOW	515	
		19	MED	44	MED	83	MED	153	MED	8	MED	58	MED	13	MED	3	MED		MED		MED		MED		
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	57	HIGH		HIGH		HIGH		HIGH	18	HIGH		
	Plant		LOW	2	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	8	
			MED		MED		MED		MED	5	MED		MED		MED		MED		MED		MED	1	MED		
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		
	Seed		LOW		LOW		LOW		LOW	10	LOW		LOW		LOW		LOW		LOW		LOW		LOW	181	
			MED	23	MED	14	MED		MED	48	MED	15	MED		MED		MED	72	MED		MED		MED	poor data	Delete this blue area.
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		
CMX	Natural		LOW	80	LOW		LOW		LOW	10	LOW		LOW		LOW		LOW		LOW	14	LOW		LOW	855	
		112	MED	125	MED	75	MED	77	MED	12	MED	26	MED	28	MED	10	MED	13	MED		MED		MED		
Adjust for:			HIGH		HIGH		HIGH		HIGH	11	HIGH		HIGH	212	HIGH	18	HIGH		HIGH		HIGH	32	HIGH		
CMX LOW	Plant		LOW	54	LOW		LOW		LOW	79	LOW		LOW		LOW		LOW		LOW		LOW		LOW	743	
= SP		21	MED	15	MED	15	MED	21	MED	98	MED	33	MED	9	MED	164	MED	110	MED		MED	57	MED		
			HIGH		HIGH		HIGH		HIGH	18	HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	50	HIGH		
CMX MED	Seed		LOW		LOW		LOW		LOW	19	LOW		LOW		LOW		LOW		LOW		LOW		LOW	239	
= PJ			MED	56	MED	53	MED	12	MED	44	MED	22	MED		MED		MED	7	MED		MED		MED		
			HIGH		HIGH		HIGH		HIGH	28	HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		
HMX	Natural		LOW	109	LOW		LOW		LOW		LOW		LOW		LOW	4	LOW		LOW	18	LOW		LOW	1,205	
		94	MED	84	MED	102	MED	167	MED	28	MED	57	MED	42	MED	5	MED	37	MED		MED		MED		
			HIGH		HIGH		HIGH		HIGH	21	HIGH		HIGH	378	HIGH		HIGH		HIGH		HIGH	60	HIGH		
	Plant		LOW	37	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	495	
		19	MED	21	MED	18	MED	5	MED	21	MED	198	MED		MED	9	MED	26	MED		MED		MED		
			HIGH		HIGH		HIGH		HIGH	8	HIGH		HIGH	10	HIGH	7	HIGH		HIGH		HIGH	116	HIGH		
Decision?:	Seed		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	291	
Not a valid		12	MED	13	MED	67	MED	6	MED	78	MED	20	MED		MED		MED	10	MED		MED		MED	Delete SEE	Adjustment, do after initial default
treatment			HIGH		HIGH		HIGH		HIGH	76	HIGH		HIGH	4	HIGH		HIGH		HIGH		HIGH	5	HIGH	poor data	Delete this blue area.

STEP 2:

Includes above changes for Poor and Clean / Little data

PROPOSED CHANGES for Other and Poor data

Still need to revise down to 1 future yield per PLANFU and Treatment

When done (and any other edits), convert top Percentages by PLANFU-YIELD below.

Can reflect PJD Shallow maintenance by AU is SFMM.

Can reflect PRW LOW/MED difference by AU is SFMM.

Pre-harvest	Regen	BFM		CMX		HMX		HRD		PJD		PJM		POD		PRW		SBD		SBL		SBM		Area By	
Forest Unit	**Type**	**Ha**	**YIELD**	**Ha**	**YIELD**	**Ha**	**YIELD**	**Ha**	**YIELD**	**Ha**	**YIELD**	**Ha**	**YIELD**	**Ha**	**YIELD**	**Ha**	**YIELD**	**Ha**	**YIELD**	**Ha**	**YIELD**	**Ha**	**YIELD**	**Treatment**	
HRD	Natural		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	718	
		17	MED	100	MED	65	MED	108	MED	80	MED	42	MED	97	MED	7	MED		MED		MED	23	MED		
			HIGH		HIGH		HIGH		HIGH	20	HIGH		HIGH	160	HIGH		HIGH		HIGH		HIGH		HIGH		
	Plant		LOW	17	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	212	
		17	MED	9	MED		MED	4	MED	30	MED	6	MED		MED		MED	34	MED		MED	18	MED		
			HIGH		HIGH		HIGH		HIGH	21	HIGH		HIGH		HIGH	37	HIGH		HIGH		HIGH	20	HIGH		
Decision?:	Seed		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	137	
Not a valid			MED	21	MED	69	MED		MED	21	MED		MED		MED		MED	2	MED		MED		MED	Delete SEE	Adjustment, do after initial default
treatment			HIGH		HIGH		HIGH		HIGH	24	HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	poor data	Delete this blue area.
PJD	Natural		LOW	30	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	361	
		30	MED	150	MED	28	MED	15	MED	18	MED	22	MED	9	MED		MED		MED		MED	23	MED		
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	36	HIGH		HIGH		HIGH		HIGH		HIGH		
	Plant		LOW	39	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	249	
			MED	13	MED	13	MED	7	MED	27	MED	27	MED		MED	35	MED	60	MED		MED	19	MED		
			HIGH		HIGH		HIGH		HIGH	8	HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		
	Seed		LOW	5	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	110	
		4	MED		MED	44	MED		MED	20	MED	7	MED		MED		MED	13	MED		MED		MED	poor data	Delete this blue area.
			HIGH		HIGH		HIGH		HIGH	16	HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		
PJM	Natural		LOW	16	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	365	
		37	MED	88	MED	39	MED	39	MED	5	MED	47	MED		MED	3	MED		MED		MED	6	MED		
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	75	HIGH	4	HIGH		HIGH		HIGH	6	HIGH		
	Plant		LOW	19	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	139	
		25	MED		MED	6	MED	6	MED		MED	40	MED		MED	6	MED	22	MED		MED	15	MED		
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		
	Seed		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	132	
			MED	55	MED	24	MED		MED	35	MED	18	MED		MED		MED		MED		MED		MED		
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		
POD	Natural		LOW	37	LOW		LOW		LOW	9	LOW		LOW		LOW		LOW		LOW		LOW		LOW	649	
		34	MED	95	MED	61	MED	37	MED		MED	25	MED	39	MED	1	MED		MED		MED		MED		
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	227	HIGH		HIGH		HIGH		HIGH	85	HIGH		
	Plant		LOW	20	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	173	
		9	MED	61	MED	4	MED	30	MED	4	MED	7	MED		MED	2	MED		MED		MED		MED		
			HIGH		HIGH		HIGH		HIGH	17	HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	20	HIGH		
Decision?:	Seed		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	45	
Not a valid			MED		MED	1	MED		MED	4	MED	29	MED		MED		MED	5	MED		MED		MED	Delete SEE	Adjustment, do after initial default
treatment			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	6	HIGH	poor data	Delete this blue area.
PRW	Natural		LOW	41	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	312	
PRW LOW=PW		25	MED		MED	77	MED	30	MED		MED	60	MED	17	MED	18	MED		MED		MED		MED		
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	34	HIGH		HIGH		HIGH		HIGH	11	HIGH		
At end, can	Plant		LOW	2	LOW		LOW		LOW		LOW		LOW		LOW	6	LOW		LOW		LOW		LOW	86	
edit forPRW AUs		13	MED	6	MED	54	MED	2	MED		MED		MED		MED	2	MED		MED		MED		MED		
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		
Decision?:	Seed		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	6	
Not a valid			MED		MED	4	MED	2	MED		MED		MED		MED		MED		MED		MED		MED	Delete SEE	Adjustment, do after initial default
treatment			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		

STEP 2:

Includes above changes for Poor and Clean / Little data

PROPOSED CHANGES for Other and Poor data

Still need to revise down to 1 future yield per PLANFU and Treatment

When done (and any other edits), convert top Percentages by PLANFU-YIELD below.

Can reflect PJD Shallow maintenance by AU is SFMM.

Can reflect PRW LOW/MED difference by AU is SFMM.

Pre-harvest	Regen	BFM		CMX		HMX		HRD		PJD		PJM		POD		PRW		SBD		SBL		SBM		Area By	
Forest Unit	Type	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Treatment	
SBD	Natural		LOW	23	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	257	
		21	MED	34	MED	40	MED		MED	15	MED	19	MED		MED		MED	11	MED		MED		MED		
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	85	HIGH		HIGH		HIGH		HIGH	10	HIGH		
	Plant		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	97	
			MED	20	MED	6	MED		MED	39	MED	7	MED		MED	6	MED	13	MED		MED		MED		
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	7	HIGH		
	Seed		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	76	
			MED	19	MED	15	MED		MED	8	MED	33	MED		MED		MED		MED		MED		MED		
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		
SBL	Natural		LOW	168	LOW		LOW		LOW	37	LOW		LOW		LOW		LOW		LOW	94	LOW		LOW	1,269	
		86	MED	84	MED	177	MED	115	MED	48	MED	27	MED	38	MED		MED		MED		MED		MED	enrich to fix	
			HIGH		HIGH		HIGH		HIGH	33	HIGH		HIGH	361	HIGH		HIGH		HIGH		HIGH		HIGH		
	Plant		LOW	39	LOW		LOW		LOW		LOW		LOW		LOW	10	LOW		LOW	15	LOW		LOW	299	
		36	MED	31	MED	48	MED	7	MED	26	MED	16	MED		MED	6	MED		MED		MED		MED	enrich to fix	
			HIGH		HIGH		HIGH		HIGH	39	HIGH		HIGH	13	HIGH	14	HIGH		HIGH		HIGH		HIGH		
Decision?:	Seed		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	2	LOW		LOW	103	Delete this blue area.
Not a valid			MED	38	MED	7	MED	4	MED	30	MED	10	MED		MED		MED		MED		MED		MED	Delete SEE	Adjustment, do after initial default
treatment			HIGH		HIGH		HIGH		HIGH	12	HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		
SBM	Natural		LOW	26	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	280	
			MED	42	MED	69	MED	62	MED	26	MED	4	MED	7	MED		MED		MED		MED		MED		
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	25	HIGH		HIGH		HIGH		HIGH	19	HIGH		
	Plant		LOW	14	LOW		LOW		LOW		LOW	7	LOW		LOW		LOW		LOW		LOW		LOW	177	
			MED	5	MED	7	MED		MED		MED	13	MED		MED		MED	95	MED		MED		MED		
			HIGH		HIGH		HIGH		HIGH	26	HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	11	HIGH		
	Seed		LOW		LOW		LOW		LOW	12	LOW		LOW		LOW		LOW		LOW		LOW		LOW	88	
			MED	20	MED	9	MED		MED	45	MED		MED		MED		MED		MED		MED		MED		
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	2	HIGH	poor data	Delete this blue area.
GRAND TOTAL		631		2,101		1,294		910		1,379		891		1,974		377		529		150		638		10,871	
																						ha check:		10,871	

STEP 3:

Lower table reflects above noted changes.

3. Summary Post-Harvest Renewal Transitions by PLANFU, Treatment, Resulting PLANFU-YIELD (area in Hectares)

Includes above changes for Other and Poor data

Poor Data includes changes to address deleting the HMX natural successions to PJD, PJM and SBL. Reduce BFM and CMX.

Areas added together for largest YIELD in a PLANFU. OK consensus of Task Team.

Can reflect PJD Shallow maintenance by AU is SFMM.

Can reflect PRW LOW/MED difference by AU is SFMM.

Pre-harvest	Regen	BFM		CMX		HMX		HRD		PJD		PJM		POD		PRW		SBD		SBL		SBM		Area By
Forest Unit	Type	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Treatment
BFM	Natural		LOW	97	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	7	LOW		LOW	515
		19	MED		MED	83	MED	153	MED	8	MED	58	MED		MED	3	MED		MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	70	HIGH		HIGH		HIGH		HIGH	18	HIGH	
	Plant		LOW	2	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	8
			MED		MED		MED		MED	5	MED		MED		MED		MED		MED		MED	1	MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	
	Seed		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	109
			MED	23	MED	14	MED		MED	57	MED	15	MED		MED		MED		MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	

STEP 3:

Includes above changes for Other and Poor data

Poor Data includes changes to address deleting the HMX natural successions to PJD, PJM and SBL. Reduce BFM and CMX.

Areas added together for largest YIELD in a PLANFU. OK consensus of Task Team.

Can reflect PJD Shallow maintenance by AU is SFMM.

Can reflect PRW LOW/MED difference by AU is SFMM.

Pre-harvest	Regen	BFM		CMX		HMX		HRD		PJD		PJM		POD		PRW		SBD		SBL		SBM		Area By
Forest Unit	Type	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Treatment
CMX	Natural		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	14	LOW		LOW	855
		112	MED	205	MED	75	MED	77	MED	32	MED	26	MED		MED		MED	13	MED		MED		MED	
Adjust for:			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	240	HIGH	28	HIGH		HIGH		HIGH	32	HIGH	
CMX LOW	Plant		LOW	69	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	743
= SP		21	MED		MED	15	MED	21	MED	195	MED	33	MED	9	MED	164	MED	110	MED		MED	107	MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	
CMX MED	Seed		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	239
= PJ			MED	56	MED	53	MED	12	MED	90	MED	22	MED		MED		MED	7	MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	
HMX	Natural		LOW	193	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	18	LOW		LOW	1,205
		94	MED		MED	102	MED	167	MED	50	MED	57	MED		MED	9	MED	37	MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	420	HIGH		HIGH		HIGH		HIGH	60	HIGH	
	Plant		LOW	59	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	495
		19	MED		MED	18	MED	5	MED	29	MED	198	MED		MED	16	MED	26	MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	10	HIGH		HIGH		HIGH		HIGH	116	HIGH	
Decision?:	Seed		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	276
Not a valid		12	MED	13	MED	67	MED	6	MED	155	MED	20	MED		MED		MED		MED		MED		MED	Delete SEED
treatment			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	4	HIGH		HIGH		HIGH		HIGH		HIGH	
HRD	Natural		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	718
		17	MED	100	MED	65	MED	108	MED	100	MED	42	MED		MED	7	MED		MED		MED	23	MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	256	HIGH		HIGH		HIGH		HIGH		HIGH	
	Plant		LOW	26	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	212
		17	MED		MED		MED	4	MED	51	MED	6	MED		MED		MED	34	MED		MED	38	MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	37	HIGH		HIGH		HIGH		HIGH	
Decision?:	Seed		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	135
Not a valid			MED	21	MED	69	MED		MED		MED		MED		MED		MED		MED		MED		MED	Delete SEED
treatment			HIGH		HIGH		HIGH		HIGH	46	HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	(adjustment)
PJD	Natural		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	361
		30	MED	179	MED	28	MED	15	MED	18	MED	22	MED		MED		MED		MED		MED	23	MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	45	HIGH		HIGH		HIGH		HIGH		HIGH	
	Plant		LOW	52	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	249
			MED		MED	13	MED	7	MED	35	MED	27	MED		MED	35	MED	60	MED		MED	19	MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	
	Seed		LOW	5	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	97
		4	MED		MED	44	MED		MED	36	MED	7	MED		MED		MED		MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	
PJM	Natural		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	365
		37	MED	103	MED	39	MED	39	MED	5	MED	47	MED		MED		MED		MED		MED	12	MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	75	HIGH	7	HIGH		HIGH		HIGH		HIGH	
	Plant		LOW	19	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	139
		25	MED		MED	6	MED	6	MED		MED	40	MED		MED	6	MED	22	MED		MED	15	MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	
	Seed		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	132
			MED	55	MED	24	MED		MED	35	MED	18	MED		MED		MED		MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	

1 **STEP 3:**

Includes above changes for Other and Poor data Poor Data includes changes to address deleting the HMX natural successions to PJD, PJM and SBL. Reduce BFM and CMX.

Areas added together for largest YIELD in a PLANFU. OK consensus of Task Team. Can reflect PJD Shallow maintenance by AU is SFMM.

Can reflect PRW LOW/MED difference by AU is SFMM.

Pre-harvest	Regen	BFM		CMX		HMX		HRD		PJD		PJM		POD		PRW		SBD		SBL		SBM		Area By
Forest Unit	Type	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Treatment
POD	Natural		LOW		LOW		LOW		LOW	9	LOW		LOW		LOW		LOW		LOW		LOW		LOW	649
		34	MED	131	MED	61	MED	37	MED		MED	25	MED		MED	1	MED		MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	265	HIGH		HIGH		HIGH		HIGH	85	HIGH	
	Plant		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	173
		9	MED	82	MED	4	MED	30	MED		MED	7	MED		MED	2	MED		MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH	21	HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	20	HIGH	
Decision?:	Seed		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	34
Not a valid			MED		MED	1	MED		MED	4	MED	29	MED		MED		MED		MED		MED		MED	Delete SEED
treatment			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	(adjustment)
PRW	Natural		LOW	41	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	312
PRW LOW=PW		25	MED		MED	77	MED	30	MED		MED	60	MED		MED	18	MED		MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	51	HIGH		HIGH		HIGH		HIGH	11	HIGH	
At end, can	Plant		LOW		LOW		LOW		LOW		LOW		LOW		LOW	9	LOW		LOW		LOW		LOW	86
edit forPRW AUs		13	MED	7	MED	54	MED	2	MED		MED		MED		MED		MED		MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	
Decision?:	Seed		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	6
Not a valid			MED		MED	4	MED	2	MED		MED		MED		MED		MED		MED		MED		MED	Delete SEED
treatment			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	(adjustment)
SBD	Natural		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	257
		21	MED	57	MED	40	MED		MED	15	MED	19	MED		MED		MED	11	MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	85	HIGH		HIGH		HIGH		HIGH	10	HIGH	
	Plant		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	97
			MED	20	MED	6	MED		MED	39	MED	7	MED		MED	6	MED	13	MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	7	HIGH	
	Seed		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	76
			MED	19	MED	15	MED		MED	8	MED	33	MED		MED		MED		MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	
SBL	Natural		LOW	252	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	94	LOW		LOW	1,269
		86	MED		MED	177	MED	115	MED	119	MED	27	MED		MED		MED		MED		MED		MED	lots of poor da
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	399	HIGH		HIGH		HIGH		HIGH		HIGH	100% mainter
	Plant		LOW	70	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	15	LOW		LOW	299
		36	MED		MED	48	MED	7	MED		MED	16	MED		MED		MED		MED		MED		MED	lots of poor da
			HIGH		HIGH		HIGH		HIGH	65	HIGH		HIGH	13	HIGH	29	HIGH		HIGH		HIGH		HIGH	
Decision?:	Seed		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	102
Not a valid			MED	38	MED	7	MED	4	MED	43	MED	10	MED		MED		MED		MED		MED		MED	100% mainter
treatment			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	
SBM	Natural		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	280
			MED	69	MED	69	MED	62	MED	26	MED	4	MED		MED		MED		MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	32	HIGH		HIGH		HIGH		HIGH	19	HIGH	
	Plant		LOW	19	LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	177
			MED		MED	7	MED		MED		MED	19	MED		MED		MED	95	MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH	26	HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	11	HIGH	
	Seed		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW		LOW	86
			MED	20	MED	9	MED		MED	57	MED		MED		MED		MED		MED		MED		MED	
			HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH		HIGH	
GRAND TOTAL		631		2,101		1,294		910		1,379		891		1,974		377		426		149		624		10,754
																						ha check:		10,754

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STEP 3 RESULT:

Pre-harvest	Regen	BFM		CMX		HMX		HRD		PJD		PJM		POD		PRW		SBD		SBL		SBM		Area By
Forest Unit	Type	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Ha	YIELD	Treatment
BFM	Natural	19	MED	97	MED	83	MED	153	MED	8	MED	58	MED	70	MED	3	MED		MED	7	LOW	18	HIGH	515
	Plant			2	LOW					5	MED													7
	Seed			23	MED	14	MED			57	MED	15	MED											109
CMX	Natural	112	MED	205	MED	75	MED	77	MED	32	MED	26	MED	-	MED	28	HIGH	13	MED	14	LOW	32	HIGH	614
	Plant	21	MED	69	LOW	15	MED	21	MED	195	MED	33	MED	9	MED	164	MED	110	MED			107	MED	743
	Seed			56	MED	53	MED	12	MED	90	MED	22	MED	-	MED			7	MED					239
HMX	Natural	35	MED	145	LOW	190	MED	300	MED					420	HIGH	9	MED	37	MED			60	HIGH	1,195
	Plant	19	MED	59	LOW	18	MED	5	MED	29	MED	198	MED	10	HIGH	16	MED	26	MED			116	HIGH	495
	Seed	12	MED	13	MED	67	MED	6	MED	155	MED	20	MED	4	HIGH									276
HRD	Natural	17	MED	100	MED	65	MED	108	MED	100	MED	42	MED	256	HIGH	7	MED					23	MED	718
	Plant	17	MED	26	LOW			4	MED	51	MED	6	MED			37	HIGH	34	MED			38	MED	212
	Seed			21	MED	69	MED			46	HIGH													135
PJD	Natural	30	MED	179	MED	28	MED	15	MED	18	MED	22	MED	45	HIGH							23	MED	361
	Plant			52	LOW	13	MED	7	MED	35	MED	27	MED			35	MED	60	MED			19	MED	249
	Seed	4	MED	5	LOW	44	MED			36	MED	7	MED											97
PJM	Natural	37	MED	103	MED	39	MED	39	MED	5	MED	47	MED	75	HIGH	7	HIGH					12	MED	365
	Plant	25	MED	19	LOW	6	MED	6	MED			40	MED			6	MED	22	MED			15	MED	139
	Seed			55	MED	24	MED			35	MED	18	MED											132
POD	Natural	34	MED	131	MED	61	MED	37	MED	9	LOW	25	MED	265	HIGH	1	MED					85	HIGH	649
	Plant	9	MED	82	MED	4	MED	30	MED	21	HIGH	7	MED			2	MED					20	HIGH	173
	Seed					1	MED			4	MED	29	MED											34
PRW	Natural	25	MED	41	LOW	77	MED	30	MED			60	MED	51	HIGH	18	MED					11	HIGH	312
	Plant	13	MED	7	MED	54	MED	2	MED							9	LOW							86
	Seed					4	MED	2	MED															6
SBD	Natural	21	MED	57	MED	40	MED			15	MED	19	MED	85	HIGH			11	MED			10	HIGH	257
	Plant			20	MED	6	MED			39	MED	7	MED			6	MED	13	MED			7	HIGH	97
	Seed			19	MED	15	MED			8	MED	33	MED											76
SBL	Natural	86	MED	252	LOW	177	MED	115	MED	119	MED	27	MED	399	HIGH					94	LOW			1,269
	Plant	36	MED	70	LOW	48	MED	7	MED	65	HIGH	16	MED	13	HIGH	29	HIGH			15	LOW			299
	Seed			38	MED	7	MED	4	MED	43	MED	10	MED											102
SBM	Natural			69	MED	69	MED	62	MED	26	MED	4	MED	32	HIGH							19	HIGH	280
	Plant			19	LOW	7	MED			26	HIGH	19	MED					95	MED			11	HIGH	177
	Seed			20	MED	9	MED			57	MED													86
																								10,503

Table 27 Default Post-Harvest Renewal Transition Rules

Pre-harvest	Regen	BFM		CMX		HMX		HRD		PJD		PJM		POD		PRW		SBD		SBL		SBM		Area By
Forest Unit	Type	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	Treatment
BFM	Natural	0.04	MED	0.19	MED	0.16	MED	30%	MED	0.02	MED	0.11	MED	0.14	MED	0.01	MED		MED	0.01	LOW	0.03	HIGH	1.00
	Plant		0	0.32	LOW		0		0	0.68	MED		0		0		0		0		0		0	1.00
	Seed		0	0.21	MED	0.13	MED		0	0.53	MED	0.14	MED		0		0		0		0		0	1.00
CMX	Natural	0.18	MED	0.33	MED	0.12	MED	13%	MED	0.05	MED	0.04	MED		MED	0.05	HIGH	0.02	MED	0.02	LOW	0.05	HIGH	1.00
	Plant	0.03	MED	0.09	LOW	0.02	MED	3%	MED	0.26	MED	0.04	MED	0.01	MED	0.22	MED	0.15	MED		0	0.14	MED	1.00
	Seed		0	0.23	MED	0.22	MED	5%	MED	0.38	MED	0.09	MED		MED		0	0.03	MED		0		0	1.00
HMX	Natural	0.03	MED	0.12	LOW	0.16	MED	25%	MED		0		0	0.35	HIGH	0.01	MED	0.03	MED		0	0.05	HIGH	1.00
	Plant	0.04	MED	0.12	LOW	0.04	MED	1%	MED	0.06	MED	0.40	MED	0.02	HIGH	0.03	MED	0.05	MED		0	0.23	HIGH	1.00
	Seed	0.04	MED	0.05	MED	0.24	MED	2%	MED	0.56	MED	0.07	MED	0.01	HIGH		0		0		0		0	1.00
HRD	Natural	0.02	MED	0.14	MED	0.09	MED	15%	MED	0.14	MED	0.06	MED	0.36	HIGH	0.01	MED		0		0	0.03	MED	1.00
	Plant	0.08	MED	0.12	LOW		0	2%	MED	0.24	MED	0.03	MED		0	0.18	HIGH	0.16	MED		0	0.18	MED	1.00
	Seed		0	0.15	MED	0.51	MED		0	0.34	HIGH		0		0		0		0		0		0	1.00
PJD	Natural	0.08	MED	0.50	MED	0.08	MED	4%	MED	0.05	MED	0.06	MED	0.12	HIGH		0		0		0	0.06	MED	1.00
	Plant		0	0.21	LOW	0.05	MED	3%	MED	0.14	MED	0.11	MED		0	0.14	MED	0.24	MED		0	0.08	MED	1.00
	Seed	0.04	MED	0.06	LOW	0.46	MED		0	0.38	MED	0.07	MED		0		0		0		0		0	1.00
PJM	Natural	0.10	MED	0.28	MED	0.11	MED	11%	MED	0.01	MED	0.13	MED	0.21	HIGH	0.02	HIGH		0		0	0.03	MED	1.00
	Plant	0.18	MED	0.14	LOW	0.05	MED	4%	MED		0	0.29	MED		0	0.04	MED	0.16	MED		0	0.11	MED	1.00
	Seed		0	0.42	MED	0.18	MED		0	0.27	MED	0.13	MED		0		0		0		0		0	1.00
POD	Natural	0.05	MED	0.20	MED	0.09	MED	6%	MED	0.01	LOW	0.04	MED	0.41	HIGH	0.00	MED		0		0	0.13	HIGH	1.00
	Plant	0.05	MED	0.47	MED	0.02	MED	17%	MED	0.12	HIGH	0.04	MED		0	0.01	MED		0		0	0.11	HIGH	1.00
	Seed		0		0	0.04	MED		0	0.12	MED	0.84	MED		0		0		0		0		0	1.00
PRW	Natural	0.08	MED	0.13	LOW	0.25	MED	10%	MED		0	0.19	MED	0.16	HIGH	0.06	MED		0		0	0.03	HIGH	1.00
	Plant	0.16	MED	0.09	MED	0.63	MED	3%	MED		0		0		0	0.10	LOW		0		0		0	1.00
	Seed		0		0	0.63	MED	38%	MED		0		0		0		0		0		0		0	1.00
SBD	Natural	0.08	MED	0.22	MED	0.16	MED		0	0.06	MED	0.07	MED	0.33	HIGH		0	0.04	MED		0	0.04	HIGH	1.00
	Plant		0	0.21	MED	0.06	MED		0	0.40	MED	0.07	MED		0	0.06	MED	0.13	MED		0	0.08	HIGH	1.00
	Seed		0	0.26	MED	0.20	MED		0	0.11	MED	0.43	MED		0		0		0		0		0	1.00
SBL	Natural	0.07	MED	0.20	LOW	0.14	MED	9%	MED	0.09	MED	0.02	MED	0.31	HIGH		0		0	0.07	LOW		0	1.00
	Plant	0.12	MED	0.23	LOW	0.16	MED	2%	MED	0.22	HIGH	0.05	MED	0.04	HIGH	0.10	HIGH		0	0.05	LOW		0	1.00
	Seed		0	0.38	MED	0.06	MED	4%	MED	0.42	MED	0.10	MED		0		0		0		0		0	1.00
SBM	Natural		0	0.24	MED	0.25	MED	22%	MED	0.09	MED	0.01	MED	0.11	HIGH		0		0		0	0.07	HIGH	1.00
	Plant		0	0.11	LOW	0.04	MED		0	0.15	HIGH	0.11	MED		0		0	0.54	MED		0	0.06	HIGH	1.00
	Seed		0	0.23	MED	0.11	MED		0	0.66	MED		0		0		0		0		0		0	1.00

C - Development of SFMM Strategic Modelling Inputs

Once the default renewal transition rules were built (subsection B), they were applied to the current conditions by plan analysis unit (AU). 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). 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:

- Very minor changes of 1% to fractions to total 100% per treatment per analysis unit.
- 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 supported by the data.
- Where some minimal areas are reflected in the future forest unit transitions, some amalgamations were undertaken to consolidate the data (e.g. smaller percentages of similar forest units were summed such as PJD and PJM).
- Edits for consistency with future Analysis Units with ecosite or leading species definitions (e.g. white pine renewal must result in PRW LOW stratum which is white pine leading).

LTMD Task Team discussions of appropriate silvicultural strategies for this plan period resulted in changes to address poor transition data for:

- In the PHRT rules, it was recognized that on many forest units, it is illogical to strategically treat natural regeneration of stands (Natural Treatment) and expect a high yield (YIELD = HIGH) as these stand will generally be low to moderate productivity sites that could have site limiting factors. As such, some Natural regeneration that resulted in HIGH YIELDS were reduced to MED YIELD for naturally regenerated sites.
  Affected PHRT Rules:
  BFM, CMX, HMX, HRD_ – Natural resulting in SBM– changed future HIGH to MED

- The post-harvest renewal transition rules were developed with the assumption that jack pine (Pj) is the seeding species on the forest. However, there are certain site conditions or PLANFUs where seeding of any species is not a suitable silvicultural option (e.g. not suitable for ecosites, or low probability of success)(Decision March 12, 2020).
  Affected PHRT Rules: For modelling purposes, this was captured by not making a seeding treatment available for the HMX, HRD, POD, and SBL PLANFUs.

It was acknowledged that herbicide use was minimal to non-existent during the 2006 – 2019 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 has changed and herbicide use will be undertaken during the 2022-2032 plan period to assist in management objective achievement according to Boreal Landscape Guide direction. As a result, an adjustment to the default PHRT rules used in SFMM modelling was made for the CMX, HMX, HRD, POD, and PRW forest units in anticipation of increased success rates of planting and seeding of conifer species, and increased implementation of tending in the 2022-2032 FMP.

Some specific changes by forest unit are noted below:

BFM

- More SBD and less CMX expected when BFM is planted (spruce planting stock)
- Low (10%) amount of tending is required for Plant and Seed treatments to ensure projected conifer-dominated results.

CMX

- CMX left for Natural regeneration will result in small amounts of PRW and SBM of MED YIELD (reduced from HIGH YIELD).
- CMX seeding would be on less rich sites and likely include some herbicide. Reduced CMX and HMX proportions, delete SBD, increase PJD expected when CMX is seeded to jack pine
- Low (10%) amount of tending is required for Plant and Seed treatments to ensure projected results with movement towards conifer dominated forest.

HMX

- Regional data supported renewal transitions to hardwood dominated forest units, and planting transitions predominantly to CMX, PJD and PJM. Minimal regional or Kenora Forest data supported the transitions resulting from seeding of HMX sites.
- Seeding was not considered an acceptable treatment type for this forest unit. No seeding treatment options included in strategic modelling for HMX.
- As per regional direction this is an adjustment, not a change to Default PHRT.

HRD

- Seeding was not considered an acceptable treatment type for this forest unit. No seeding treatment options included in strategic modelling for HRD.
- As per regional direction this is an adjustment, not a change to Default PHRT.

PJD

- PJD has minimal hardwood component, minimal Bf, so less will go to BFM, CMX, HMX and none to HRD, POD than DEFAULT. Increase PJD and PJM transitions.
- Some herbicide will be projected for use in the 2022, less hardwood and more upland conifers (30% on deep soils, 20% on shallow soils).

PJM

- PJM has minimal hardwood component, minimal Bf, so less will go to BFM, CMX, HMX and none to HRD, POD than DEFAULT.
- Some herbicide will be projected for use in the 2022 FMP (Natural 10%, Planting and Seeding both 25%) resulting in less hardwood, CMX and BFM, and more upland conifers.

POD

- POD left for natural would not likely result in BFM, CMX, PJD, PJM or SBM.
- Planting POD should not result in BFM.
- Seeding was not considered an acceptable treatment type for this forest unit. No seeding treatment options included in strategic modelling for POD.

PRW

- If the red pine component of PRW was planted, red pine would be the preferred species (shift in resulting AU to PRWR).
- Planting of PRW should result in a higher percentage of future PRW area, with less HMX and HRD (site selection and some herbicide use – 40%). Success of re-establishing PRW is important to achieve management objective to increase all ages PRW.
- Planting or PRWR will usually result in PRWR (80% success).
- On PRWW, Pw planting should occur or be strongly encouraged, as well as Pr planting on suitable sites, followed by tending when needed in order to match the projected level of forest unit maintenance of 55% reflected in the PRWW PHRT for this plan's strategic modelling (increased success levels compared to past plans).
- Seeding to jack pine was not supported by regional data, and was not considered an acceptable treatment type for this forest unit. No seeding treatment options included in strategic modelling for PRW.
- Consistent with the *Forest Management Guide to Silviculture in the Great Lakes-St. Lawrence and Boreal Forests of Ontario 2015.*

SBD

- SBD has minimal hardwood component, so less will go to BFM, CMX, HMX, PJD and none to POD than DEFAULT.
- Planting will be mostly spruce on spruce sites. Shift some PJ to SB, Reduce PRW.
- Plant, Seed - More herbicide (20%) will be projected for use on upland conifers. Less HMX and CMX, more upland conifers. Natural will require 10% tending.
- Rationale was considered sufficient and proposed changes reasonable. Tending is included in the most common treatment package for SBD when treating with natural/plant/seed.

SBL

- Planning Team decision March 12 for 100% maintenance in SBL. Poor transition data was addressed rather than adjusted.
- Seeding is not an acceptable treatment type for this lowland forest unit. No seeding treatment options included in strategic modelling for SBL.

SBM

- SBM has minimal hardwood component, so less will go to CMX, HMX, HRD, and PJD and none to POD than DEFAULT. (More SBM)
- Plant, Seed - More herbicide will be projected for use on upland conifers. Less HMX and CMX, more upland conifers.
- Current silvicultural practices include more herbicide vegetation control to reduce the hardwood component (Natural 15%, Plant and Seed both 25%).
- Planting will be mostly spruce on spruce sites. Shift some PJD to SBD.
- Rationale was considered sufficient and proposed changes reasonable. Tending is included in the most common treatment package for SBD when treating with natural/plant/seed.

Poor transition data, or data changed to reflect realistic silvicultural strategies for this 2022-2032 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.

A summary of main adjustments to analysis unit transitions for strategic modelling are shown in Table 28. The resulting Summary of Post-Harvest Renewal Transition Rules for SFMM strategic modelling is recorded in Table 29.

Table 28 Primary Changes to Renewal Transitions by Analysis Unit for Strategic Modelling

			BFM		CMX				HMX		HRD						PJD				PJM		POD		PRW				SBD		SBL				SBM		
Forest	Analysis	Treatment	BFM		CMX_		CMXC		HMX		HRDA		HRDB		HRD_		PJDD		PJDS		PJM_		POD_		PRWR		PRWW		SBD		SBL_		SBLC		SBM_		
Unit	Unit	Type	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	
PJD	PJDD	Natural	8	MED	50	MED			8	MED					4	MED	6	MED			6	MED	12	HIGH											6	MED	
		Plant			21	LOW			5	MED					3	MED	14	MED			11	MED			14	MED			24	MED					8	MED	
		Seed	4	MED	6	LOW			46	MED							37	MED			7	MED															
	PJDS	Natural	8	MED	50	MED			8	MED					4	MED			6	MED	6	MED	12	HIGH											6	MED	
		Plant			21	LOW			5	MED					3	MED			14	MED	11	MED			14	MED			24	MED					8	MED	
		Seed	4	MED	6	LOW			46	MED									37	MED	7	MED															
SUGGESTED ADJUSTMENT			BFM		CMX				HMX		HRD						PJD				PJM		POD		PRW				SBD		SBL				SBM		
PJD	PJDD	Natural			20	MED			8	MED							60	MED			6	MED													6	MED	30
		Plant			11	LOW											29	MED			14	MED			14	MED			24	MED					8	MED	30
		Seed			6	LOW			5	MED							79	MED			10	MED															30
	PJDS	Natural	0		20	MED	0		8	MED	0		0						60	LOW	6	MED	0				0						0		6	MED	20
		Plant			11	LOW	0		0		0		0		0				29	LOW	14	MED			14	MED	0		24	MED			0		8	MED	20
		Seed	0		6	LOW	0		5	MED	0		0						79	LOW	10	MED					0						0				20
ADJUSTMENT RATIONALE:					PJD has minimal hardwood component, minimal Bf, so less will go to BFM, CMX, HMX and none to HRD, POD than DEFAULT.																																
					Some herbicide will be projected for use in the 2022, less hardwood and more upland conifers.																																
					rationale sufficient and proposed changes reasonable, ensure that tending is included in the most common treatment package for PJD when treating with natural/plant/seed																																
			BFM		CMX				HMX		HRD						PJD				PJM		POD		PRW				SBD		SBL				SBM		
Forest	Analysis	Treatment	BFM		CMX_		CMXC		HMX		HRDA		HRDB		HRD_		PJDD		PJDS		PJM_		POD_		PRWR		PRWW		SBD		SBL_		SBLC		SBM_		
Unit	Unit	Type	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	
PJM	PJM_	Natural	10	MED	28	MED			11	MED					11	MED	1	MED			13	MED	21	HIGH	2	HIGH									3	MED	
		Plant	18	MED	14	LOW			5	MED					4	MED					28	MED			4	MED			16	MED					11	MED	
		Seed			42	MED			18	MED							27	MED			13	MED															
SUGGESTED ADJUSTMENT			BFM		CMX				HMX		HRD						PJD				PJM		POD		PRW				SBD		SBL				SBM		
PJM	PJM_	Natural	3	MED	20	MED			11	MED							12	MED			49	MED			2	HIGH									3	MED	10
		Plant	5	MED	10	LOW											26	MED			28	MED			4	MED			16	MED					11	MED	25
		Seed			10	MED			18	MED							52	MED			20	MED															25
ADJUSTMENT RATIONALE:					PJM has minimal hardwood component, minimal Bf, so less will go to BFM, CMX, HMX and none to HRD, POD than DEFAULT.																Tending will be required on certain sites to achieve above conversion.																
					Some herbicide will be projected for use in the 2022, less hardwood and BFM, and more upland conifers.																																
					rationale sufficient and proposed changes reasonable, ensure that tending is included in the most common treatment package for PJM when treating with natural/plant/seed																																

			BFM		CMX				HMX		HRD						PJD				PJM		POD		PRW				SBD		SBL				SBM		
Forest	Analysis	Treatment	BFM		CMX_		CMXC		HMX		HRDA		HRDB		HRD_		PJDD		PJDS		PJM_		POD_		PRWR		PRWW		SBD		SBL_		SBLC		SBM_		
Unit	Unit	Type	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	
SBD	SBD_	Natural	8	MED	22	MED			16	MED							6	MED			7	MED	33	HIGH					4	MED					4	HIGH	
		Plant			21	MED			6	MED							39	MED			7	MED			6	MED			13	MED					8	HIGH	
		Seed			26	MED			20	MED							11	MED			43	MED															
SUGGESTED ADJUSTMENT			BFM		CMX				HMX		HRD						PJD				PJM		POD		PRW				SBD		SBL				SBM		
SBD	SBD_	Natural			20	MED			5	MED							3	MED			7	MED							25	MED					40	HIGH	10
		Plant			5	MED											4	MED			10	MED			1	MED			50	MED					30	HIGH	20
		Seed			5	MED											15	MED			75	MED													5	MED	20

ADJUSTMENT RATIONALE:

SBD has minimal hardwood component, so less will go to BFM, CMX, HMX, PJD and none to POD than DEFAULT.

Plant, Seed - More herbicide will be projected for use on upland conifers. Less HMX and CMX, more upland conifers.

Planting will be mostly spruce on spruce sites. Shift some PJ to SB, Reduce PRW

1 rationale sufficient and proposed changes reasonable, ensure that tending is included in the most common treatment package for SBD when treating with natural/plant/seed

			BFM		CMX				HMX		HRD						PJD				PJM		POD		PRW				SBD		SBL				SBM		
Forest	Analysis	Treatment	BFM		CMX_		CMXC		HMX		HRDA		HRDB		HRD_		PJDD		PJDS		PJM_		POD_		PRWR		PRWW		SBD		SBL_		SBLC		SBM_		
Unit	Unit	Type	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	
PRW	PRWR	Natural	8	MED	13	LOW			25	MED					10	MED					19	MED	16	HIGH	6	MED									3	HIGH	
		Plant	16	MED	9	MED			62	MED					3	MED											10	LOW									
		Seed							62	MED					38	MED																					
	PRWW	Natural	8	MED	13	LOW			25	MED					10	MED					19	MED	16	HIGH			6	MED							3	HIGH	
		Plant	16	MED	9	MED			62	MED					3	MED											10	LOW									
		Seed							62	MED					38	MED																					
SUGGESTED ADJUSTMENT			BFM		CMX				HMX		HRD						PJD				PJM		POD		PRW				SBD		SBL				SBM		
PRW	PRWR	Natural	8	MED	13	LOW			25	MED					10	MED					19	MED	16	HIGH	6	MED									3	HIGH	
		Plant	16	MED	9	MED			52	MED					3	MED									20												
		Seed							62	MED					38	MED																					
	PRWW	Natural	8	MED	13	LOW			25	MED					10	MED					19	MED	16	HIGH			6	MED							3	HIGH	
		Plant	16	MED	9	MED			62	MED					3	MED											10	LOW									
		Seed							62	MED					38	MED																					
SECOND ADJUSTMENT			BFM		CMX				HMX		HRD						PJD				PJM		POD		PRW				SBD		SBL				SBM		
PRW	PRWR	Natural	8	MED	13	LOW			25	MED					10	MED					19	MED	16	HIGH	6	MED									3	HIGH	
		Plant	3	MED	5	MED			9	MED					3	MED									80	MED											40
		Seed																																			
	PRWW	Natural	8	MED	13	LOW			25	MED					10	MED					19	MED	16	HIGH			6	MED							3	HIGH	
		Plant	11	MED	9	MED			22	MED					3	MED									25	MED	30	LOW									40
		Seed																																			

ADJUSTMENT RATIONALE:

If the red pine componet of PRW was planted, red pine would be the preferred species (shift in resulting AU).

Planting of PRW should result in a higher percentage of future PRW area, with less HMX and HRD (site selection and some herbicide use).

ok **PRWR Adjustment for planting of PR, PJ to maintain forest unit area (partially) needs herbicide - professional judgement for silvic strategy (very small dataset)**

PRWW Adjustment for planting of PW, PR to maintain forest unit area (partially) needs herbicide - professional judgement for silvic strategy (very small dataset)

2 **ADJUSTMENT: Seeding on PRW will not strategically be applied to these pre-harvest FU (transition was based on minimal data). Default PHRT was adjusted by removing them.**

			BFM		CMX				HMX		HRD						PJD				PJM		POD		PRW				SBD		SBL				SBM		
Forest	Analysis	Treatment	BFM		CMX_		CMXC		HMX		HRDA		HRDB		HRD_		PJDD		PJDS		PJM_		POD_		PRWR		PRWW		SBD		SBL_		SBLC		SBM_		
Unit	Unit	Type	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	
SBM	SBM_	Natural			25	MED			25	MED					22	MED	9	MED			1	MED	11	HIGH											7	HIGH	
		Plant			11	LOW			4	MED							15	HIGH			11	MED							53	MED					6	HIGH	
		Seed			23	MED			11	MED							66	MED																			
SUGGESTED ADJUSTMENT			BFM		CMX				HMX		HRD						PJD				PJM		POD		PRW				SBD		SBL				SBM		
SBM	SBM_	Natural			13	MED			5	MED					2	MED					5	MED							20	MED					55	HIGH	15
		Plant			6	LOW			2	MED							4	HIGH			11	MED							60	MED					17	HIGH	25
		Seed			10	MED			5	MED							66	MED			19	MED															25

ADJUSTMENT RATIONALE:

SBM has minimal hardwood component, so less will go to CMX, HMX, HRD, and PJD and none to POD than DEFAULT. (More SBM)

Plant, Seed - More herbicide will be projected for use on upland conifers. Less HMX and CMX, more upland conifers.

Planting will be mostly spruce on spruce sites. Shift some PJD to SBD

rationale sufficient and proposed changes reasonable, ensure that tending is included in the most common treatment package for SBM when treating with natural/plant/seed

Table 29 Summary of FMP Post-Harvest Renewal Transitions by Analysis Unit for Strategic Modelling

Analysis	Treatment	BFM		CMX_		CMXC		HMX		HRDA		HRDB		HRD_		PJDD		PJDS		PJM_		POD_		PRWR		PRWW		SBD		SBL_		SBLC		SBM_	
Unit	Type	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD	%	YIELD
BFM_	Natural	4	MED	19	MED			16	MED					29	MED	2	MED			11	MED	14	MED	1	MED					1	LOW			3	HIGH
	Plant			26	LOW											68	MED											6	MED						
	Seed			21	MED			13	MED							52	MED			14	MED														
CMX_	Natural	18	MED	34	MED			12	MED					13	MED	5	MED			4	MED		MED	5	MED			2	MED	2	LOW			5	MED
	Plant	3	MED	9	LOW			2	MED					3	MED	27	MED			4	MED	1	MED	22	MED			15	MED					14	MED
	Seed			23	MED			22	`					5	MED	38	MED			9	MED		MED					3	MED						
CMXC	Natural	18	MED			34	MED	12	MED					13	MED	5	MED			4	MED		MED	5	MED			2	MED	2	LOW			5	MED
	Plant	3	MED			9	LOW	2	MED					3	MED	27	MED			4	MED	1	MED	22	MED			15	MED					14	MED
	Seed					16	MED	10	MED					5	MED	50	MED			19	MED		MED												
HMX_	Natural	3	MED	12	LOW			16	MED					25	MED		MED					35	HIGH	1	MED			3	MED					5	MED
	Plant	4	MED	12	LOW			4	MED					1	MED	6	MED			40	MED	2	HIGH	3	MED			5	MED					23	HIGH
	Seed																																		
HRDA	Natural	8	MED	16	LOW			8	MED	14	MED					4	MED			5	MED	35	HIGH	1	MED			3	MED	1	LOW			5	HIGH
	Plant	4	MED	12	LOW			4	MED	1	MED					6	MED			40	MED	2	HIGH	3	MED			5	MED					23	HIGH
	Seed																																		
HRDB	Natural	8	MED	16	LOW			8	MED			14	MED			4	MED			5	MED	35	HIGH	1	MED			3	MED	1	LOW			5	HIGH
	Plant	4	MED	12	LOW			4	MED			1	MED			6	MED			40	MED	2	HIGH	3	MED			5	MED					23	HIGH
	Seed																																		
HRD_	Natural	2	MED	14	MED			9	MED					15	MED	14	MED			6	MED	36	HIGH	1	MED									3	MED
	Plant	8	MED	12	LOW									2	MED	23	MED			3	MED			18	HIGH			16	MED					18	MED
	Seed																																		
PJDD	Natural			20	MED			8	MED							60	MED			6	MED													6	MED
	Plant			11	LOW											29	MED			14	MED			14	MED			24	MED					8	MED
	Seed			6	LOW			5	MED							79	MED			10	MED														
PJDS	Natural			20	MED	0		8	MED	0		0						60	LOW	6	MED					0						0		6	MED
	Plant			11	LOW	0				0		0						29	LOW	14	MED			14	MED	0		24	MED			0		8	MED
	Seed			6	LOW	0		5	MED	0		0						79	LOW	10	MED					0						0			
PJM_	Natural	3	MED	20	MED			11	MED							12	MED			49	MED			2	HIGH									3	MED
	Plant	5	MED	10	LOW											26	MED			28	MED			4	MED			16	MED					11	MED
	Seed			10	MED			18	MED							52	MED			20	MED														
POD_	Natural							9	MED					6	MED							85	HIGH		MED										
	Plant		MED	53	MED			2	MED					17	MED	12	HIGH			4	MED			1	MED									11	HIGH
	Seed																																		
PRWR	Natural	8	MED	13	LOW			25	MED					10	MED					19	MED	16	HIGH	6	MED									3	HIGH
	Plant	3	MED	5	MED			9	MED					3	MED									80	MED										
	Seed																																		
PRWW	Natural	8	MED	13	LOW			25	MED					10	MED					19	MED	16	HIGH			6	MED							3	HIGH
	Plant	11	MED	9	MED			22	MED					3	MED									25	MED	30	LOW								
	Seed																																		
SBD_	Natural			20	MED			5	MED							3	MED			7	MED							25	MED					40	HIGH
	Plant			5	MED											4	MED			10	MED			1	MED			50	MED					30	HIGH
	Seed			5	MED											15	MED			75	MED													5	MED
SBL_	Natural																													100	LOW				
	Plant																													100	LOW				
	Seed																																		
SBLC	Natural																															100	LOW		
	Plant																															100	LOW		
	Seed																																		
SBM_	Natural			13	MED			5	MED					2	MED					5	MED							20	MED					55	HIGH
	Plant			6	LOW			2	MED							4	HIGH			11	MED							60	MED					17	HIGH
	Seed			10	MED			5	MED							66	MED			19	MED														

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 Kenora 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 of 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 **30**. These same costs area applied through each plan period and are not adjusted for inflation.

Table 30 Post-Harvest Renewal Transition Estimated Costs

Analysis Unit	Renewal Costs ($/ha)		
	Natural	**Plant**	**Seed**
BFM_	83.60	1337.60	624.80
CMX_	83.60	1337.60	624.80
CMXC	83.60	1337.60	624.80
HMX_	83.60	892.10	
HRDA	83.60	892.10	
HRDB	83.60	892.10	
HRD_	83.60	892.10	
PJDD	215.60	1425.60	712.80
PJDS	171.60	1381.60	668.80
PJM_	127.60	1403.60	690.80
POD_	83.60	892.10	
PRWR	83.60	1469.60	
PRWW	83.60	1469.60	
SBD_	127.60	1381.60	668.80
SBL_	83.60	892.10	
SBLC	83.60	661.10	
SBM_	149.60	1403.60	690.80

6.2.3.4 Renewal Revenues and Timber Harvesting Costs

Harvesting costs were not built into 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 fund contribution rate per cubic metre of harvested wood is $8.50 for red pine and white pine, $3.00 for cedar, $6.00 for other conifer, $1.50 for lowland hardwood, and $1.05 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 31.

Table 31 Tree Species and Associated Renewal Revenue

Tree Species	Product	Stumpage Values	Harvesting Costs
Pj	All	$6.00	$0.00
Sb	All	$6.00	$0.00
Sw	All	$6.00	$0.00
Bf	All	$6.00	$0.00
Pw	All	$8.50	$0.00
Pr	All	$8.50	$0.00
Ce	All	$3.00	$0.00
La	All	$6.00	$0.00
Po	All	$1.05	$0.00
Bw	All	$1.05	$0.00
UH	All	$1.05	$0.00
LH	All	$1.50	$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 NDMNRF 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 "Ripar" in SFMM.

Estimated reserves around bird nests 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 2020 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 Kenora 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 Kenora 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 32.

Accumulating reserves may apply to first rotation (i.e. up to first 90 years in DCHC, 50 years in non-caribou zone), but are not further deducted during second harvest. The summary of the resulting SFMM inputs for Areas reserved from Harvesting are included as Table 33.

Table 32 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.	171	297	486	471	89	61	331	111	21	41	31	2,110	<==	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)	30,356	82,101	61,637	65,289	137,961	35,394	51,860	14,027	19,863	35,316	27,627	561,431	<==	Total area in available and estimated reserve (OWN=1, not including ProtF)
Total Riparian Reserve (ha)	**4,677**	**10,145**	**7,697**	**7,051**	**10,987**	**3,185**	**3,545**	**2,726**	**1,465**	**3,586**	**2,633**	**57,697**	<==	Total estimated riparian (reserve in initial land base)
Ripar Reserve %	0.15	0.12	0.12	0.11	0.08	0.09	0.07	0.19	0.07	0.10	0.10	0.10	<==	Est. Reserved percent of available land base (less ProtF).
Total Estimated Residual Area being retained	**0.19**	**0.15**	**0.16**	**0.15**	**0.11**	**0.12**	**0.11**	**0.23**	**0.10**	**0.13**	**0.13**	**0.13**	<==	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?	**-0.13** **NO**	**-0.09** **NO**	**-0.10** **NO**	**-0.09** **NO**	**-0.05** **NO**	**-0.06** **NO**	**-0.05** **NO**	**-0.17** **NO**	**-0.04** **NO**	**-0.07** **NO**	**-0.07** **NO**	**More area is being left unharvested in and adjacent to harvest areas than required by the Stand and Site Guide.**		

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:

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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

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.

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>= 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).
- residual trees accounted for in the Volumes Left Unharvested percentages in the SFMM modelling (also allcounts for increased wildlife trees retained in Wabaseemoong Stewardship Area).

Table 33 Summary of SFMM Inputs for Areas Reserves from Harvesting

	Reserve	Planning Period:															
Forest Unit	**Type**	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**	**T9**	**T10**	**T11**	**T12**	**T13**	**T14**	**T15**	**T16**
BFM	AccRes	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04							
CMX	AccRes	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03							
HMX	AccRes	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04							
HRD	AccRes	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04							
PJD	AccRes	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03							
PJM	AccRes	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03							
POD	AccRes	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04							
PRW	AccRes	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04							
SBD	AccRes	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03							
SBL	AccRes	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03							
SBM	AccRes	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03							
		AcRes	Percentages applied to non-caribou zone (Terms 1-5 only)							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.

A majority of the Kenora Forest is reasonably well-accessed at Plan Start, with the exception of the northern third of the forest (caribou zone and northern portion of the non-caribou zone).

Considerations for calculation of Conversion to Non-Forest:

- accounts for road building during 1st cycle of DCHS harvesting approx. 90 years.
- accounts for loss to non-productive area during next 40 years when non-caribou zone expected to be accessed.
- 1 km of road covers approx. 4 ha. (40m ROW x 1000 m = 40,000 m2 or 4 ha/km of road)
- new DCHS road needed is 98 km (392 ha loss to non-productive land, = 0.47%. Landings estimated to be another 0.5%). Total loss of 1% of harvest area.
- new non-caribou zone road needed is 255 km (estimated 1,020 ha loss to non-productive land, or 0.18%. Landings estimated to be another 0.5%). Total loss of 1% of harvest area.
- 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 2022 FMP, but with revised timelines.

The projected loss of harvested area to non-forest, through road development, is set at 1% for the all forest units (Table 34). 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 34 Conversion of Harvested Area to Non-forest Land

All Caribou Subunits		Planning Period:															
1st DCHS Cycle (90 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**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	0	0	0	0	0	0	0

Non-Caribou Zone SUs		Planning Period:															
40 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**	**0.01**	**0.01**	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. These inputs are included in the base SFMM model and all subsequent runs. No ecological forest renewal limits were used in the SFMM modelling.

Additional Forest Renewal limits are addressed with additional constraints added to reflect common local practices or to force the model to do (or not do) specific treatments. Not included in the base model inputs. These management decisions 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 which 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 planning term. Subunits were included in the modelling to allow scheduling of the Dynamic Caribou Habitat Schedule subunits (SMZ field in BMI) as well as to represent any fixed operability timing considerations for other operational management zones (OMZs). These SMZs and OMZs, combined into the SU field in the BMI, are described in Section 5.2.1. The Caribou Zone is subject to DCHS timing. Rationale for timing of caribou DCHS blocks is included in Appendix 1, Development of the DCHS. OMZ Z01 includes islands in Lake of the Woods that will not be operated (not eligible / “turned off” in SFMM for all terms). OMZ Z14 is a northern block that will not be accessed within the 2022-2032 period, therefore is “turned off” for this plan period. Subunit timing for the Base Model is shown in Table 35.

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 35 Sub-Unit Harvest and Renewal Operability Timing

Legend: (blank) Eligible for operations; 1 Not eligible for operations

Period:	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16
SU:																
A1	1	1	1	1	1	1	1	1			1	1	1	1	1	1
A2	1	1	1	1	1	1	1	1			1	1	1	1	1	1
B1			1	1	1	1	1	1	1	1			1	1	1	1
B2			1	1	1	1	1	1	1	1			1	1	1	1
C	1	1			1	1	1	1	1	1	1	1			1	1
D	1	1	1	1			1	1	1	1	1	1	1	1		
E	1	1	1	1	1	1			1	1	1	1	1	1	1	1
P	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MEA1																
MEA2																
MEA3																
MEA4																
DEA1																
ELK																
Z01	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Z02																
Z03																
Z04																
Z05																
Z06																
Z07																
Z08																
Z09																
Z10																
Z11																
Z12																
Z13																
Z14	1															
Z15																

Non-Declining Growing Stock – For the last period of the modelling horizon, total growing stock was not allowed to decline below 44 million cubic metres (all management zones combined). 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.

Boreal Landscape Guide Indicator Targets:

Boreal Landscape Guide indicator targets were included in the Base Model at Terms 15-17 only, ready to be activated by including targets to achieve the target earlier 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 were used in this FMP as referenced in Table 36.

Table 36 Boreal Landscape Guide Indicator Targets

Minimum areas are the lower IQR as calculated by OLT.			
Indicator:	Abbreviation	Minimum Area (ha)	Applies to:
Pre-/Sapling	PSp	na	na
Imm Con	Icn	na	na
Imm Hwd	Ihd	na	na
Mature-Late Balsam Fir	MLb	12,782	Entire forest
Mature-Late Upland Conifer	MLc	152,976	Entire forest
Mature-Late Hardwood & Mixedwood	MLh	43,706	Entire forest
Mature-Late Conifer Lowland	MLl	23,354	Entire forest
Caribou - Refuge	Cr	54,045	CAR zone only
Caribou - Winter (Combined)	Cw	18,667	CAR zone only
Old Growth - Upland Conifer	OGupC	47,362	Entire forest
Old Growth - Lowland Conifer	OGloC	12,236	Entire forest
Old Growth - Hardwood & Mixedwood	OGhmx	55,649	Entire forest
Old Growth - Red Pine - White Pine	OGprw	incr (from 1,969)	Entire forest
Upland Conifer (Pure)	PurCn	290,514	Entire forest
Young Forest	Young	129,712	Entire forest

The following Boreal Landscape Guide indicators were not part of the Base Model, however 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 incorporated into 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. For the Base Model, 24,000 ha was used.

Upland Conifer Area 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.

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 2022 FMP.

This SFMM input is used to define harvest volume by groupings of timber species. For the Kenora 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 37. 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 Kenora Forest.

Table 37 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 38). While included in the SFMM scenarios, timber value weighting was not adjusted further to constrain the results between scenarios.

Table 38 Relative Timber Value by Tree Species

Tree Species	Timber Value
PW	7
PR	7
PJ	10
SB	10
SW	10
BF	10
CE	3
OC	3
PO	10
BW	3
UH	3
LH	3

6.2.5.5 Execution Control Options

The following SFMM execution control options used in the Base Model and other scenarios:

- Greatest value of timber harvested over the entire planning horizon (unless noted as being changed for a specific investigation)
- Natural succession delayed Term 1
- Silviculture Spending Limit equal limited to Stumpage Revenues (all subunits combined)
- (No deferred areas, No Natural Disturbance)
- (Selection harvest excluded)

6.2.6 Assembly and Calibration of the SFMM Base Model Land Base

After the Base Model Inventory was completed and accepted for use, the various land base classifications were sorted to ensure the initial land base was entered correctly into the SFMM for use in investigations and developing a Long-term Management Direction for the Kenora Forest. This SFMM initial land base was reconciled to Tables FMP-1 and FMP-3 (Table 39).

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 includes as “non-forest” categories, to ensure the hectares were represented, but that they did not contribute to any projected objective achievement. This was simply to facilitate the reconciliation of the strategic modelling land base for the entire Kenora Forest.

The SFMM model initial land base totalled 1,225,168 ha and the total land base in Table FMP-3 equals 1,225,172 ha, a difference of only four (4) hectares. Reconciled land base for productive Crown land (ownerships 1-5-7) are 652,254 ha (SFMM) and 652,253 ha (FMP-1), a difference of only one (1) hectare. These extremely small differences result from the rounding (precision) of area numbers calculated for the Base Model Inventory (vert high precision) versus the SFMM land base import (1/100th of a hectare). This shortfall in area was not strategically important and the loaded SFMM land base was accepted as comparable to the BMI for use in the SFMM Base Model for development of the Long-Term Management Direction.

The second step in reconciling the SFMM initial land base involved a check of the SFMM calculation of the Plan Start 2022 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, in fact, count areas comparable to those calculated by OLT (Section 6.2.2.7)(Table 40).

During this check of SFMM counter for BLG indicators, a few anomalies were identified and corrected to ensure that SFMM would provide similar Plan Start projections for BLG indicators, supporting confidence in long-term projections through the modelling horizon. Indicators for Landscape Class area, most Old Growth area groupings and Caribou Habitat were comparable between SFMM and OLT calculations. Certain indicators were measured more specifically in OLT (to the single year age) versus more generally in SFMM (to ½ of a 10-year age class), which accounted for higher plan start values in SFMM for upland conifer (total and old growth) and young forest area. These minor discrepancies were apparent at plan start, but not expected to impact strategic projections as areas age into older age classes.

Table 39 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	503,772	503,771	OWNER = 1, POLYTYPE = FOR. Available breakdown from FMP-3.
Reserve (Unavailable)			
Estimated Riparian Reserve - EstRes	57,663	57,892	FMP-3 Estimated Unavailable (Comprised of riparian EstRes and Small)
Protf	19,195	19,194	FORMOD = PF, OWNER = 1, 5, or 7.
Parks	71,396	71,396	FORMOD =FOR, OWNER = 5 or 7 only.
Management Reserve	0	0	
Forested Islands	0	0	ACCESS1 = ISL, OWNER = 1
Small (reduced from Available)	229		Polygons <0.4 ha removed from Available Harvest Area calculation (Available in Table FMP-3, and Available for harvest allocation)
Reserve (Unavailable) Subtotal	148,482	148,482	
Non-forest and Non-Productive			
Brush & Alder (BSH)	6,823	6,823	POLYTYPE = BSH, OWNER = 1, 5, or 7.
Designated Agricultural Land (DAL)	0	0	POLYTYPE = DAL, OWNER = 1, 5, or 7.
Grass & Meadow (GRS)	211	211	POLYTYPE = GRS, OWNER = 1, 5, or 7.
Non-forested Islands (ISL)	6,048	6,051	POLYTYPE = RCK, ACCESS1 = ISL, OWNER = 1, 5, or 7.
Open Muskeg (OMS)	44,771	44,771	POLYTYPE = OMS, OWNER = 1, 5, or 7.
Rock (RCK)	2,513	2,513	POLYTYPE = RCK, OWNER = 1, 5, or 7.
Treed Muskeg (TMS)	4,427	4,427	POLYTYPE = TMS, OWNER = 1, 5, or 7.
Unclassified Land (UCL)	3,359	3,359	POLYTYPE = UCL, RRW, or BFL, OWNER = 1, 5, or 7.
Water (WAT)	416,610	416,611	POLYTYPE = WAT, OWNER = 1, 5, or 7.
Total Patent Ownership = 2, 3, 4 (PAT)	44,359	0	
Federal Ownership 6 (OTH)	43,792	0	
Non-Forest Subtotal	572,914	484,767	
	1,137,017	1,137,020	**Total Crown Ownerships 1, 5, and 7.**
PATENT		44,359	Total Patent Ownership = 2, 3, 4
OTHER		43,792	Federal Ownership 6
TOTAL SFMM AREA	**1,225,168**	**1,225,172**	**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).
Small	Polygons <0.4 ha area, not otherwise classified

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.

Table 40 Reconciliation of Plan Start 2022 BLG Indicators between SFMM and OLT

Minimum areas are the lower IQR as calculated by OLT.				Base06	FMP-10	
Indicator:	Abbreviation	Minimum Area (ha)	Applies to:	SFMM	OLT	
Pre-/Sapling	PSp	na	na	40,952	39,198	
Imm Con	Icn	na	na	136,142	136,344	
Imm Hwd	Ihd	na	na	68,484	61,507	
Mature-Late Balsam Fir	MLb	12,782	Entire forest	18,070	18,014	
Mature-Late Upland Conifer	MLc	152,976	Entire forest	208,260	207,290	close
Mature-Late Hardwood & Mixedwood	MLh	43,706	Entire forest	141,825	145,804	
Mature-Late Conifer Lowland	MLl	23,354	Entire forest	38,522	38,317	
Caribou - Refuge	Cr	54,045	CAR zone only	71,994	71,574	close
Caribou - Winter (Combined)	Cw	18,667	CAR zone only	29,678	29,131	close
Old Growth - Upland Conifer	OGupC	47,362	Entire forest	30,442	24,764	high
Old Growth - Lowland Conifer	OGloC	12,236	Entire forest	4,217	4,194	close
Old Growth - Hardwood & Mixedwood	OGhmx	55,649	Entire forest	25,043	24,780	close
Old Growth - Red Pine - White Pine	OGprw	incr (from 1,969)	Entire forest	1,953	1,969	close
Upland Conifer (Pure)	PurCn	290,514	Entire forest	241,172	233,327	high
Young Forest	Young	129,712	Entire forest	104,723	83,576	high

The LTMD Task Team and Planning Team reviewed the results of the land base import into SFMM and calibration analysis. The SFMM Plan Start 2022 land base was accepted as the starting point for the development of the Kenora Forest LTMD for the 2022-2032 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 Stephen Yeung, R.P.F Regional Planning Forester to Kurt Pochailo, R.P.F., Plan Author on June 10th, 2020.

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 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 are summarized in Appendix 8. The Base Model, key investigations, and the Long-term Management Direction are included in electronic modelling files provided to NDMNRF for review and confirmation. The SFMM modelling files do not form part of the electronic FMP, but are supplied to NDMNRF 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 Kenora Forest Year Seven Annual Report according to the FMPM 2009 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 2012-2022 forest management plan to confirm which objectives were still desired forest and benefits applicable to the 2022 FMP. This review was conducted with information on what mandatory management objective indicators are required by the FMPM 2017 and the *Forest Management Guide for Boreal Landscapes*. Meetings were held in November 2019 with representatives from the Kenora Local Citizens' Committee, and the Métis Nation of Ontario to review management objectives from the 2012-2022 FMP and to discuss desired forest and benefits for this 2022-2032 FMP. Local First Nation communities were also contacted for input on desired forest and benefits.

Management objectives and indicators from the 2012 FMP were reconfirmed as being important, and most were carried forward into the FMP 2022 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 Kenora Forest was not appreciably changed. Minor changes in objectives or indicators from 2012 to 2022 FMPs are noted below in Table 41 (objective and indicator discussion continues following the table).

Table 41 Review of Management Objectives from the 2012-2022 FMP

SUMMARY OF MANAGEMENT OBJECTIVES

Objective wording is subject to change.
2012 Indicators in red font may not be included in the 2022 FMP.
FMPM = Forest Management Planning Manual
BLG = Boreal Landscape Guide

(FMPM 2017) Mandatory?	CFSA Objective Category	Indicator	Timing of Assessment	(FMPM 2009) in KF 2012 FMP?
	Management Objective 1: Caribou Habitat	To maintain forest function for caribou habitat in the Kenora Forest (caribou zone).		
✓ required by BLG	Forest Diversity – habitat for animal life	(1a) Caribou Habitat Area (refuge and winter) used for Area of habitat for forest-related species at risk	(1) Proposed LTMD (2) Completion of operational planning (4) Annual Reports for Year 5 and final year of plan implementation	✓ Indicator 3a
✓ required by BLG		(1b) Landscape Pattern (Texture) of Caribou Winter Habitat (Combined)	(1) Proposed LTMD (2) Completion of operational planning (4) Annual Reports for Year 5 and final year of plan implementation	✓ Indicator 3c
X (but good to include)		(1c) Landscape Pattern (Texture) of Caribou Refuge Habitat	(1) Proposed LTMD (2) Completion of operational planning (4) Annual Reports for Year 5 and final year of plan implementation	✓ Indicator 3b
✓ required by Caribou Recovery Strategy		(1d) Conifer Purity in Jack Pine and Black Spruce LGFUs	(4) Annual Report for final year of plan implementation	✓ Indicator 3f
✓ required by BLG		(1e) On-line Caribou DCHS (% of DCHS area)	(1) Proposed LTMD	
X		% of conifer dominated forest units in the caribou zone.	*already covered by Indicators 1a, b, d.*	✓ Indicator 3e
	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 (includes various species and age groups) used for Area of habitat for forest-related species - Mature and Late classes	(1) Proposed LTMD (2) Completion of operational planning (4) Annual Reports for Year 5 and final year of plan implementation	✓ Indicator 2a
✓		(2b) Old Growth Forest (by groupings)		✓ Indicator 2c
✓		(2c) All ages red pine and white pine forest unit area		✓ Indicator 2d
✓		(2d) Upland Pine and Spruce: (ha)		✓ Indicator 2e
✓		(2e) Young Forest Area: (ha) All Plan Forest Units <36 years		✓ Indicator 2b
X (now in Obj 2a)		Productive area by forest unit and Age Grouping	*Replaced by Indicator 2a, 2e (redundant)*	✓ Indicator 2b
	Management Objective 3: Landscape Pattern	To emulate natural disturbance and landscape patterns characteristic of the Kenora Forest.		
✓ required by BLG	Forest Diversity – natural landscape patterns	(3a) Landscape Pattern (Texture) of Mature and Old	(1) Proposed LTMD (2) Completion of operational planning (4) Annual Reports for Year 5 and final year of plan implementation	✓ Indicator 1a
✓ required by BLG		(3b) Young forest patch size	(1) Proposed LTMD (2) Completion of operational planning (4) Annual Reports for Year 5 and final year of plan implementation	✓ Indicator 1b
X (in indicator above)		Landscape pattern - interior, Marten Core Habitat	*Replaced with BLG Indicator 3a above.*	✓ Indicator 3d
	Management Objective 4: Wildlife Habitat	To maintain forest function for wildlife habitat in the Kenora Forest.		
✓	Forest Diversity and Provision of Forest Cover	Habitat for Forest-related Species: (4a) Number of (or Habitat in) Moose Emphasis Areas (only if applicable in 2022 FMP)	(1) Proposed LTMD (2) Completion of operational planning (4) Annual Reports for Year 5 and final year of plan implementation	X
✓ Obj. 1 (others if modelled)		Habitat for Forest-related Species at Risk	*Only if strategically modelled and managed. Otherwise addressed through operational planning*	X
	Management Objective 5: Forest Access	To provide road-based access, land use and recreational opportunities through road maintenance and development of access to areas planned for harvest and renewal within the plan period.		
✓	Social and Economic - Community well-being	(5a) Kilometres of SFL roads per square kilometre of Crown forest	(4) Annual Reports for Year 5 and final year of plan implementation	✓ Indicator 8a

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Objective wording is subject to change.

SUMMARY OF MANAGEMENT OBJECTIVES

2012 Indicators in red font may not be included in the 2022 FMP.
FMPM = Forest Management Planning Manual
BLG = Boreal Landscape Guide

(FMPM 2017) Mandatory?	CFSA Objective Category	Indicator	Timing of Assessment	(FMPM 2009) in KF 2012 FMP?
✓✓	**Management Objective 6: Wood Supply**	To provide a predictable and continuous supply of wood to the forest products industry from the Kenora Forest.		✓
✓	Social and Economic – Harvest levels, Community well-being	(6a) Managed, Crown forest available for timber production	(4) Annual Reports for Year 5 and final year of plan implementation	✓ Indicator 5a
✓	Social and Economic – Long-term harvest levels	(6b) Long-term projected available harvest area	(1) Proposed LTMD	✓ Indicator 4a
✓		(6c) Long-term projected available harvest volume by species group (includes short-term volume target)	(1) Proposed LTMD	✓ Indicator 4b, 4c
new ✓		(6d) Long-term projected available harvest volume by broad size or product group	(1) Proposed LTMD	X
✓	Social and Economic - Planned harvest levels, Community well-being	(6e) Actual harvest area, by forest unit (% of planned harvest area)	(4) Annual Reports for Year 5 and final year of plan implementation	✓ Indicator 4d
✓		(6f) Actual harvest volume, by species group (% of planned harvest volume)	(4) Annual Reports for Year 5 and final year of plan implementation	✓ Indicator 4e
	Management Objective 7: First Nation Engagement	To engage during plan development the First Nation and Métis communities in or adjacent to the Kenora Forest, as well as individual Indigenous peoples who live off the reserve but continue to have traditional ties to the Kenora Forest.		
✓	Social and Economic - Involvement in forest management planning	(7a) Feedback on "effectiveness of engagement" from participating First Nation and Métis communities	(3) Draft Plan *(wording of indicator is optional. 2012 FMP had reprsentation on the Planning Team)*	✓ Indicator 6a
X		(7b) Opportunities for involvement of First Nation and Métis communities in plan development, background information and values identification.	*Required process by FMPM so not a required indicator, but may be important to include.*	✓ Indicator 6b
	Management Objective 8: LCC Engagement	To have the Local Citizens' Committee effectively participate in plan development.		
✓	Social and Economic - Community well-being	(8a) Local Citizens' Committee's self-evaluation of its effectiveness in plan development	(3) Draft Plan	✓ Indicator 7a
	Management Objective 9: Forest Renewal	To effectively regenerate harvest areas consistent with the regeneration standards outlined in the Silvicultural Ground Rules.		
X (no longer applicable)	Silviculture	Percent of harvested forest area assessed as free-growing.	*Replaced with Indicator 9a below. New measure and terminology.*	✓ Indicator 9a
✓		(9a) Percent of harvested forest area assessed as successfully established, by forest unit		X
✓		9b) Planned and actual percent of harvest area treated, by broad treatment type	*(treatment type, not silvicultural strata).*	✓ Indicator 9b
✓		(9c) Planned and actual percent of area successfully regenerated to the target forest unit, by forest unit.		✓ Indicator 9c
	Management Objective 10: 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	(10a) Percent of forest operation inspections in non-compliance, by activity and remedy type.	(4) Annual Reports for Year 5 and final year of plan implementation	✓ Indicator 10a
	Management Objective 11: Healthy Ecosystems	To maintain productivity of soil function, and to protect water quality and fisheries habitat where forest management activities occur in the Kenora Forest.		
✓	Ecological Sustainability – Healthy forest ecosystems	(11a) Compliance with management practices that prevent, minimize or mitigate site damage (% of inspections in non-compliance, by remedy type)	(4) Annual Reports for Year 5 and final year of plan implementation	✓ Indicator 11a
✓		(11b) Compliance with management practices that protect water quality and fish habitat (% of inspections in non-compliance, by remedy type)	(4) Annual Reports for Year 5 and final year of plan implementation	✓ Indicator 11b

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Several management objectives and indicators are streamlined and reorganized as a result of the indicators required by the FMPM 2017 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 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 requires a new mandatory indicator for long-term volume by broad size class or product group.
- One mandatory indicator reporting forest operations inspections in non-compliance, by activity and remedy type now replaces three separate indicators from the 2012 FMP (all related to compliance with prescriptions).
- Short-term wood supply, and associated socio-economic benefits, will continue to be managed in the 2022 FMP, but it will not be a separate objective, but rather the plan target for the long-term wood supply objective indicator.

8.2 Consideration of Background Information and NDMNRF Direction

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

NDMNRF FMP Direction

Since the approval of the 2012 FMP, several major NDMNRF guidance documents have been revised or prepared that are being implemented on the Kenora Forest for the first time for this 2022 forest management plan, including the 2017 FMPM. 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 NDMNRF 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 2022 FMP. The documents containing new NDMNRF direction include:

1. Forest Management Planning Manual (2017)

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 2022 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 NDMNRF 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 NDMNRF 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)

IFAs are required on each SFL at least every five years. The last IFA was conducted on the Kenora Forest in 2018. The IFA contained some findings that pertained to the development of the forest management plan (numbered by IFA Finding #), however not all findings related to development of the LTMD (as noted):

#1 Outdated Indigenous Community Background Information Reports

- NDMNRF District staff and Miisun worked collaboratively with Indigenous communities in an effort to update the reports during FMP development.

#5 Company-identified changes in the aquatic GIS layer were not processed.
#6 MNRF delivered ownership data boundaries do not line up correctly with the same boundaries in the 2018 eFRI.

- Water layer amendments were updated in Land Information Ontario (LIO).
- Ownership information was reconciled prior to approval of the PCI.

#8 Low implementation rate of planned tending (cleaning/competition control) during 2012-2018 period

- The strategic silviculture program for the 2022 FMP was reviewed prior to development of the LTMD projected renewal transitions and associated costs. The expected amount of required tending was determined for different site types on the Kenora Forest (Section 6.2.3.3).

#13 A number of 2012 FMP objectives and targets are unlikely to be achieved.

- Miisun, NDMNRF and the Planning Team reviewed 2012 FMP objectives and targets during development of the 2022 Objective and indicators (Section 8.1).
- Management objective indicators required by the FMPM, Boreal Landscape Guide and the Stand and Site Guide were included in the LTMD and assessed for objective achievement (Table FMP-10)(Section 8.2).
- Desirable levels were investigated and finalized based on provincially set parameters, strategic modelling projections and reasonable expectations for the Kenora Forest.

Enhanced Year Seven Annual Report (AR)

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.

As noted in the Year Seven Annual Report, the Kenora Forest has a long history of under-harvest for many different reasons. Under-harvest results in lost opportunity for the province, forest industry and local communities. Under harvest also leads to a high proportion of over-mature forest stands that may be lower in yield as they transition through succession. This in turns leads to lower sustainable harvest levels as old forest stands succeed to low-stocked stands of less desirable species, or succumb to natural depletion from blowdown, insects or fire.

While harvest levels were low, annualized renewal remained comparable to harvest area. In reviewing the trends of achievements over the past 20-years, it was recognized the percentage of artificial regeneration to conifer had decreased over the years due to an increase in poplar harvesting and decrease in demand for softwood. Another potentially significant trend noted was the lack of tending on the Kenora Forest, which has decreased in recent years. This is directly related to public and First Nation opinion of chemical tending. There continues to be a need for some level of tending to be utilized in order to ensure the conifer component of plantations is maintained.

Certain priorities from the Trend Analysis can be, at least partially, addressed strategically in the 2022-2032 FMP through:

- Ensure available harvest area is fully allocated (planned) in the FMP;
- Continue to work to expand operations in areas currently not utilized (north of Caribou Falls) on the Kenora Forest. (relates to DCHS B Block timing for 2022-2042 and proposed Umfreville Road primary corridor to north);
- Include tending where appropriate in Post-Harvest Renewal Transitions and Table FMP-4 Silvicultural Ground Rules; and
- Undertake consultation and communications efforts to increase public acceptance of a limited amount of tending on the Kenora Forest.

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 **Base-06**).

- estimated slope-based reserve areas as per the Stand and Site Guide (riparian);
- management decisions subunit timing for caribou management based on the approved Dynamic Caribou Habitat Schedule (subunits (SMZs)) and operational timing limit to harvest in Z01 off all terms, and Z14 off for 2022-2032;
- with Boreal Landscape Guide indicator achievement for Interquartile Ranges (mandatory desirable level) – timing of achievement varies; 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 Appendix 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 NDMNRF for review. They do not form part of the public portion of the electronic FMP and are provided to NDMNRF 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.

	FMPM Direction:	
	The following investigations will be considered in the development of desirable levels:	
	The establishment of targets for each indicator will consider (FMPM A-42-43):	
	(a) the current forest condition;	
		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);
		Investigations on impact of forcing the achievement of the SRNV (stay within "box" ASAP = above lower IQR) for various Landscape Guide/OLT indicators.

1. **Forest Diversity** - 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);

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 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 results were less critical (unless a resulting underachievement of another indicator resulted, then lower indicator would be forced up).

Best BLG results:	
SFMM Case:	Description:
01-BLG-30	Achieve SRNV (IQR) for most BLG indicators within 10 years, rest as soon as feasible.

- primary scenario focus is achievement of BLG indicators as soon as possible, regardless of other objectives
- BLG (entire forest) and caribou habitat (caribou zone) targets included. No harvest volume targets included.
- Volumes are not a priority, and flow between terms is not regulated … but resulting timber volumes are illustrated in table (to right):

See 01_BLG30 results summary in Appendix 7.

Volume Harvested by Species Group

AllSU | Average volumes harvested by s

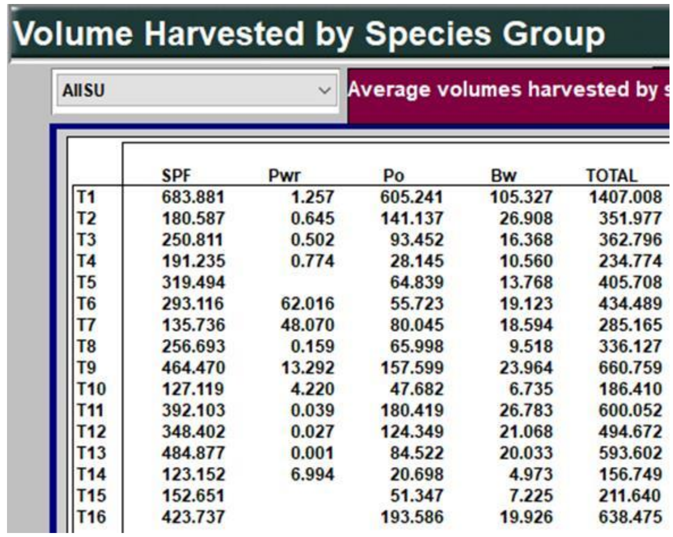
	SPF	Pwr	Po	Bw	TOTAL
T1	488.248	1.597	449.332	77.565	1023.132
T2	312.530	0.688	246.772	43.955	608.962
T3	190.396	0.319	89.553	21.314	306.898
T4	201.777		67.919	14.952	295.628
T5	231.118	0.039	49.409	14.234	298.926
T6	275.475	88.673	99.127	30.678	497.963
T7	249.563	0.001	54.705	11.525	316.068
T8	297.031	0.936	154.916	17.596	471.357
T9	238.001	9.450	43.801	10.401	304.187
T10	224.182	12.522	63.751	9.737	311.535
T11	297.518	2.112	113.046	17.344	431.048
T12	322.411	0.060	91.017	18.694	433.028
T13	239.248	1.636	39.718	11.374	293.764
T14	216.903		34.719	8.884	262.559
T15	367.114		262.479	30.924	671.352
T16	305.758		71.765	12.849	392.672

<u>Results</u>: all BLG and caribou habitat indicators achieve BLG lower IQR (or better) within 10 years, except OGIoC and OGprw (30 years), Upland Conifer (PurCn) in 60 years, and PRW at 25K in 90 years.
- Some OG is not achievable earlier, as enough area must age to become classified as Old Growth which takes 20-30 years.
- Run shows BLG targets are achievable, though Upland Conifer takes a longer time period as area is harvested and renewed with conversion of PLANFU area (longer-term).
- high harvest area in T1 is needed to convert hardwood area ASAP to conifer (not operationally feasible).

Next step was to back off BLG achievement (allow more time than 01-BLG-30 (the "Relaxed" BLG timeframe)

SFMM Case:	Description:
01-BLG-40	Achieve all SRNV (IQR) for BLG indicators within 40 years, most within 10 years.

- primary scenario focus is still achievement of BLG indicators fairly quickly, but allows for more solution space in modelling (to be taken up with other constraints or targets later.) Still no harvest volume constraints included.



Volume Harvested by Species Group

AllSU | Average volumes harvested by s

	SPF	Pwr	Po	Bw	TOTAL
T1	683.881	1.257	605.241	105.327	1407.008
T2	180.587	0.645	141.137	26.908	351.977
T3	250.811	0.502	93.452	16.368	362.796
T4	191.235	0.774	28.145	10.560	234.774
T5	319.494		64.839	13.768	405.708
T6	293.116	62.016	55.723	19.123	434.489
T7	135.736	48.070	80.045	18.594	285.165
T8	256.693	0.159	65.998	9.518	336.127
T9	464.470	13.292	157.599	23.964	660.759
T10	127.119	4.220	47.682	6.735	186.410
T11	392.103	0.039	180.419	26.783	600.052
T12	348.402	0.027	124.349	21.068	494.672
T13	484.877	0.001	84.522	20.033	593.602
T14	123.152	6.994	20.698	4.973	156.749
T15	152.651		51.347	7.225	211.640
T16	423.737		193.586	19.926	638.475

<u>Results</u>: all BLG and caribou habitat indicators achieve BLG lower IQR (or better) within 10 years, except all 4 OG classes (40 years), Upland Conifer (PurCn) in 70 years (T8) and PRW at 25K at T14.

- includes renewal expenditures balanced with available revenues (Forest Renewal Trust Fund)
- suggested scenario on which to build other investigations, scoping. Task Team may further adjust the timing of BLG indicator achievement during LTMD development.
- Needs volume flow moderation between terms.

FMPM Direction: (continued)

(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 will also consider:
(a) historic wood utilization;
(b) Current industrial wood requirements:

SFMM Case:		Description:	
02-2012Wood		Achieve 2012 FMP LTMD wood demand for as long as possible	
Group:	**2012Wood**	thousands of m3 per year.	
PWR	14.1	from T1 2012 FMP.	**BUILT ON 01-BLG-40, binding vol targets added, T1-T7 no vol flow control.**
SPF	240.0	from T1 2012 FMP.	Balanced budget, will determine if minimum commitment volumes by species group are achievable, and for how many terms.
PO	150.0	from T1 2012 FMP.	
BW	28.8	from T1 2012 FMP.	Binding volume targets added for as long as they can be met. Volume flow constraints infinite for allowable decreases and increases between terms.
Total	443.6		

Results: **2012 FMP volumes achieveable for seven 10-year periods. Some BLG achievement earlier than targets.**

- **higher proportion of natural regen done**
- shows pathways exist in model inputs to create all forest types needed for BLG.
- available volumes reflect (mostly unconstrained) subunit timing.
- is feasible given the BASE06 subunit timing
- balanced renewal budget

SFMM Case:		Description:
03-COMMIT		Achieve 2020 current wood supply committments for as long as possible
Group:	**COMMIT**	thousands of m3 pe
PWR	2.0	from region.
SPF	156.0	from region.
PO	152.0	from region.
BW	14.5	from region.
Total	324.5	

Inputs:

BUILT ON 01-BLG-40, binding vol targets added, T1-9, no vol flow control.

Balanced budget, will determine if minimum commitment volumes by species group are achievable, and for how many terms.

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

Results: **2020 Commitment volumes achieveable for nine 10-year terms.**

- higher level of harvest due to minimal targets later in the planning horizon (after volume targets are not achievable).
- lower volumes than 02-2012Wood, therefore achieveable for more terms into the future.

(c) Ontario Forest Accord Advisory Board benchmark harvest levels, as identified in the Provincial Wood Supply Strategies; and
Benchmark volume by species group (OFAAB):

SFMM Case:		Description:
04-OFAAB		Achieve OFAAB benchmark volumes by species group
Group:	**OFAAB**	thousands of m3 per year
PWR	9.0	
SPF	119.0	**BUILT ON 01-BLG-40, binding vol targets added, T1-16, no vol flow control.**
PO	88.0	
BW	3.0	
Total	219.0	

Results: **OFAAB Benchmark level volumes achieveable for all 16 10-year terms. Some BLG achievment earlier.**

- lower volumes than 02-2012Wood, therefore achieveable more terms (in fact all 16 terms).

(d) maximum even-flow harvest volume by major species 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.

All runs BUILT ON 01-BLG-40, no vol targets, only vol flow controls on allowable decreases/ increases, between 10-year terms.

Backstop ("end of world") constraint of 40 million m3 growing stock added for Non-Declining runs, and all subsequent runs.

SFMM Case:	Description: Even Flow Runs	Flat Vol. (1,000's m3/year)	Non-Declining Vol:	Terms with increases noted (1,000's m3/year)
05-Flat-SPF	Even SPF volume all terms	290	**05a-NonDecl-SPF**	283 to T10, 294 to T15, T16 356
06-Flat-PO	Even PO volume all terms	106	**06a-NonDecl-PO**	T16 limiting, 106 all terms
07-Flat-BW	Even BW volume all terms	22	**07a-NonDecl-BW**	T16 limiting, 22 all terms
08-Flat-TOTAL	Even TOTAL volume all terms	427	**08a-NonDecl-TOTAL**	T16 limiting, 427 all terms

09-Flat-ALLGrps – Even vol. for all species groups (1,000's m3/year)

	TOTAL	SPF	PO	BW
T1	369	246	90	20
T2	369	246	90	20
T3	369	246	90	20
T4	369	246	90	20
T5	369	246	90	20
T6	369	246	90	20
T7	369	246	90	20
T8	369	246	90	20
T9	369	246	90	20
T10	369	246	90	20
T11	369	246	90	20
T12	369	246	90	20
T13	369	246	90	20
T14	369	246	90	20
T15	369	246	90	20
T16	369	246	90	20

09a-NonDecl-ALLGrps at same time

	TOTAL	SPF	PO	BW	PWR
T1	245	245	92	21	0
T2	245	245	92	21	5
T3	245	245	92	21	5
T4	245	245	92	21	5
T5	245	245	92	21	7
T6	245	245	92	21	13
T7	245	245	92	21	13
T8	245	245	92	21	13
T9	245	245	92	21	15
T10	245	245	92	21	15
T11	245	245	92	21	15
T12	245	245	92	21	15
T13	245	245	95	21	15
T14	245	245	101	21	15
T15	245	245	101	21	24
T16	245	245	101	21	25

- lots of natural and seeding projected, when conifer forest is in target. Less planting overall due to projected transition results.
- 08a-Non-Decl-TOTAL only achieves Young forest T3 (others achieve in T2)
- 09 and 09a - Flat and Non-Decl ALLGroups - some BLG indicators achieved 1-2 terms later than BLG-40 (and other runs).

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 2022 Kenora Forest FMP land bases (Table 42). The table below shows some variance in productive area by landscape class between plans, primarily as a result of a revised forest resources inventory for the 2022 FMP (including > 60,000 ha reclassified from non-productive land to productive), harvest and renewal activities conducted in accordance with the 2012 FMP, and aging of the forest by 10 years.

Table 42 Comparison of Landscape Class Area between 2012 and 2022 FMPs

Landscape Class:	2012 (ha)	2022 (ha)
Pre/sapling	94,539	39,198
Immature hardwoods and hardwood mixedwoods	82,177	136,344
Immature Conifer and conifer mixedwoods	54,904	61,507
Mature and late balsam fir and balsam fir mixed	14,936	18,014
Mature and late lowland spruce and low other conifer	28,239	38,317
Mature and late conifer mixedwood	166,371	207,290
Mature and late hardwoods and hardwood mixedwoods	138,817	145,804
	579,982	**646,473**

The productive forest area in the 2022 FMP is now higher than reported at the start of the 2012 FMP. Therefore, it is concluded that the Kenora Forest's ability to continue to provide (or to increase) forest benefits associated with the productive forest should be able to be maintained throughout this 2022-2032 FMP period.

Old Growth Area – Next, the quantity of old growth forest was compared for Plan Starts 2012 and 2022 (Table 43). 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 2022 FMP old growth groupings.

The total area of Old Growth has increased from the start of the 2012 FMP to this 2022 FMP which is expected due to aging of the forest 10 years and an under-harvest during 2012-2022. Some classification of old growth area has changed due to the new inventory of the Kenora Forest (e.g. shifting of some area classification from lowland to upland). It is expected that the Kenora Forest can continue in this plan period to provide similar or enhanced levels of forest and benefits associated with old growth conditions, as compared to the 2012 FMP.

Table 43 Comparison of Old Growth Area between 2012 and 2022 FMPs

Old Growth Forest Area:	2012 (ha)	2022 (ha)
Lowland Conifer	3,258	4,194
Upland Conifer	21,539	24,764
Mixedwood and Hardwood	19,663	24,780
White Pine and Red Pine	1,020	1,969
	45,480	**55,707**

Caribou Habitat – A similar dynamic caribou habitat schedule was spatially applied for both the 2012 and 2022 forest management plan land bases. 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 2022-2-32 Kenora Forest FMP will continue to be able to supply forest and benefits levels associated with the 2012-2022 forest management plan.

8.4 Documentation of the Management Objectives Checkpoint

Progress Checkpoint #4 approval of the Management Objectives was received via email from Steven Yeung, R.P.F., Regional Planning Forester to Kurt Pochailo, R.P.F., Plan Author, on May 12, 2020.

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 Kenora Forest 2022 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 44).

Table 44 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 Area	SFMM model tracks projected area by caribou habitat type (2 types: refuge, winter combined).	Projected areas for the 2 caribou habitats are compared to OLT IQR desirable area levels to determine achievement.
		1b)	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.
		1c)	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.
		1d)	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).
		1e)	Amount and arrangement of capable online DCHS blocks in suitable habitat condition:	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 Kenora Forest caribou zone are deemed capable.
		1f)	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 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.
2	**Forest Compositio**	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 OLT 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.
		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 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 minimum desirable level to determine achievement.

OBJECTIVE		INDICATOR		HOW REPRESENTED IN ANALYSIS	HOW INTERPRETED FROM RESULTS
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 four 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 four 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.
5	**Forest Access**	5a)	km primary and branch SFL road per km2 of productive forest	Not included in strategic modelling.	Not assessed through strategic analysis. GIS query with length of SFL responsibility road (primary and branch) divided by the area of Crown productive land. Road density measured for caribou zone and non-caribou zone separately.
6	**Wood Supply**	6a)	Area of managed Crown forest available for timber production	SFMM projected total available area.	Projected total long-term (Period 10) available forest area is compared to minimum desirable level to determine achievement.
		6b)	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.
		6c)	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.
		6d)	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. No quantified desirable level.
		6e)	% 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.
		6f)	% 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.
7	**Indigenous Engagement**	7a)	Opportunities for involvement of Indigenous communities and Métis Nation of Ontario in plan development	Not included in strategic modelling.	Not assessed through strategic analysis.
8	**LCC Engagement**	8a)	LCC self-evaluation of its effectiveness in plan	Not included in strategic modelling.	Not assessed through strategic analysis.

OBJECTIVE		INDICATOR		HOW REPRESENTED IN ANALYSIS	HOW INTERPRETED FROM RESULTS
9	**Forest Renewal**	9a)	Percent of harvested forest area assessed as successfully established, by forest unit	Not included in strategic modelling.	Not assessed through strategic analysis.
		9b)	Planned and actual percent of harvest area treated broad treatment type.	Not included in strategic modelling.	Not assessed through strategic analysis.
		9c)	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.
10	**Forest Values**	10a)	Percent of forest operation inspections in non-compliance, by activity and remedy type.	Not included in strategic modelling.	Not assessed through strategic analysis.
11	**Healthy Ecosystems**	11a)	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.
		11b)	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.

1

9.2 Summary of Development of the Long-term Management Direction

9.2.1 LTMD Development Overview

The base model (**Base06**) 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 SFL staff and NDMNRF 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 investigations as included in Appendix 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 NDMNRF 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):

Base01-05 were progressively developed to assemble the Base Model land base and inputs for forest dynamics, silviculture, and management options. Early LTMD development runs used Base05.

Correction: Changes from Base05 to Base 06 included the revision of subunit operability timing to turn off Z01 in all terms (islands in Lake of the Woods) and a correction to the classification of some NAT YIELD forest area. Base06 is the final base model. Scoping runs for Aulneau Peninsula (MEA1) subunit timing (availability for harvest) were redone and results noted (as documented in Section 8.3). Later development of the LTMD built on Base05 was re-run on Base06 and analysis results and findings were updated.

A no-harvest scenario was run for reference purposes. What is the Kenora Forest projected to be like, in the absence of harvest (and absence of fire disturbance). Only natural succession through aging changed forest condition (was rerun on Base06).

Saved as **00-noHARV**

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

01-BLG-30 - Achieve SRNV (IQR) for most BLG indicators within 10 years, rest as soon as feasible.

01-BLG-40 - Achieve all SRNV (IQR) for BLG indicators within 40 years, most within 10 years. This run was used to push BLG achievement for all subsequent runs.

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:

- keep subunit timing as is in BASE06 (to be scoped further in LTMD development)
- use BLG-40 targets, but accelerate or improve where possible (approx. 1-2 terms) to ensure good BLG objective achievement
- use a general PO volume target of 150.0 K per year, SPF volume target of 240.0 K per year for all terms (non-binding)
- add general volume flow control for SPF +/- 15%, PO -40%/+30%
- (further adjustment based on results) tightened general volume flow control for PO +/-25% - since previous run had extremes in flow from T1 936 to T8 61 PO.

Saved as: **10-BalObj**

The LTMD Task Team noted that conflicts in achievement of all objectives may dictate the minor refinement of previous decisions or target levels.

- did an additional run with 00-LTMD with +/- 10% volume flow control for TOTAL volume group.

Saved as: **11-BalObj_TOTAL_10**

Findings:

- very good overall "amount" BLG indicator achievement. May be improved slightly during final LTMD development runs.
- balanced renewal funding and transitions were generally sufficient to meet management objectives, varied by term.
- projected wood variations are likely looser than we will end up with, but sufficient to test subunit timing
- use 11-BalObj_TOTAL_10 from which to test subunit timing projected impacts.

The following testing of subunit timing was originally run with 11-BalObj_10 based on BASE05**.** The scoping set was rerun again with BASE06 changes (after revised LTMD-07, to correct issues. Due to additional constraints to timing (Z01), results do show more differences compared to earlier work.

ScopeMEA1 - Aulneau Peninsula (MEA1) subunit scoping runs - built on 11-BalObj_TOTAL_10 (originally run with Base05, but rerun with Base06)

MEA1 SUBUNIT TIMING was varied - to consider different scenarios to timing of access (subunits off T1, T2, etc.), as warranted since there was a potential risk that access to the Aulneau Peninsula could be delayed, or harvest on the Aulneau not approved.

ScopeMEA1-off-ALL - Aulneau Peninsula off all Terms T1-T16, not available in any term. No MEA1 moose habitat targets as young forest browse could not be created in strategic model in MEA1.

ScopeMEA1-off-T1-10
 - Aulneau Peninsula off Term T1 only, available rest of planning horizon
ScopeMEA1-off-T1-4
 - Aulneau Peninsula off Terms T1-T2 only, available rest of planning horizon
Findings:

- With no harvest in MEA1 (160 years) - Overall, very good BLG achievement, however achievement of PRW all ages decreases as there is no opportunity to harvest area and regenerate Pr/Pw through forest renewal activities. Some indicators remained at lower IQR (but achieved). No moose browse after T3 as no young forest. Lower T1 SPF harvest volume than LTMD, and lower long-term TOTAL sustainable volumes when MEA1 removed from eligible harvest area.
- With no harvest in MEA1 T1-10 (100 years) - Overall, very good BLG achievement, however achievement of PRW all ages is only maintained, as limited opportunity to regenerate new PRW area. Moose browse negatively impacted (none T3-10). Meets T1 SPF and TOTAL volumes, but lower long-term sustainable volumes.
- With no harvest in MEA1 T1-4 (40 years) – Overall very good BLG achievement (similar to LTMD). Similar T1 harvest volumes (SPF and TOTAL) as LTMD, as well as similar long-term sustainable volumes. With projected harvest in MEA1 T5 onwards, SFMM shifts to allow greater harvest in rest of Kenora Forest, to compensate in the short- to medium-term for lack of MEA1 harvest. Minimal impact to overall objective achievement.

13-SUtest_no_DCHS_harv **-** No harvesting in the DCHS caribou zone (off T1-T16), only for information only (is against policy). Not documented.
Findings:

- relaxed BLG targets are achieved, however variations in volume per terms. Overall volumes achievable for 40+ years.

LTMD-01 **–** Balanced targets run with subunit timing as per BASE05 and 11-BalObj_TOTAL_10 (DCHS timing, Z14 off T1 only)

- improved BLG achievement targets = 1 term better for OGupC (now T2 achieve), OGhmx (now T3), UpCon (now T7). MLc (T5), OGloC (T4), OGprw (T4)
- volume flow by species group = +/- 10% for TOTAL and SPF, +/- 15% for PO
- Binding volume targets = TOTAL 450 T1-16, SPF 240 + PO 150 T1-T5
- 0% decrease allowed in PRW forest unit area through planning horizon (placeholder target - needs review to increase)

Findings:

- BLG achieved for all indicators by T2 (or earlier) except PurCn (T8), OGupC (T3), OGhmx (T3), OGloC (T4)
- More even wood supply - TOTAL 450 for all terms. SPF > 240 all terms. PO > 150 for 5 terms.
- need to review subunit timing, and which subunits SFMM is targeting majority of harvest area (T1 and T2)

LTMD-02 **-** improve harvest area MEA1+Z12, improve BLG, limit Plant amount, increase PRW all ages, smooth wood volumes

- min. target habitat for moose habitat per MEA
- consider if DEA1 habitat management needed in SFMM (strategic deferral of Critical Thermal Cover), or if being addressed operationally only
- check balance of on-line caribou habitat through time. Is a line shifting between DCHS blocks (subunits) warranted. Won't trigger remodelling.

LTMD development continued to LTMD-06:
Built on Base05 with good, overall balance of objective achievement including refined harvest volume targets, limits to renewal treatments and limiting harvest in MEA1 Term (specific inputs detailed in Section 9.2.3). LTMD-06 case results were reviewed and accepted as the preliminary LTMD run to be used to identify preferred harvest areas for this 10-year plan period.
LTMD-06 was acceptable to operationalize for preferred LTMD harvest allocations (LTMD Task Team consensus).

It was then identified that Z01 should have been unavailable for operations as it includes Lake of the Woods islands (won't harvest them). It was also noticed that the classification of YIELD had an error (had misclassified some NAT as managed stands resulting in minor change as some volumes increased, and some decreased)(introduced for late runs when updated forecast depletions were added).

BASE06 was revised from BASE05, with the same corrections for Z01 timing OFF, and YIELD fixed. Additional GS limit T17 of 44 million used.

LTMD-07 was created with inputs from LTMD-06, but with corrections for Z01 timing OFF, and YIELD fixed.

The series of wood supply investigations (Section 8.3), 00-noHARV, 01-BLG-30, 02-BLG-40, and LTMD-06 (revised case called LTMD-07), were all revised with same corrections as per Base06. Results were substantively similar when revised, however since Z01 (large subunit) was OFF in the revised runs, average harvest area and volumes were reduced, and there were re limiting terms or levels of achievement in runs. Overall achievement was more comparable to 2012 LTMD (previous runs provided more volumes, since Z01 was on, and shouldn't have been).

LTMD-07 was recommended by the LTMD Task Team for approval by the Planning Team for use as the LTMD for the 2022-2032 FMP. The Planning Team also supported LTMD-07.

9.2.3 Documentation of Management Constraints in the LTMD Scenario

The following subsections describe the final constraints included in LTMD-07. 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 45). These flow % values are the maximum decrease or maximum increase allowed for the species group volumes between 10-year plan periods. No volume targets by individual species were included in the Base Model or the LTMD.

Table 45 LTMD-07 Harvest Volume Flow Controls

	Direction: (max. % change between terms):	
SPGroup	Decrease	Increase
PWR	inf	inf
SPF	10	10
PO	15	15
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 meet current wood supply commitments. The targets for TOTAL of all species were used to regulate the volume through time, and specifically to manage the decrease over the next 60 years. Volume targets were also added to minimize the harvest as operations initially access the Aulneau Peninsula (MEA1 subunit limited harvest to 20,000 m3 T1 and 50,000 T2-4). And since subunit Z12 is a critical area for current, accessible harvest operations, the volume for this plan period in Z12 was targeted to be between 65,000-75,000 m3/year for this plan period, and capped at a maximum of 50,000 m3 for T2-4. The harvest volume targets in LTMD-07 are included in Table 46.

Table 46 LTMD-07 Harvest Volume Targets

	All Subunits combined:				By Subunit:		
Volume in 1,000s:	Tree Species Group:				MEA1	Z12	Z12
	SPF	PO	PWR	TOTAL	TOTAL	TOTAL	TOTAL
Term	Lower	Lower	Lower	Lower	Upper	Lower	Upper
T1	240	150	2	450	20	65	75
T2			2		50		50
T3			2	400	50		50
T4			2	400	50		50
T5			2	400	50		50
T6		90	2	400	50		50
T7		90	2	375	50		50
T8		90	2	375	50		50
T9		90	2	375	50		50
T10		90	2	375	50		50
T11		90	2	375	50		50
T12		90	2	375	50		50
T13		90	2	375	50		50
T14		90	2	375	50		50
T15		90	2	375	50		50
T16		90	2	375	50		50

9.2.3.2 Harvest Area Controls

<u>Stability of Harvest Area</u>

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.

No harvest area constraints were included in the Base Model. The LTMD included constraints as recorded in Table 47 of generally -30% to +30% change between terms, except the spruce dominated SBD and SBM areas were -40% to +40% as they are smaller areas on the Kenora Forest.

<u>Harvest Area Limit by Forest Unit</u>

For PJDS (shallow jack pine dominant area), SFMM did not project any harvest area, likely due to low timber volumes, and the positive objective achievement of keeping upland conifer area. Since no area was projected for harvest, a harvest flow constraint as above would not work.

Since PJDS makes up one-third of the PJD forest unit, projected PJDS harvest area was important in the LTMD, therefore, a minimum harvest area of 250 ha per year was added.

No harvest area limits by subunit were used.

Table 47 LTMD-07 Stability of Harvest Areas

				Harvest Flow Limit:		Harvest Area Limit:	
Forest Unit	Analysis Unit	BASE MODEL		LTMD-07		LTMD-07	
		% Decrease	% Increase	% Decrease	% Increase	Min. Ha	Max. Ha
BFM	BFM_	inf	inf	inf	inf		
CMX	CMX_	inf	inf	30	30		
	CMXC	inf	inf	inf	inf		
HMX	HMX_	inf	inf	30	30		
HRD	HRDA	inf	inf	inf	inf		
	HRDB	inf	inf	inf	inf		
	HRD_	inf	inf	30	30		
PJD	PJDD	inf	inf	30	30		
	PJDS	inf	inf	30	30	250.0	
PJM	PJM_	inf	inf	30	30		
POD	POD_	inf	inf	30	30		
PRW	PRWR	inf	inf	inf	inf		
	PRWW	inf	inf	inf	inf		
SBD	SBD_	inf	inf	40	40		
SBL	SBL_	30	30	30	30		
	SBLC	inf	inf	inf	inf		
SBM	SBM_	inf	inf	40	40		
	Limits apply to ALL SUBUNITS only.						

9.2.3.3 Renewal Controls

Forest Renewal Limits

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-07 to reflect the silvicultural strategy for this plan period on the Kenora Forest (see Table 48).

These renewal limits are maximum proportions of Natural and Planting by analysis unit. It is expected certain forest units will be targeted for maintenance of or conversion to upland conifer and less of these areas should be naturally regeneration where hardwood composition would be expected to increase (i.e. BFM, CMX, PJD, PJM, PRW, SDB, SBM)

Forest units with a higher hardwood component (CMX, HMX, HRD) have a maximum proportion applied to the Plant treatment in SFMM. While some conversion to conifer through planting is expected, hardwood competition on many sites limits the potential success when limited tending is conducted on the Kenora Forest.

Table 48 LTMD-07 Forest Renewal Limits

FU (AU)	Treatment	Max. Proportion	Justification for Percentages in 00-LTMD
BFM_	Natural	0.30	Reflects average renewal strategy for Kenora Forest. More Natural approporiate for CMX due to hardwood component. Less Natural for Red Pine and White Pine stands, projected to receive more intensive PR-PW renewal efforts to maintain PRW.
CMX_	Natural	0.40	
PJDD, PJDS	Natural	0.30	
PJM_	Natural	0.30	
PRWR, PRWW	Natural	0.25	
SBD_, SBM_	Natural	0.30	
FU (AU)	**Treatment**	**Max. Proportion**	**Justification for Percentages in LTMD**
CMX_	Plant	0.30	
HMX_, all HRD	Plant	0.25	

Balanced Silvicultural Budget

LTMD-07 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

Boreal Landscape Guide Indicators

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 were added in multiple terms to force achievement by certain terms, and as noted below, to aid push achievement further up into the desirable range for Old Growth Upland Conifer, Hardwood/Mix, and Red Pine-White Pine, as well as for Upland Conifer (all ages):

Table 49 LTMD-07 BLG Indicator Targets

			LTMD-07	
Indicator:	Minimum Area (ha)	Applies to:	Desirable Level	Improved Level
Mature-Late Balsam Fir	12,782	Entire forest	all terms	
Mature-Late Upland Conifer	152,976	Entire forest	all terms	
Mature-Late Hardwood & Mixedwood	43,706	Entire forest	all terms	
Mature-Late Conifer Lowland	23,354	Entire forest	all terms	
Caribou - Refuge	54,045	CAR zone only	all terms	
Caribou - Winter (Combined)	18,667	CAR zone only	all terms	
Old Growth - Upland Conifer	47,362	Entire forest	T2-T10	incr. to 50,000 ha T11-T17
Old Growth - Lowland Conifer	12,236	Entire forest	T4-T17	
Old Growth - Hardwood & Mixedwood	55,649	Entire forest	T2-T10	incr. to 58,000 ha T11-T17
Old Growth - Red Pine - White Pine	incr (from 1,969)	Entire forest	na	5,000 ha T4-T17
Upland Conifer (Pure)	290,514	Entire forest	T8-T12	incr. to 310,000 ha T13-T17
Young Forest	129,712	Entire forest	T5-T17	

LTMD DEVELOPMENT CONCLUSION:

LTMD-07 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-07 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-07 was selected as the Proposed Long-Term Management Direction.

Results of LTMD-07 are summarized in Appendix 8.

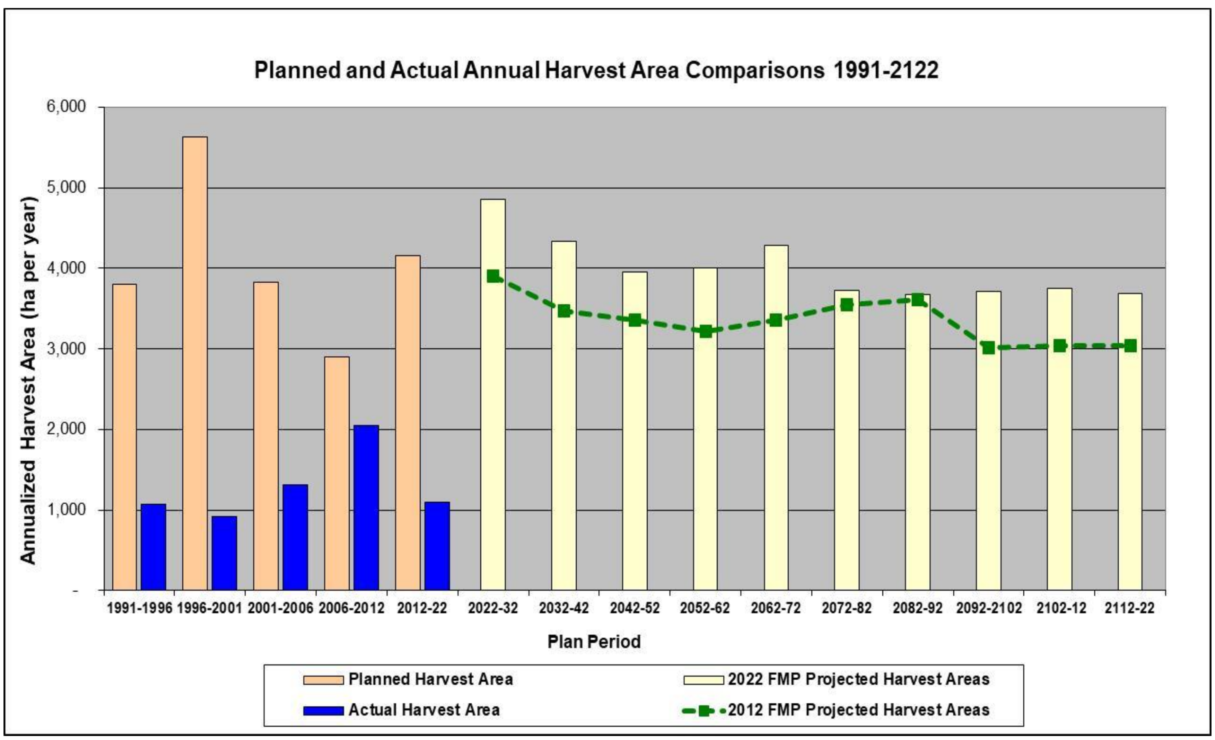
9.2.4 Historic Wood Utilization and OFAAB Investigation

HARVEST AREA

Short-term Harvest Areas 2022-2032:

The Long-term Management Direction (LTMD-07) projects a harvest of 4,859 hectares per year from 2022-2032. The projected annual harvest area in the LTMD was compared to the historical planned and actual total harvest areas for 1996 through to 2122 (Figure 3). The LTMD harvest area level is greater than the 2012 FMP available harvest area (4,859 ha versus 4,158 ha per year in the 2012 FMP). The increase in projected available harvest area results from a continuation of the strategic direction for the Kenora Forest. Minor adjustments to modelling assumptions were made and revised desirable levels for management objective indicators were included in this plan. Timing of BLG indicator achievement and continuation of the management strategic to convert some hardwood and mixedwood forest types to upland conifer was a major influence on harvest area projections. 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 Kenora Forest in the strategic modelling.

Figure 3 Planned and Actual Annual Harvest Area Comparisons 1991-2122



Long-term Harvest Areas 2032-2122:

Annual total harvest areas are projected to average approximately 3,997 hectares per year for the next 100 years (vary from 3,670 to 4,859 ha per year), slightly higher than projections in the 2012 FMP (3,354 ha per year over 100 years). Variation in projected harvest areas between 10-year periods results 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 Kenora Forest. Long-term strategic planning trends in projected harvest area remain similar between plans with minor changes resulting from improvements and refinements of modelling assumptions, changes in guide implementation and revised desirable levels for management objective indicators.

HARVEST VOLUME

Short-term Harvest Volume 2022-2032:

The 2022-2032 Long-term Management Direction annual harvest area is projected to yield approximately 487,200 cubic metres of timber each year from 2022-2032. This is comprised of 240,000 cubic metres of Spruce-Pine-Fir (SPF), 214,800 cubic metres of Poplar (PO), and 29,500 cubic metres White Birch (BW) per year. White Bitch volume is reported, but is not considered a major species group. Red Pine and White Pine (PWR)(2,000 cubic metres per year) is also not considered a major species group on the Kenora Forest. Other Conifer (OC)(cedar, larch) and Lowland Hardwood (black ash) are incidental species on the Kenora Forest, all together totalling approximately 800 cubic metres per year.

The annual total harvest volume level in the LTMD for the 2022-2032 Kenora FMP (487,200 cubic metres) is 10% higher than the harvest volumes projected in the selected management alternative for the 2012-2022 FMP (443,500 cubic metres). The increased harvest volume corresponds to the increase in harvest area discussed above. The increase in harvest area and volume is a result of 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 2012-2022 FMP. The Planning Team carefully considered the impact of the 2022-2032 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 247,900 m3 of defect volume and 93,600 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 8,287,950 m3 for this 10-year plan period 2022-2032 (total 828,795 m3 per year for all three volumes types).

Long-term Harvest Volume 2032-2122:

The LTMD projects that the total net merchantable volume will decrease from 2022-2042, then remain stable at 400,000 cubic metres per year from 2042 to 2082. Thereafter, total volume will decrease slightly to 375,000 cubic metres per year. On average, strategic total harvest volumes projections are slightly higher through time for the 2022-2032 forest management plan as compared to the 2012-2022 FMP. Both plans projected very stable harvest volumes through time, therefore the difference in projected volumes results from strategic model input changes (e.g. yield curves, desirable levels for various management objectives, etc.).

In the 2022-2032 FMP projections, after this 10-year plan period, Spruce-Pine-Fir volume is projected to remain relatively stable at 207,000 to 250,000 nm m3/year from 2032-2082. The in 60 years (after 2082), the SPF volume is projected to increase to the end of the planning horizon. Poplar volume is projected to decrease to 2072, after which time it is stable at 90,000 cubic metres per year.

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 Kenora Forest from 1991 to the present. The planned and actual harvest volumes are also illustrated by 10-year FMP period from 1996 to 2022, and projected volumes from 2022 to 2132. Volume comparisons are included for all volumes (TOTAL, Figure 4), Spruce-Pine-Fir (Figure 5), Poplar, (Figure 6), and White Birch (Figure 7). Red Pine and White Pine is not a major volume species group on the Kenora Forest.

Projections for TOTAL volume and SPF volume are projected to be higher than the OFAAB benchmark levels through to 2122. Poplar volumes are projected to be higher than OFAAB benchmark levels for 50 years, after which it is at or lower than OFAAB volumes.

Figure 4 Planned and Actual Harvest Volume Comparisons, Species Group – TOTAL

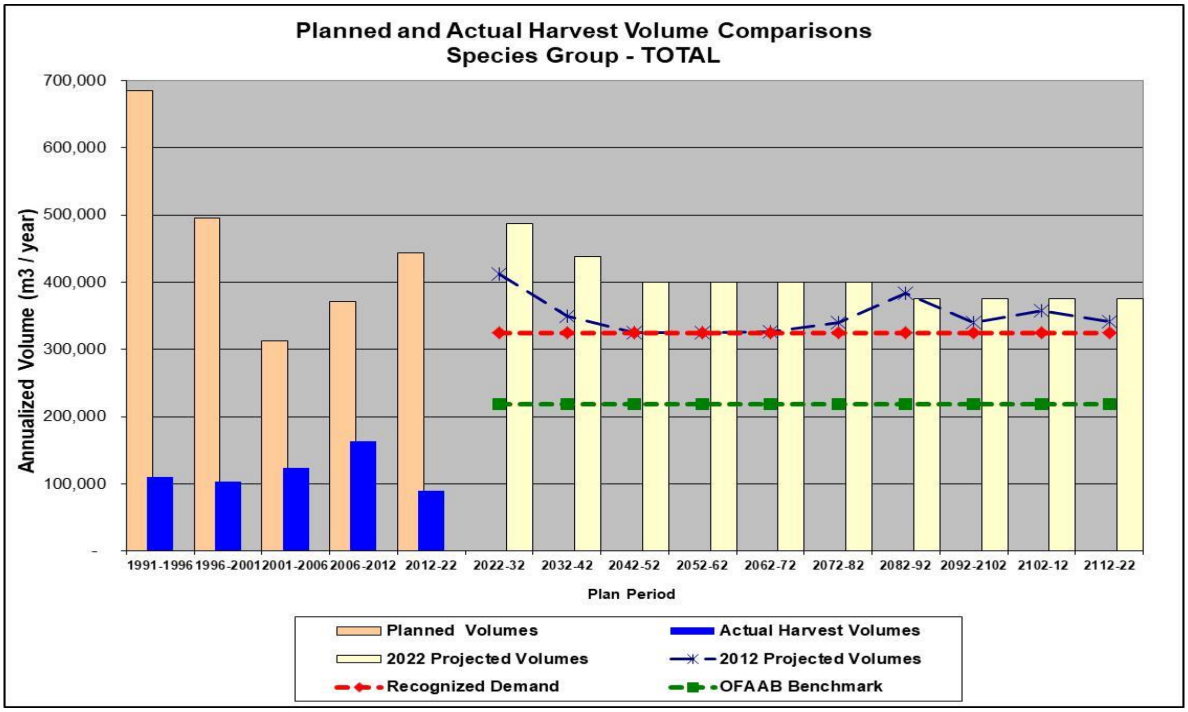


Figure 5 Planned and Actual Harvest Volume Comparisons, Species Group – Spruce-Pine-Fir

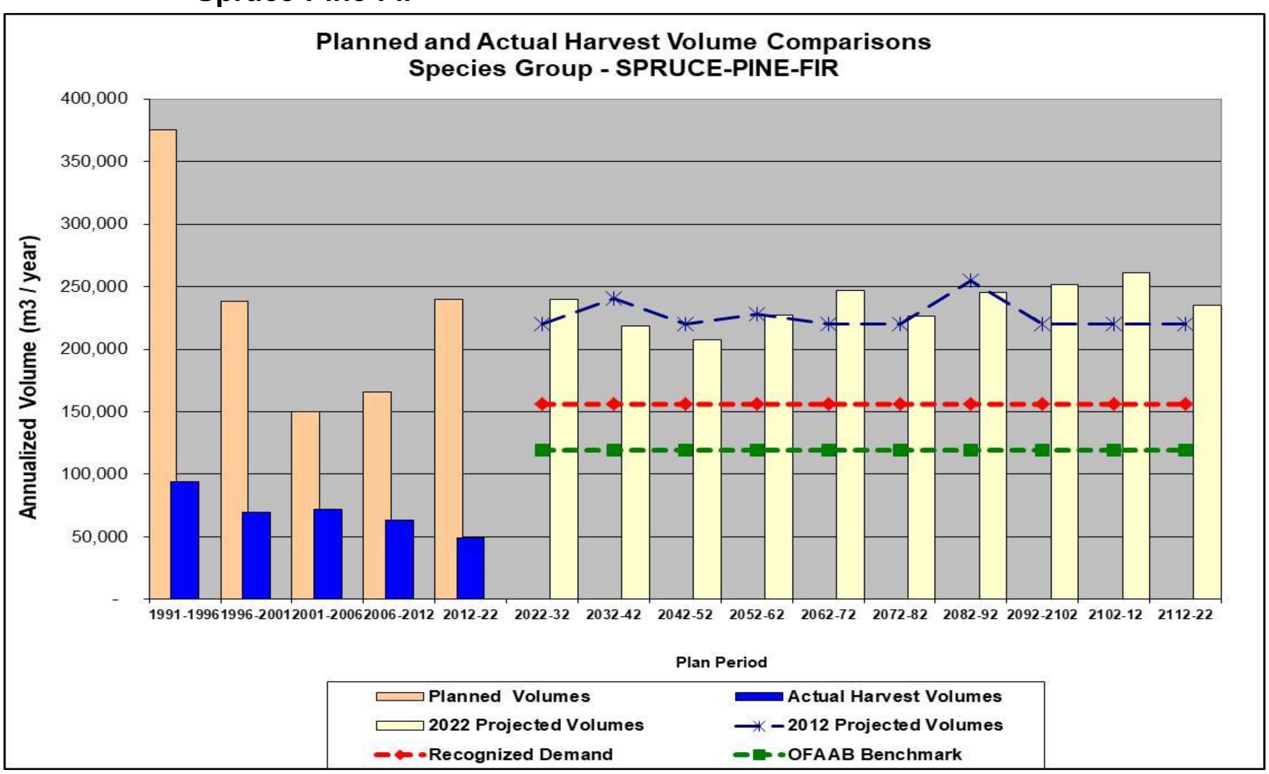


Figure 6 Planned and Actual Harvest Volume Comparisons, Species Group – Poplar

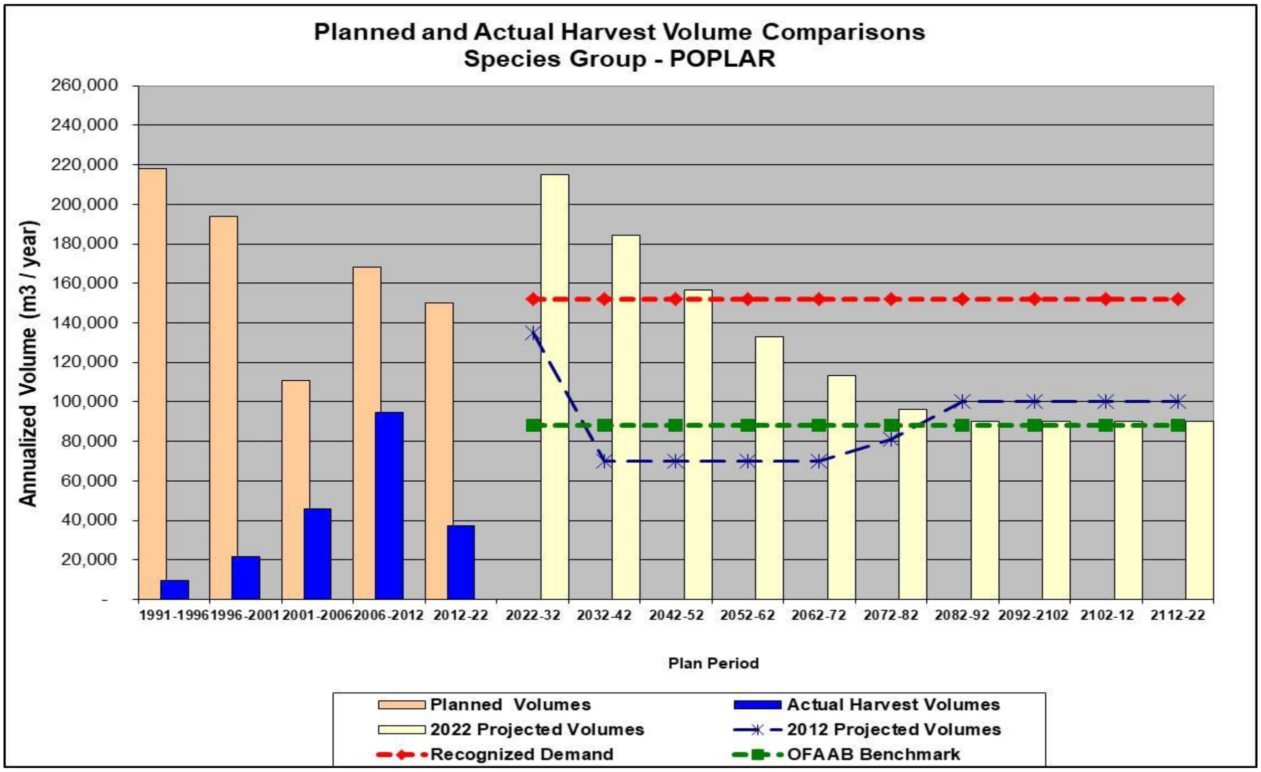
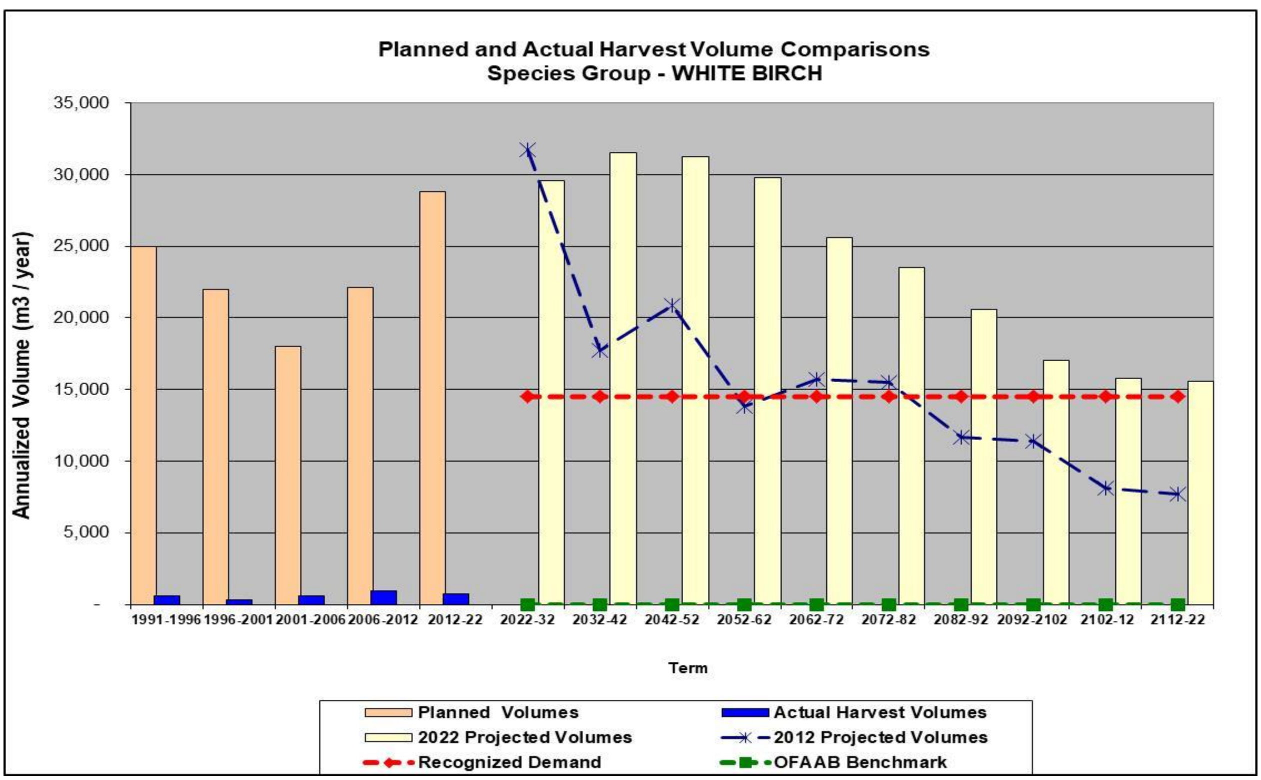


Figure 7 Planned and Actual Harvest Volume Comparisons, Species Group – White Birch



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 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 9C)

<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 NDMNRF 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 Steven Yeung, R.P.F., Regional Planning Forester, to Kurt Pochailo, R.P.F., Plan Author, on June 22, 2020.

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 2022 Kenora Forest FMP

FINAL PLAN UPDATE: Revised Kenora Forest DCHS Online Caribou Habitat at Plan Start 2022

Appendix 2 Moose Emphasis Area Delineation

Moose Emphasis Area Delineation for the 2022 Kenora Forest FMP

FINAL PLAN UPDATE: Revised Discussion of Habitat in Moose Emphasis Areas

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

Appendix 4 Elk Emphasis Area Delineation

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:

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 2022 Kenora Forest FMP

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Caribou Habitat at Plan Start 2022

Plan-start Caribou Habitat Tract Analysis using the Ecosite-based Habitat Model and Caribou Occurrence Information

March 1, 2020

Plan-start Caribou Habitat Tract Analysis 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.

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 Kenora Forest (KF) exists within Ecoregion 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.

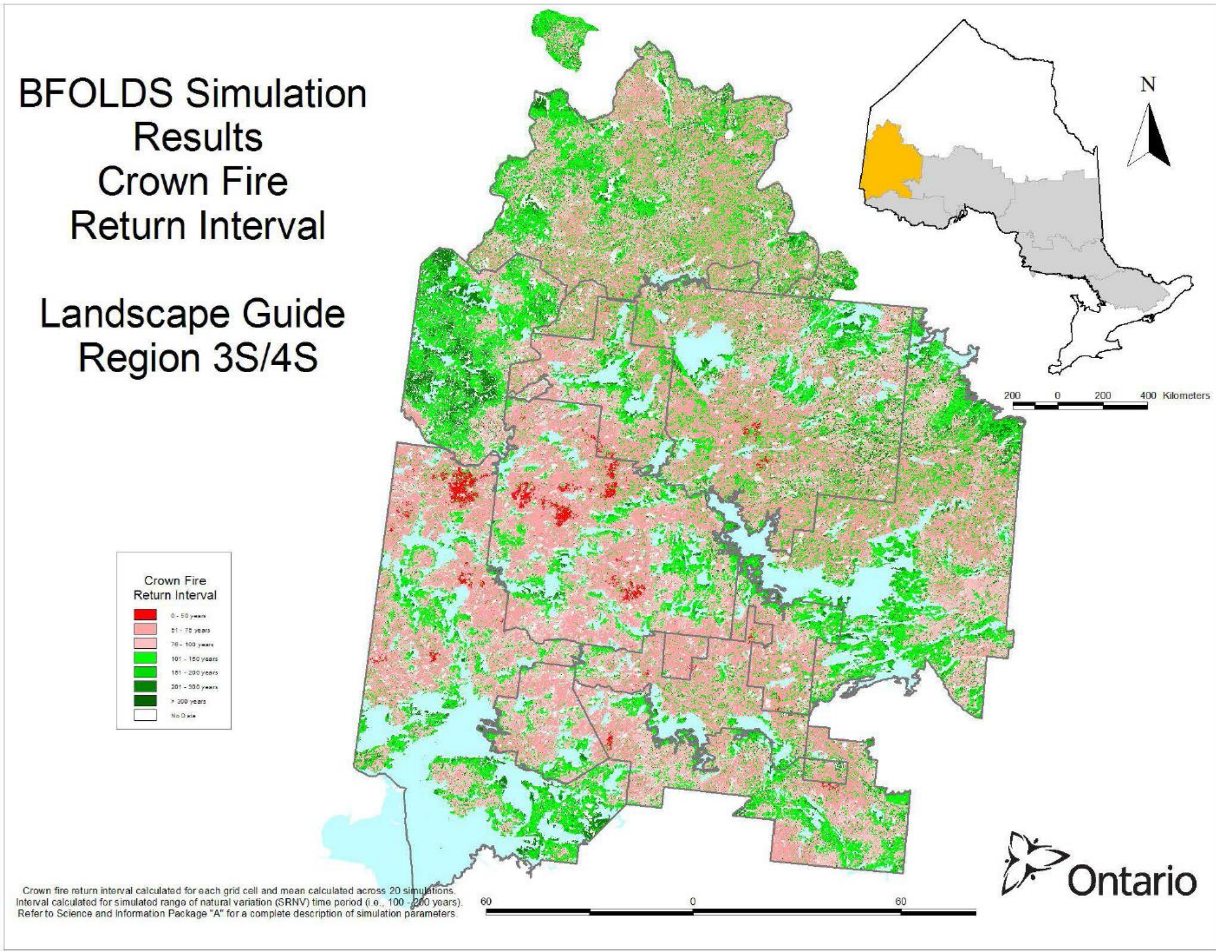

Figure 1 Fire Return Interval for Ecoregion 3S/4S. Kenora Forest is located to the southwestern extent

For ecoregion 4S, where the Kenora Forest is located, the fire return interval ranges from 50-100 years with portions of the Kenora Forest having shorter or longer intervals (Figure 1, Elkie et al, 2018A). Of note, shoreline areas along Lake of the Woods and the Winnipeg River have a longer fire return interval of 100-300 years and a patch in the northern portion of the Kenora Forest has a fire return interval of only 0-50 years. This is typical of Ecoregion 4S 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 Kenora Forest is considered woodland caribou habitat. This area is demarcated with the Caribou Continuous Range boundary (Fig. 2). The area of the Kenora Forest within the Caribou Continuous Range has had multiple large fires since the 1980s which have resulted in much of the treed habitat being <40 years old (at plan start in 2022). Notable fires, since the 1980s, have included KEN73 (in 1983 – 82 323 ha), KEN186 (in 1988 – 2710 ha) and KEN71 (in 2018 – 10 684 ha).

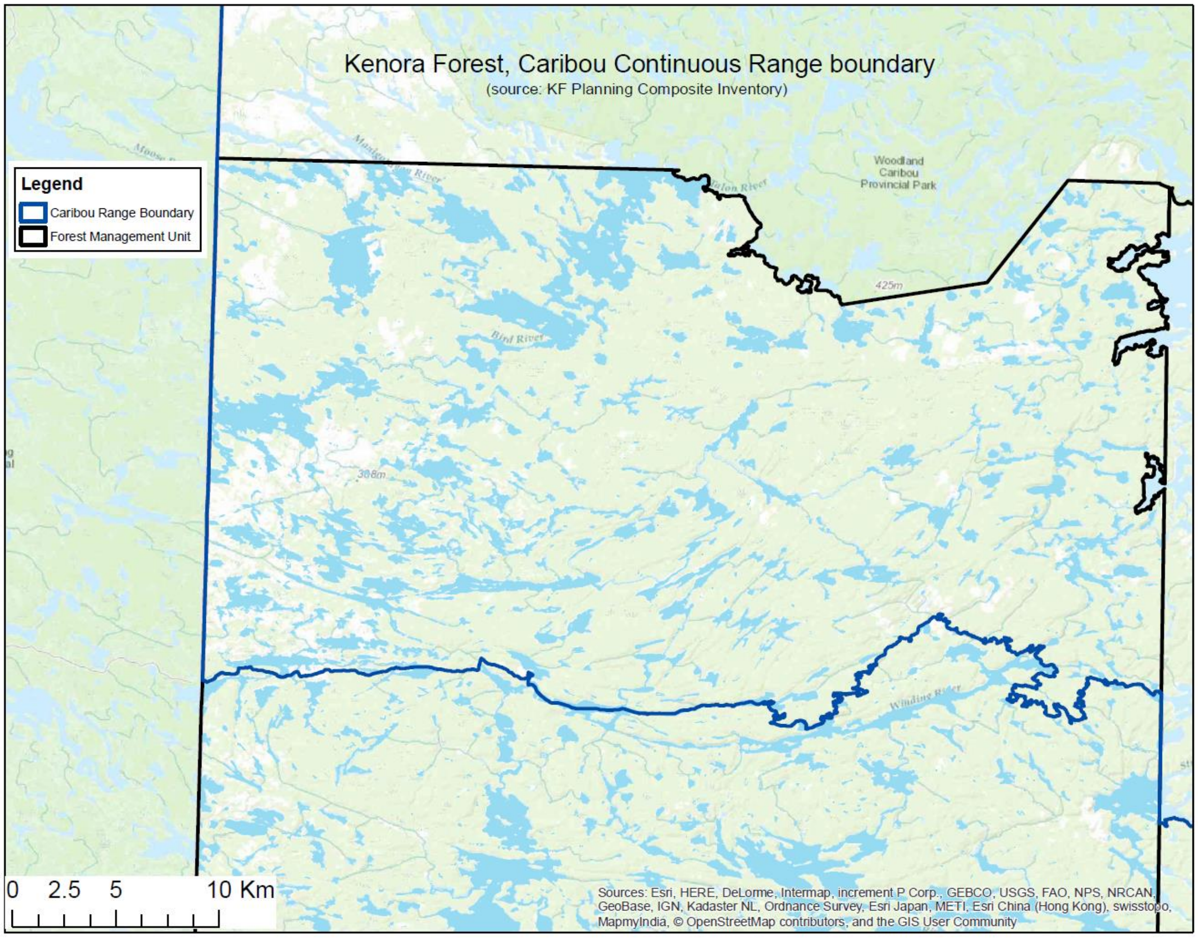

Figure 2 Caribou Continuous Range in the Kenora Forest

Fires in the Kenora Forest have resulted in different landscape patches that have the potential to serve as woodland caribou habitat. Accordingly, the geographic areas that have been impacted by fires, and the resulting renewal of forested stands, is a major determinant in the location of caribou habitat tracts in the Kenora Forest.

Habitat tracts are delineated at coarse, large landscape scales that reflect the scale at which caribou use the landscape, and the scale where the large natural disturbance patterns tend to drive most of the 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 2021 BSF 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 KF landscape woodland caribou is:

- Relatively unstudied although considered largely consistent with other boreal landscapes sharing low levels of anthropogenic disturbance and the same fire return interval;
- Occurring north of the Continuous Caribou Range boundary but with some evidence of calving south of the range boundary;
- Porous with forested areas located inside the Manitoba border (Nopiming Provincial Park), as well as Ontario's Woodland Caribou Provincial Park, located to the north.

The portion of the KF inside the caribou continuous distribution is predominately made up of jack pine dominant and black spruce dominant stands. While these forest stands have the potential to be preferred caribou winter and refuge habitat, a series of fires which have occurred since the 1980s have limited the area's potential as habitat. Approximately 40% of the KF north of the Caribou Continuous Range boundary was impacted by the 1983 KEN73 fire with smaller portions also affected by more recent fires. On balance, the KF is made up of young forest that is of limited quality as caribou winter and refuge habitat.

The Eagle-Snowshoe Conservation Reserve occurs in the northwestern portion of the portion of the caribou continuous distribution overlapping the KF, and continuous with Woodland Caribou Provincial Park. The area encompassed by the Eagle-Snowshoe Conservation Reserve takes up a large portion of forest stands > 40 years of age available in the KF within the caribou continuous distribution. The shoreline areas in the Eagle-Snowshoe Conservation Reservation are productive habitat areas with quantities of hardwood mixedwood and hardwood dominant forest stands, indicating that these areas are not suitable as winter or refuge habitat and are suitable for supporting moose rather than woodland caribou.

Since 1998, woodland caribou habitat north of the caribou continuous distribution has been considered through available observational and radio-collar data. As per the 1998 North Kenora Pilot Project Agreement, the Eagle/Midway/Chase chain of lakes, Sydney Lake and Snowshoe Lake were identified as likely caribou calving areas (Ranta 2001). Later radio-collar data was used to validate these assumptions. The extent of winter habitat use by woodland caribou within the KF is largely unknown based on observational and radio-collar data, leaving habitat models on winter and refuge habitat suitability the key means for assessing use over the winter season.

In the Kenora Forest, the southern limit of the continuous distribution follows Werner Lake road that extends from a provincial road inside Manitoba and accessing Manitoba's Nopiming Provincial Park. While the extent of Werner Lake Road only runs an approximate 15km inside the KF, the trajectory of the range boundary roughly follows the path for another 30km where the range boundary takes a sharp jog south when reaching the Whiskey Jack Forest Management Unit boundary.

While Werner Lake Road forms the southern range boundary for woodland caribou in the KF, it does not accurately demonstrate the southern extent of range movements. Based on available radio-collar data and incidental observations, the potential for caribou calving activities includes several lakes up to 6km south of Werner Lake Road. However, a large portion of forested area around these lakes was burnt by the KEN71 fire in 2018. While the fire was patchy, it did burn hot and will result in increased moose habitat over the short to medium term and loss of available woodland caribou winter habitat. This will result in decreased habitat suitability for woodland caribou in this portion of the KF.

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 the fire from more recent decades have the more accurate perimeter mapping, and older decades have a smoother approximate outline.

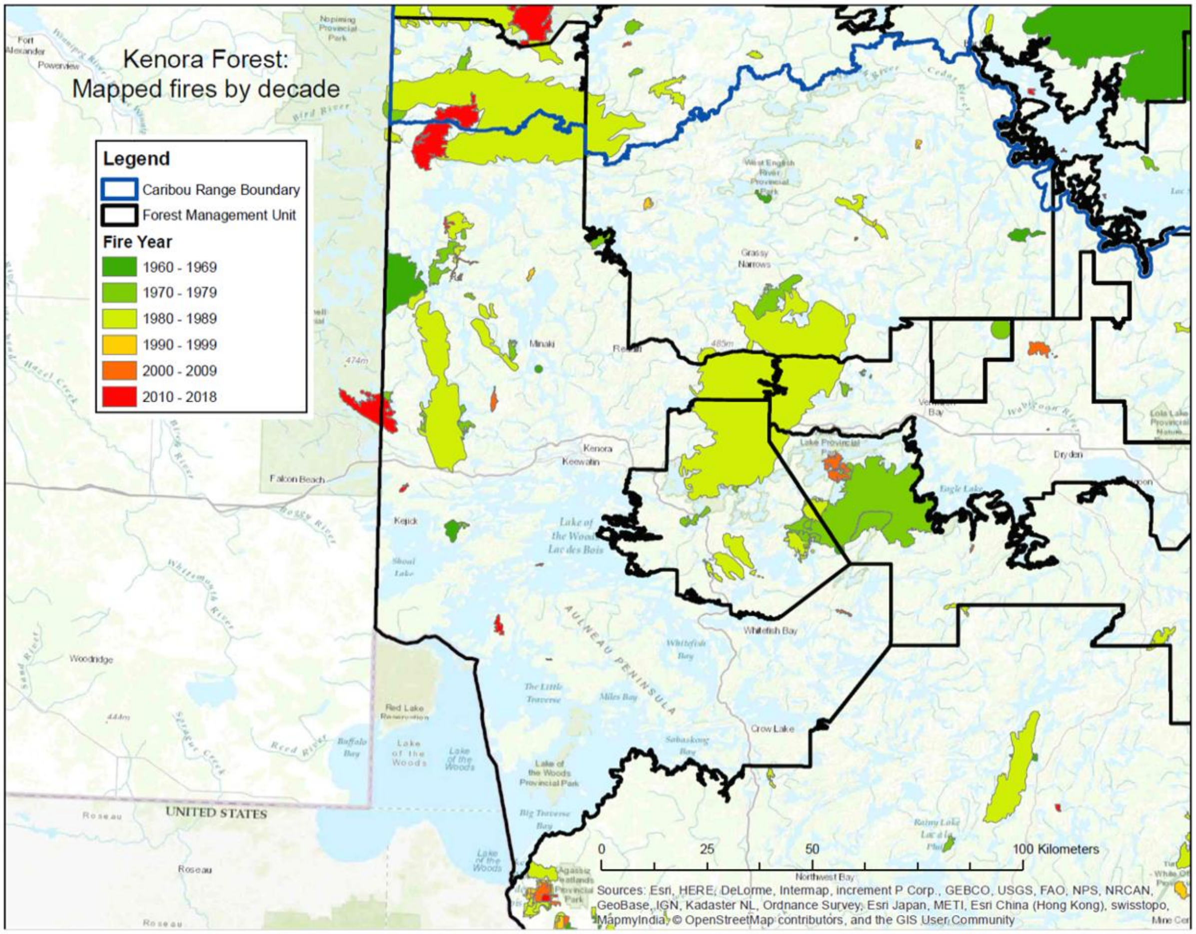

Figure 3 Mapped Fires by decade in the Kenora Forest 1960 – 2018

Fig. 4 shows the age class for the forest in 20-year age classes. Patterns of caribou 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.

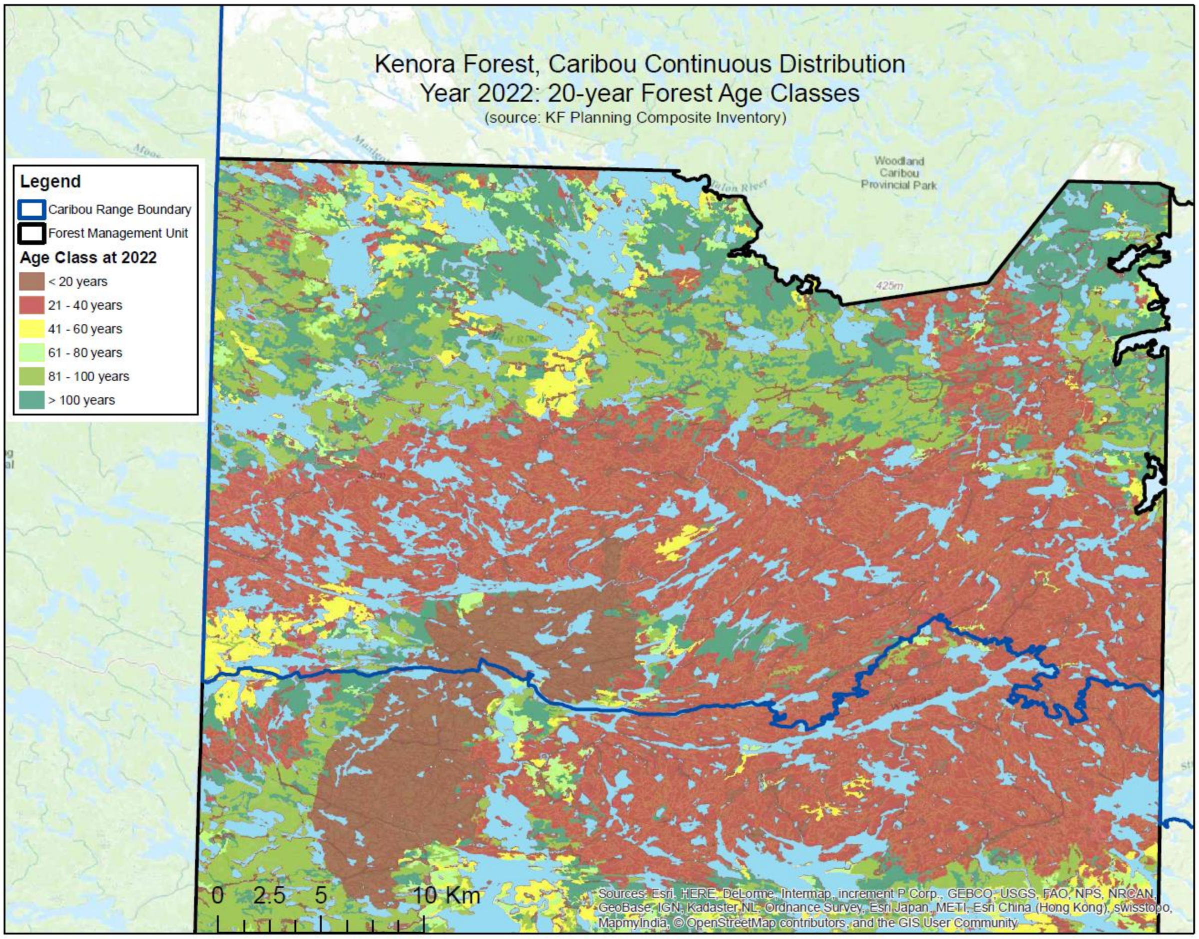

Figure 4 Forest Age Classes in the Kenora Forest overlapping the caribou continuous distribution. Forest age classes are based on a 2022 plan start and using the available Planning Composite Inventory

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 KF north of the caribou continuous range 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.

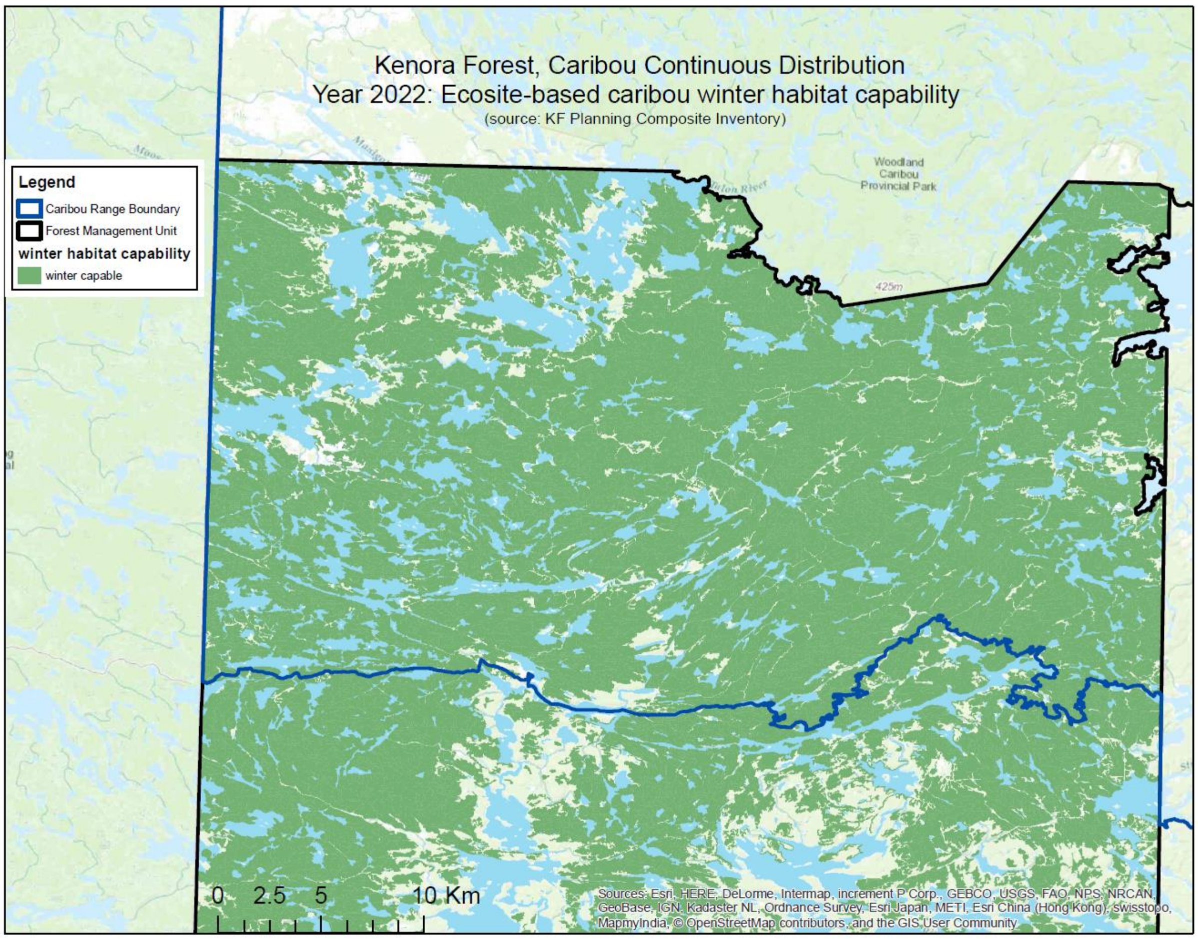

Figure 5 Winter habitat capability for the portion of Kenora Forest overlapping the caribou continuous distribution. Analysis conducted using Ontario's Landscape Tool and based on a 2022 plan start date and ecosite data available in the Planning Composite Inventory

Figure 6 shows the Northwest Regional Landscape Guide Forest Units classified from the EFRI. Most stands are jack pine dominant or black spruce dominant. The hardwood dominant stands that do occur are largely with the Eagle-Snowshoe Conservation Reserve or the extreme northeast portion of the KF north of the Caribou Continuous Range boundary.

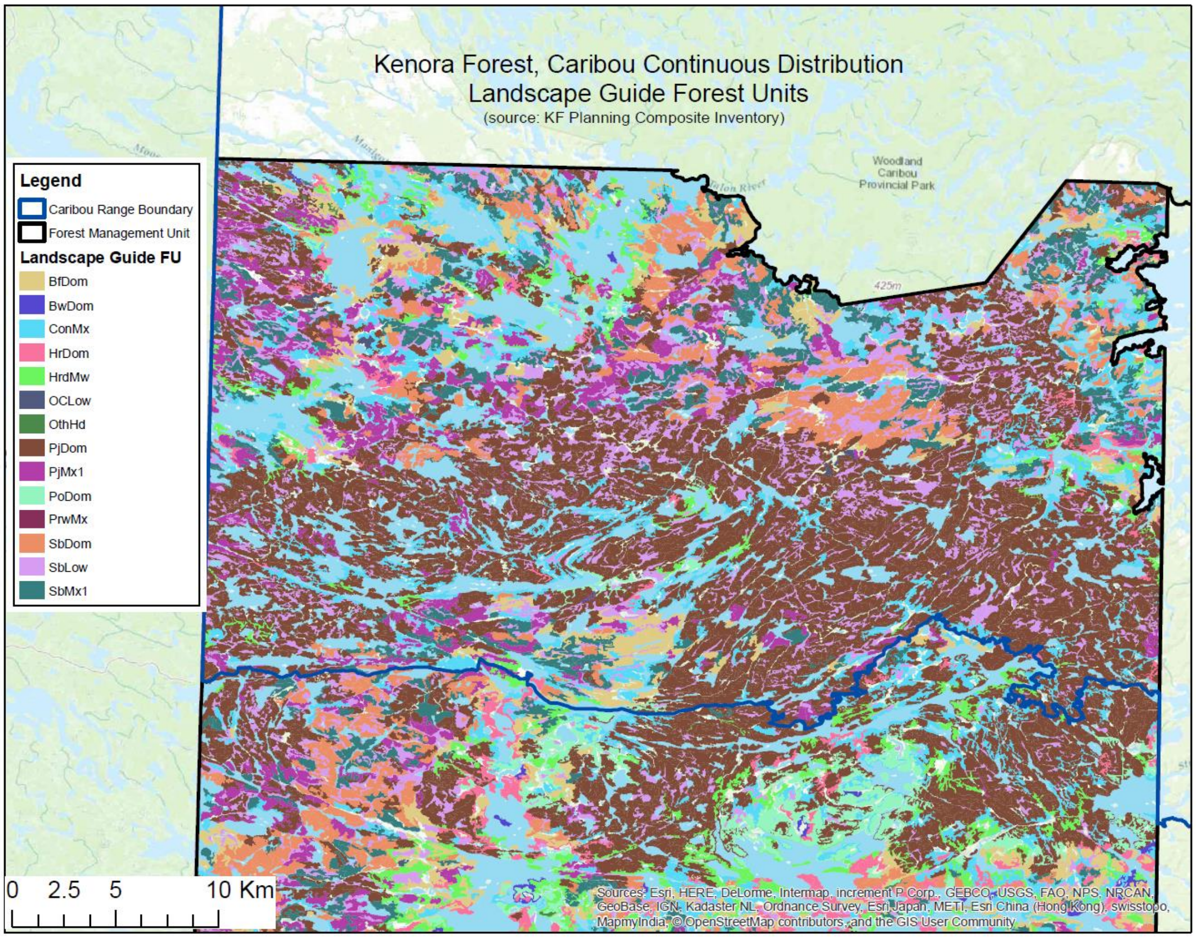

Figure 6 Landscape guide forest units identified for the portion of Kenora Forest overlapping the caribou continuous distribution. Analysis conducted using Ontario's Landscape Tool and based on a 2022 plan start date and ecosite data available in the Planning Composite Inventory

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. Note that values of "preferred" and "useable" from the model in nature may be of similar function. In the review of Figure 7, it is apparent that the area impacted by the KEN71 fire in 2018 is one of the least suitable areas in considering the potential for preferred or useable winter habitat to be present. Alternately, that area directly to the west has good quantities of 'preferred' winter habitat, based on the eco-site model.

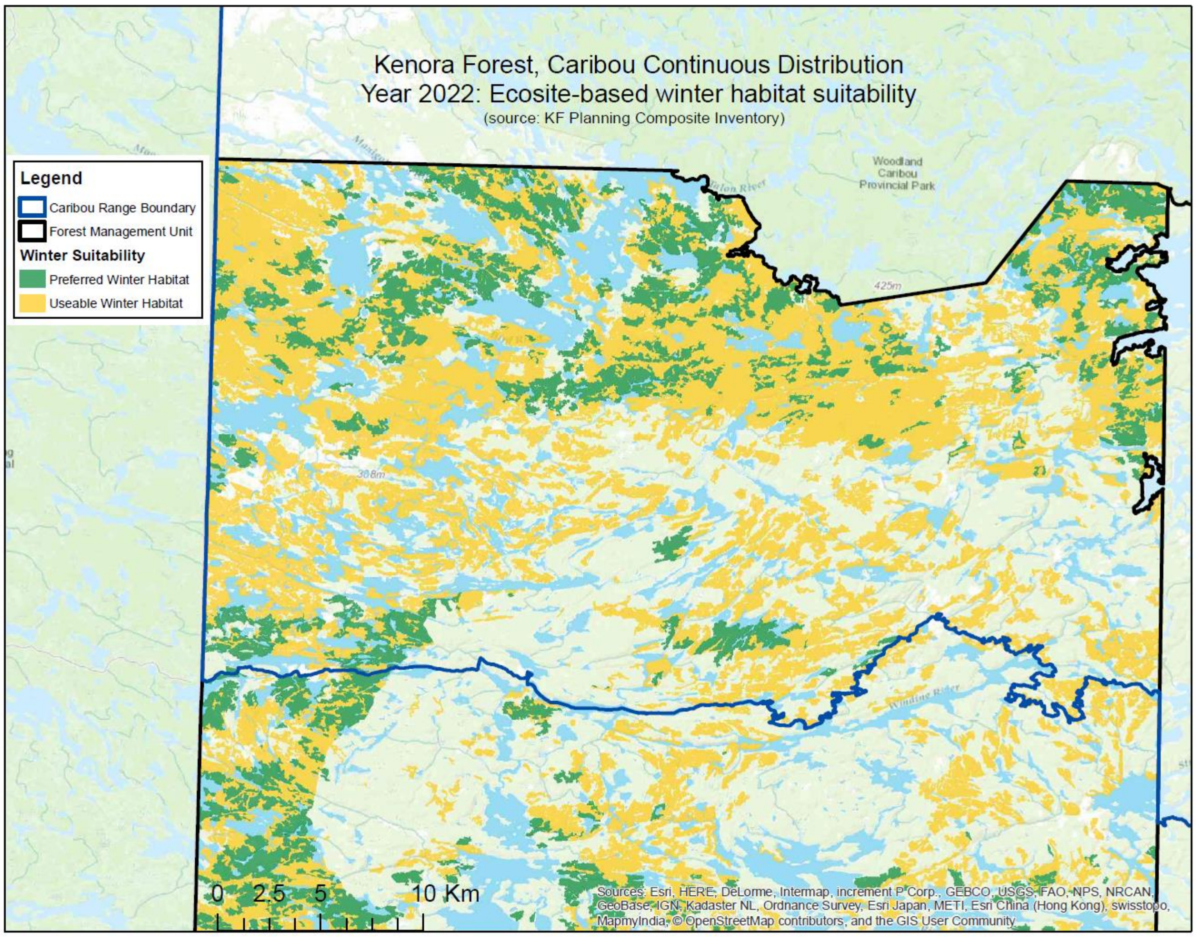

Figure 7 Winter habitat Suitability identified for the portion of Kenora Forest overlapping the caribou continuous distribution. Analysis conducted using Ontario's Landscape Tool and based on a 2022 plan start date and ecosite data available in the Planning Composite Inventory

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 area occurring in this portion of the KF can be identified as either preferred or usable refuge habitat.

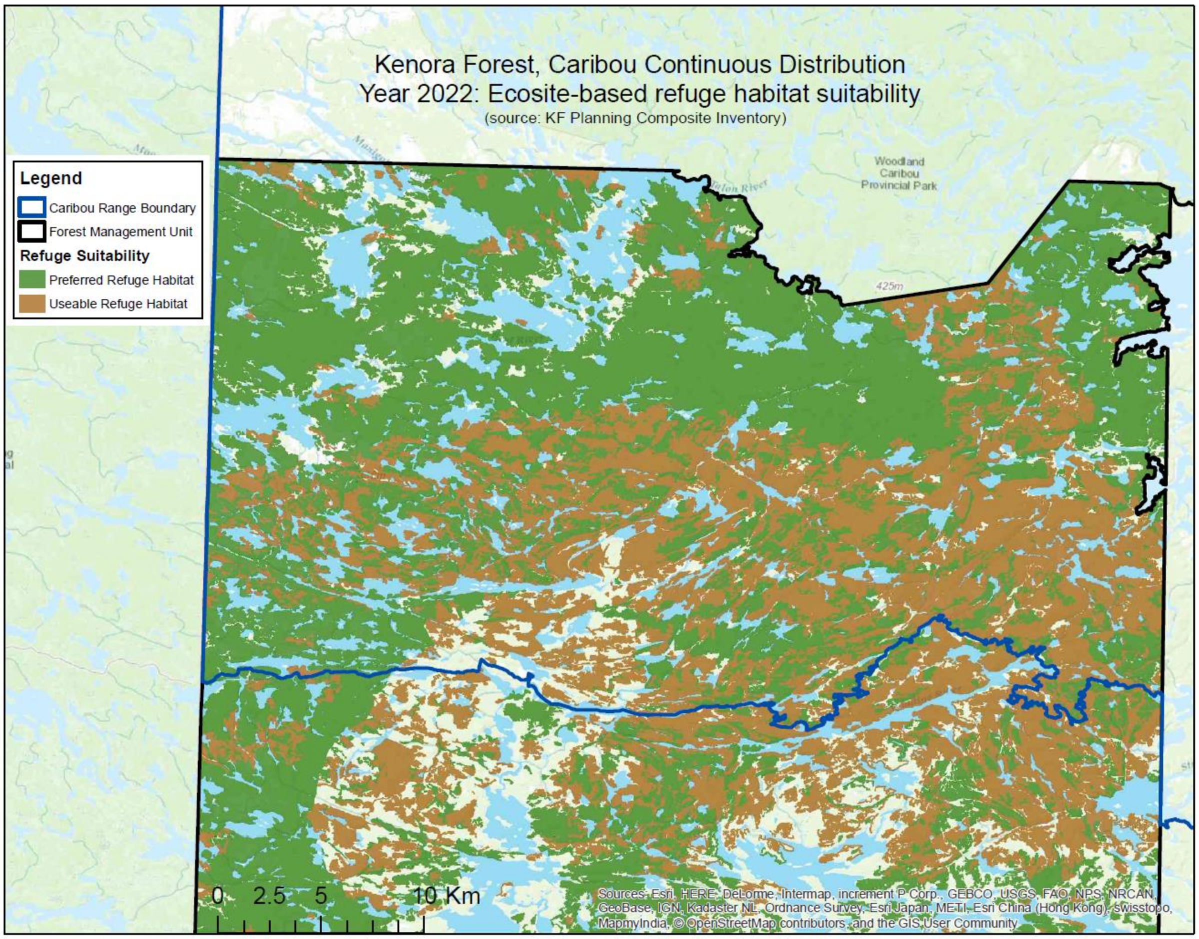

Figure 8 Refuge habitat Suitability identified for the portion of Kenora Forest overlapping the caribou continuous distribution. Analysis conducted using Ontario's Landscape Tool and based on a 2022 plan start date and ecosite data available in the Planning Composite Inventory

<u>Delineated Habitat Tracts for the Plan-Start Condition:</u>

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 layer that drives the understanding of habitat tract patterns. For the portion of the KF north of the Caribou Continuous Range boundary, age class is the dominant influence on habitat amount and arrangement. This is based on the relatively small size of this area and where there is a generally homogenous mixture of jack pine and black spruce. In this portion of the KF, large fires, particularly that which occurred in 1983, resulted in much of this portion of the KF being < 40 years of age at plan start. Winter and refuge habitat generally correspond to the age class pattern lines because these two habitat classes have age class built into the classification.

Evidence of caribou occupancy and use in the KF is limited based on the lack of ongoing forestry operations this far north and which often spur on the need for values collection. 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 habitat tract south of the Caribou Continuous Range boundary is based on evidence of caribou calving/nursery activities. This evidence is based on the placement of radio-collar data and observational information passed on by a Kenora Forest Planning Team member. Based on the identification of caribou/nursery activities and the subsequent review of forest stands, two additional habitat tracts were created south of the range boundary and where it is understood that Werner Lake Road is likely, to some extent, a permeable boundary to caribou movements on the landscape. Two separate tracts were created based on a portion having been impacted by the 2018 fire and which resulted in this area being identified as a separate tract compared to a more westerly tract, also south of the range boundary, which was not impacted by the fire.

Landscape guide forest units in the KF were considered in the creation of habitat tracts. Notably, a small area in the east primarily consisting of hardwood and mixedwood dominant stands was delineated as a separate tract based on its habitat characteristics. Most of the KF area under consideration is jack pine dominant and black spruce dominant stands where there was no clear boundary for demarcating different tracts and where other data sources, namely age class, were the primary consideration. Some 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.

Figures 9 through 13 identify where the caribou habitat tracts are in relation the data class categories considered. Figure 9 demonstrates the location of habitat tracts in relation to forest age class data. Figure 10 shows the location of habitat tracts compared to winter habitat capability, etc.

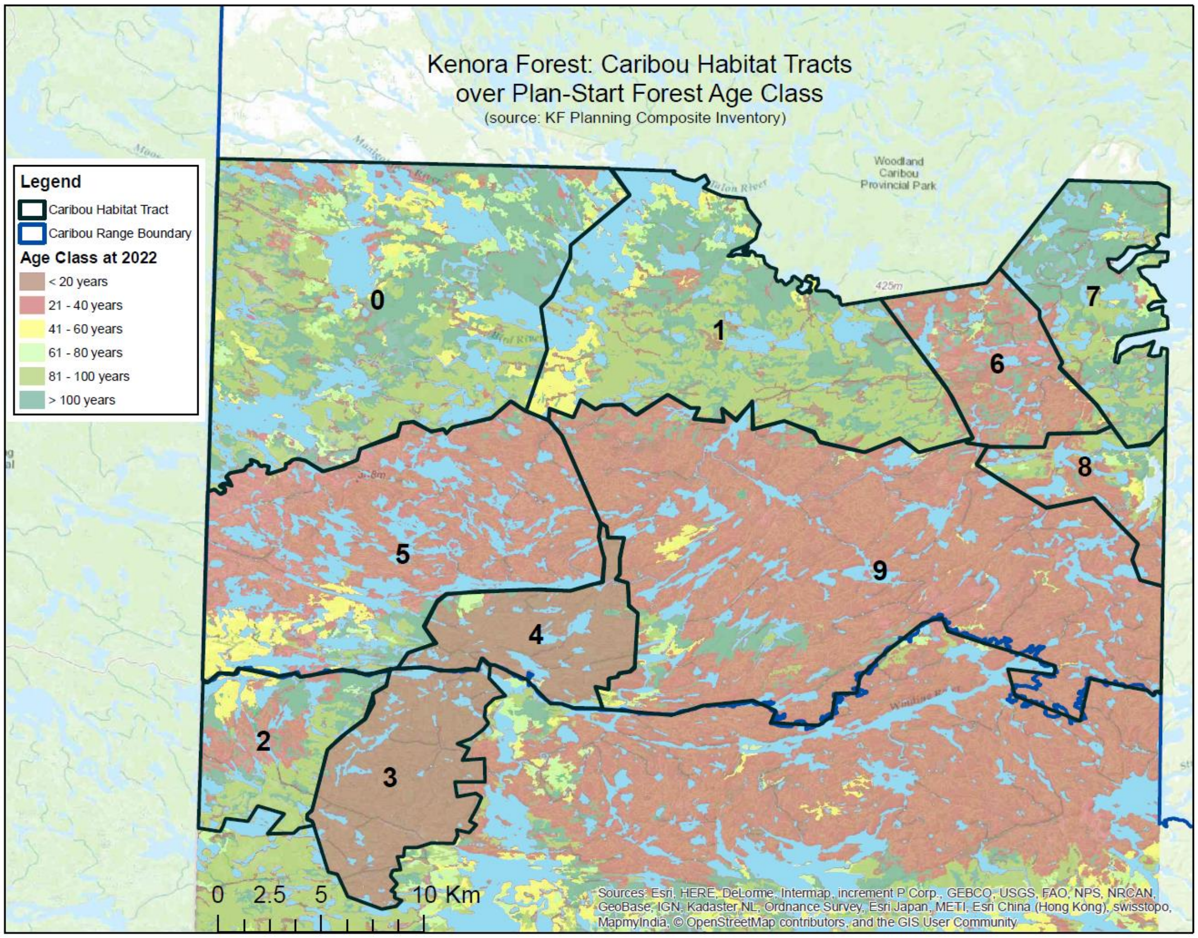

Figure 9 Kenora Forest Caribou Habitat Tracts prepared for 2022 Forest Management Plan and overlaid on plan-start forest age class.

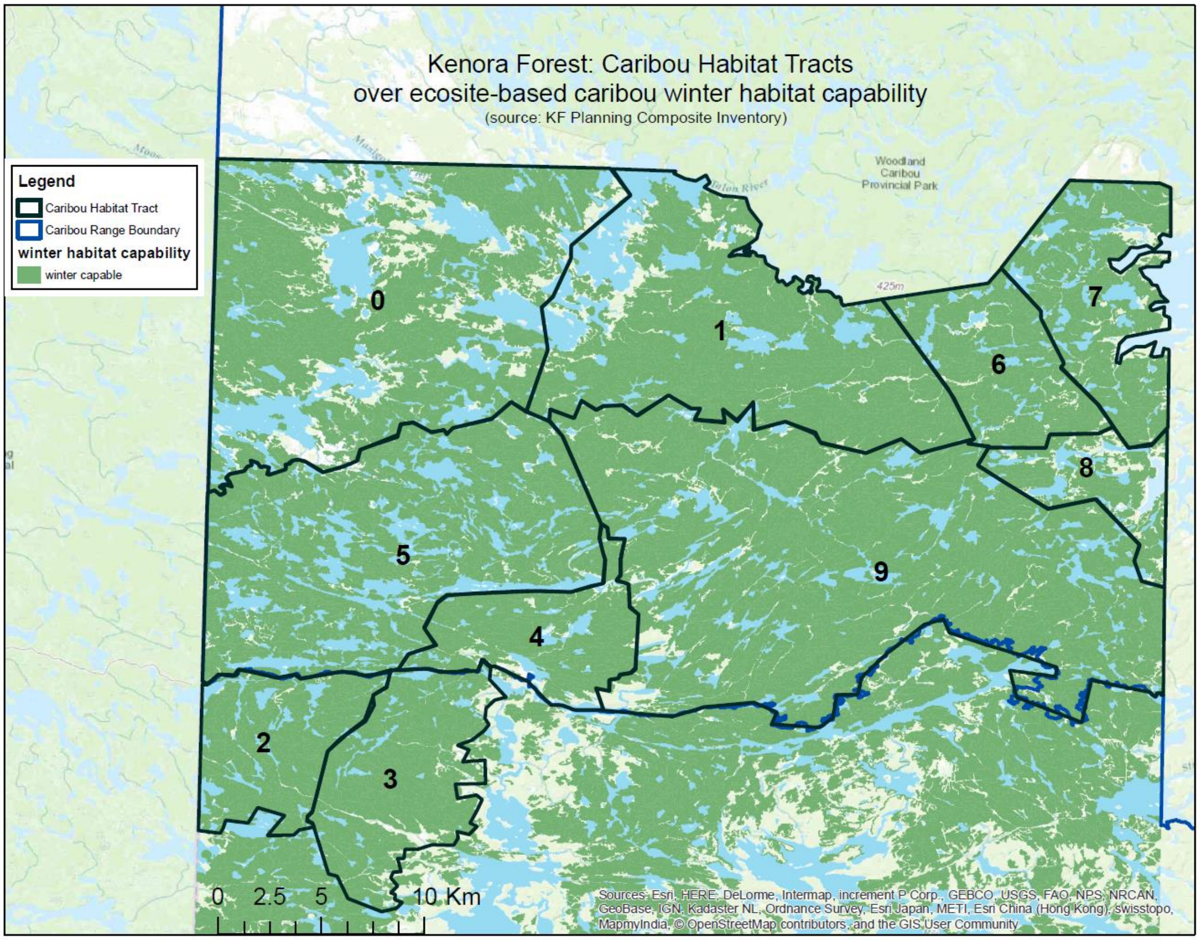

Figure 10 Kenora Forest Caribou Habitat Tracts prepared for 2022 Forest Management Plan and overlaid on ecosite-based caribou winter habitat capability

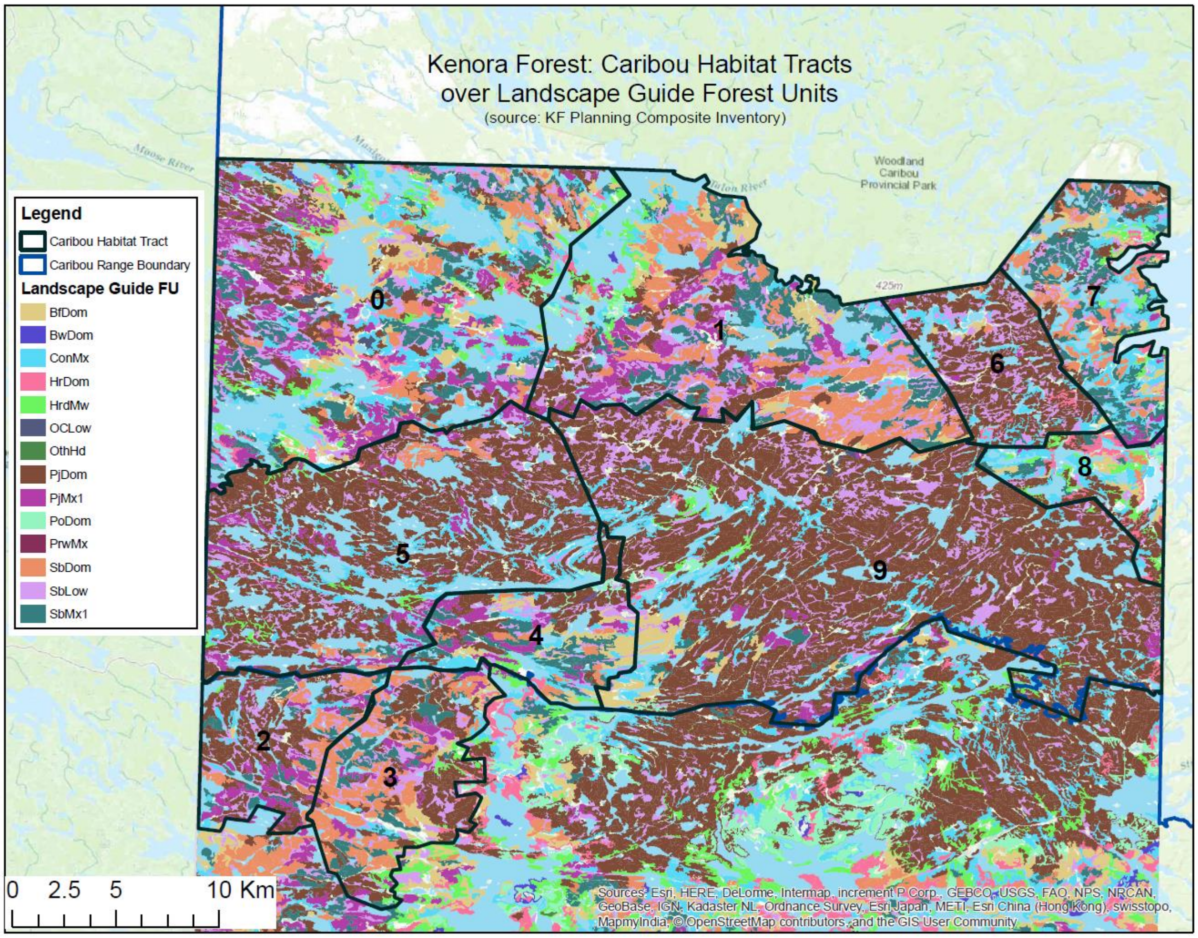

Figure 11 Kenora Forest Caribou Habitat Tracts prepared for 2022 Forest Management Plan and overlaid on Landscape Guide Forest Units

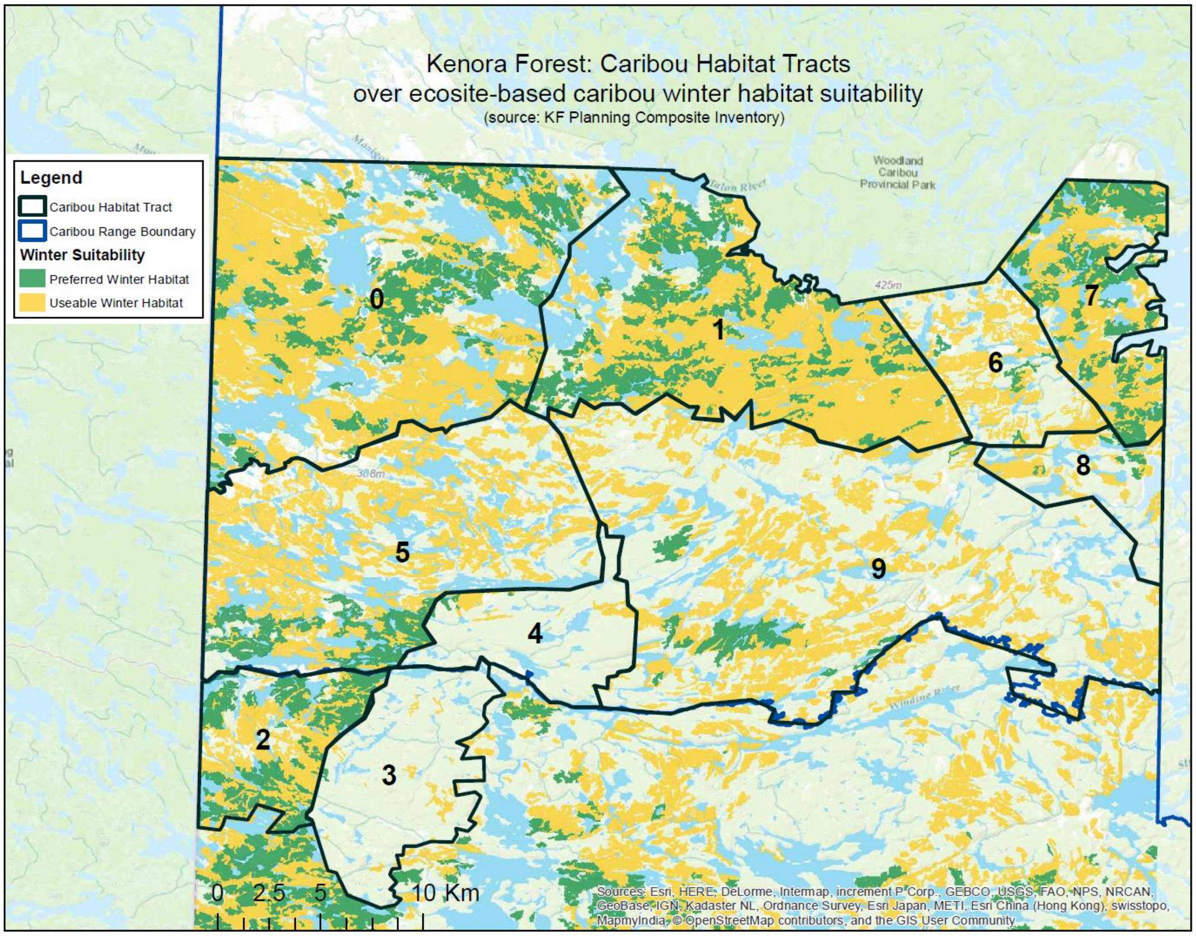

Figure 12 Kenora Forest Caribou Habitat Tracts prepared for 2022 Forest Management Plan and overlaid on ecosite based winter habitat suitability

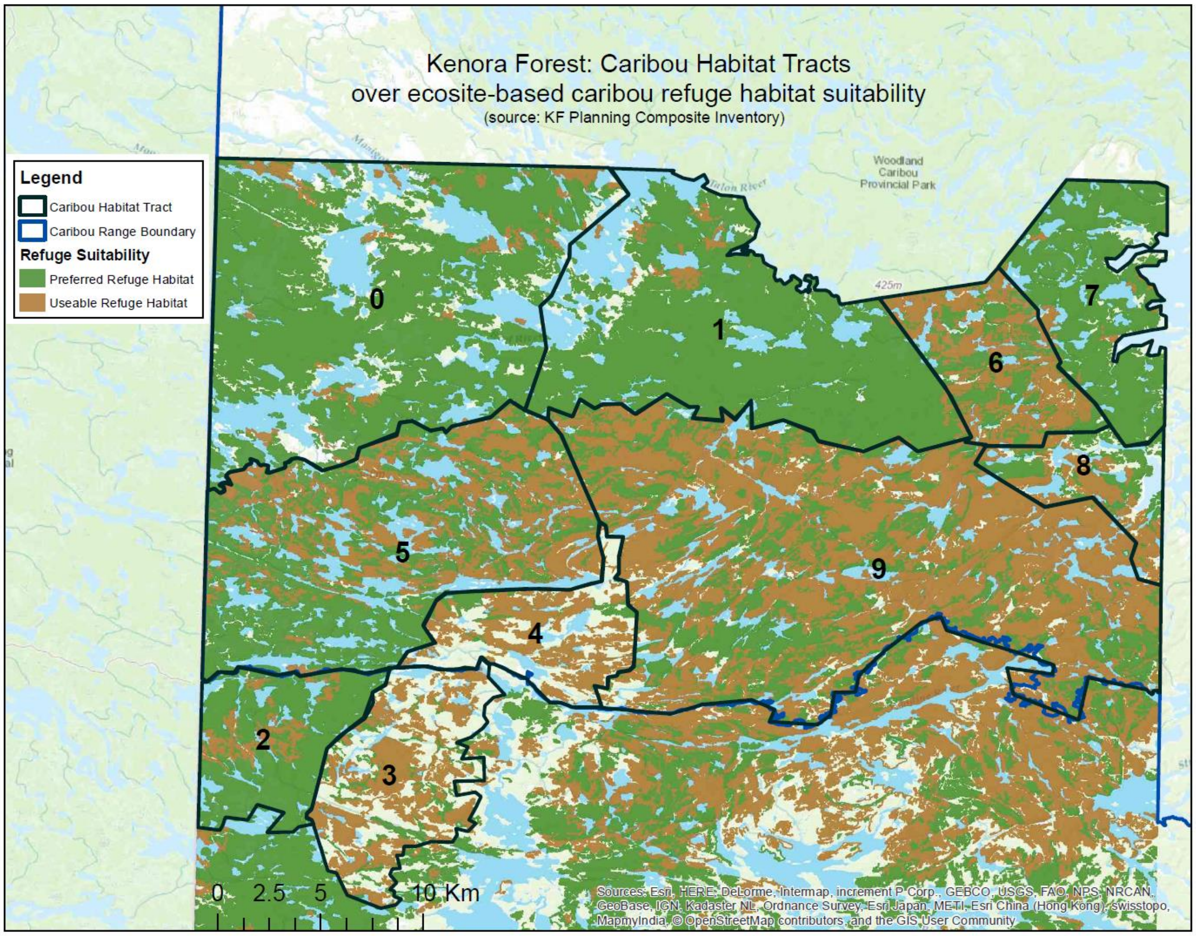

Figure 13 Kenora Forest Caribou Habitat Tracts prepared for 2022 Forest Management Plan and overlaid on ecosite based refuge habitat suitability

Table 2: Habitat Tract attributes for delineated tracts on the Kenora Forest in preparation of the 2022 plan

ID	Age Range	Capability	Winter Use	Winter Habitat	Refuge Habitat	Comments
0	Mixed/Old	yes	unknown	yes	yes	Much of tract occurs within conservation reserve with forest >40 years old
1	Mixed/Old	yes	yes	yes	yes	Much of tract consists of forest stands >40 years old. Good documentation of caribou use
2	Mixed	yes	yes	yes	yes	Much of tract consists of forest stands >40 years old. Some documentation of caribou use, occurs south of caribou line
3	<20	yes	yes	no	no	Tract impacted by 2018 fire, occurs south of caribou line
4	<20	yes	yes	no	no	Tract impacted by 2018 fire, previously did have caribou recorded in area
5	Mixed/Young	yes	unknown	yes	yes	Tract impacted by 1983 fire, some records of caribou use
6	21-40	yes	yes	yes	Yes	Tract impacted by 1988 fire, limited records of use
7	Mixed/Old	yes	yes	yes	yes	Much of tract consists of forest stands >40 years old. Some documentation of caribou use
8	Mixed	no	unknown	no	yes	Tract has hardwood and mixed wood stands present
9	21-40	yes	yes	no	yes	Tract impacted by 1983 fire, limited records of use

Discussion:

The placement of habitat tracts in the KF are based on multiple attributes which, when taken in concert, form a composite of caribou use of the KF. 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 Team members 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 KF, within the caribou zone, is made up of forests <40 years of age (Figure 9). This is due to several large fires which have occurred in this area and left a legacy of younger age habitat. Despite the characterization of forest <40 years of age being 'younger,' these areas (habitat patches) are still primarily made up of jack pine dominant and black spruce lowland patches (as characterized through the evaluation of Landscape Guide Forest Units – Figure 10). Despite its 'younger' age this has resulted in much of the KF (inside the caribou zone) being less suitable for moose and, at minimum, being suitable refuge habitat for caribou.

The transition of forested areas <40 years of age to being suitable winter habitat is a transition that will largely occur in the duration of the 2022-2032 plan. 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. Currently, the concentrations of preferred winter habitat in the KF are in the extreme northern portions of the forest, in those tracts neighbouring Woodland Caribou Provincial Park. This is based on these tracts mainly comprising of stands that are >40 years of age and again, primarily made up of jack pine dominant and black spruce lowland patches. On this basis, most of the portion of the KF, north of the caribou boundary, is capable of sustaining woodland caribou with there only being relatively small geographic areas that will remain more preferable to moose.

The characterization of habitat tracts in this document was reflective of known caribou occurrences and habitat use south of the caribou continuous distribution boundary. These noted occurrences were based on radiocollar data as well an observational information passed on by those involved in the KF planning team. It is expected with the continued association of caribou habitat use characteristics in this portion of the KF that available habitat tracts will continue to be refined and reflected in the 10-year Forest Management Plan planning cycle.

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 Landscape Guide, or BLG (*Forest Management Guide for Boreal Landscapes.* OMNR 2014). The 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).

The 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 Landscape 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 the 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.

While the placement of habitat tracts in this document was solely based on habitat characteristics and known caribou use in the Kenora Forest, the sustainability of caribou populations can mostly be directed back to range-level assessments. For these purposes, the caribou range which overlaps the Kenora Forest is known as the Sydney Range. The evaluation of quantities of winter and refuge habitat over time is also a function carried out by OLT and can be found in Appendix 2.

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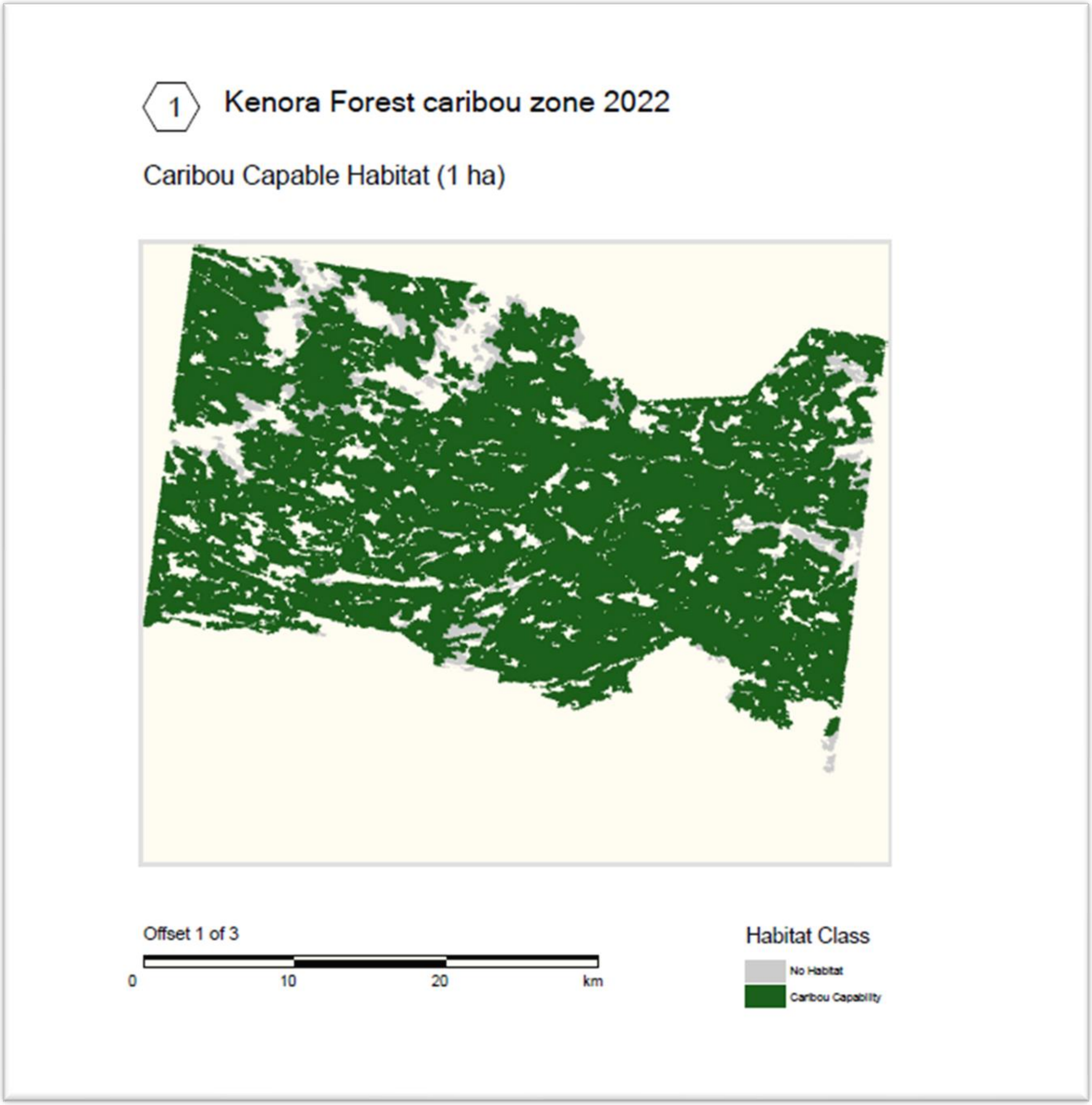
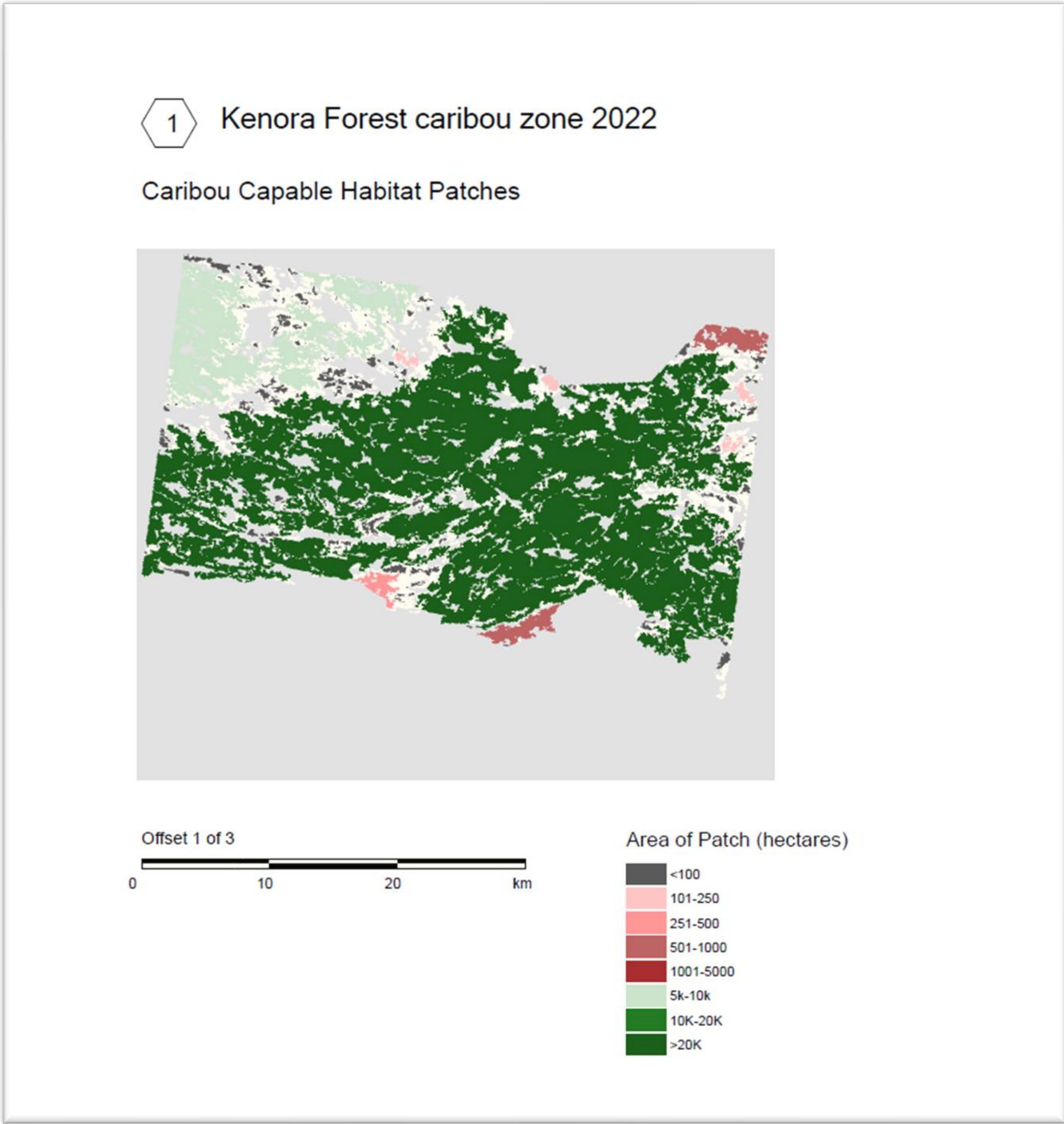
Appendix 1

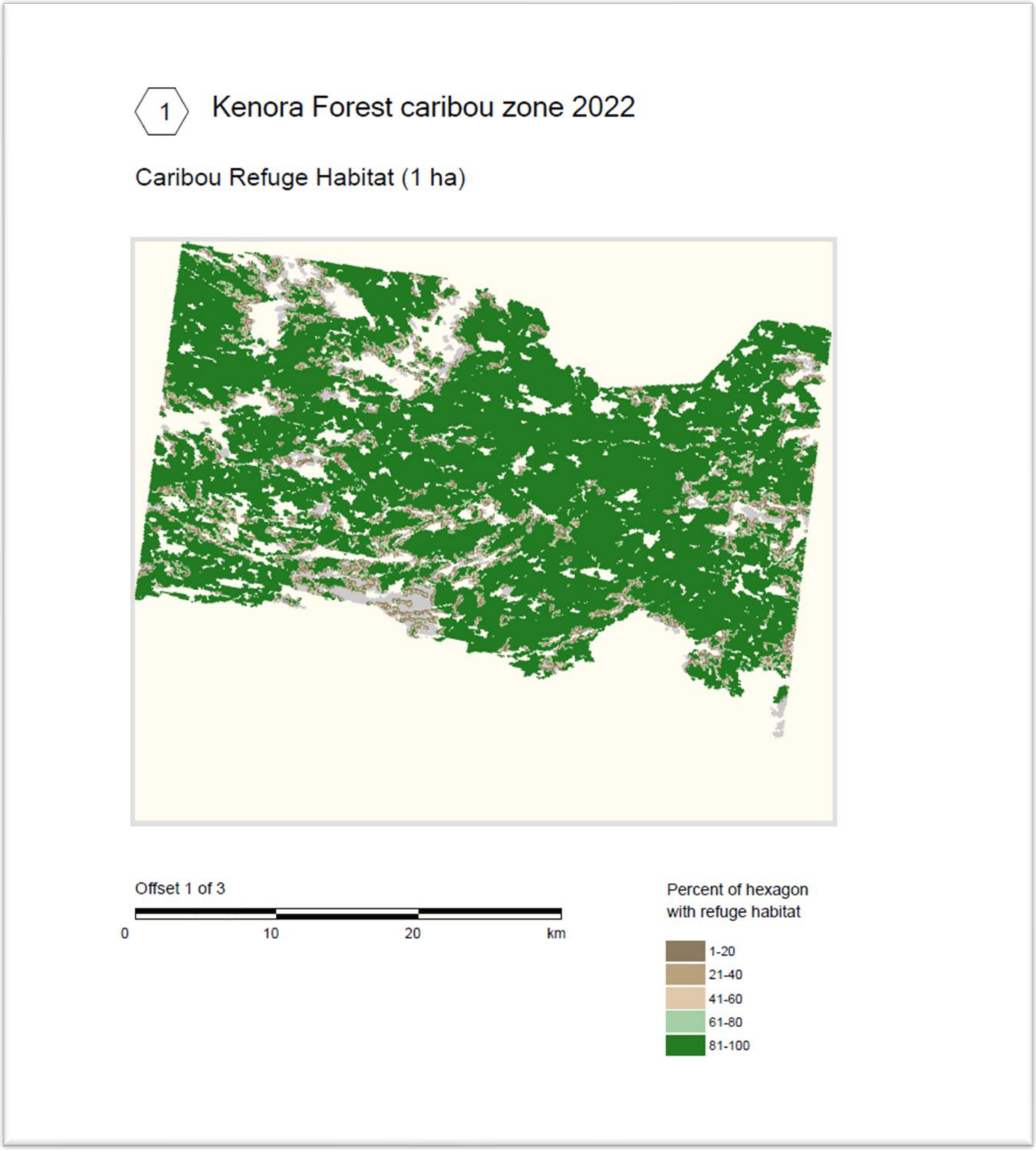
Appendix Map 1 Caribou capable habitat in the portion of the Kenora Forest overlapping the Caribou Continuous Distribution



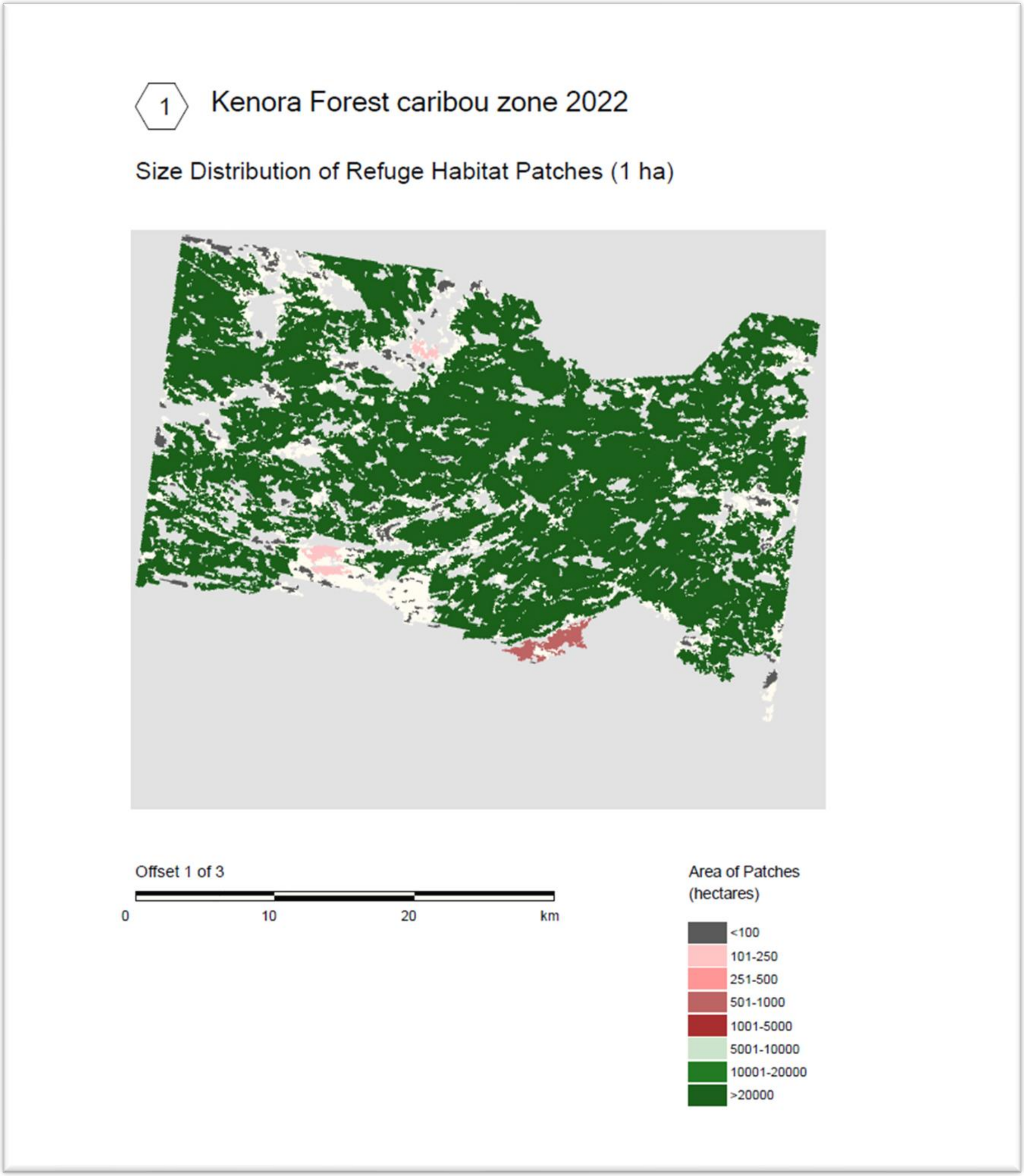
Appendix Map 2 Caribou capable habitat patches in the portion of the Kenora Forest overlapping the Caribou Continuous Distribution



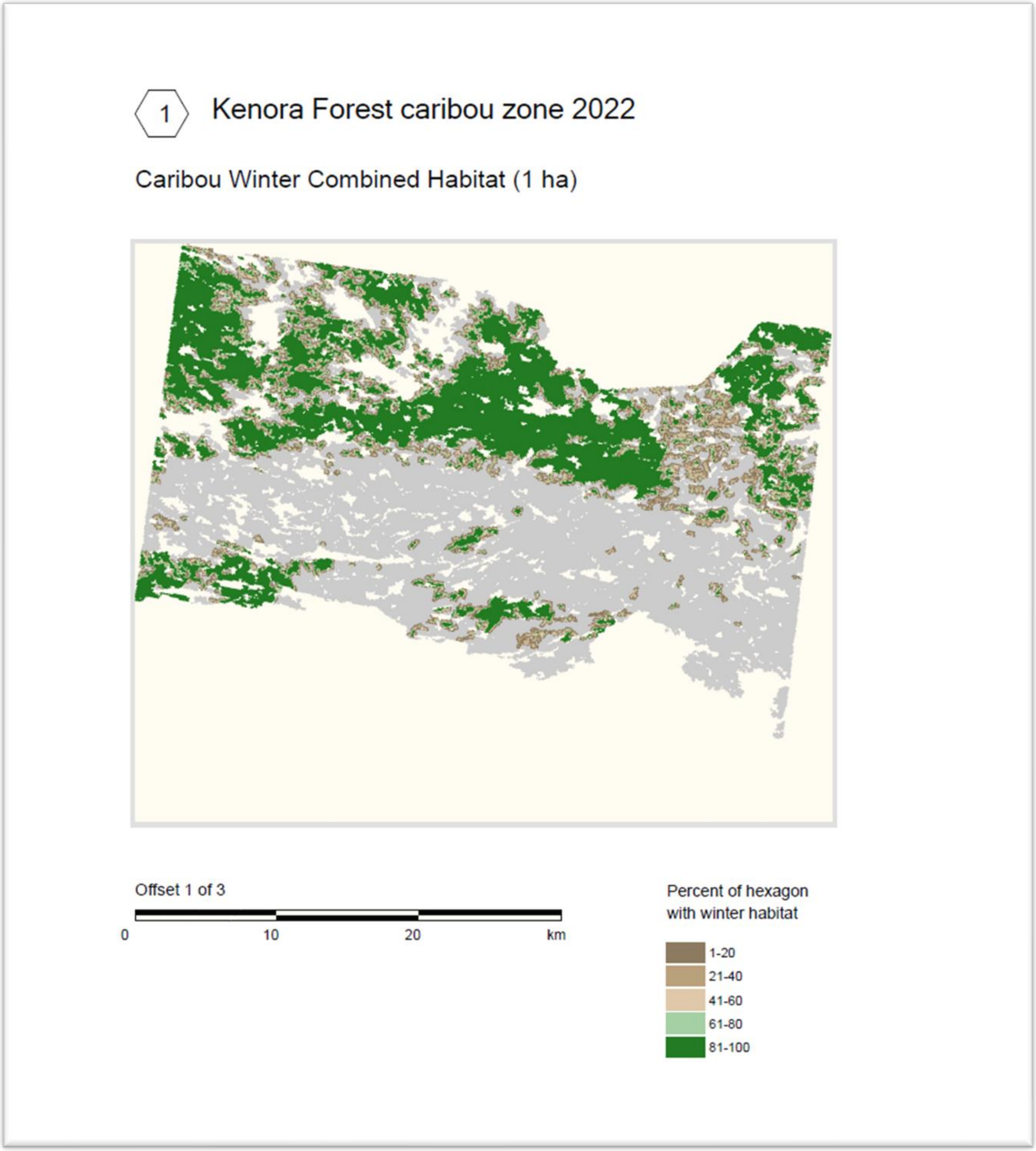
Appendix Map 3 Caribou refuge habitat in the portion of the Kenora Forest overlapping the Caribou Continuous Distribution



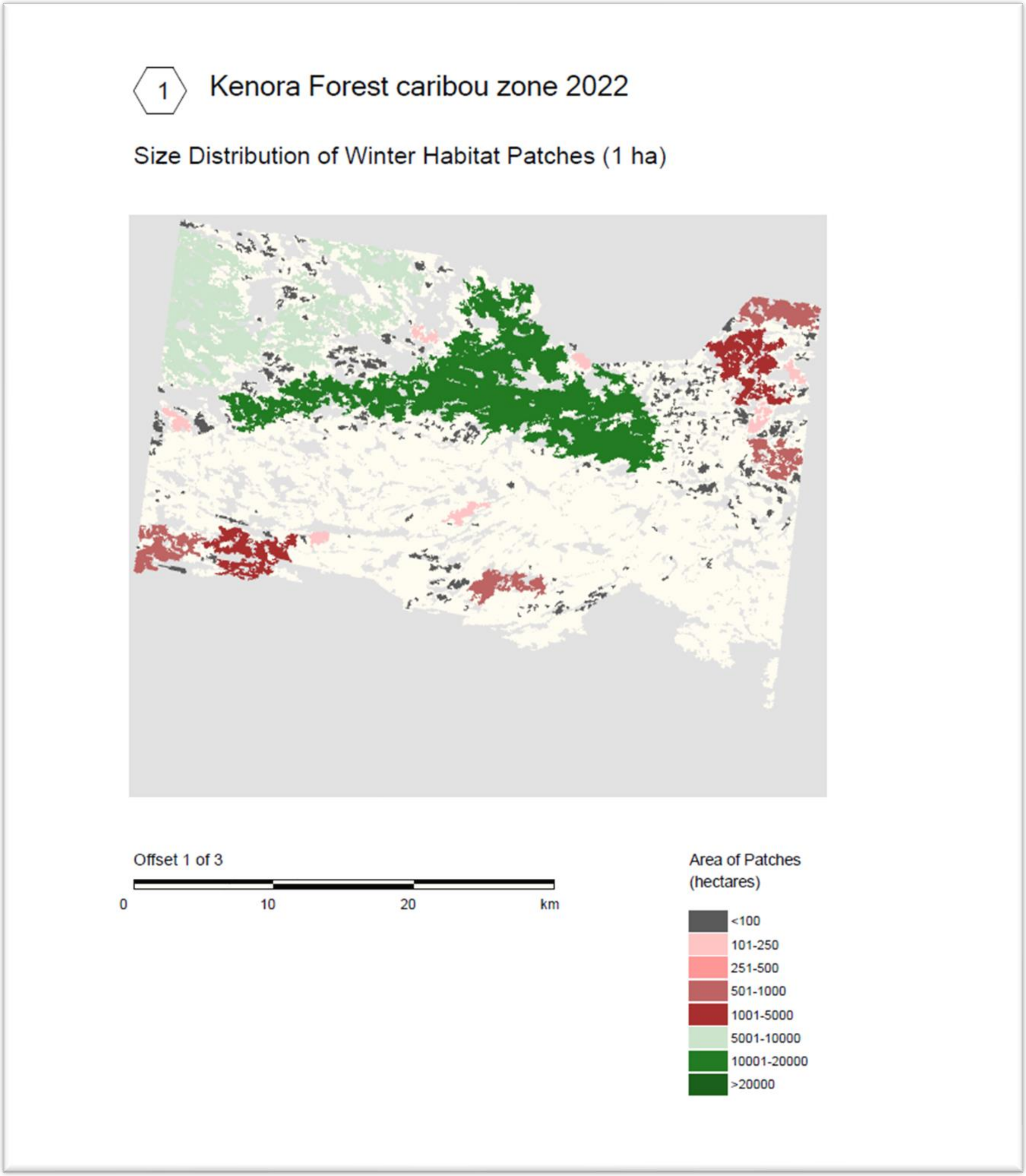
Appendix Map 4 Caribou refuge habitat patches in the portion of the Kenora Forest overlapping the Caribou Continuous Distribution



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

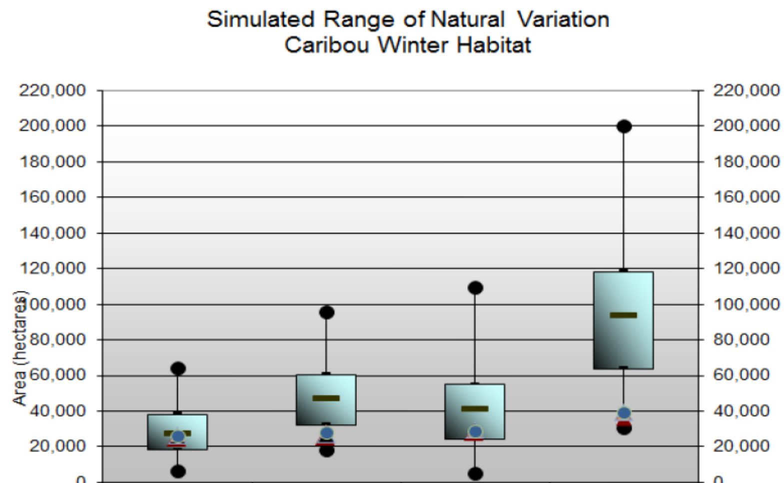


Appendix Map 6 Caribou winter combined habitat patches in the portion of the Kenora Forest overlapping the Caribou Continuous Distribution

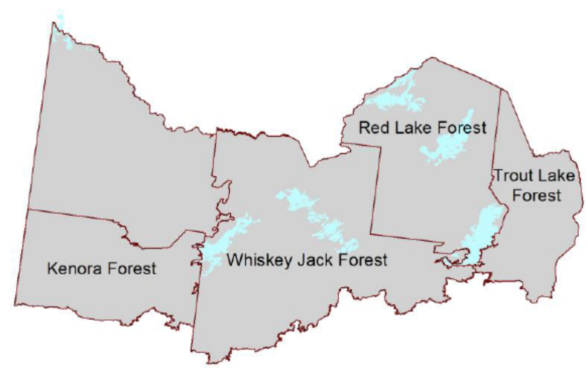


State of Caribou Range - Information Sheet

Range 2: Sydney 2011 – 2015, Winter Habitat SRNV by FMU



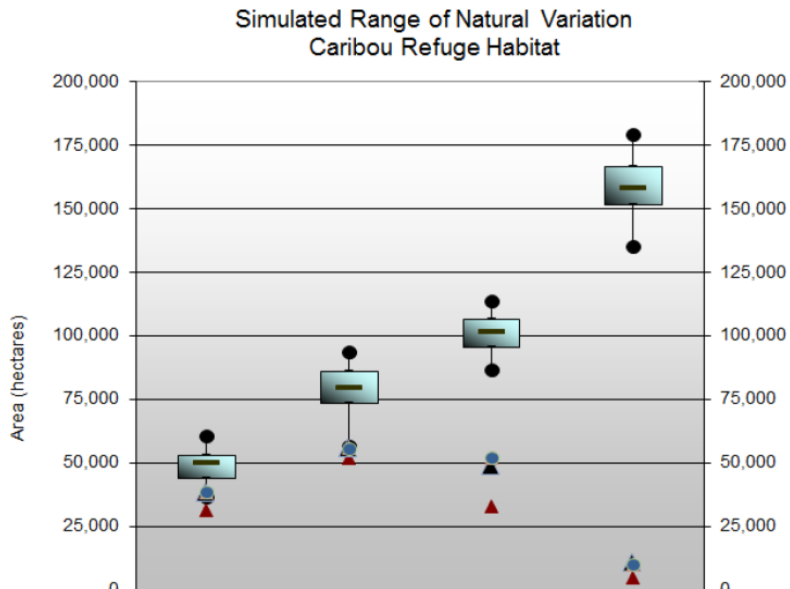
	Trout Lake Forest Caribou Range 2	Red Lake Forest Caribou Range 2	Kenora Forest Range 2	Whiskey Jack Forest Range 2
Lower quartile	18,224	32,611	24,350	64,097
Lower Range	6,576	18,275	5,271	30,849
Median	27,424	47,082	41,349	93,873
Upper Range	64,597	95,813	109,406	200,439
Upper Quartile	38,341	60,838	55,242	118,698
2011	24757	25489	28042	35472
2012	26466	26798	29172	39342
2013	26470	29118	29033	38941
2015	26489	27977	29033	39189



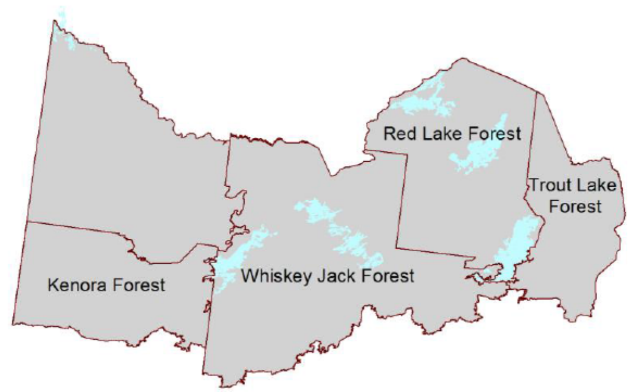
Statistics are approximate and may contain estimates from forest management planning annual work schedules.

State of Caribou Range - Information Sheet

Range 2: Sydney 2011 – 2015, Refuge Habitat SRNV by FMU



	Trout Lake Forest Caribou Range 2	Red Lake Forest Caribou Range 2	Kenora Forest Range 2	Whiskey Jack Forest Range 2
Lower quartile	43,715	73,266	95,540	151,474
Lower Range	36,401	56,425	86,210	134,796
Median	49,749	79,493	101,326	157,895
Upper Range	60,498	93,477	113,467	179,136
Upper Quartile	53,034	86,012	106,578	166,326
2011	31141	52072	32889	4589
2012	37808	55216	48385	10042
2013	38209	56046	52033	9975
2015	38133	55249	52032	10026

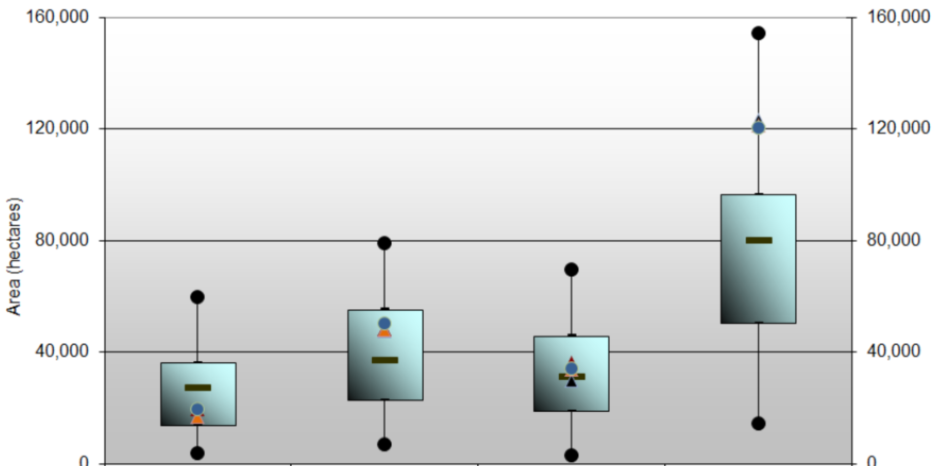


Statistics are approximate and may contain estimates from forest management planning annual work schedules.

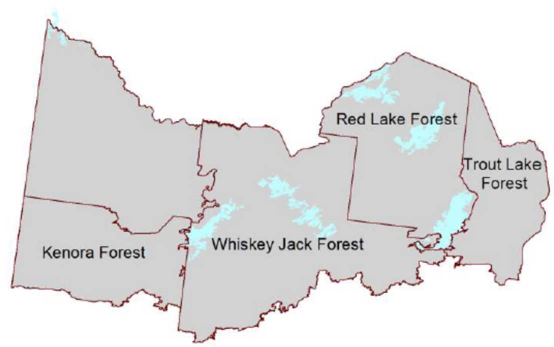
State of Caribou Range - Information Sheet

Range 2: Sydney 2011 – 2015, Young Forest and Permanent Disturbance SRNV by FMU

Simulated Range of Natural Variation
Young Forest and Permanent Disturbance



	Trout Lake Forest Caribou Range 2	Red Lake Forest Caribou Range 2	Kenora Forest Range 2	Whiskey Jack Forest Range 2
– Lower quartile	14,066	22,799	18,887	50,388
● Lower Range	3,708	6,843	3,104	14,700
– Median	27,422	37,163	31,536	80,304
● Upper Range	59,939	79,127	69,575	154,470
– Upper Quartile	36,271	55,359	46,000	96,503
▲ 2011	19,707	48,507	36,038	122,464
▲ 2012	16,876	47,675	29,880	123,179
▲ 2013	16,827	48,100	33,787	121,103
● 2015	19,639	50,385	34,320	120,451



Statistics are approximate and may contain estimates from forest management planning annual work schedules.

Development of the Dynamic Caribou Habitat Schedule for the 2022 Kenora Forest FMP

May 25, 2020

Development of the Dynamic Caribou Habitat Schedule for the 2022 Kenora Forest FMP

Harvest areas for the 2022 Kenora Forest FMP were developed in accordance with the Dynamic Caribou Habitat Schedule (DCHS). With the harvest of large forested areas in the caribou zone, the intention is to maintain a supply of woodland caribou habitat into the future while emulating natural disturbance patterns e.g. large-scale forest fires. As such, the extent of the caribou zone occurring inside the Kenora Forest was broken into blocks which represent where harvest can occur not just within the ten-year scope of the 2022-2032 Kenora Forest FMP, but in perpetuity given the success of harvesting the entirety of an assigned block within a twenty-year horizon and the lack of large-scale natural disturbances e.g. forest fires that may serve to deplete available habitat/wood supply. Future plans will provide an opportunity to update DCHS blocks where required.

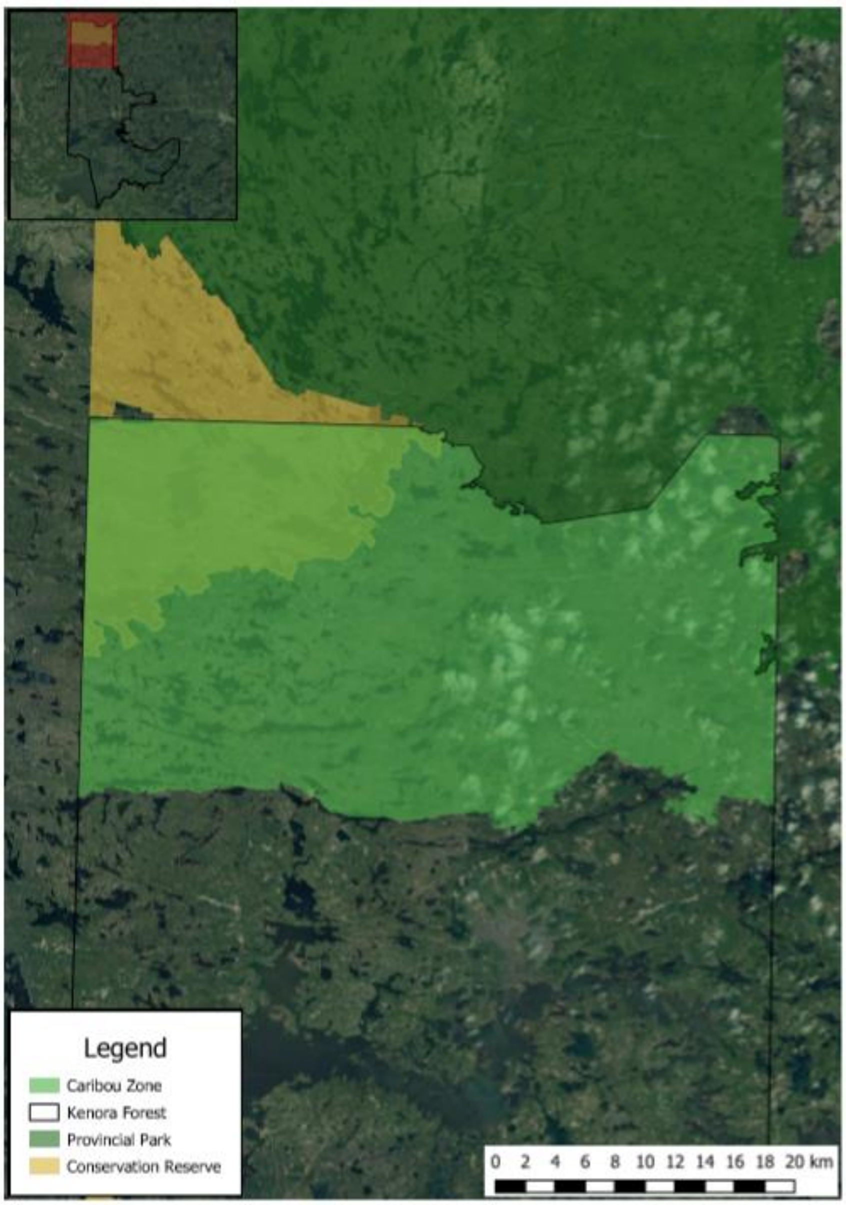


Figure 1 Location of caribou zone within the Kenora Forest

Dynamic Caribou Habitat Schedule blocks were based on delineated caribou habitat tracts in the Kenora Forest. Documentation of the steps taken in the development of habitat tracts are detailed in 'Plan-start Caribou Habitat Tract Analysis using the Ecosite-based Habitat Model and Caribou Occurrence Information' report. Those habitat tracts developed for the 2022 Kenora Forest FMP are available in Figure 2. Only those habitat tracts occurring within the caribou zone were considered in DCHS block development.

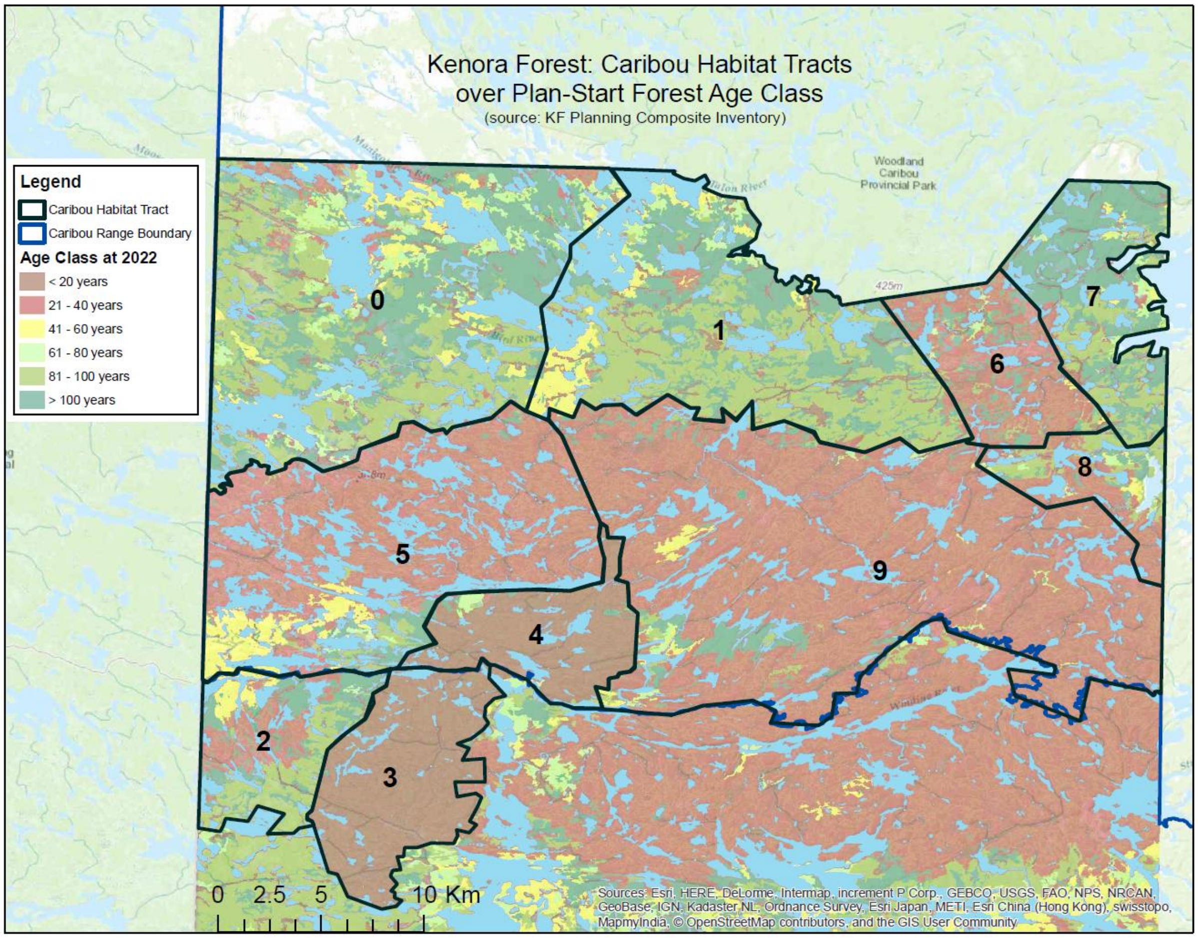


Figure 2 Delineated caribou habitat tracts in the Kenora Forest 2022 FMP

Following the delineation of caribou habitat tracts, these areas were 'operationalized' with their borders refined to create DCHS blocks. Key considerations in DCHS block refinement included the spatial location of mature stands currently available for harvest and when stands in other tracts would mature and become merchantable. In addition, no harvest is permitted in the Eagle-Snowshoe Conservation Reserve and road corridor placement is limited by geographic features including major waterways and lowlands. This limits opportunities for road development and how mature forest areas can be accessed.

Delineated blocks were assigned into classes based on when they are to become available for harvest in order to maintain a sufficient supply of caribou habitat in the caribou zone. Those classes assigned include A, B, C, D and E blocks with each of these to be harvested over two ten-year terms. Those blocks identified as B blocks are to be harvested in the 2022-2032 and the 2032-2042 plans (Table 1).

Table 1. Caribou habitat online in the Kenora Forest caribou zone at 2022 plan start and predicted online habitat to 2142 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

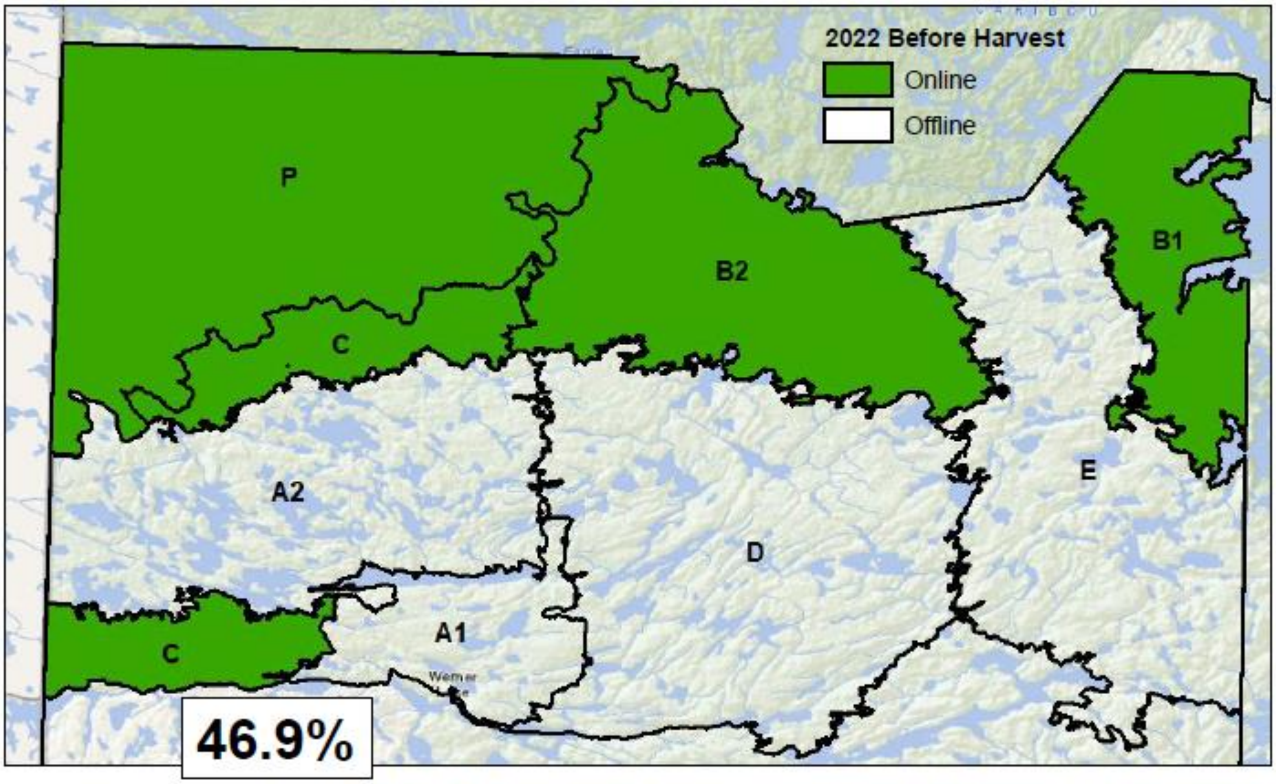
DCHS Block	Area (ha)	Area (%)	Harvest Year	Habitat Online pre-2022	Habitat online 2022-2032	Habitat online 2032-2042	Habitat online 2042-2062	Habitat online 2062-2082	Habitat online 2082-2102	Habitat online 2102-2122	Habitat online 2122-2142
A1	4864	4.6	2102-2122	N	N	N	N	Y	Y	N	N
A2	14799	13.9	2102-2122	N	N	Y	Y	Y	Y	N	N
B1	7197	6.8	2022-2032 2122-2142	Y	N	N	N	N	Y	Y	N
B2	13158	12.4	2032-2042 2122-2142	Y	N	N	N	N	Y	Y	N
C	7010	6.6	2042-2062	Y	Y	Y	N	N	N	Y	Y
D	20426	19.2	2062-2082	N	N	Y	Y	N	N	N	Y
E	16436	15.4	2082-2102	N	N	Y	Y	Y	N	N	N
P	22553	21.2	NA	Y	Y	Y	Y	Y	Y	Y	Y
TOTAL	106443	100	-	-	-	-	-	-	-	-	-
Online Block Area (ha)				49918	29563	81224	74214	58652	62571	49918	49989
Online Block Area (%)				46.9	27.8	76.3	69.7	55.1	58.8	46.9	47.0

The calculation of Online Block Area is used in assessing indicator 1e in FMP-10, “Amount and arrangement of capable on-line DCHS blocks in suitable habitat condition.” Indicator 1e 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 Kenora Forest FMPs) and 40% of the forest maturing to a condition suitable as caribou habitat. To this extent, the five DCHS terms (where A, B, C, D or E blocks are 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. Currently, the conservation reserve in the Kenora Forest caribou zone (‘P’ in Table 1) serves to provide roughly half (21.1%) of the 40% minimum woodland caribou habitat that is to be maintained in perpetuity.

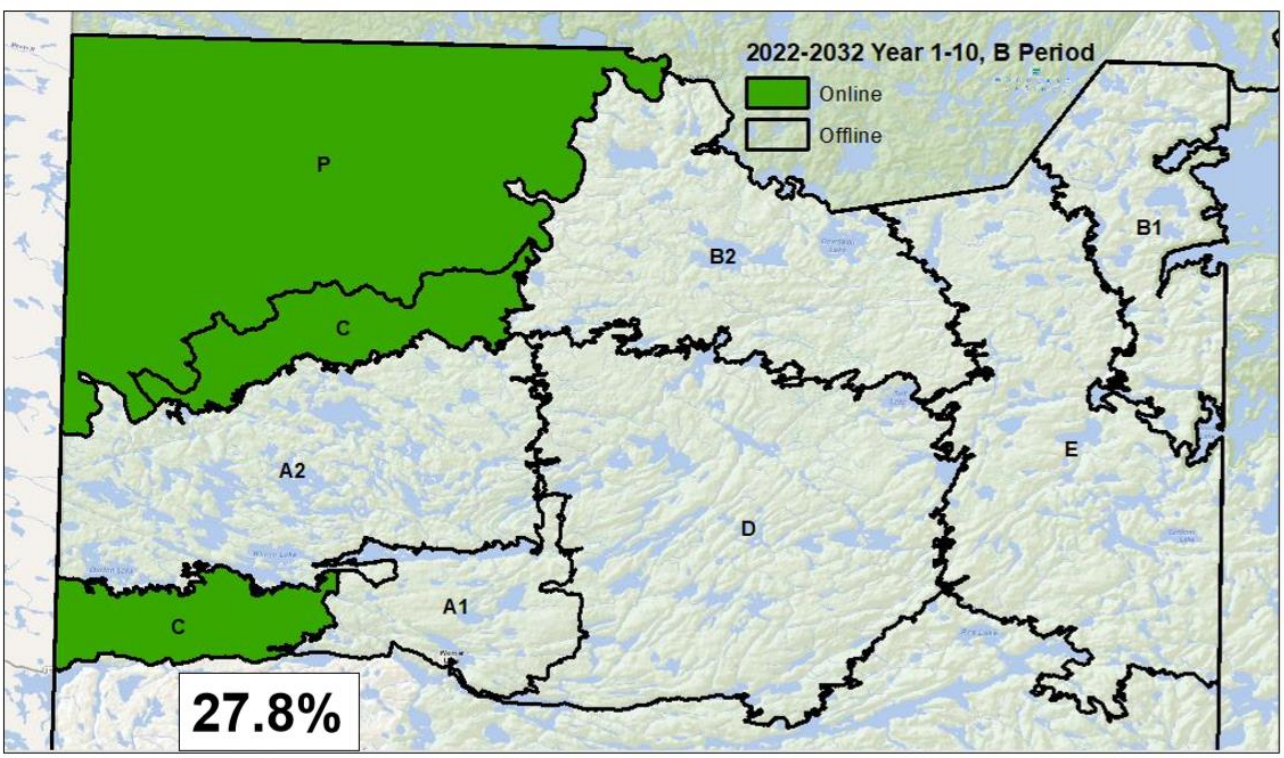
Based on measured Online Block Area (%) in Table 1, the portion of habitat online from 2022-2032 is 27.8%. This represents a drop from 46.9% before plan start and is under the 40% desirable level. It is recognized however that a large portion of the caribou zone which is currently considered ‘offline’ will mature shortly after the 2022 plan start date (2023) with 76.3% of the caribou zone being online for the 2032 plan start date. In addition, the transition from 46.9% to 27.8% habitat online from pre-plan start to plan start will not occur instantaneously, but rather be based on harvest that occurs over a twenty-year cycle (two ten-year harvest plans) leaving some of the area of B blocks available for caribou use in the interim.

The following figures show the shifting mosaic of caribou habitat suitability in the Kenora Forest from pre-plan start to 2142 based on the alternate harvesting of identified A, B, C, D and E blocks at twenty-year intervals.

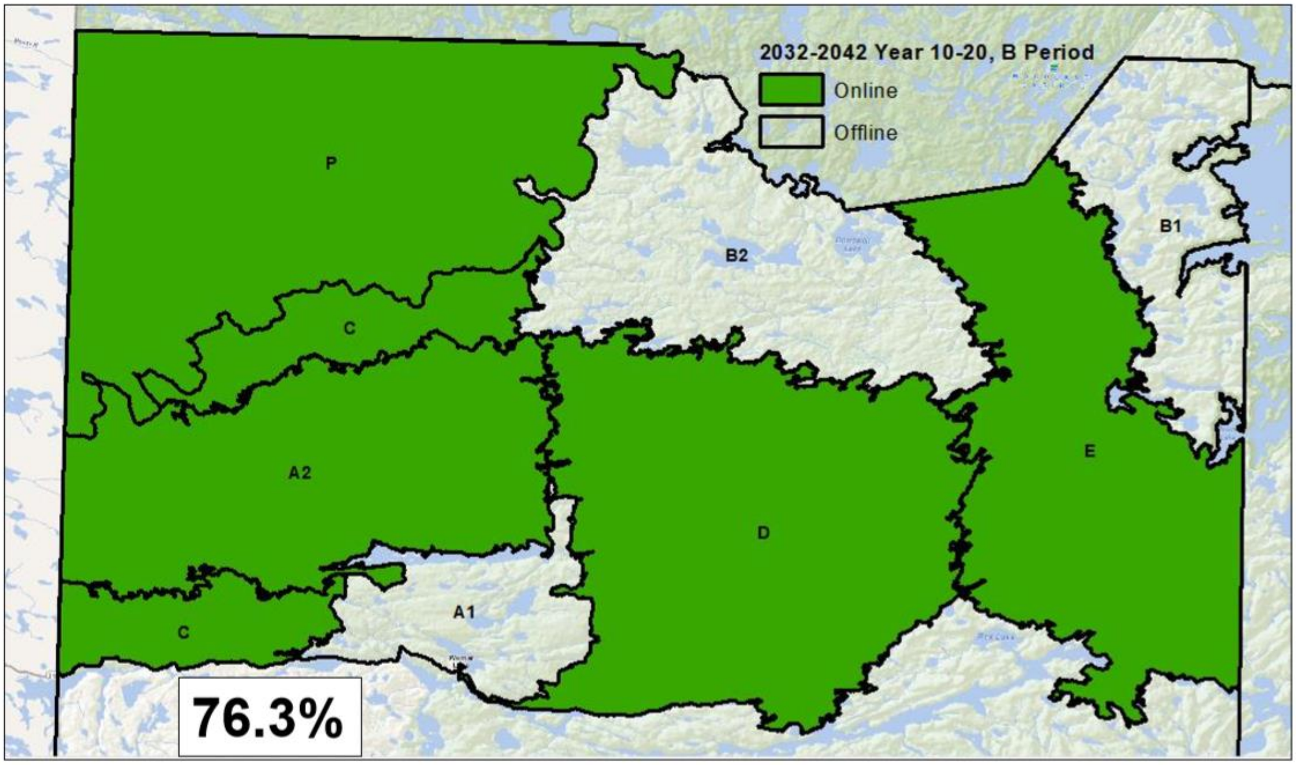
2022 Kenora Forest plan start condition before harvest commences in the caribou zone



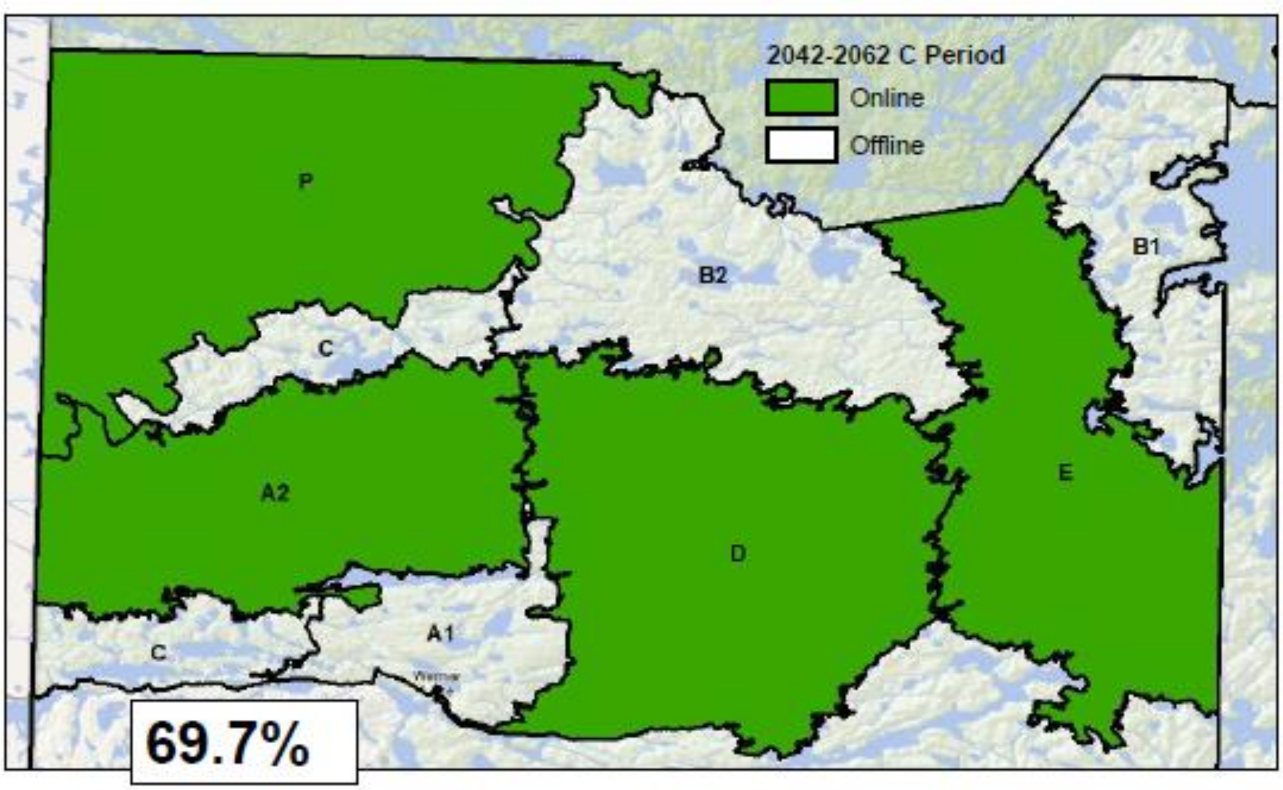
Boreal woodland caribou habitat online during year 1-10 of B period (2022-2032)



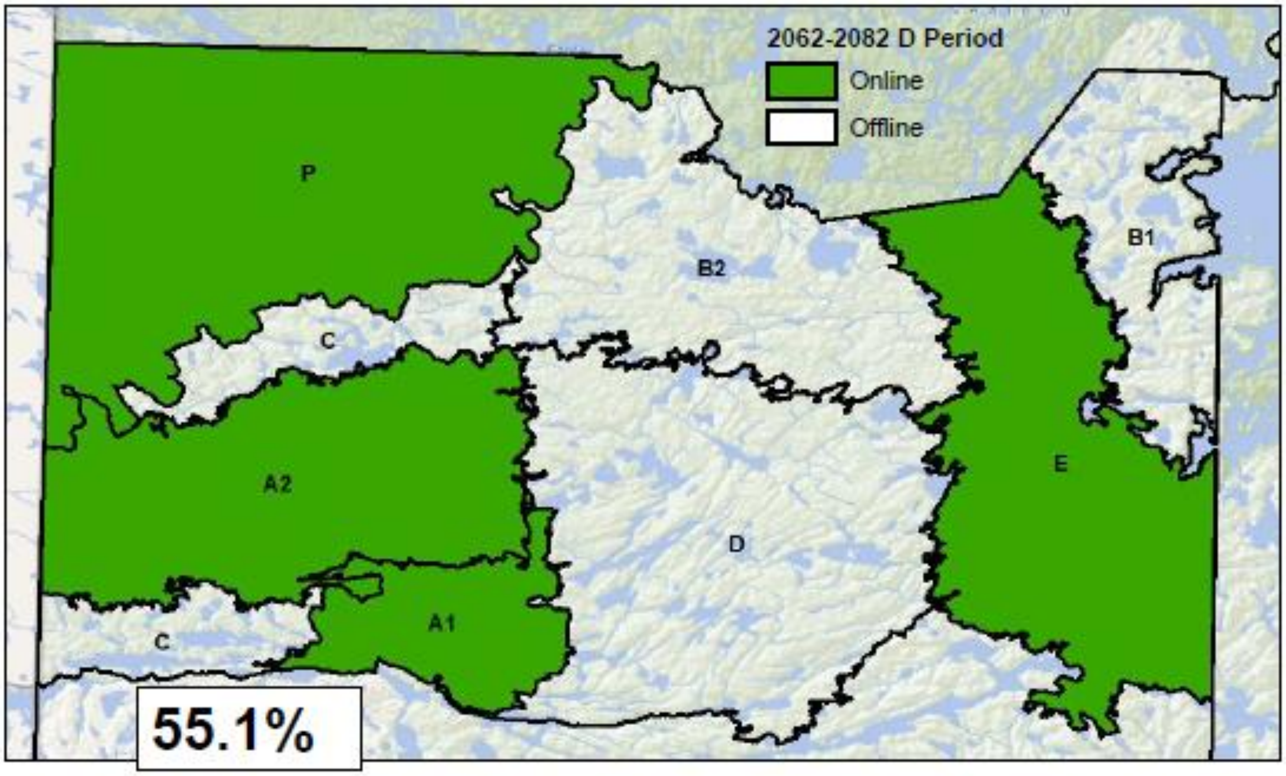
Boreal woodland caribou habitat online during year 11-20 of B period (2032-2042)



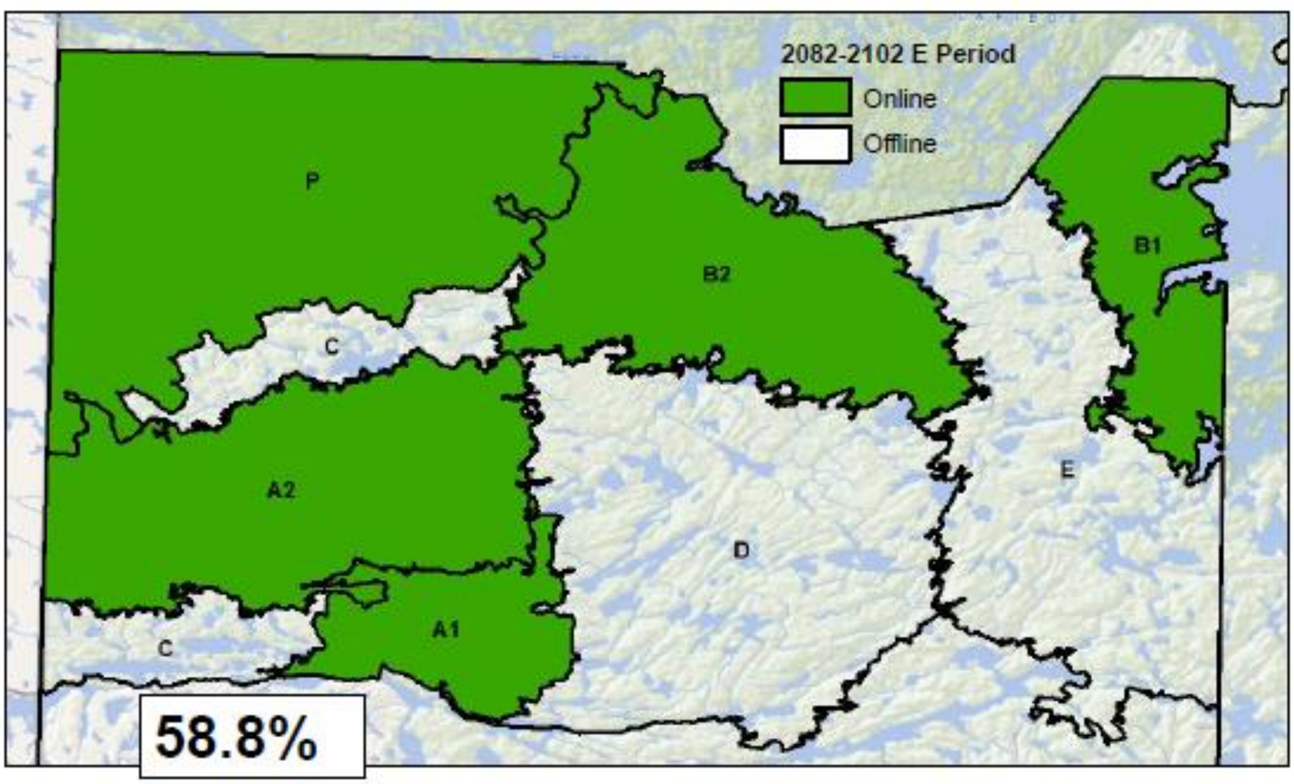
Boreal woodland caribou habitat online during C period (2042-2062)



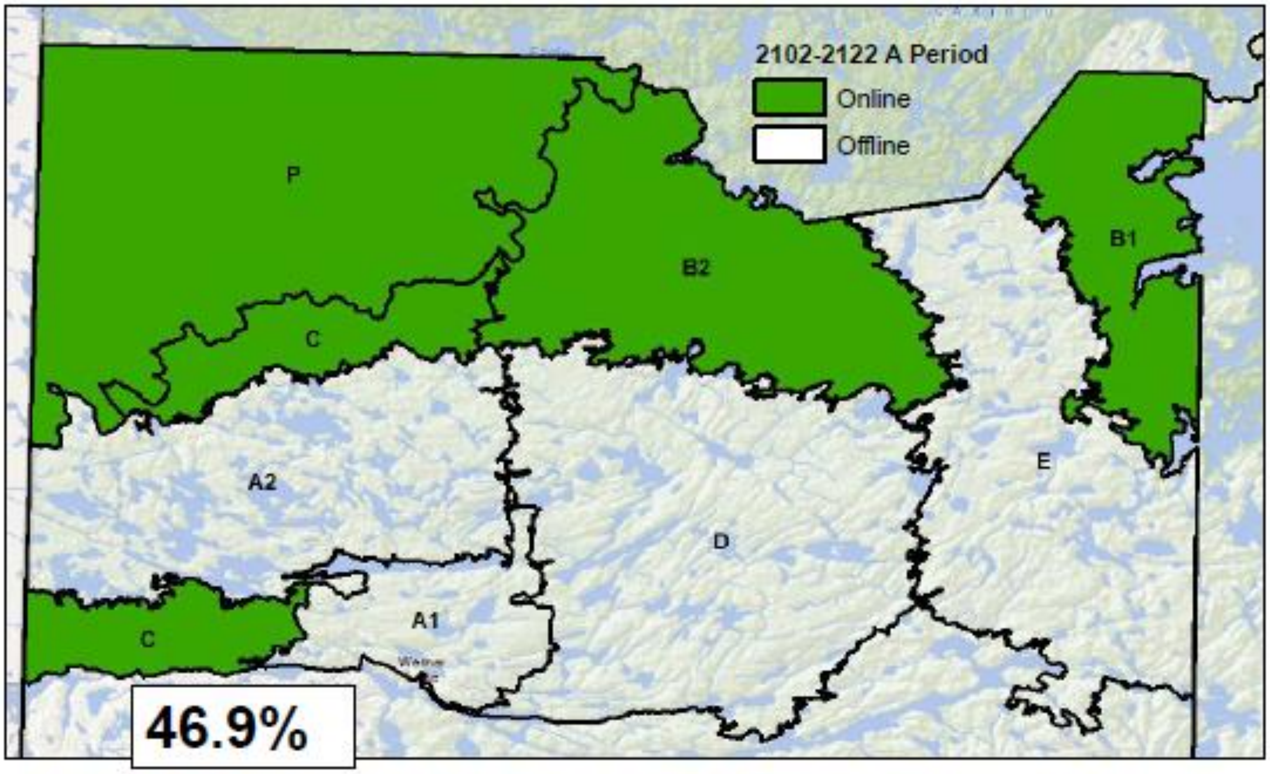
Boreal woodland caribou habitat online during D period (2062-2082)



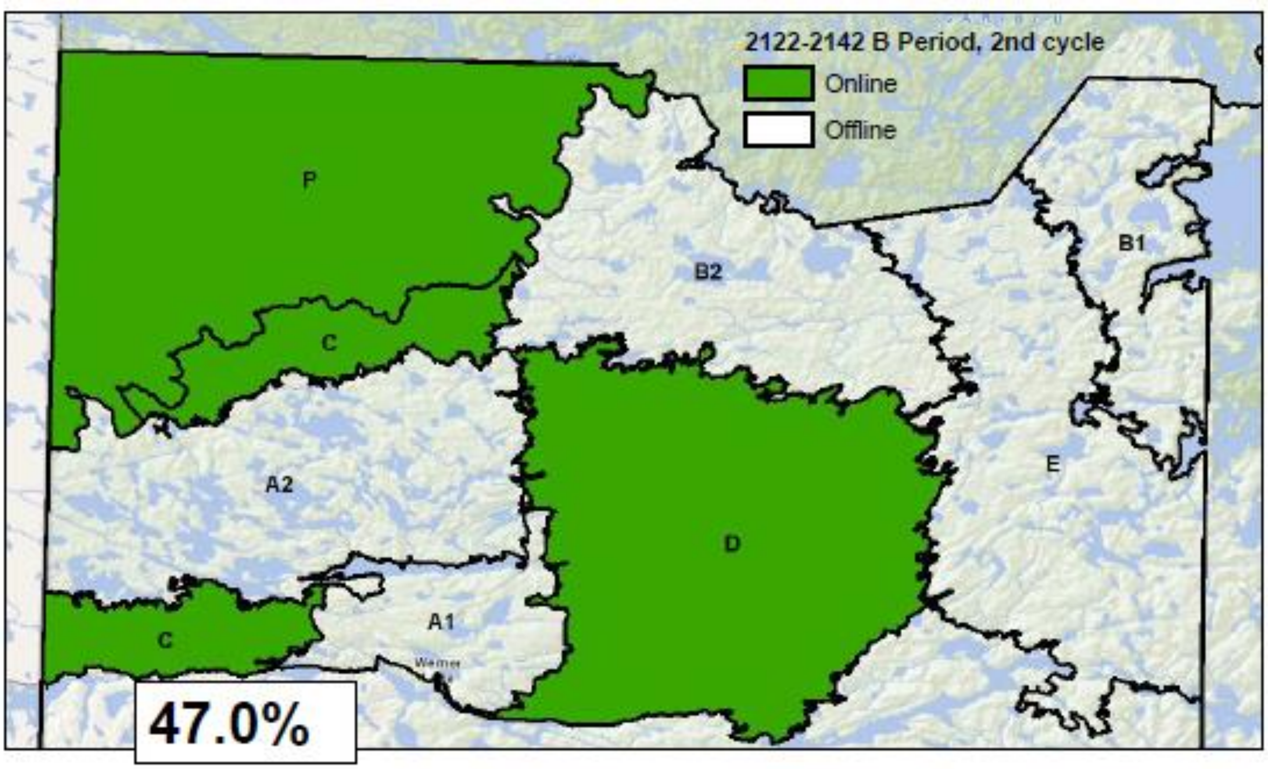
Boreal woodland caribou habitat online during E period (2082-2102)



Boreal woodland caribou habitat online during A period (2102-2122)



Boreal woodland caribou habitat online during second B period (2122-2142)



FINAL PLAN NOTE:

Revised Kenora Forest DCHS Online Caribou Habitat at Plan Start 2022

The DCHS developed for the Kenora Forest LTMD (May 2020), calculated a plan start proportion of online caribou habitat as 27.8%. As per Figure 1, the B period of 2022-2032 showed 3 of the 9 blocks as providing a mature forest condition of greater than 60 years of age. Block P overlays the Eagle- Snowshoe Conservation Reserve portion of the Kenora forest. The two C blocks encompassed cover in a range of older age classes. Blocks B1 and B2 were planned for harvest and the remaining landscape was regenerating fire disturbances.

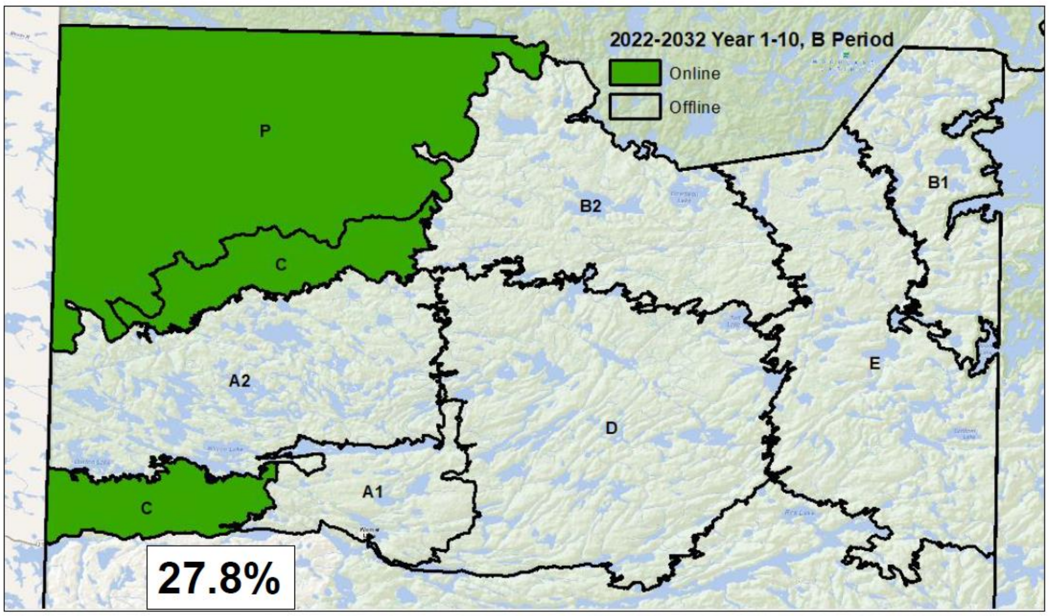


Figure 1. Caribou portion of the Kenora Forest showing the online habitat for the B period 2022- 2032.

The summer of 2021 saw record fire activity with about 1000 fires burning across the province and five times the average annual area burned. Among those fires was Kenora 51 which burned from early June until it was declared out in mid-October. The total fire size was 200,600 hectares. The fire burned through the northern portion of the Kenora Forest and burned a significant portion, 86%, of the total DCHS area.

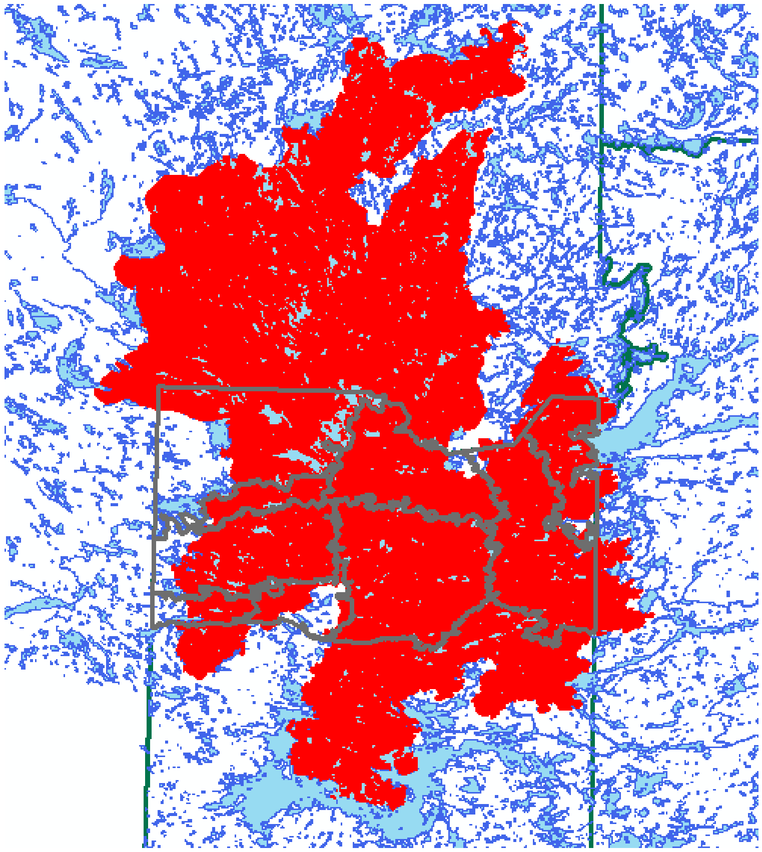


Figure 2. Forest fire Kenora 51 in relation to the DCHS on the Kenora Forest.

The blocks identified as online at plan start (P and 2 C blocks) were 67% burned. Burned area by SMZ are provided in the table below. The three blocks considered online habitat at plan start (C and P blocks) are no longer considered to be online and therefore the revised plan start level is 0%. The 2032 planning process will include a re-assessment of the caribou portion of the unit including the development of new habitat tracts and DCHS.

Block ID/ SMZ	Block Area	Lakes Area	Block Area Without Lakes	Fire Area Overlapping Block	% of Block Burned
A1	4864	765	4099	2245	55
A2	14799	2829	11970	10011	84
B1	7197	977	6220	5718	92
B2	13158	1127	12031	11581	96
C	7010	1035	5975	4716	79
D	20426	2374	18052	18014	100
E	16436	1638	14798	14430	98
P	22553	6358	16195	10300	64
Totals	106443		89340	77015	

All area values in hectares.

Appendix 2

Moose Emphasis Area Delineation

For the 2022 Kenora Forest FMP

Includes:

oose E asis Area Delineation or t e 2022 Kenora Forest F P

FINAL PLAN UPDATE: Revised Dis ussion o Habitat in oose E asis Areas

Moose Emphasis Area Delineation for the 2022 Kenora Forest FMP

April 26, 2020

Moose Emphasis Area Delineation for the 2022 Kenora Forest FMP

1.0 Introduction

Forestry operations accommodate the habitat needs of wildlife species, including moose, through coarse landscape-scale filters considered during the Forest Management Planning process. These habitat needs are informed using the Forest Management Guide for Boreal Landscapes (Boreal Landscape Guide, or BLG) and Ontario's Landscape Tool (OLT). However, moose population objectives are informed by various social, economic and ecological factors which can require moose habitat management to alternately occur using a fine-filter approach. This is done at the multi-stand scale in select locations to enhance the type, amount, and quality of habitat available for moose and to meet population objectives. The Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales (Stand and Site Guide, or S&SG), provides direction in section 3.3.4 for delineating "Moose Emphasis Areas" (MEAs).

This document is a summary of the process that the Landscape Task Team undertook to identify the MEAs for use in the 2022 Kenora Forest FMP.

1.1 Background: Cervid Ecological Framework Overarching Habitat Guidance

Guidance for the management of cervid species in Ontario occurs through the direction of the Cervid Ecological Framework (CEF). The CEF outlines population and habitat direction for cervid species through five different Cervid Ecological Zones (CEZs) in Ontario.

The CEF indicates that population management of cervid species occurs 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 emphasize species-specific cervid habitat direction (e.g. moose) contained in Forest Management Guides. "

There are three unique CEZs overlapping the Kenora Forest which dictate unique population and habitat management considerations (Figure 1).

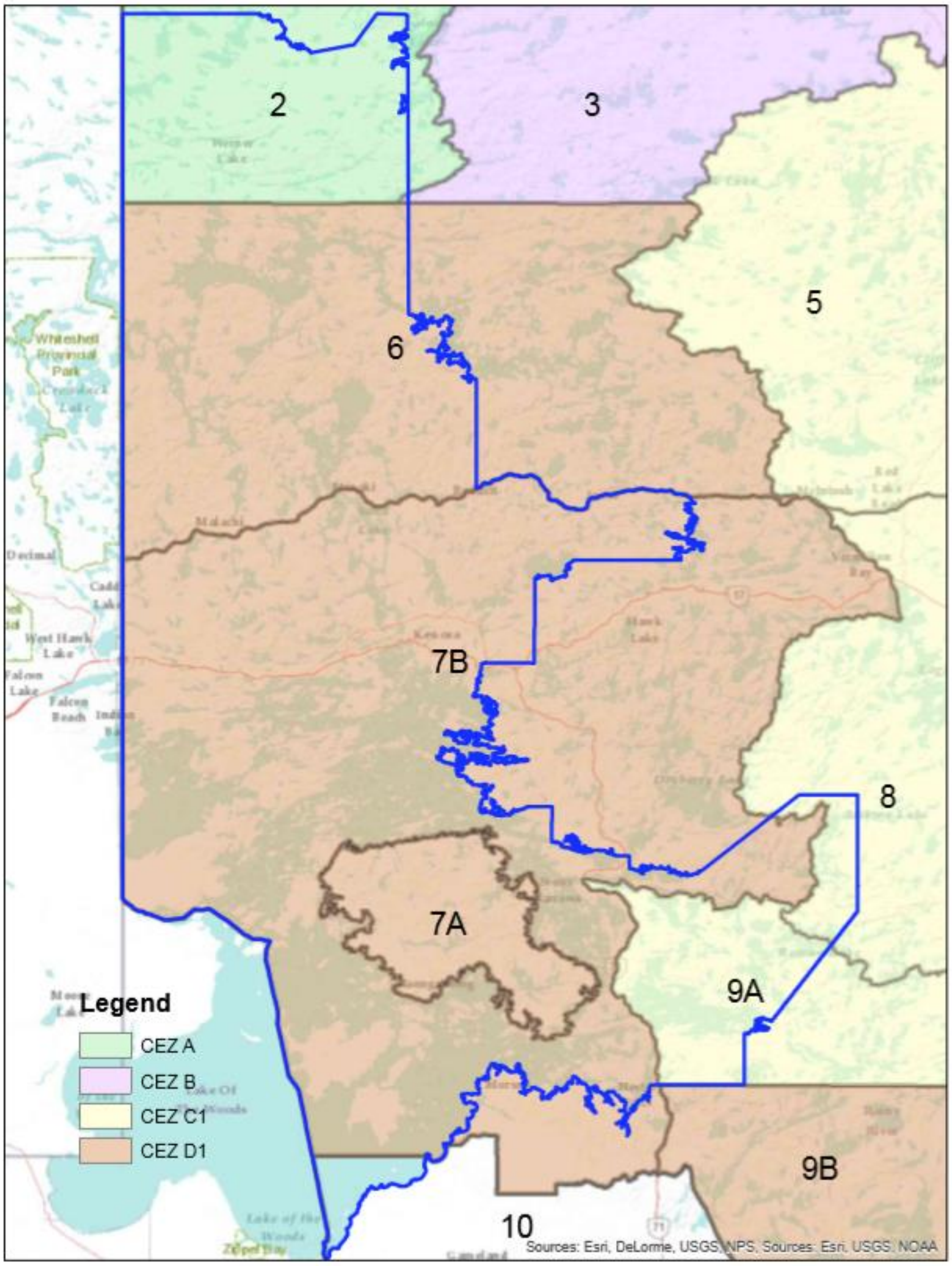


Figure 1 Cervid Ecological Zones and Wildlife Management Units overlapping the Kenora Forest

The habitat direction provided for CEZs A, C1 and D1 in the CEF all indicate moose habitat management should be emphasized to varying degrees and proportional to identified population objectives (Section 1.2). Portions of CEZ A occurring within the Caribou Continuous Distribution were not considered for candidate MEAs due to the alternate focus of forestry operations to create/maintain habitat suitable for boreal woodland caribou. Alternately, the portion of CEZ A occurring south of the Caribou Continuous Distribution is an area where moose habitat management may still be emphasized. The most predominate CEZ in the Kenora Forest is D1 with a portion of CEZ C1 overlapping the southeastern corner.

1.2 Wildlife Management Unit Specific Population Densities and Objectives

Population objectives for moose vary by CEZ. Each CEZ is made up of a number of Wildlife Management Units (WMUs). Wildlife Management Units are the scale to which moose population management in Ontario occurs using the big-game harvest licensing system. Wildlife Management Unit specific population objectives are identified in Table 1. Where initial population targets were released as part of the 2009 CEF these were later updated as part of the 2016 Moose Project where the lower bound interval of each WMU-specific population range is to be met by 2030. Currently, measured moose population densities for the six WMUs overlapping the Kenora Forest are below or within the 2030 moose population objective range with WMUs 6, 7A and 7B being considerably lower.

Table 1 Target moose population densities for WMU overlapping the Kenora Forest

Wildlife Management Unit	Cervid Ecological Zone	Target density	2009 Cervid Ecological Framework population objective range (moose per 100 km^2)	2016 Moose Project range (moose per 100 km^2)*
2	A	Low	15 - 35	12.8 – 17.1
6	D1	Moderate	15 - 45	13.5 – 37.8
7A	D1	Moderate	15 - 45	9.7 – 23.2
7B	D1	Moderate	15 - 45	5.0 – 13.6
8	C1	Moderate to high	30 - 55	20.4 – 54.5
9A	C1	Moderate to high	30 - 55	35.9 – 46.9

*population objective to be reached by year 2030

2.0 Current habitat suitability and capability within the Kenora Forest and candidate MEA identification

Note: The data used in this summary is from the March 2020 BMI. There are additional iterations of the Kenora Forest BMI which, if used, will alter the calculated outputs and provide results that are slightly different than those reported here. All calculations were done using a 2022 plan start date to assess habitat availability at this time and to carry-out planning over the 2022-2032 plan term.

Habitat suitability informed the placement of MEAs. Within OLT, the Boreal Bioclimatic Moose Model and the Ontario Wildlife Habitat Assessment Model (OWHAM) use forest unit and age information to model suitable moose habitat and assess carrying capacity.

Assessments of available moose habitat are often based on the availability of early successional stage forest species. These areas often occur through natural disturbances, particularly forest fires, which can lead to the growth of shrubs and hardwood species that serve as preferred moose forage species. Portions of the Kenora Forest impacted by recent forest fires are shown in Figure 2.

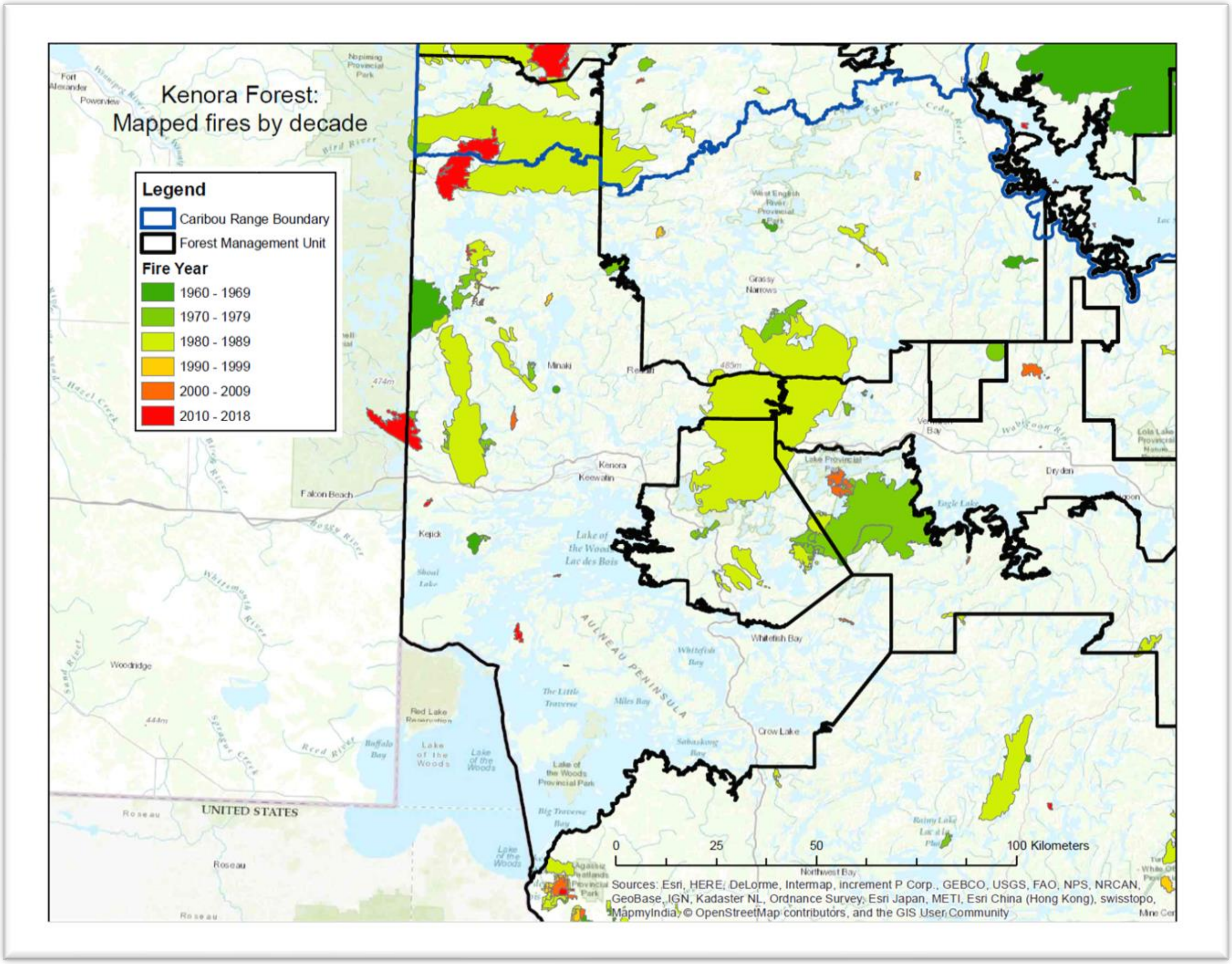


Figure 2 Mapped fires in the Kenora Forest by decade (1960-2018)

In the review of areas burned in the Kenora Forest, there are few areas where fires have occurred since 1990 which may be associated with increased browse potential. The notable areas of the Kenora Forest where there have been recent forest fires is along the Ontario-Manitoba border and straddling the caribou zone boundary in the northern portion of the forest. These areas will potentially have increased browse availability over the next several decades and were considered in MEA development.

2.1 Habitat Suitability on the Kenora Forest based on the 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. The availability of these habitat types was then compared to the simulated range of natural variation (SRNV) to determine if Kenora Forest levels were equivalent to those levels identified in a typified boreal forest landscape which is expected to have moose present (Figure 3).

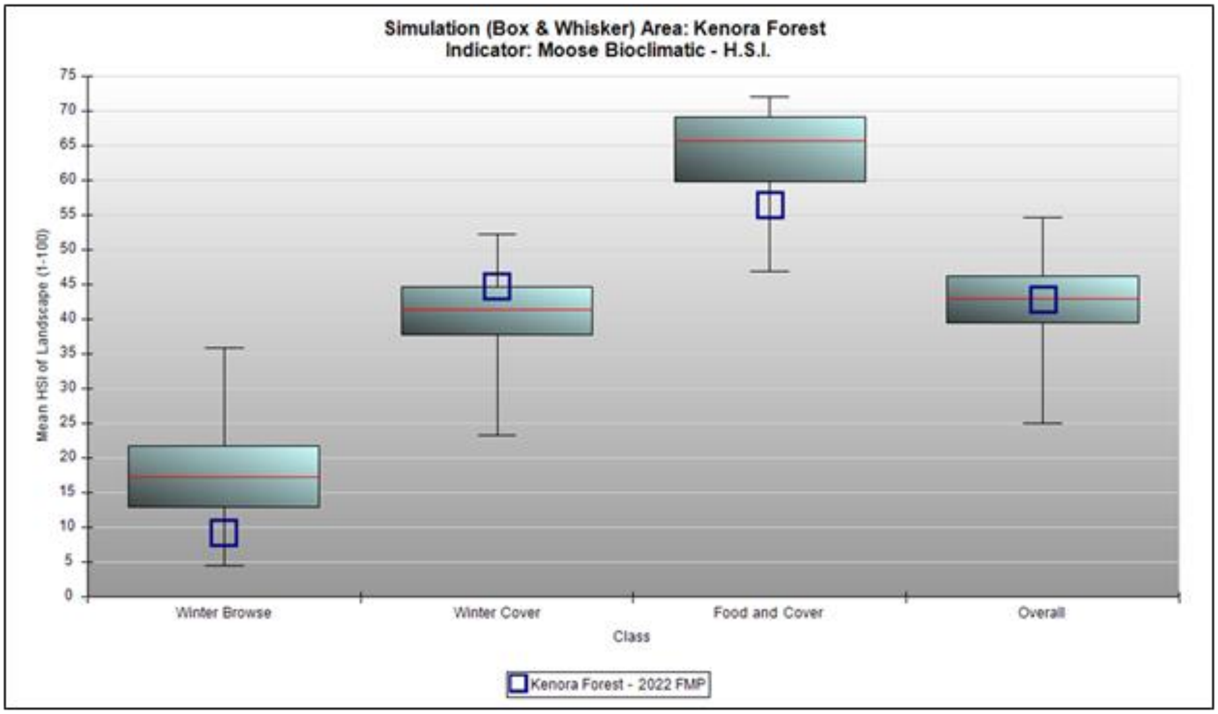


Figure 3: Moose Habitat Suitability Index model output for the Kenora Forest. The red bar within each box and whisker plot signifies an average value for a boreal forest landscape with the error bars to each side marking the interquartile range.

As per Figure 3, calculated levels of moose habitat indicated that values for winter browse, winter cover and food and cover as all being within the interquartile range. Values for winter browse and food and cover are below average while quantities of winter cover are above average. Overall, the HSI model indicates the Kenora Forest to be approximately average for providing moose habitat. Based on this, the Kenora Forest should sustain moose population densities at expected carrying capacity levels based on calculations performed using this model.

The bioclimatic moose model shows that much of the Kenora Forest has the potential to sustain moose populations of over 0.30 moose per square kilometer with some areas being less suitable (Figure 4). Those pockets which are less suitable occur at a higher proportion in the most northern portions of the forest where there is some potential for population sizes <0.09 moose per square kilometer. In 2019 documentation provided with the OLT Moose Package, the area overlapping the Kenora Forest is identified as having ‘uniformly good capability.’

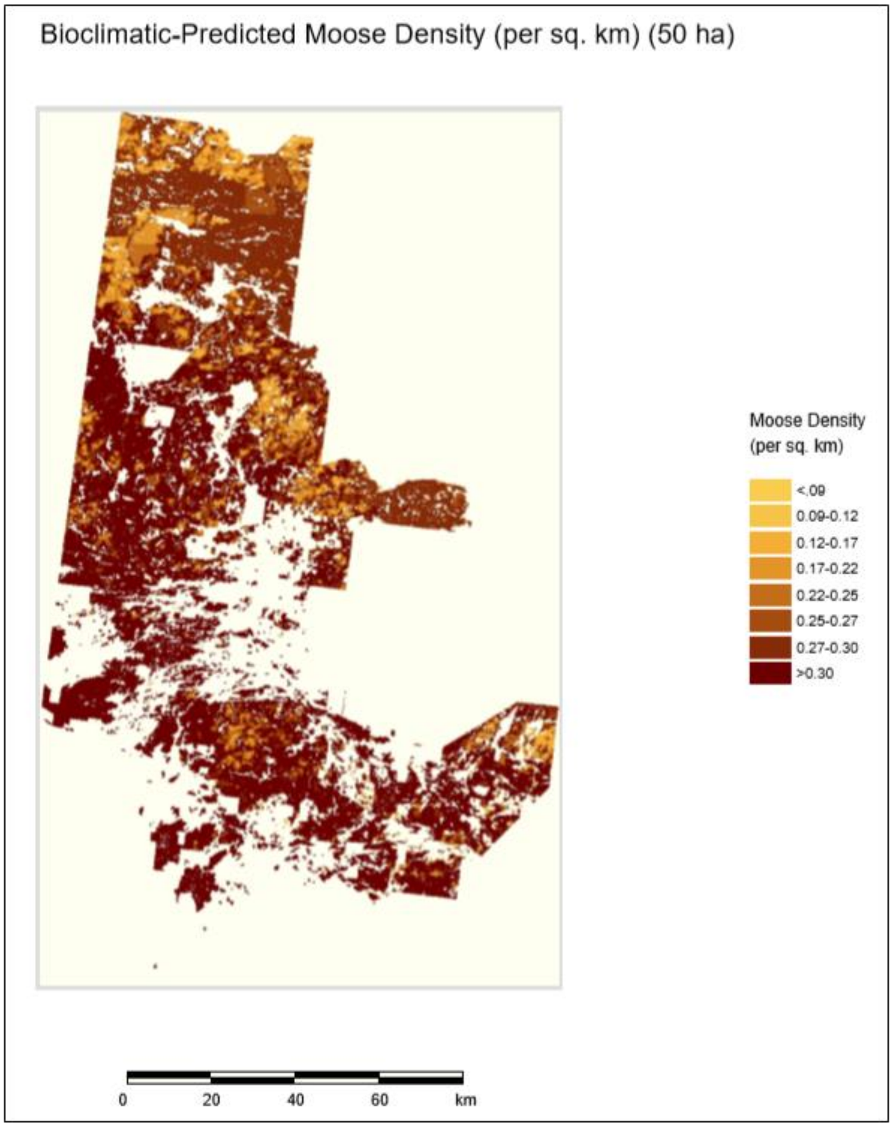


Figure 4 Results of the Bioclimatic Moose Model illustrating predicted moose density on the Kenora Forest

The Boreal Bioclimatic Moose Model was also run independently with results of available as part of the Moose Package run through OLT. A comparison of quantities of available browse, winter cover and food and cover to the SRNV is found in Appendix 1. Based on these model runs, the Kenora Forest was identified as having the highest potential moose densities of any FMU in NW Ontario based on simulations run over the next 100-200 years.

2.2 Habitat Suitability on the Kenora Forest based on the Ontario Wildlife Habitat Assessment Model

The OWHAM moose model reports calculated habitat values for dormant season, growing season and aquatic feeding (Figure 5). For the Kenora Forest, calculated growing and dormant season values are above average and over the interquartile range while aquatic feeding values are above average also but within the interquartile range. These results indicate there is currently a sufficient supply of habitat in the Kenora Forest to support calculated carrying capacity values based on this model.

Figure 5 OWHAM current modelled carrying capacity for the dormant season, growing season and aquatic feeding compared with the simulated range of natural variation for estimated habitat quantities in the Kenora Forest.

The OWHAM moose model suggests the Kenora Forest has a high moose carrying capacity (Figure 6). Using the OWHAM moose model, those habitat areas within close proximity to Lake of the Woods and the Winnipeg River have high potential carrying capacities whereas the most northerly portion of the Kenora Forest has the lowest. As noted in OLT documentation, the OWHAM moose models are calibrated to Great Lakes St. Lawrence forest units and 'further calibration and validation of the Boreal version is recommended and planned.'

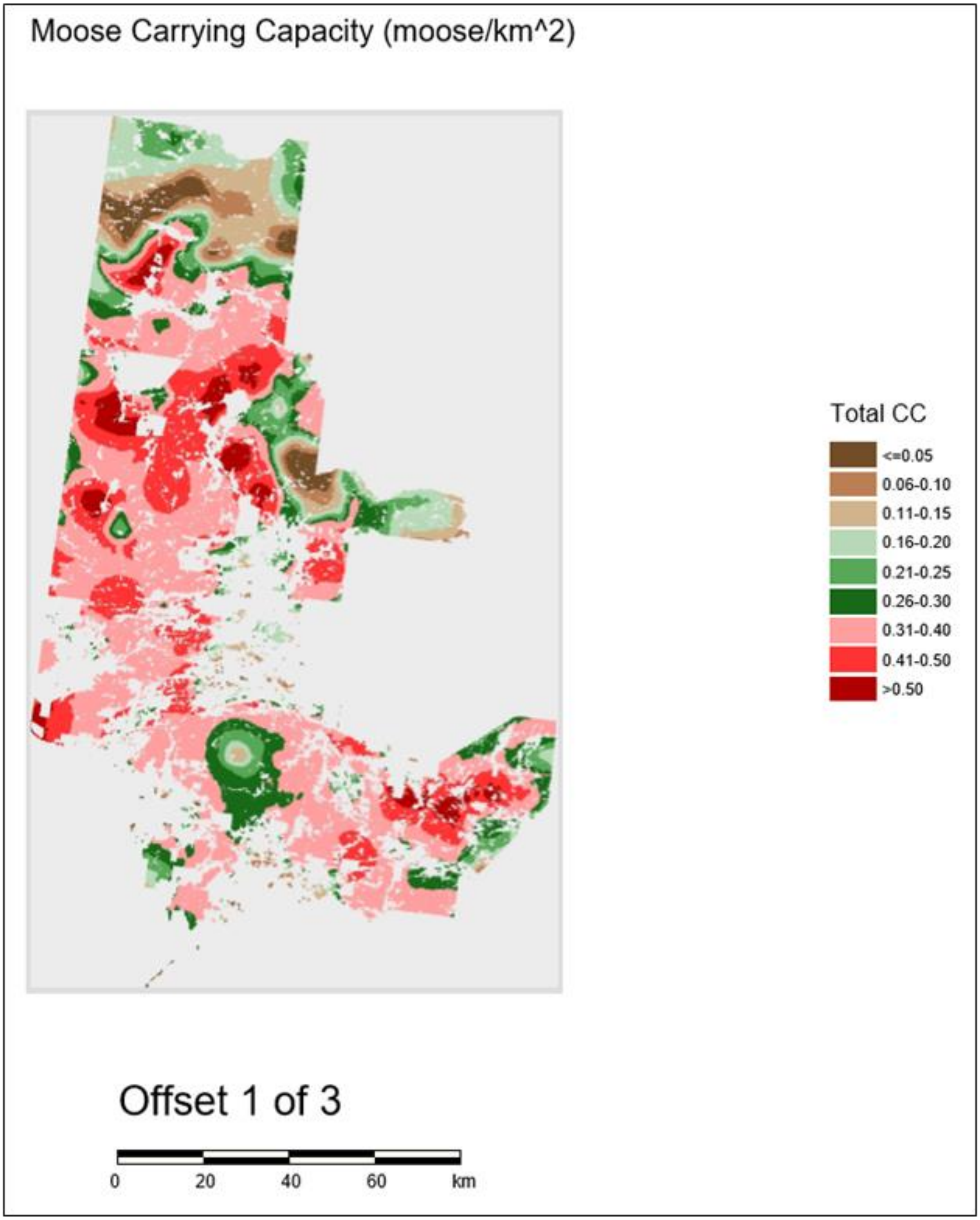


Figure 6 Results of the OWHAM moose model illustrating the predicted moose carrying capacity on the Kenora Forest

2.3 Habitat Capability

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.

The modelling of habitat capability based on ecosite productivity was done using an ecosite productivity ordination in the mapping software ArcMAP. Within ArcMAP, queries on the BMI were used in classify stands as being of 'poor,' 'moderate,' or 'rich' productivity. These queries followed those that are used across NW Region for the assessment of ecosite productivity for the purposes of designing MEAs. See Appendix 2 for a complete listing of ecotypes used in assessing and delineating ecosite productivity.

Following modelling done in ArcMAP, the Kenora Forest was found to predominately contain low and moderate productivity soils with high productivity areas found predominately in areas around Lake of the Woods, Winnipeg River and other major waterbodies (Figure 7). Not all areas surrounding these waterbodies were high productivity however. The presence of considerable low and moderate productivity areas is likely due in part to the predominance of shallow soils and the rocky landscape that constitutes the Kenora Forest landscape.

The identification of potential MEAs in the Kenora Forest was based around the evaluation of stands and the role they would serve as moose habitat in a large landscape patch. Direction provided in the S&SG for the maintenance of MEAs indicates forested stands be maintained within a specific range that is amenable to meeting seasonal moose habitat needs. The forested stands considered include those classed as 'browse,' 'mature-conifer,' and 'hardwood-dominated or mixedwood.' The spatial configuration of these different stand types was considered in identifying potential MEAs that had all three of these stand types present in amounts that satisfied the S&SG (Figure 8). This was done based on the consideration of plan start (2022) as well as based on projections done for what would occur in 2032 where forested stands were allowed to mature but no harvest takes place. The queries used for assessing plan-start and plan-end (with no harvest) are available in Appendix 2.

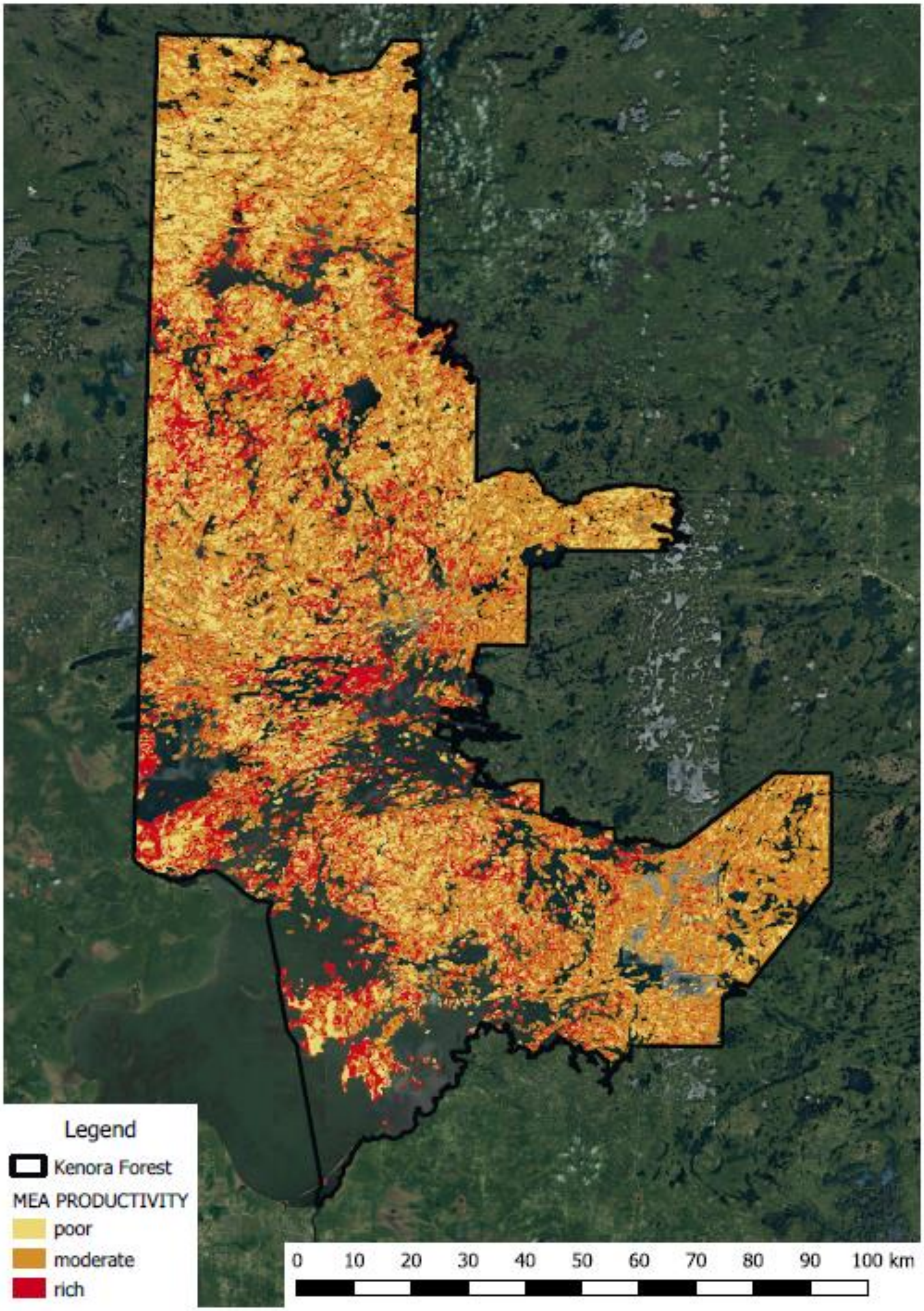


Figure 7 Ecosite productivity in the Kenora Forest

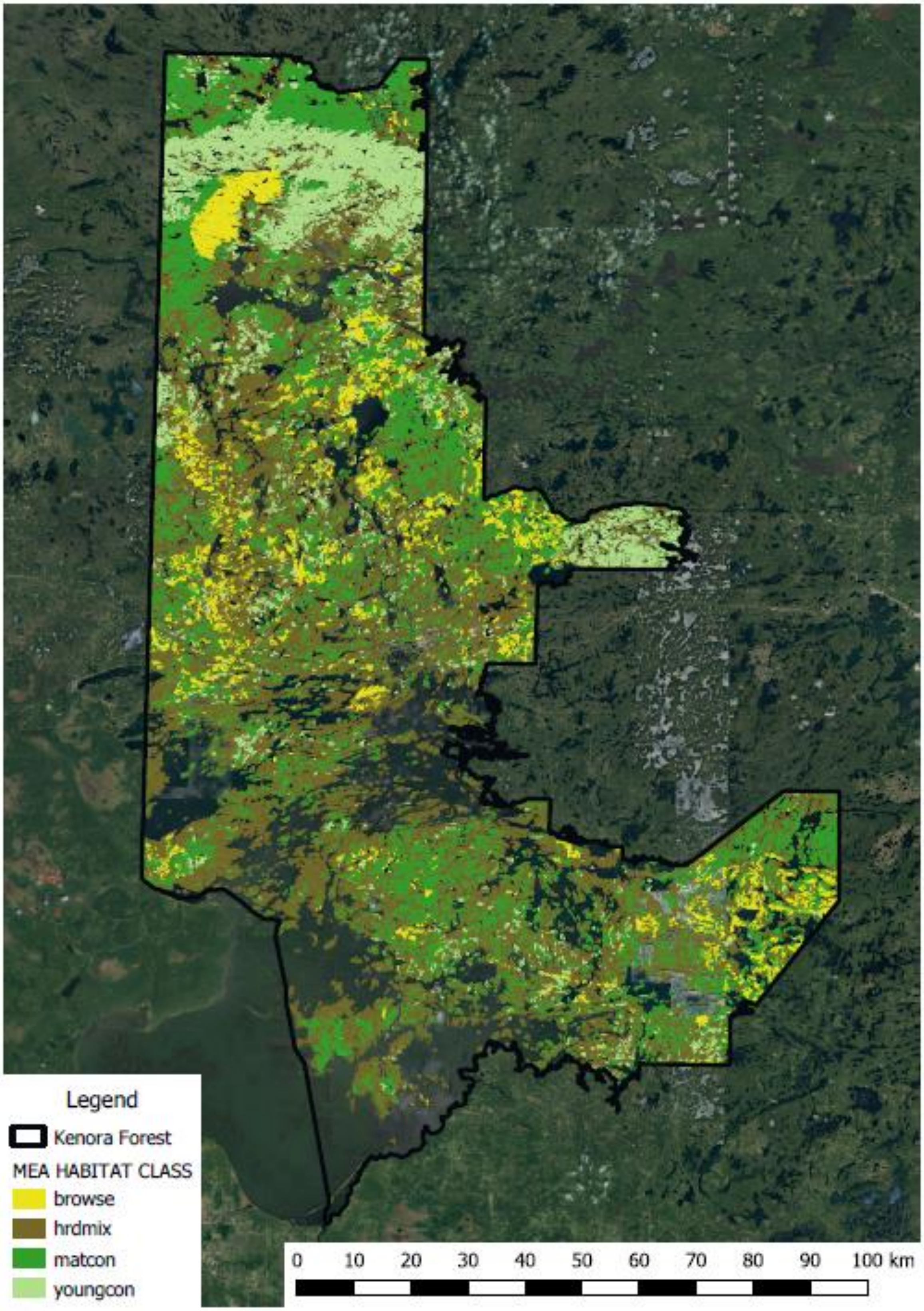


Figure 8 Moose habitat types in the Kenora Forest at plan start

3.0 Assessment of Candidate MEAs

Preliminary MEAs were assessed based on the potential for forestry operations to assist in meeting moose population objectives and CEZ policy guidance. Large areas of the Kenora Forest were removed from consideration for MEAs based on occurring within close proximity to built-up human settlements. While these areas may be considered to have suitable habitat based on evaluated models, the potential for forestry operations to influence the growth of moose populations in these areas will be limited. To this extent, those MEAs selected for the 2022 FMP tended towards the more remote locations of the Kenora Forest.

The consideration of MEAs for the 2022 Kenora Forest FMP was based on available policy guidance and assessments of habitat suitability. As MEAs were also developed for the 2012 FMP, followed much of the same guidance and assessments, and were re-evaluated as part of the 2017 Phase II Kenora Forest FMP, the 2012 MEAs were the initial set of MEA candidates for the 2022 FMP. For the Kenora Forest 2012 FMP the were three MEAs which had been previously developed (Figure 9).

In discussions with the 2022 Kenora Forest Landscape Task Team, it was identified that the largest of the 2012 MEAs was undesirable due to its overlap with a Deer Emphasis Area (DEA). The overlap of a DEA and MEA is counterproductive as deer transmit brainworm, *Parelaphostrongylus tenuis*, to moose and negatively impact moose populations. Whereas delineated MEAs are based on modelled habitat availability, DEAs are based around identified wintering areas where a particular survey protocol has been used and demonstrated the presence of deer. As such, there exists more flexibility in selecting MEA locations which led to the MEA on the Ontario-Manitoba border not being selected for use in the 2022 plan. The pre-existing DEA in the area will be retained for the 2022 plan. The other MEAs considered in the 2012 Kenora Forest FMP were retained with some modifications.

The entirety of the Aulneau Peninsula (WMU 7A) was considered as an MEA for the 2022 plan based on pre-existing policy focussed on the enhancement of moose habitat through forestry for this area. As the direction provided in the Enhanced Management Area Wildlife Plan for the maintenance and creation of moose habitat is unlike that provided in the S&SG, in relation to the maintenance of MEAs, there is a need to modernize how moose habitat enhancement will occur through forestry on the Aulneau Peninsula in such a way that meets current forestry guidelines.

In considering the most northern MEA from the 2012 Kenora Forest FMP (Table 9), there were task team discussions around breaking a newly proposed MEA into two separate MEAs or keeping them together. This discussion was based on the northern portion of a divided MEA not having habitat quantities occurring within the range of suggested values by the S&SG at plan start (Table 2). In particular, the browse and mature conifer quantities for the divided 'North English River' MEA are below 5% and 15% at 3.5 and 8.2% at plan start, respectively. Alternately, the South English River MEA has calculated habitat quantities occurring within the S&SG parameters and where, if combined with the North English River MEA, would occur within the S&SG parameters. It was ultimately decided to retain these two MEAs as separate.

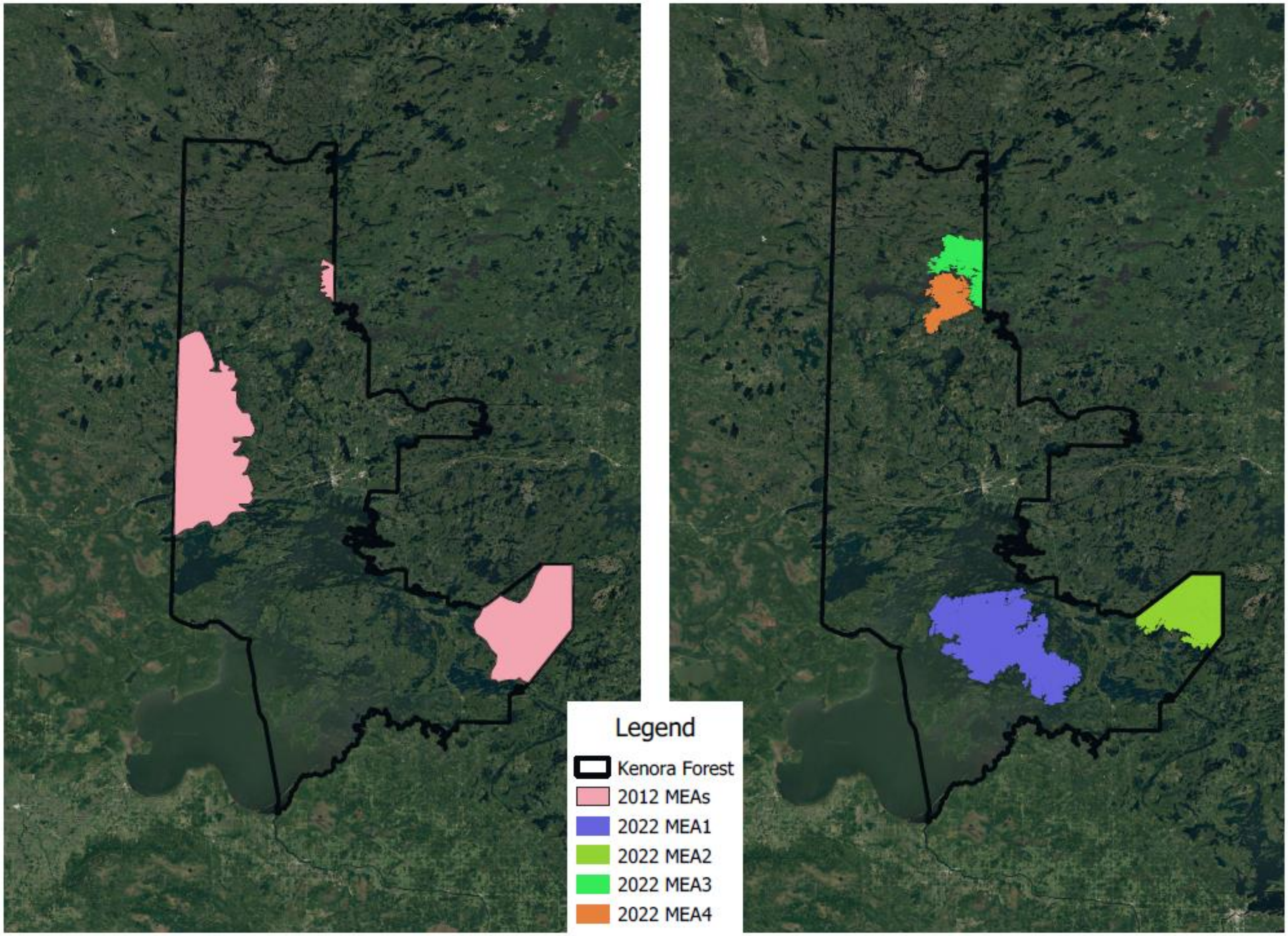


Figure 9. Candidate MEAs based on 2012 Kenora Forest FMP (left) and final MEAs for 2022 FMP (right)

Table 2 Calculated habitat for the 2022 Kenora Forest MEAs. Values for the entire Kenora Forest provided for comparison

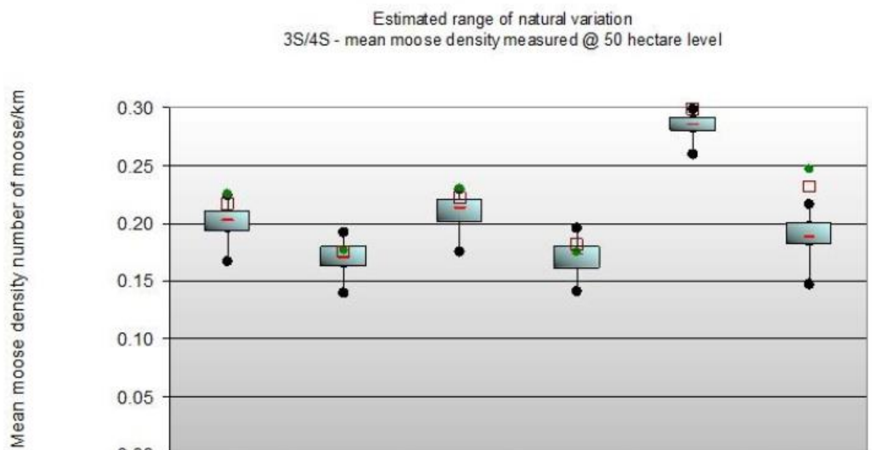
Candidate MEA	Total area (ha), all polytypes	Net Area (ha) of BSH+OMS+TMS+RCK+FOR polytypes (no WAT, UCL, or ISL), and % of Total	Polytype (ha) & (% of Net Area)					Productivity/Nutrient Regime (ha) & (% of Net Area)			General Habitat Category Plan Start (ha) & (% of Net Area)				General Habitat Category Plan End No-Harvest (ha) & (% of Net Area)			
			BSH	OMS	TMS	RCK	FOR	RICH	MODERATE	POOR	BROWSE (target 5-30%)	HARD-MIXED WOOD (target 20-55%)	MATURE CONIFER (target 15-35%)	IMMATURE (young) CONIFER	BROWSE	HARD-MIXED WOOD	MATURE CONIFER	IMMATURE (young) CONIFER
Aulneau	80613	74513	1666	6884	1060	487	64412	15538	35070	23416	2044	32068	27256	3021	1434	32374	28198	2406
		92.4%	2.2%	9.2%	1.4%	0.7%	86.4%	20.9%	47.1%	31.4%	2.7%	43.0%	36.6%	4.1%	1.9%	43.4%	37.8%	3.2%
Maybrun	38728	29946	248	1355	143	34	28166	1620	24940	3343	4034	10149	13169	483	1830	11371	13207	1758
		77.3%	0.8%	4.5%	0.5%	0.1%	94.1%	5.4%	83.3%	11.2%	13.5%	33.9%	44.0%	1.6%	6.1%	38.0%	44.1%	5.9%
North English River	17170	15894	84	869	19	0	14922	2090	10799	3005	550	6607	1311	6293	0	6849	1703	6370
		92.6%	0.5%	5.5%	0.1%	0.0%	93.9%	13.1%	67.9%	18.9%	3.5%	41.6%	8.2%	39.6%	0.0%	43.1%	10.7%	40.1%
South English River	14269	12956	54	588	54	38	12222	2466	6292	4160	1720	4629	3916	1942	56	5314	4445	2407
		90.8%	0.4%	4.5%	0.4%	0.3%	94.3%	19.0%	48.6%	32.1%	13.3%	35.7%	30.2%	15.0%	0.4%	41.0%	34.3%	18.6%
KENORA FOREST	1222924	786350	8072	50537	4842	2738	718715	145779	429649	207297	60480	322208	231869	98044	40878	332951	246330	98556
		64.3%	1.0%	6.4%	0.6%	0.3%	91.4%	18.5%	54.6%	26.4%	7.7%	41.0%	29.5%	12.5%	5.2%	42.3%	31.3%	12.5%

Appendix 1 - Additional OLT outputs based on Boreal Moose Bioclimatic Model

Forest Management Guide for Landscapes - Moose Information Sheet

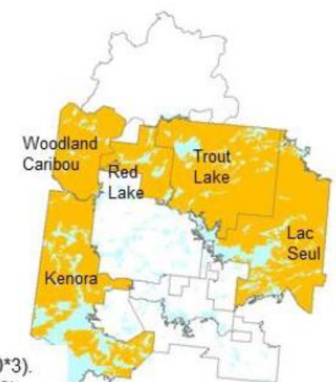
3S/4S & Forest Management Units– Moose Density – SRNV (a)

*100 – 200 year simulation ranges**



	Landscape Guide Region 3S/4S	Trout Lake Forest	Red Lake Forest	Lac Seul Forest	Kenora Forest	Woodland Caribou Forest
- Lower Quartile	0.19	0.16	0.20	0.16	0.28	0.18
● Lower range	0.17	0.14	0.18	0.14	0.26	0.15
— Median	0.20	0.17	0.21	0.17	0.29	0.19
● Upper Range	0.22	0.19	0.23	0.20	0.30	0.22
- Upper Quartile	0.21	0.18	0.22	0.18	0.29	0.20
● Year 0	0.23	0.18	0.23	0.18	0.30	0.25
□ 50 year median	0.22	0.18	0.22	0.18	0.30	0.23

Location



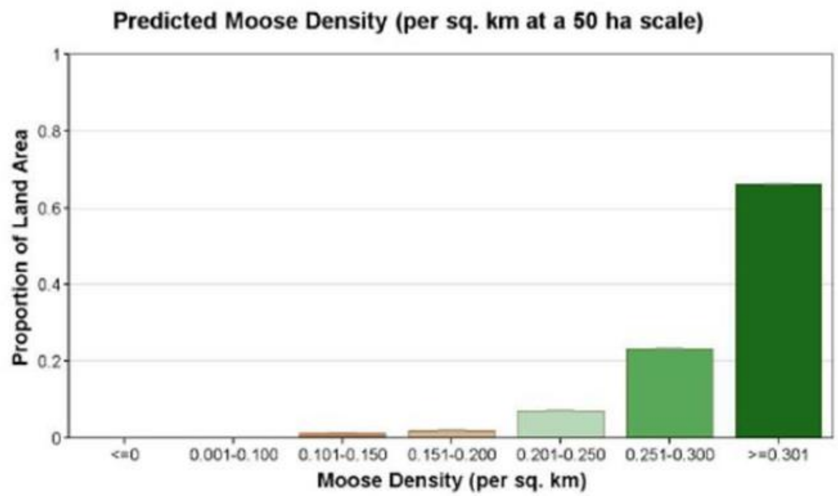
* Estimated natural ranges based on 20 – 200 year simulation replications with measurements taken at years 100,150, 200 (n=20*3).
** 2006 areas based on the 2006 inventory, 50 year simulation ranges based on 20 runs with measurement taken at year 50 (n=50).
Tools used – Boreal Forest Landscape Dynamics Simulator (BFOLDS).

Forest Management Guide for Landscapes - Moose Information Sheet

Kenora – Year 0 (50 ha) - Histogram

Boreal West - Moose

7 Kenora Forest: Year 0



	Case
	1
Offset#	1
Replicate#	1
N	128207
Mean	.300
StdDev	.0389

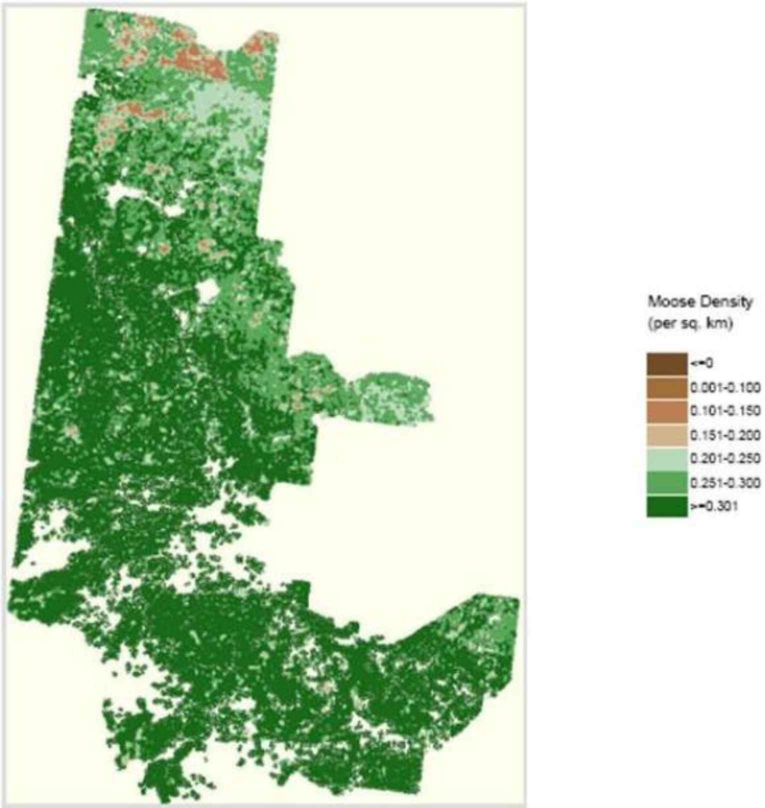
Bar	Case
	1
<=0	.000
0.001-0.100	.000
0.101-0.150	.012
0.151-0.200	.020
0.201-0.250	.071
0.251-0.300	.233
>=0.301	.662

Kenora Forest
Crown area 522,448 ha

7 Kenora Forest: Year 0

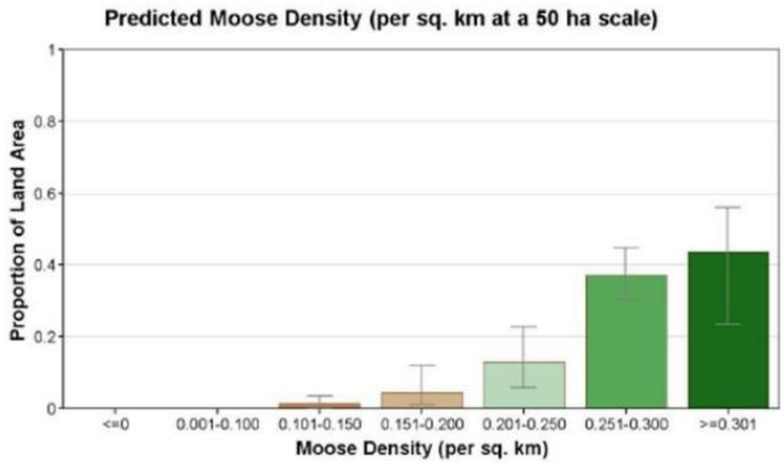
Predicted Moose Density (per sq. km) (50 ha)

r1



Kenora Forest
Crown area 522,448 ha

7 Kenora Forest: Years 100-150-200



	Case
	1
Offset#	1
#Replicates	60 of 60
N	128207
Mean	.285
StdDev	.0433

Bar	Case
	1
<=0	.000
0.001-0.100	.000
0.101-0.150	.014
0.151-0.200	.046
0.201-0.250	.131
0.251-0.300	.371
>=0.301	.437

Kenora Forest
Crown area 522,448 ha

Appendix 2 - Ecosite Productivity Determination, and Stand-level Habitat Model for Northwest Region

In the evaluation of candidate MEAs, a productivity value of Poor, Moderate, or Rich was assigned to each polygon, based upon Primary Ecosite in the eFRI. Productivity values are based on nutrient regime ordination for either forest or wetland ecosites from the 'Terrestrial and Wetland Ecosites of Northwestern Ontario – Field Guide' (MNR 1996). The new eFRI provides a primary ecosite to each polygon using the Provincial Ecosite Classification, otherwise known as the 'Ecosites of Ontario'.

Northwest Region moose habitat classification scripts using regional standard forest units, height and age:

Productivity scripts using primary Boreal ecosite for the stand:

Poor Productivity Rating

"prieco" 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')

Moderate Productivity Rating

"prieco" 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')

Rich Productivity Rating

"prieco" IN ('B088', 'B089','B091', 'B092', 'B104', 'B105', 'B106','B107', 'B108', 'B118', 'B119', 'B120','B122', 'B125', 'B130', 'B131', 'B133', 'B134','B135', 'B142', 'B144')

Prefix "s" is tagged on the EFRI inventory fields for the "selected" stand attributes, based on the overstory/understory determination from the vertical field attribute.

"sage" = plan start age

"sht" = height estimated at plan start

"snwsfu" = Northwest standard forest unit

"scclo" = canopy closure

Scripts were written, based on the direction and description of habitat in section 3.3.4 Moose, in the Stand & Site Guide (OMNR. 2010. Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales. Toronto: Queen's Printer for Ontario. 211 pp.).

Habitat Class – Plan Start

Browse plan start = "browse":

"sage_2022" <35 AND "sht_2022" <10

Hardwood mixedwood plan start = "hrdmix":

("snwsfu" = 'PoSha' AND "sage_2022" >= 35) OR ("snwsfu" = 'PoSha' AND "sht_2022" >= 10)

OR ("snwsfu" = 'PoDee' AND "sage_2022" >= 35) OR ("snwsfu" = 'PoDee' AND "sht_2022" >= 10)

OR ("snwsfu" = 'BwSha' AND "sage_2022" >= 35) OR ("snwsfu" = 'BwSha' AND "sht_2022" >= 10)

OR ("snwsfu" = 'BwDee' AND "sage_2022" >= 35) OR ("snwsfu" = 'BwDee' AND "sht_2022" >= 10)

OR ("snwsfu" = 'OthHd' AND "sage_2022" >= 35) OR ("snwsfu" = 'OthHd' AND "sht_2022" >= 10) OR

("snwsfu" = 'HrDom' AND "sage_2022" >= 35) OR ("snwsfu" = 'HrDom' AND "sht_2022" >= 10) OR

("snwsfu" = 'HrdMw' AND "sage_2022" >= 35) OR ("snwsfu" = 'HrdMw' AND "sht_2022" >= 10) OR

("snwsfu" = 'ConMx' AND "sage_2022" >= 35) OR ("snwsfu" = 'ConMx' AND "sht_2022" >= 10)

Mature conifer plan start = "matcon":

("snwsfu" = 'UplCe' AND "sage_2022" >= 70) OR ("snwsfu" = 'OCLow' AND "sage_2022" >= 70) OR

("snwsfu" = 'SbLow' AND "sage_2022" >= 70) OR ("snwsfu" = 'SbSha' AND "sage_2022" >= 70) OR

("snwsfu" = 'SbDee' AND "sage_2022" >= 70) OR ("snwsfu" = 'PjSha' AND "sage_2022" >= 70) OR

("snwsfu" = 'PjDee' AND "sage_2022" >= 70) OR ("snwsfu" = 'SbMx1' AND "sage_2022" >= 70) OR

("snwsfu" = 'PjMx1' AND "sage_2022" >= 70) OR ("snwsfu" = 'BfPur' AND "sage_2022" >= 60) OR

("snwsfu" = 'BfMx1' AND "sage_2022" >= 60) OR ("snwsfu" = 'PwDom' AND "sage_2022" >= 80) OR

("snwsfu" = 'PrwMx' AND "sage_2022" >= 80) OR ("snwsfu" = 'PrDom' AND "sage_2022" >= 80)

Young conifer plan start = "youngcon":

("snwsfu" = 'UplCe' AND "sage_2022" <70 AND "sage_2022" >=35) OR("snwsfu" = 'OCLow' AND "sage_2022" <70 AND "sage_2022" >=35) OR

("snwsfu" = 'SbLow' AND "sage_2022" <70 AND "sage_2022" >=35) OR("snwsfu" = 'SbSha' AND

"sage_2022" <70 AND "sage_2022" >=35) OR

("snwsfu" = 'SbDee' AND "sage_2022" <70 AND "sage_2022" >=35) OR ("snwsfu" = 'PjSha' AND "sage_2022" <70 AND "sage_2022" >=35) OR

("snwsfu" = 'PjDee' AND "sage_2022" <70 AND "sage_2022" >=35) OR ("snwsfu" = 'SbMx1' AND "sage_2022" <70 AND "sage_2022" >=35) OR

("snwsfu" = 'PjMx1' AND "sage_2022" <70 AND "sage_2022" >=35) OR ("snwsfu" = 'BfMx1' AND "sage_2022" <60 AND "sage_2022" >=35) OR

("snwsfu" = 'BfPur' AND "sage_2022" <60 AND "sage_2022" >=35) OR ("snwsfu" = 'PwDom' AND "sage_2022" <80 AND "sage_2022" >=35) OR

("snwsfu" = 'PrwMx' AND "sage_2022" <80 AND "sage_2022" >=35) OR ("snwsfu" = 'PrDom' AND "sage_2022" <80 AND "sage_2022" >=35)

Habitat Class – Plan End

Browse plan END = “browse”:

"sage_2022" <25

Hardwood mixedwood plan END = “hrdmix”:

("snwsfu" = 'PoSha' AND "sage_2022" >= 25) OR ("snwsfu" = 'PoDee' AND "sage_2022" >= 25) OR

("snwsfu" = 'BwSha' AND "sage_2022" >= 25) OR ("snwsfu" = 'BwDee' AND "sage_2022" >= 25) OR

("snwsfu" = 'OthHd' AND "sage_2022" >= 25) OR ("snwsfu" = 'HrDom' AND "sage_2022" >= 25) OR

("snwsfu" = 'HrdMw' AND "sage_2022" >= 25) OR ("snwsfu" = 'ConMx' AND "sage_2022" >= 25)

Mature conifer plan END = “matcon”:

("snwsfu" = 'UplCe' AND "sage_2022" >= 60) OR ("snwsfu" = 'OCLow' AND "sage_2022" >= 60) OR

("snwsfu" = 'SbLow' AND "sage_2022" >= 60) OR ("snwsfu" = 'SbSha' AND "sage_2022" >= 60) OR

("snwsfu" = 'SbDee' AND "sage_2022" >= 60) OR ("snwsfu" = 'PjSha' AND "sage_2022" >= 60) OR

("snwsfu" = 'PjDee' AND "sage_2022" >= 60) OR ("snwsfu" = 'SbMx1' AND "sage_2022" >= 60) OR

("snwsfu" = 'PjMx1' AND "sage_2022" >= 60) OR ("snwsfu" = 'BfPur' AND "sage_2022" >= 50) OR

("snwsfu" = 'BfMx1' AND "sage_2022" >= 50) OR ("snwsfu" = 'PwDom' AND "sage_2022" >= 70) OR

("snwsfu" = 'PrwMx' AND "sage_2022" >= 70) OR ("snwsfu" = 'PrDom' AND "sage_2022" >= 70)

Young conifer plan END = “youngcon”:

("snwsfu" = 'UplCe' AND "sage_2022" <60 AND "sage_2022" >=25) OR("snwsfu" = 'OCLow' AND "sage_2022" <60 AND "sage_2022" >=25) OR

("snwsfu" = 'SbLow' AND "sage_2022" <60 AND "sage_2022" >=25) OR("snwsfu" = 'SbSha' AND "sage_2022" <60 AND "sage_2022" >=25) OR

("snwsfu" = 'SbDee' AND "sage_2022" <60 AND "sage_2022" >=25) OR ("snwsfu" = 'PjSha' AND "sage_2022" <60 AND "sage_2022" >=25) OR

("snwsfu" = 'PjDee' AND "sage_2022" <60 AND "sage_2022" >=25) OR ("snwsfu" = 'SbMx1' AND "sage_2022" <60 AND "sage_2022" >=25) OR

("snwsfu" = 'PjMx1' AND "sage_2022" <60 AND "sage_2022" >=25) OR ("snwsfu" = 'BfMx1' AND "sage_2022" <50 AND "sage_2022" >=25) OR

("snwsfu" = 'BfPur' AND "sage_2022" <50 AND "sage_2022" >=25) OR ("snwsfu" = 'PwDom' AND "sage_2022" <70 AND "sage_2022" >=25) OR

("snwsfu" = 'PrwMx' AND "sage_2022" <70 AND "sage_2022" >=25) OR ("snwsfu" = 'PrDom' AND "sage_2022" <70 AND "sage_2022" >=25)

Summer Cover:

Minimum criteria:

("sage_2022" >=35 AND "sht" >=10 AND "scclo" >=70)

up_con_B:

("snwsfu" = 'SbDee' AND "sage_2022" >= 35 AND "scclo" >= 70 AND "sht_2022" >= 10) OR ("snwsfu" = 'SbSha' AND "sage_2022" >= 35 AND "scclo" >= 70 AND "sht_2022" >= 10) OR

("snwsfu" = 'UplCe' AND "sage_2022" >= 35 AND "scclo" >= 70 AND "sht_2022" >= 10) OR ("snwsfu" = 'BfPur' AND "sage_2022" >= 35 AND "scclo" >= 70 AND "sht_2022" >= 10) OR

("snwsfu" = 'PjDee' AND "sage_2022" >= 35 AND "scclo" >= 70 AND "sht_2022" >= 10) OR ("snwsfu" = 'PjSha' AND "sage_2022" >= 35 AND "scclo" >= 70 AND "sht_2022" >= 10) OR

("snwsfu" = 'PrDom' AND "sage_2022" >= 35 AND "scclo" >= 70 AND "sht_2022" >= 10) OR ("snwsfu" = 'PwDom' AND "sage_2022" >= 35 AND "scclo" >= 70 AND "sht_2022" >= 10) OR

("snwsfu" = 'BfMx1' AND "sage_2022" >= 35 AND "scclo" >= 70 AND "sht_2022" >= 10) OR ("snwsfu" = 'ConMx' AND "sage_2022" >= 35 AND "scclo" >= 70 AND "sht_2022" >= 10) OR

("snwsfu" = 'PjMx1' AND "sage_2022" >= 35 AND "scclo" >= 70 AND "sht_2022" >= 10) OR ("snwsfu" = 'SbMx1' AND "sage_2022" >= 35 AND "scclo" >= 70 AND "sht_2022" >= 10) OR

("snwsfu" = 'PrwMx' AND "sage_2022" >= 35 AND "scclo" >= 70 AND "sht_2022" >= 10)

up_con_A:

("snwsfu" = 'SbDee' AND "sage_2022" >= 70 AND "scclo" >= 70 AND "sht_2022" >= 10) OR ("snwsfu" = 'SbSha' AND "sage_2022" >= 70 AND "scclo" >= 70 AND "sht_2022" >= 10) OR

("snwsfu" = 'UplCe' AND "sage_2022" >= 60 AND "scclo" >= 70 AND "sht_2022" >= 10) OR ("snwsfu" = 'BfPur' AND "sage_2022" >= 60 AND "scclo" >= 70 AND "sht_2022" >= 10) OR

("snwsfu" = 'PjDee' AND "sage_2022" >= 70 AND "scclo" >= 70 AND "sht_2022" >= 10) OR ("snwsfu" = 'PjSha' AND "sage_2022" >= 70 AND "scclo" >= 70 AND "sht_2022" >= 10) OR

("snwsfu" = 'PrDom' AND "sage_2022" >= 80 AND "scclo" >= 70 AND "sht_2022" >= 10) OR ("snwsfu" = 'PwDom' AND "sage_2022" >= 80 AND "scclo" >= 70 AND "sht_2022" >= 10) OR

("snwsfu" = 'BfMx1' AND "sage_2022" >= 70 AND "scclo" >= 70 AND "sht_2022" >= 10) OR ("snwsfu" = 'ConMx' AND "sage_2022" >= 70 AND "scclo" >= 70 AND "sht_2022" >= 10) OR

("snwsfu" = 'PjMx1' AND "sage_2022" >= 70 AND "scclo" >= 70 AND "sht_2022" >= 10) OR ("snwsfu" = 'SbMx1' AND "sage_2022" >= 70 AND "scclo" >= 70 AND "sht_2022" >= 10) OR

("snwsfu" = 'PrwMx' AND "sage_2022" >= 80 AND "scclo" >= 70 AND "sht_2022" >= 10)

low_con_C:

("snwsfu" = 'SbLow' AND "sage_2022" >= 35 AND "scclo" >= 50 AND "sht_2022" >= 10) OR ("snwsfu" = 'OcLow' AND "sage_2022" >= 35 AND "scclo" >= 50 AND "sht_2022" >= 10)

low_con_B:

("snwsfu" = 'SbLow' AND "sage_2022" >= 35 AND "scclo" >= 70 AND "sht_2022" >= 10) OR ("snwsfu" = 'OcLow' AND "sage_2022" >= 35 AND "scclo" >= 70 AND "sht_2022" >= 10)

low_con_A:

("snwsfu" = 'SbLow' AND "sage_2022" >= 70 AND "scclo" >= 70 AND "sht_2022" >= 10) OR ("snwsfu" = 'OcLow' AND "sage_2022" >= 70 AND "scclo" >= 70 AND "sht_2022" >= 10)

<u>Winter Cover:</u>

Minimum Criteria Winter Cover - "mwu":

"snwsfu" IN ('BfMx1', 'BfPur', 'ConMx', 'PjMx1', 'PrDom', 'PrwMx', 'PwDom', 'SbDee', 'SbMx1', 'SbSha', 'UplCe') AND ("sht_2022" >=10) AND("scclo" >=60)

Preferred Winter Cover - "mwp"

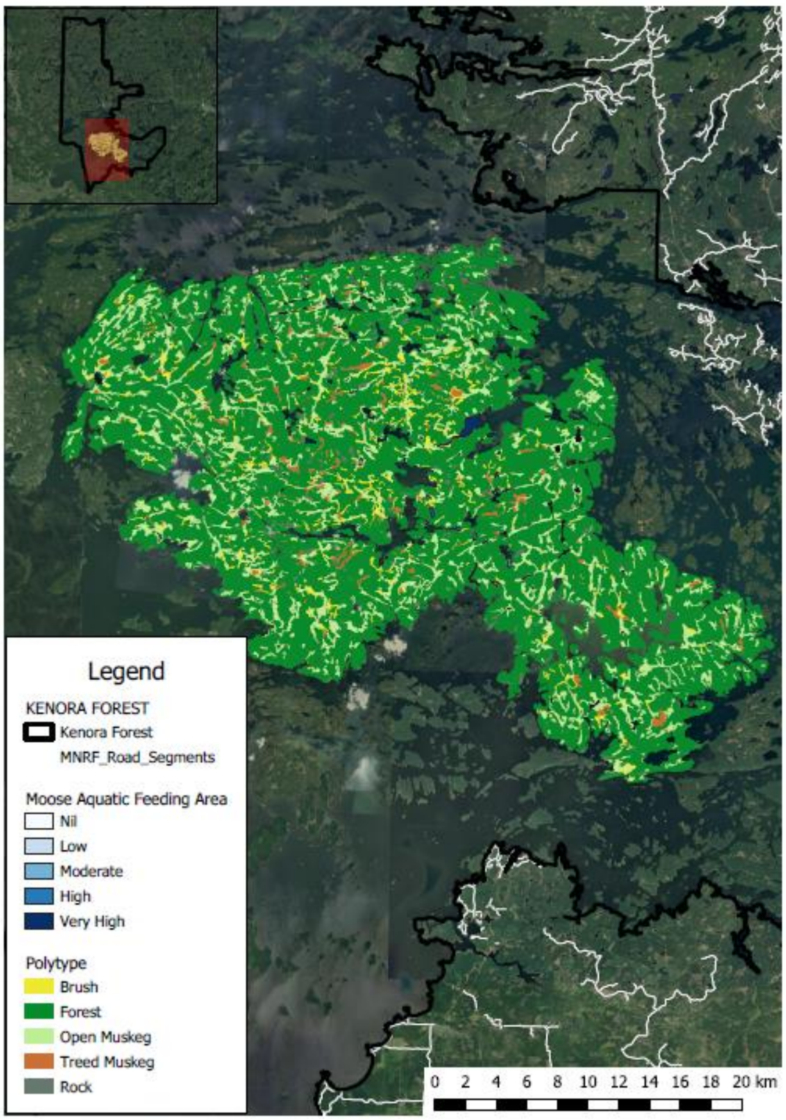
"snwsfu" IN ('BfMx1', 'BfPur', 'ConMx', 'PrwMx', 'PwDom', 'SbDee', 'SbMx1', 'UplCe') AND ("sht_2022" >=10) AND("scclo" >=70)

Appendix 3 – Final Candidate MEA Descriptions

Note: Calculation and mapping of polytype, productivity and habitat based on a BMI provided in March 2020. Different vintage BMIs may lead to slightly different estimates.

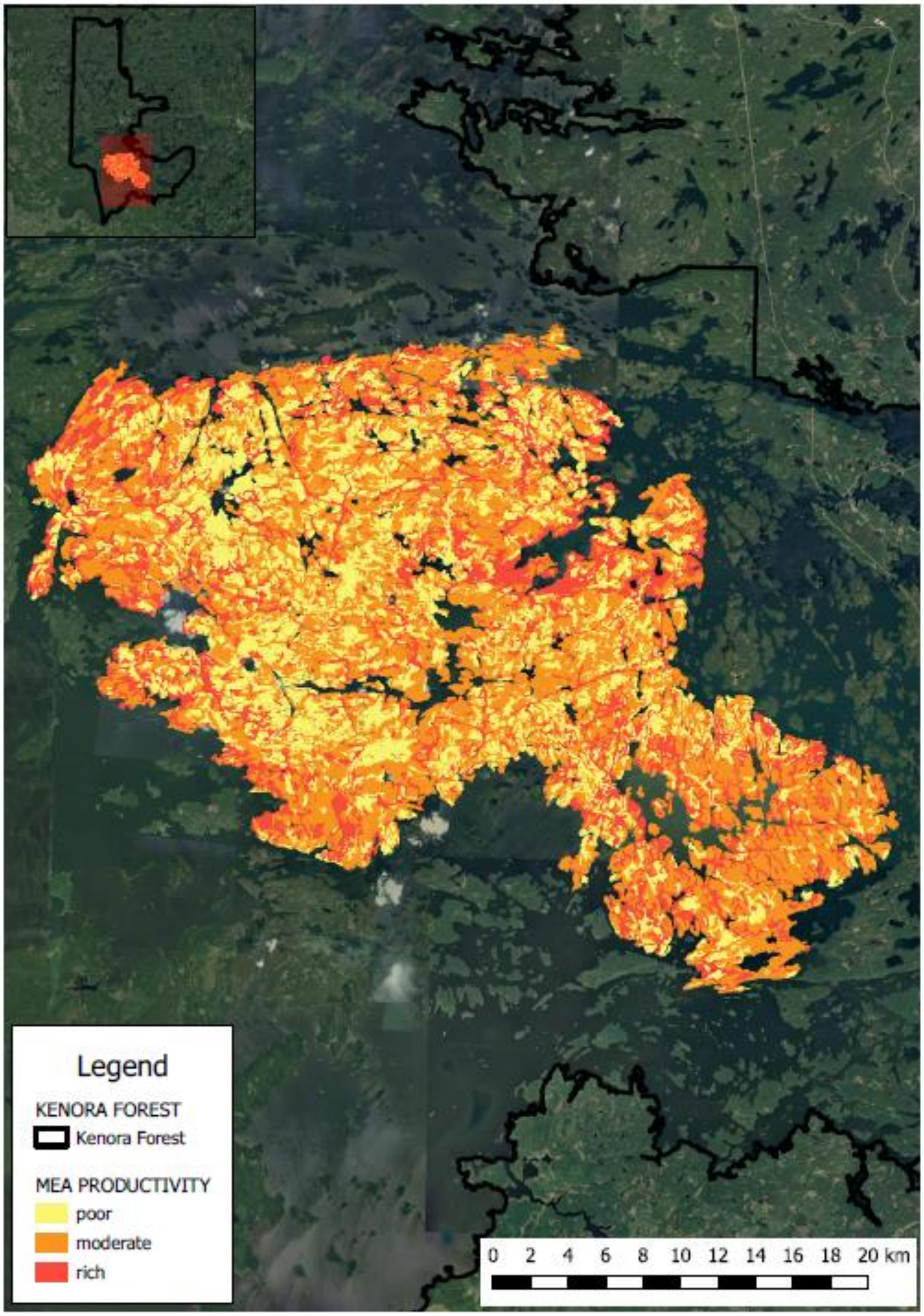
MEA 1 – Aulneau

Polytype and Moose Aquatic Feeding Areas for MEA1



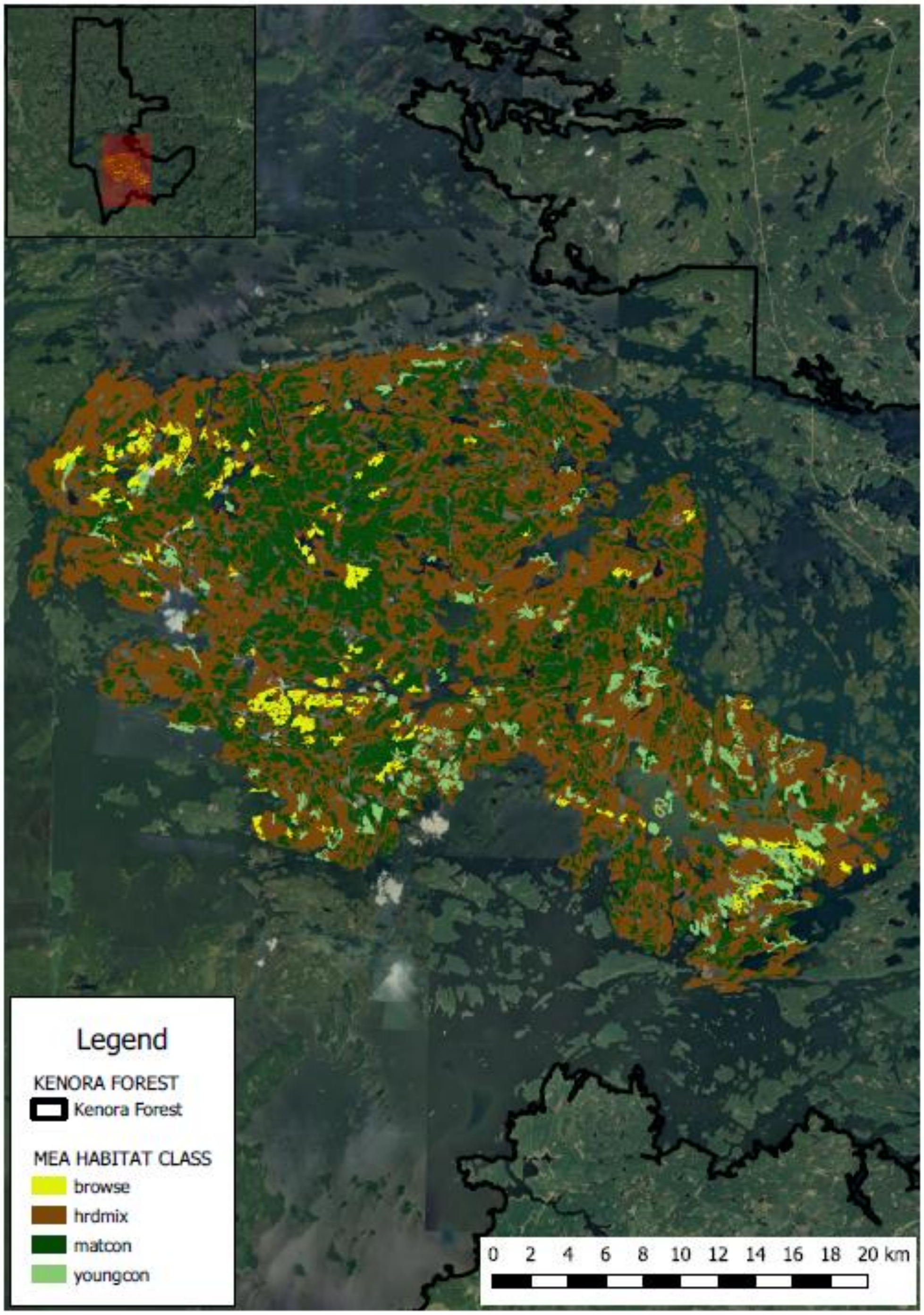
Polytype	Area (ha)	%
Brush	1666	2.2
Open Muskeg	6884	9.2
Treed Muskeg	1060	1.4
Rock	487	0.7
Forest	64412	86.4

Ecosite productivity for MEA1



Productivity	Area (ha)	%
Poor	23416	31.4
Moderate	35070	47.1
Rich	15538	20.9

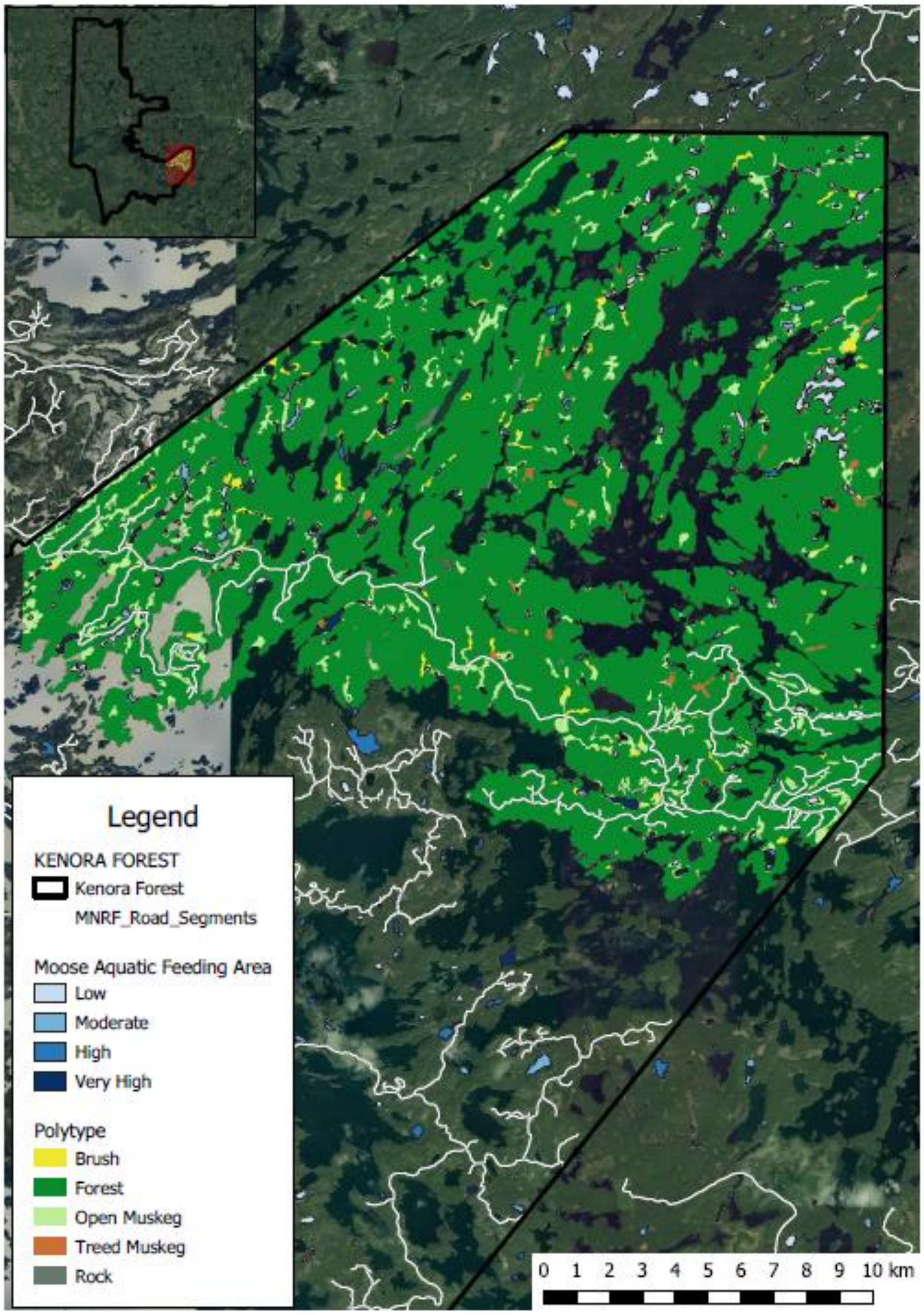
Habitat Classes at Plan Start for MEA1



Habitat Class (Plan Start)	Area (ha)	%	target %
Browse	2044	2.7	5-30
Hardwood – Mixedwood	32068	43.0	20-55
Mature Conifer	27256	36.6	15-35
Young Conifer	3021	4.1	NA

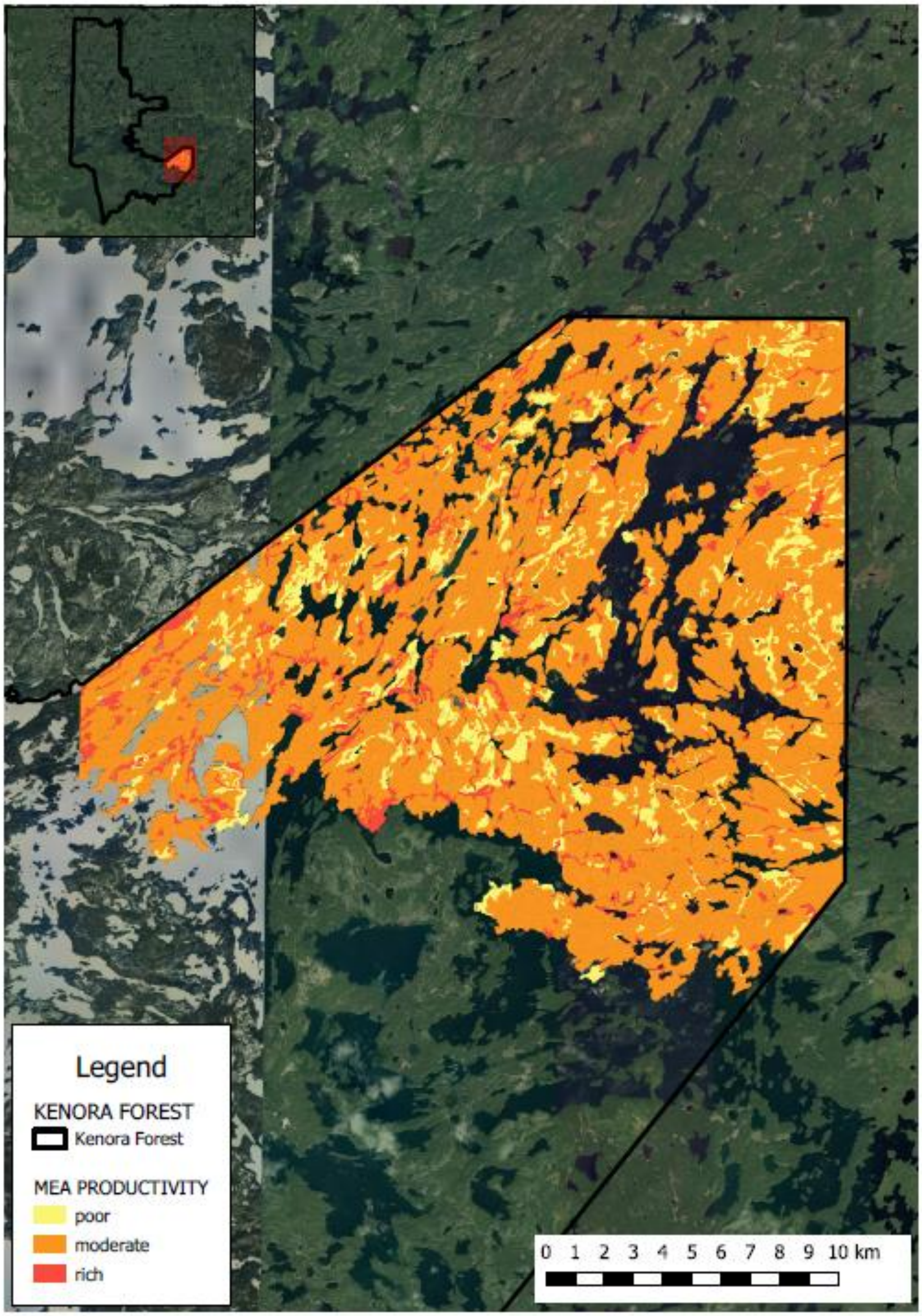
MEA2 – Maybrun

Polytype and Moose Aquatic Feeding Areas for MEA2



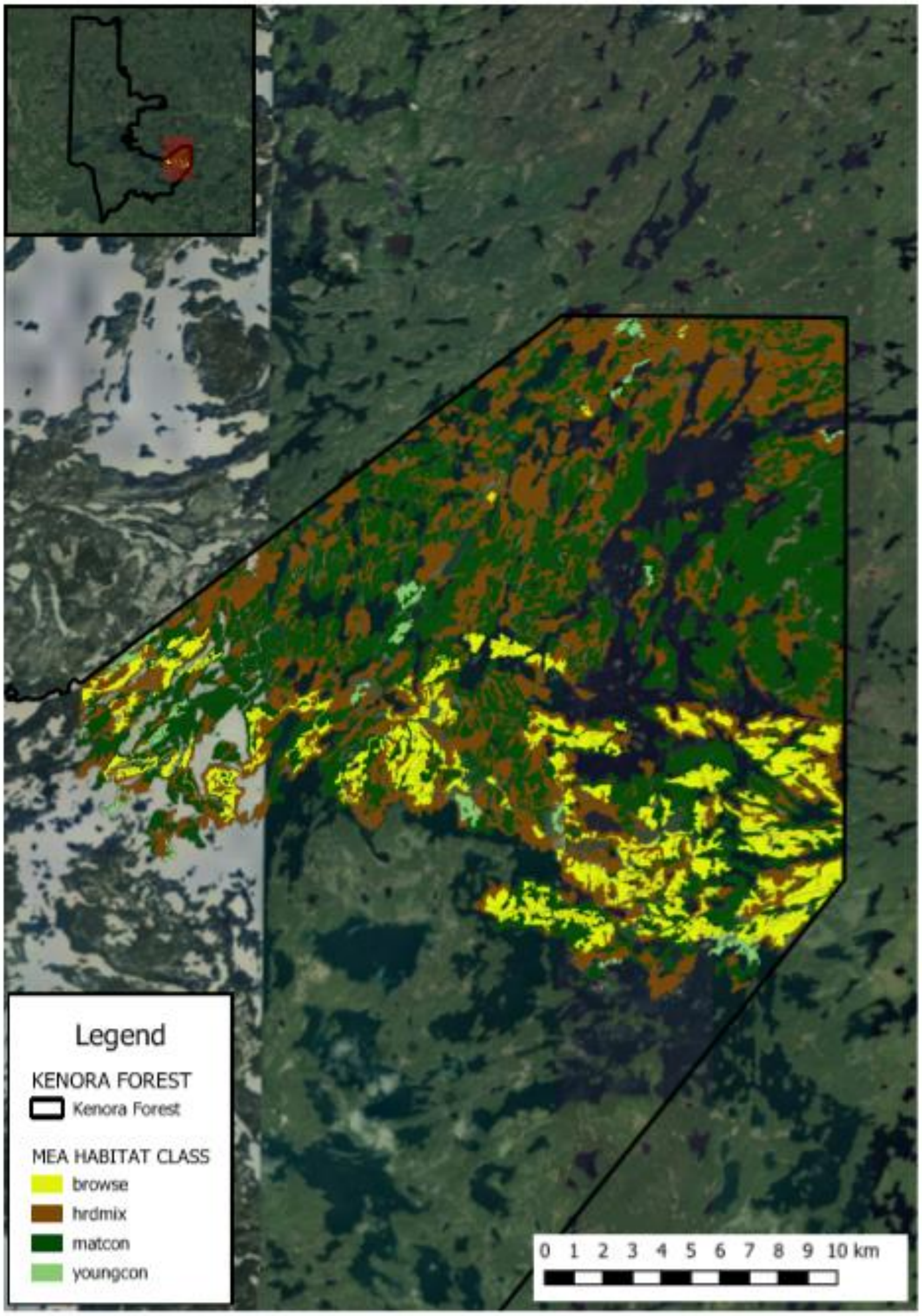
Polytype	Area (ha)	%
Brush	248	0.8
Open Muskeg	1355	4.5
Treed Muskeg	143	0.5
Rock	34	0.1
Forest	28166	94.1

Ecosite productivity for MEA2



Productivity	Area (ha)	%
Poor	3343	11.2
Moderate	24940	83.3
Rich	1620	5.4

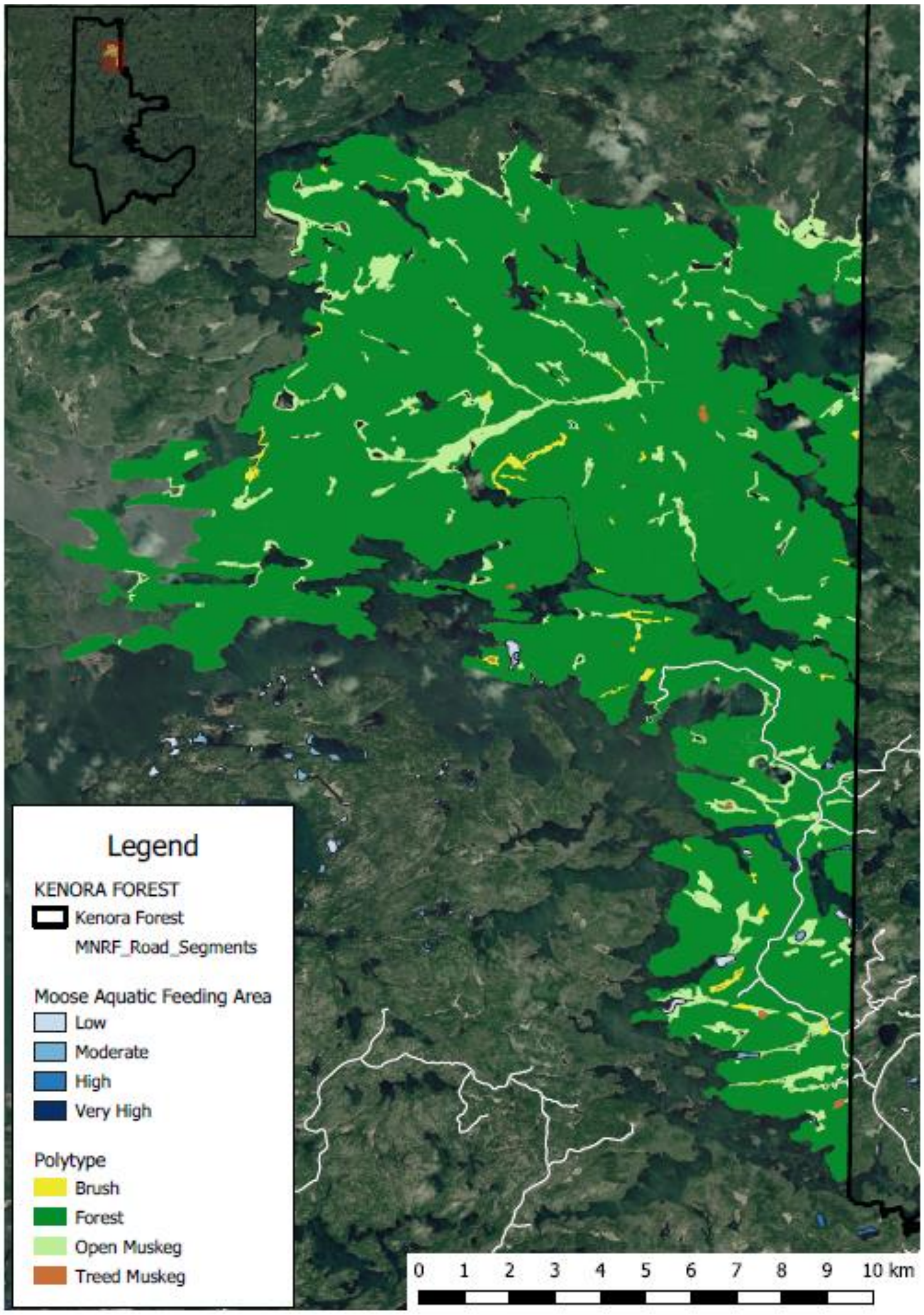
Habitat Classes at Plan Start for MEA2



Habitat Class (Plan Start)	Area (ha)	%	target %
Browse	4034	13.5	5-30
Hardwood – Mixedwood	10149	33.9	20-55
Mature Conifer	13169	44.0	15-35
Young Conifer	483	1.6	NA

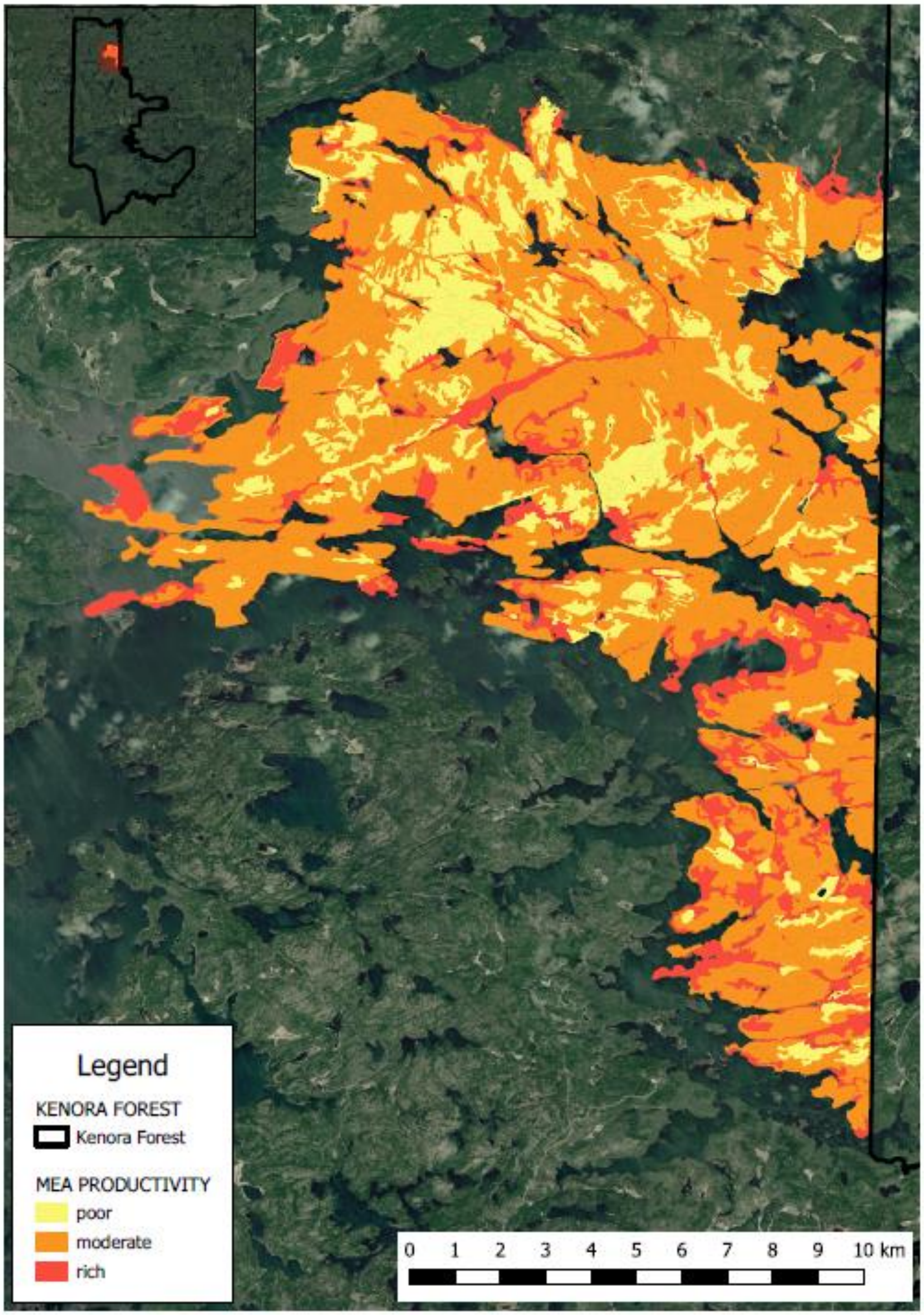
MEA3 – North English River

Polytype and Moose Aquatic Feeding Areas for MEA3



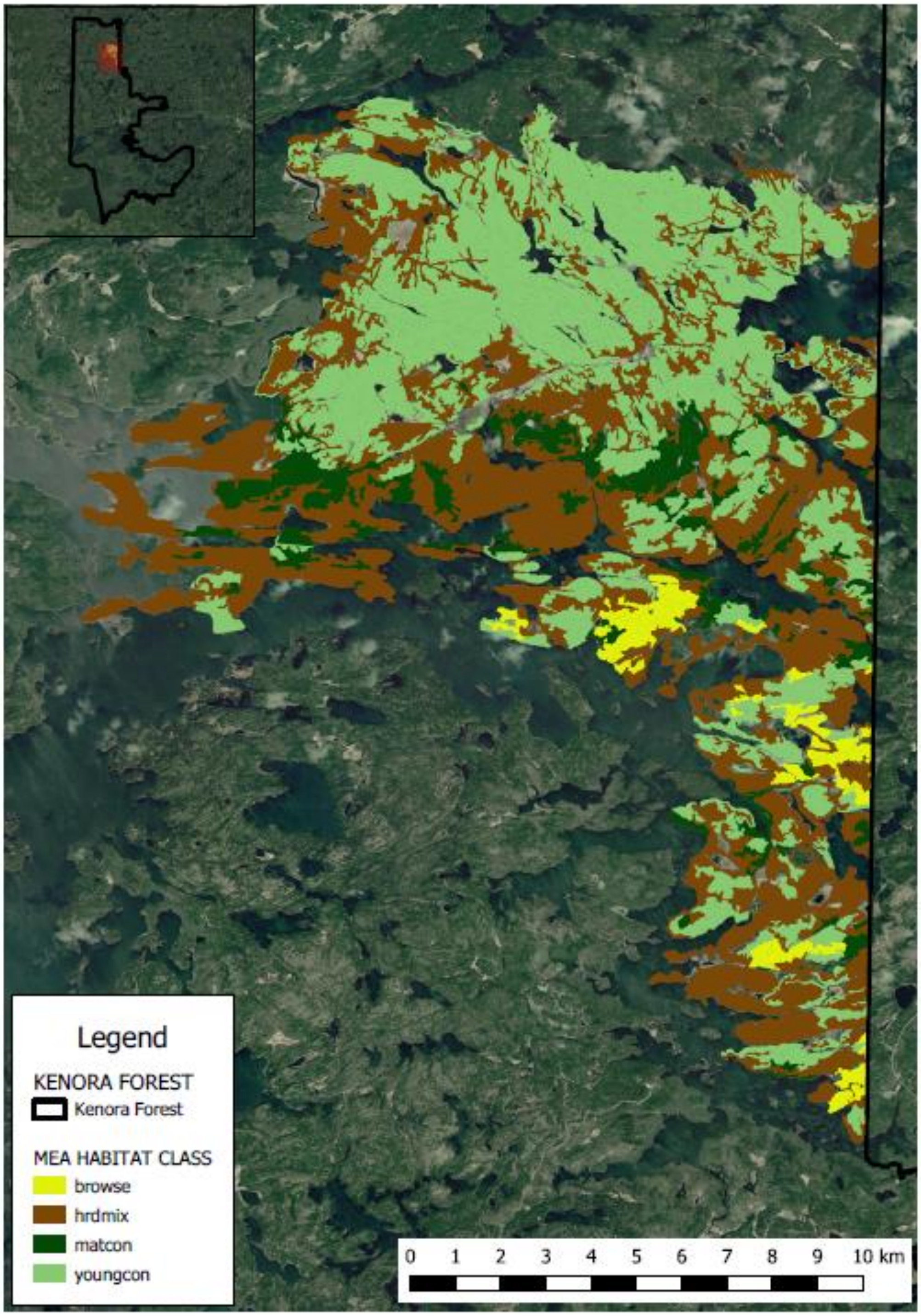
Polytype	Area (ha)	%
Brush	84	0.5
Open Muskeg	869	5.5
Treed Muskeg	19	0.1
Rock	0	0.0
Forest	14922	93.9

Ecosite productivity for MEA3



Productivity	Area (ha)	%
Poor	2090	13.1
Moderate	10799	67.9
Rich	3005	18.9

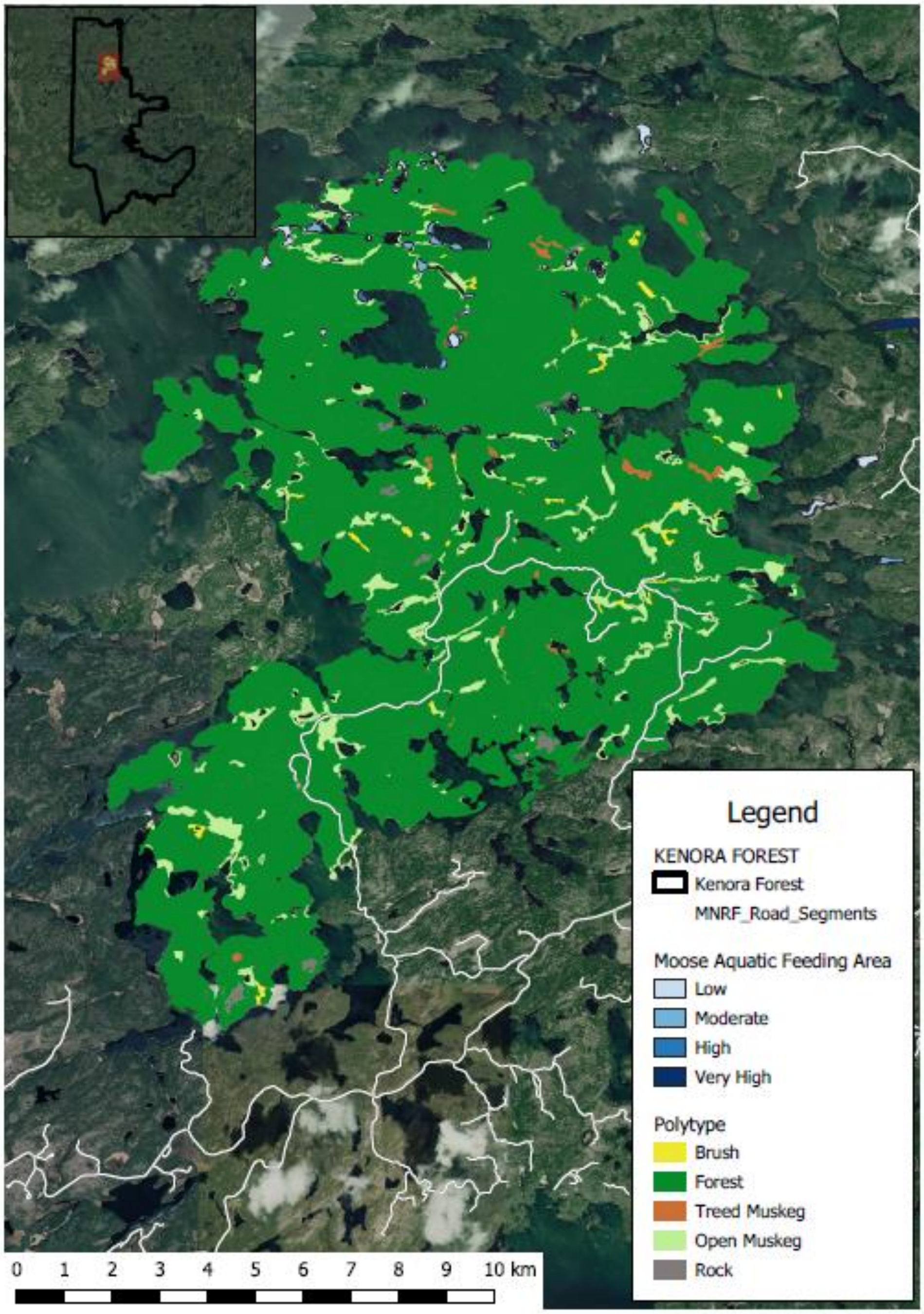
Habitat Classes at Plan Start for MEA3



Habitat Class (Plan Start)	Area (ha)	%	target %
Browse	550	3.5	5-30
Hardwood – Mixedwood	6607	41.6	20-55
Mature Conifer	1311	8.2	15-35
Young Conifer	6293	39.6	NA

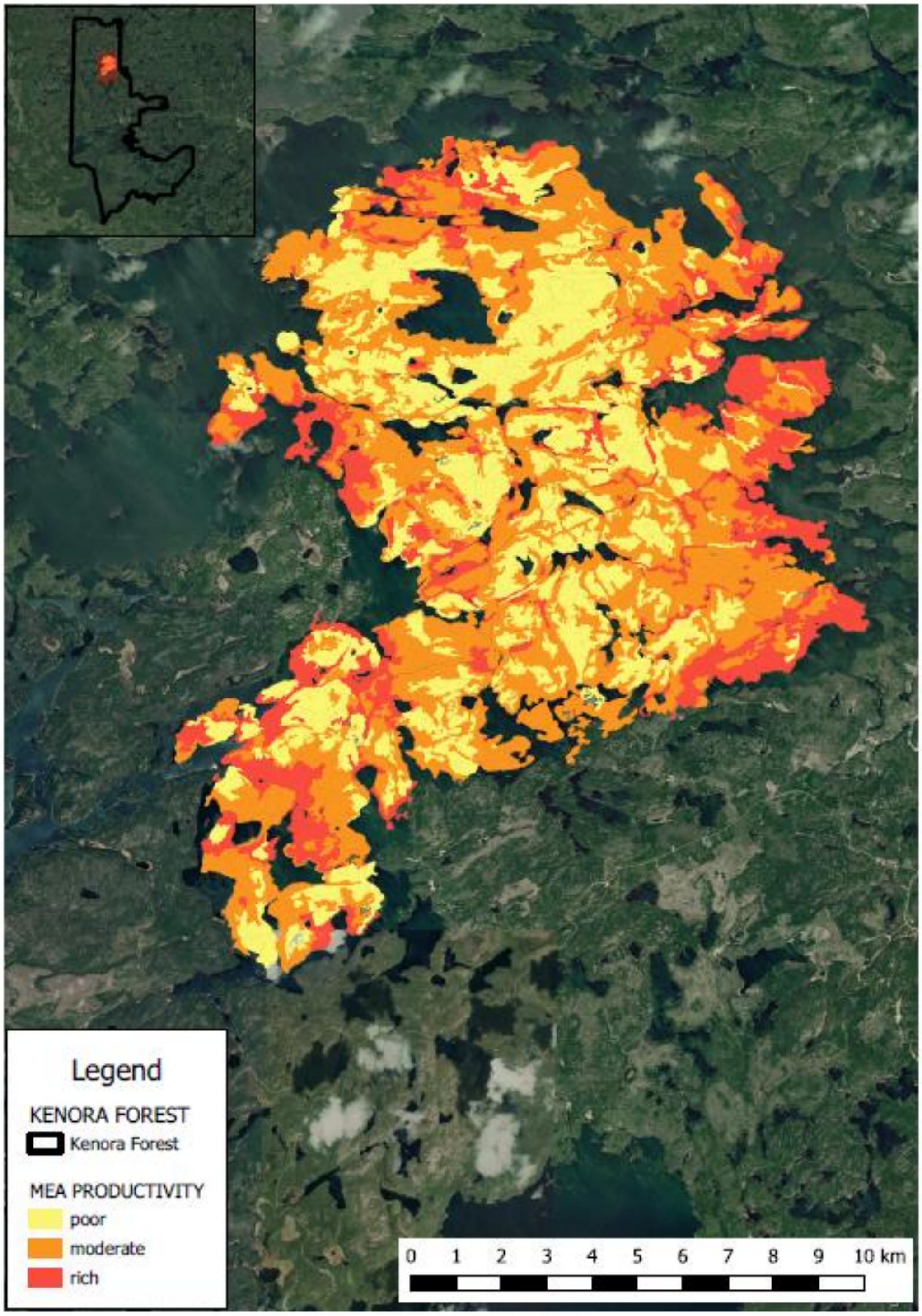
MEA4 – South English River

Polytype and Moose Aquatic Feeding Areas for MEA4



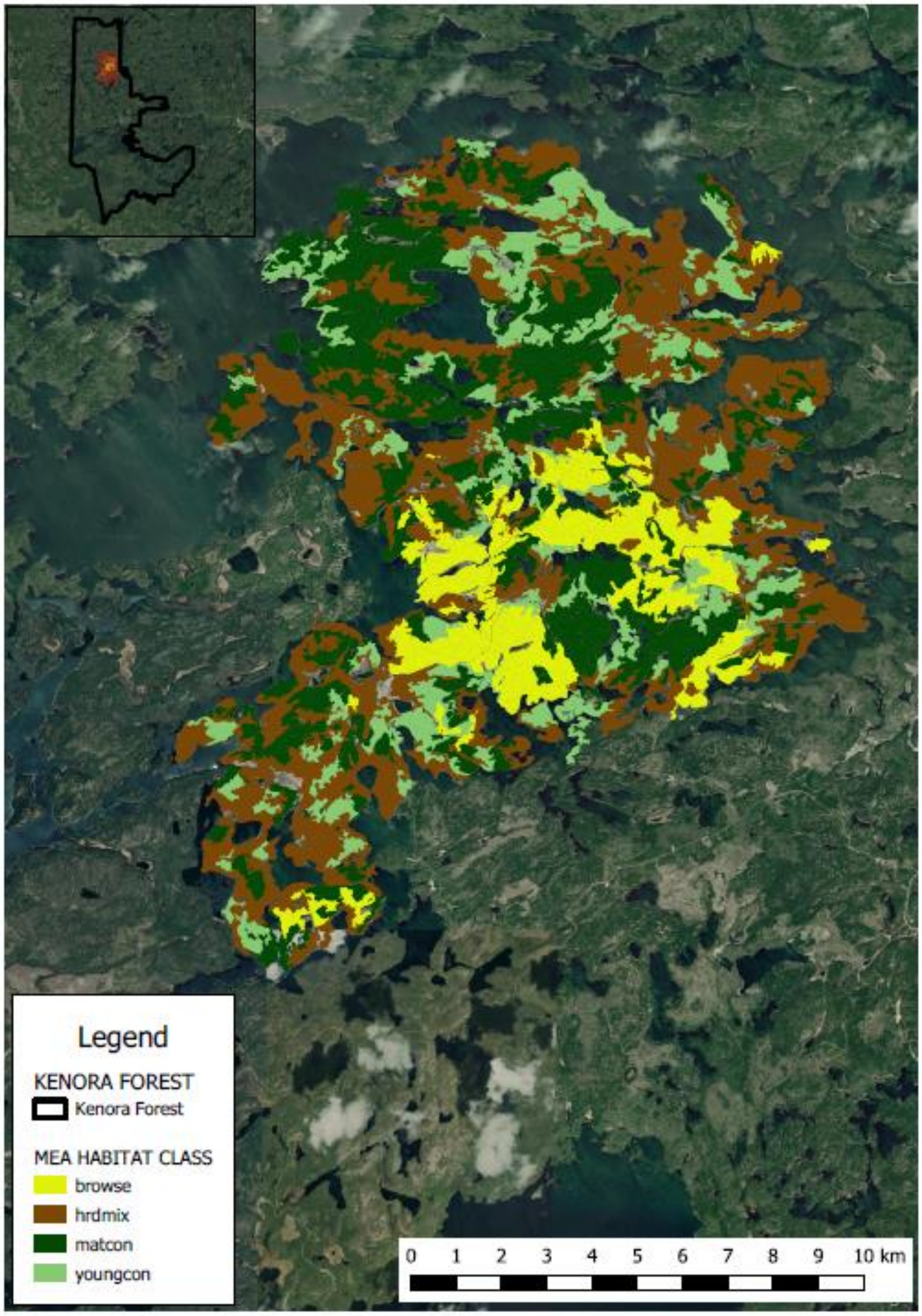
Polytype	Area (ha)	%
Brush	54	0.4
Open Muskeg	588	4.5
Treed Muskeg	54	0.4
Rock	38	0.3
Forest	12222	94.3

Ecosite productivity for MEA4



Productivity	Area (ha)	%
Poor	2466	19.0
Moderate	6292	48.6
Rich	4160	32.1

Habitat Classes at Plan Start for MEA4



Habitat Class (Plan Start)	Area (ha)	%	target %
Browse	1720	13.3	5-30
Hardwood – Mixedwood	4629	35.7	20-55
Mature Conifer	3916	30.2	15-35
Young Conifer	1942	15.0	NA

FINAL PLAN NOTE: Revised Discussion of Habitat in Moose Emphasis Areas

In summer 2021, a number of fires impacted the Kenora Forest land base during the preparation of the Kenora Forest 2022 Forest Management Plan (FMP). Two of these fires occurred within two of the four identified Moose Emphasis Areas (MEAs) and served to shift the habitat composition of these areas from what was apparent earlier in the planning process and provided a new context in which to consider proposed harvest in these areas. This write-up will summarize those changes, particularly as they relate to indicators for the availability of browse, mature conifer and hardwood-mixedwood stands (Indicator 4a) and young forest patch size (Indicator 4b) as they are found in FMP Table-10 and used to evaluate the sustainability of the Forest Management Plan throughout its ten-year cycle.

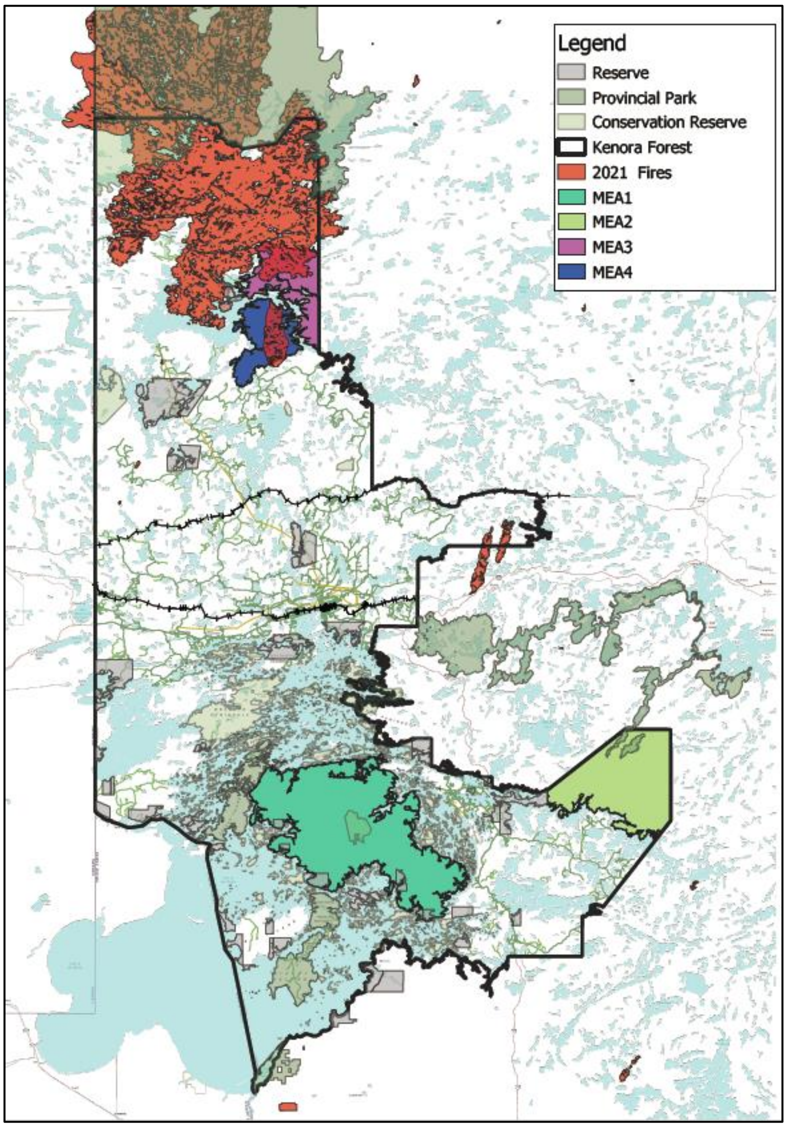


Figure 1. Moose Emphasis Areas in the 2022 Kenora Forest FMP. 2021 Forest Fire boundaries recent as of September 23, 2021.

As indicated in Figure 1, the extent of the 2021 fires in the Kenora Forest were limited to MEAs 3 and 4. Moose Emphasis Area 3 was impacted by KEN051 and MEA 4 was impacted by KEN027 (Figure 2).

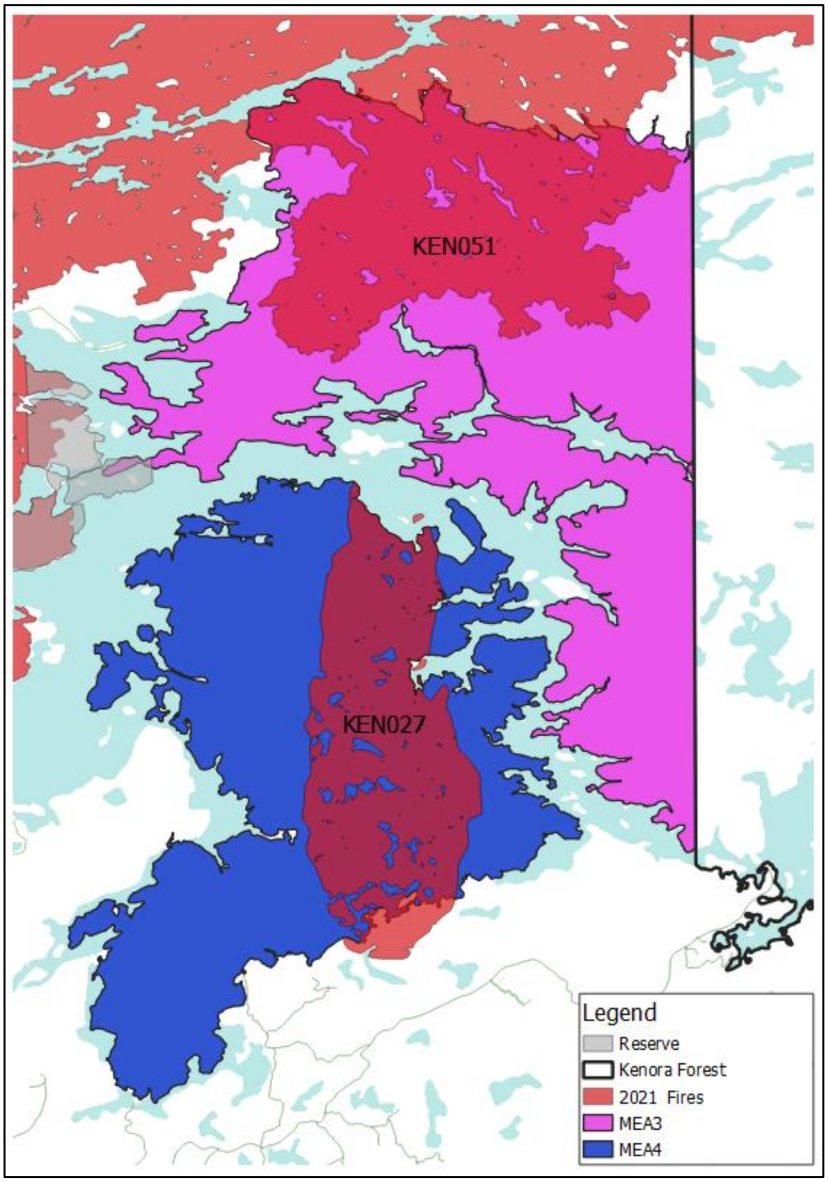


Figure 2. Moose Emphasis Areas 3 and 4 in the 2022 Kenora Forest FMP. 2021 Forest Fire boundaries recent as of September 23, 2021.

The assessment of Indicator 4a is based on the proportion of the three habitat types as they occur within a delineated MEA and where a fourth habitat type, young conifer, is also evaluated but not treated as an indicator. As per Indicator 4a in FMP-10, the desired proportion of browse within an MEA is 5 – 30%, for hardwood-mixedwood is 20-55% and for mature conifer is 15-35% of an MEA.

Table 1. Kenora Forest 2022 FMP MEA habitat proportions prior to Summer 2021. Plan End levels include forest maturation and planned harvest until 2032.

	Plan Start level (2022)				Plan End level (2032)		
	Browse	HRDMX	MATCON		Browse	HRDMX	MATCON
	5-30%	20-55%	15-35%		5-30%	20-55%	15-35%
MEA1	3%	43%	37%		5%	41%	37%
MEA2	13%	34%	44%		19%	31%	38%
MEA3	3%	42%	8%		8%	36%	9%
MEA4	13%	36%	30%		12%	33%	31%

Table 2. Kenora Forest 2022 FMP MEA habitat proportions following Summer 2021. Plan End levels include forest maturation and planned harvest until 2032.

	Plan Start level				Plan End level		
	Browse	HRDMX	MATCON		Browse	HRDMX	MATCON
	5-30%	20-55%	15-35%		5-30%	20-55%	15-35%
MEA1	3%	42%	36%		5%	40%	37%
MEA2	13%	32%	43%		22%	28%	34%
MEA3	42%	32%	8%		39%	33%	11%
MEA4	38%	28%	20%		39%	25%	21%

As indicated in Tables 1 and 2, the calculated proportions of browse, hardwood-mixedwood and mature conifer changed from Plan Start to Plan End. These changes are based on maturation of forest stands as well as the planned harvest of hardwood-mixedwood and mature conifer stands in the duration of the ten-year plan. The planned harvest of hardwood-mixedwood and mature conifer stands creates additional browse, as does natural disturbance i.e. fire, and allows for browse quantities to increase.

Following the Summer 2021 fires the proportions of available browse, hardwood-mixedwood and mature conifer stands (Table 2) varied in comparison with those values calculated previously (Table 1). Notably, the quantities of browse at Plan Start (2022) for MEAs 3 and 4 is much higher than originally calculated. For MEA 3, the quantity of available browse at Plan Start went from 3% (Table 1) to 42% (Table 2). For MEA 4, the quantity of available browse at Plan Start went from 13% (Table 1) to 38% (Table 2). Corresponding to this there were drops in the proportions of hardwood-mixedwood and mature conifer stands although changes in the value of these proportions were ≤ 10% when comparing pre-2021 fire values to post-2021 fire values. As expected, for MEAs 3 and 4 there now remains a considerable quantity of browse at Plan End (2032) as the calculation of browse is based on any forest stand < 35 years old and the plan only extends for ten years. Calculated habitat indicator values remained largely unchanged for MEAs 1 and 2 which were not impacted by the Summer 2021 fires but were refined somewhat from the original Plan Start calculations which were done in May 2020.

The calculation of young forest patch (YFP) size occurs using Ontario's Landscape Tool. The calculation of YFP occurs at a 15 ha hexagonal scale and classes the proportion of young forest patches occurring within certain size ranges and is used in considering the availability and spatial distribution of browse (as considered in Indicator 4a) throughout an MEA. Within MEAs, YFP are to occur or move toward the 1-100 ha, 101- 250 and 251-500 ha ranges with those larger size patches not preferred in meeting an assessment of achievement but where moving towards having YFP under 250 ha, and reduced patches above this size, is also evaluated as an indicator of success.

Table 3. Kenora Forest 2022 FMP MEA young forest patch size frequency prior to summer 2021 fires. Plan End levels include forest maturation and planned harvest occurring until 2032.

	Plan Start level (2022)					Plan End level (2032)			
	MEA1	MEA2	MEA3	MEA4		MEA1	MEA2	MEA3	MEA4
<100	93%	65%	64%	37%		91%	62%	48%	83%
101-250	7%	17%	17%	32%		9%	28%	38%	15%
251-500	0%	11%	19%	4%		0%	10%	3%	2%
501-1000	0%	7%	0%	25%		0%	0%	11%	0%
1001-2500	0%	0%	0%	2%		0%	0%	0%	0%
2501-5000	0%	0%	0%	0%		0%	0%	0%	0%
5001-10 000	0%	0%	0%	0%		0%	0%	0%	0%
10 001 - 20 000	0%	0%	0%	0%		0%	0%	0%	0%
>20 000	0%	0%	0%	0%		0%	0%	0%	0%

Table 4. Kenora Forest 2022 FMP MEA young forest patch size frequency following summer 2021 fires. Plan End levels include forest maturation and planned harvest occurring until 2032.

	Plan Start level (2022)					Plan End level (2032)			
	MEA1	MEA2	MEA3	MEA4		MEA1	MEA2	MEA3	MEA4
<100	95%	67%	58%	54%		93%	64%	50%	83%
101-250	5%	13%	14%	19%		7%	25%	0%	0%
251-500	0%	12%	14%	0%		0%	7%	0%	0%
501-1000	0%	8%	0%	0%		0%	4%	0%	0%
1001-2500	0%	0%	0%	0%		0%	0%	0%	0%
2501-5000	0%	0%	0%	15%		0%	0%	0%	17%
5001-10 000	0%	0%	14%	11%		0%	0%	50%	0%
10 001 - 20 000	0%	0%	0%	0%		0%	0%	0%	0%
>20 000	0%	0%	0%	0%		0%	0%	0%	0%

The comparison of YFP pre and post 2021 fires indicates little change in expected values for MEAs 1 and 2 which were not impacted by large fires. The change in expected YFP proportions for these MEAs is based on changes in planned harvest areas that were considered throughout operational planning. Changes in the YFP at

Plan Start and Plan End are apparent for MEAs 3 and 4 which were impacted by the 2021 fires as well as changes in planned harvest.

For MEA 3 the revised YFP levels at Plan Start indicate that most patches still fall within the desired levels ≤500 ha but with some patches occurring in the 5001 – 10 000 range (one large patch due to the KEN051 fires). At Plan End however there is a change from YFP falling within or just over (501-1000 ha) the desired levels at Plan End (Table 3) to there being a 50-50 split of YFP occurring at the <100ha and 5001-10 000 ha levels (Table 4). This is due to most of YFP in this MEA, present at Plan Start, maturing into another habitat class over the ten years of the plan and where most planned harvest in this MEA was removed due to lower wood supply availability north of the English River following the 2021 fire season. Due to this, there only remains two YFP patches that occur in 2032 (one in the <100 ha and one in the 5001 – 10 000 ha ranges) (Figure 3).

For MEA 4, the proportion of YFP smaller than 500 ha is the same at 73% when considering pre-2021 fire and post-2021 fire values with a similar proportion of YFP occurring at larger YFP sizes. However, those YFP in the revised Plan Start values (Table 4) also encompass patches in the 2501-5000 and 5001 – 10 000 ranges instead of the 501-1000 and 1001-2500 ranges (Table 3). This is due to the impacts of the KEN027 fire which was approximately 4000 ha in size and occurred almost entirely within this planned MEA. The revised Plan End values for this MEA shows this also with most patches (83%) falling into the <100 ha size class with 13% of patches in this MEA falling in to the 2501-5000 ha range. As indicated in Figure 4, this translates into five patches occurring at Plan End in the 1-100 ha range and one patch falling into the 2501-5000 ha range.

Changes to the habitat composition and YFP of MEAs 3 and 4 due to the Summer 2021 fires on the Kenora Forest will influence moose population growth locally. Forest fires are often seen as a positive precursor to moose population growth (in areas where moose are already present) due to the creation of browse interspersed within a mature forested area. It remains to be seen how 'patchy' the KEN051 and KEN027 fires were where they overlapped MEAs 3 and 4, respectively. More patchiness in the fire pattern will provide some unburnt stands for moose to use as cover habitat while accessing the newly created browse. A more complete fire will however limit the use of the fire-created browse in comparison with how forestry practices would have hopefully been able to emulate through harvesting in accordance with having sufficient quantities of hardwood-mixedwood and mature conifer (Indicator 4a) as well as in the configuration of YFP that allows for increased edge habitat preferred by moose (Indicator 4b).

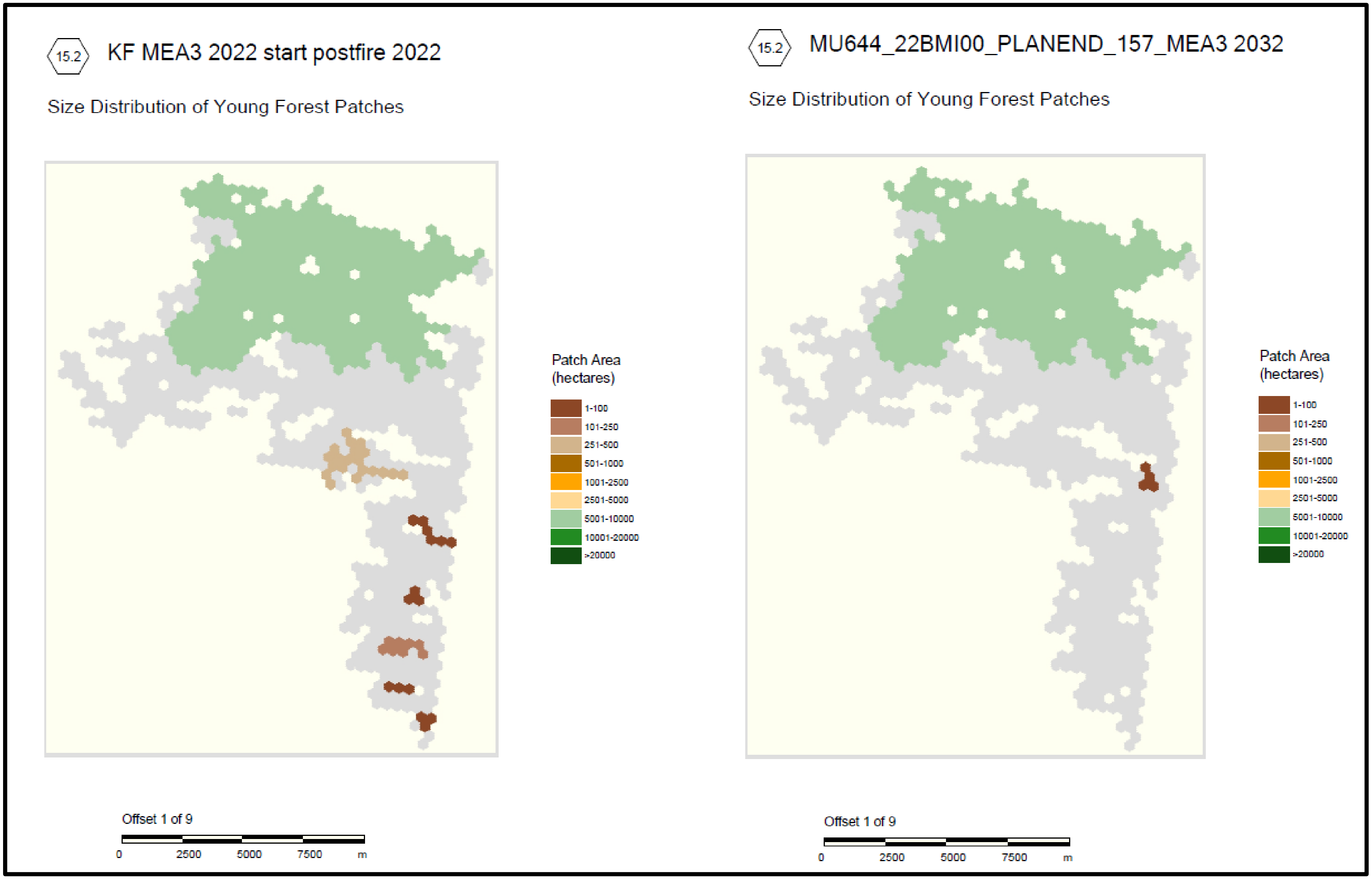


Figure 3. Revised YFP size frequency at Plan Start (left) and Plan End (right) for MEA 3 in the Kenora Forest 2022 FMP

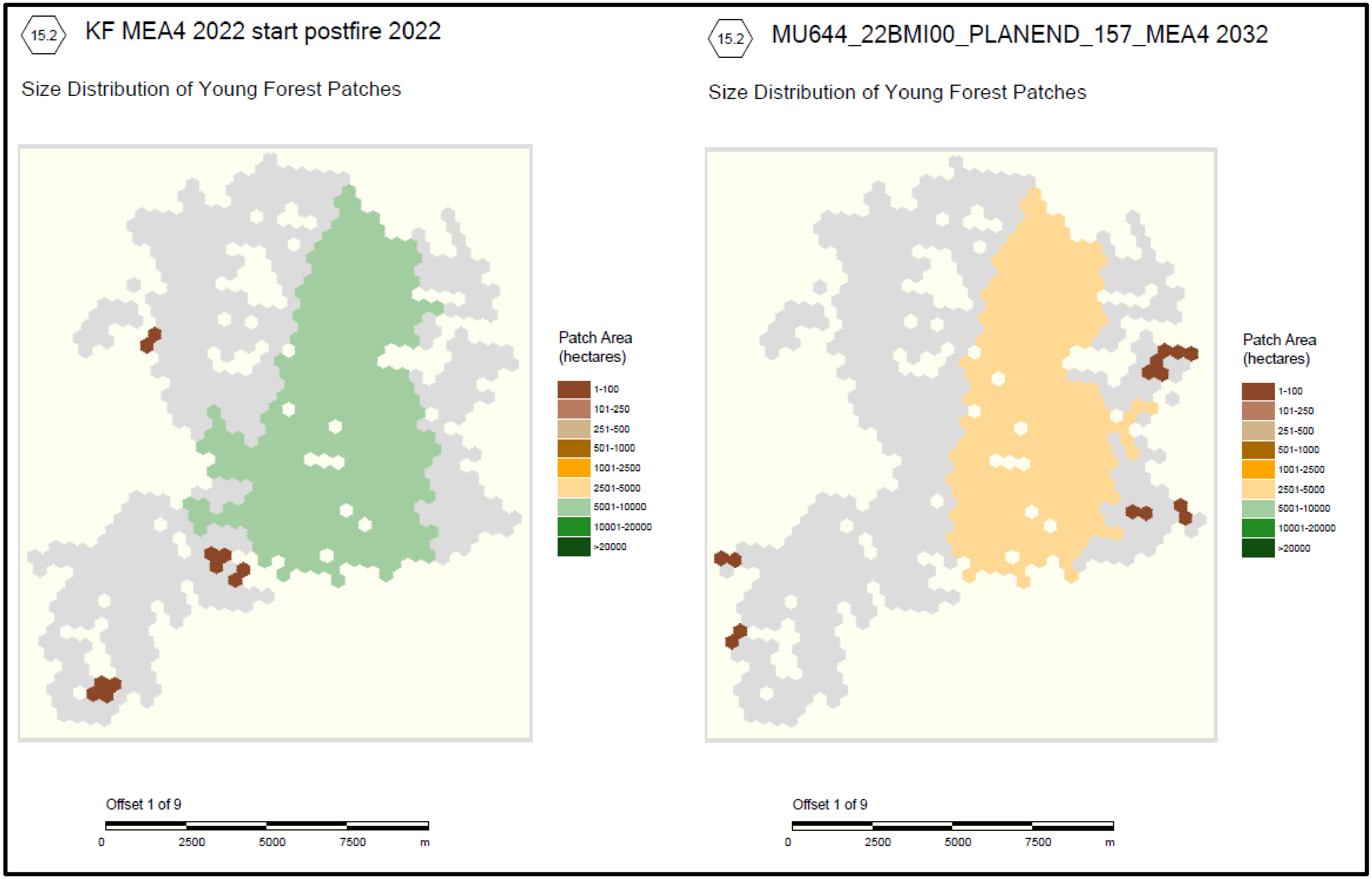


Figure 4. Revised YFP size frequency at Plan Start (left) and Plan End (right) for MEA 4 in the Kenora Forest 2022 FMP

7

Appendix 3

Deer Emphasis Area Delineation

and Identification of Critical Thermal Cover

Deer Emphasis Area Delineation and Identification of Critical Thermal Cover for the 2022 Kenora Forest FMP

May 3, 2020

Deer Emphasis Area Delineation and Identification of Critical Thermal Cover for the 2022 Kenora Forest FMP

1.0 Introduction

The identification of Deer Emphasis Areas for use in Forest Management Planning are 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 2022 Kenora Forest FMP and which will be in effect over the 2022-2032 plan cycle.

Key consideration for setting habitat objectives related to DEAs is available in the Stand and Site Guide (S&SG) as well as in the Cervid Ecological Framework (CEF). The DEA in place for the 2012 Kenora Forest FMP was also instructive as the DEA used for the 2022 plan is, with some alterations, geographically the same as from the 2012 plan. To this extent, the geographic boundaries of the Kenora Forest DEA is based on field work that went into the delineation of deer winter habitat and followed the sampling 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 is 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 when seasonal winter conditions are colder and have increased snow depths that act to depress deer populations and where warmer winters with less snow do the opposite. As such the maintenance of winter cover helps maintain deer populations during winters that are considered moderate or severe.

Due to winter cover having a strong link to deer population growth and the potential for these stands to be allocated and harvested through forestry, the development of large landscape patch prescriptions is necessary. Other measures used in the consideration of seasonal deer habitat occurs through meeting the various landscape indicators discussed in the Boreal Landscape Guide, and measured using Ontario's Landscape Tool, including 'Young Forest Patch Size' and 'Area of Mature Conifer-Dominated Landscape Class.' Landscape Guide indicators represent the state of a forest in its having a quantity and configuration of forest patches that is within a range of variation expected of a forest ecosystem impacted by various natural disturbances (fire, insect outbreaks, etc.) but which may be less prevalent due to the management of timber supply and forest fire prevention. To this extent, the whole forest can be considered as potential white-tailed deer habitat but where the consideration of DEAs is a specific tool in meeting deer population objectives that are in place at scales separate from that of the Forest Management Unit, namely 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.

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 emphasize species-specific cervid habitat direction (e.g. moose) contained in Forest Management Guides."

There are three unique CEZs overlapping the Kenora Forest which identify varying population and habitat management considerations (Figure 1). Each CEZ is made up of a number of WMUs which is the spatial scale that cervid species are regulated through Ontario's big-game harvest licensing system.

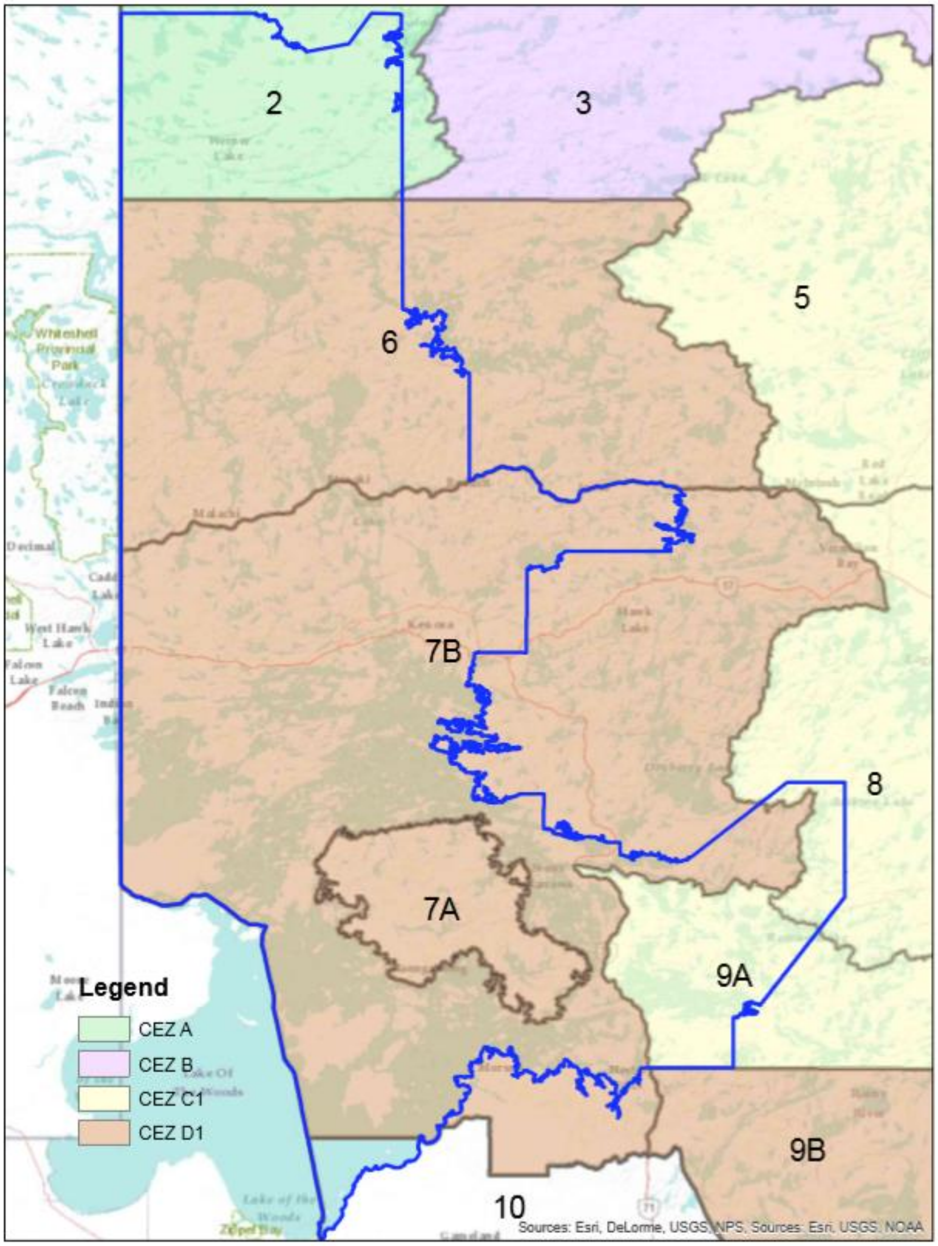


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Figure 1 Cervid Ecological Zones and Wildlife Management Units overlapping the Kenora Forest

The habitat direction provided for CEZs A, C1 and D1 in the CEF indicates how deer habitat should be considered in forest management planning. For CEZs A and C1 deer habitat management should not be emphasized. This includes the portions of the Kenora Forest overlapping WMUs 2, 8 and 9A. 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, 7A and 7B that overlap the Kenora Forest.

1.2 Cervid Ecological Framework Overarching Population Guidance and Wildlife Management Unit Specific Population Densities and Objectives

Cervid Ecological Framework Overarching Population Guidance: Population objectives for deer vary by CEZ and are measured based on deer seen per hunter day within each WMU (Table 1). Annual deer seen per hunter day estimates are used to inform on the health of deer populations and inform licensed harvest opportunities for the proceeding hunting season.

Table 1 Target deer population densities for WMUs overlapping the Kenora Forest

WMU	CEZ	Target deer density	NWR CEZ ecological population range (deer seen per hunter day)
2	A	Low	0.20 – 0.40
6	D1	Moderate	1.40 – 2.35
7A	D1	Moderate	1.40 – 2.35
7B	D1	Moderate	1.40 – 2.35
8	C1	Low	0.95 – 1.35
9A	C1	Low	0.95 – 1.35

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 Kenora Forest 2022 FMP. In addition, as no deer wintering areas have been identified in WMU 7A, it was excluded from further consideration in DEA placement.

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 lower population objective for both WMUs 6 and 7B. This has been evident based on hunter postcard data received since 2013 where previous to this, 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 two successive severe winters which served to considerably reduce deer numbers in these WMUs.

2.0 Deer Winter Habitat Availability in the Kenora Forest

The availability of deer winter habitat can be considered in multiple ways. Annual deer seen per hunter day estimates provide information on deer population numbers and give an indication of overall habitat quality. Other measures include the use of aerial survey techniques to identify deer winter habitat and the use of annual snow depth indices to assess winter severity as impacting deer populations.

2.1 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.

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 6 indicates eight mild, three moderate and nine severe winters (Figure 2). Alternately, SDI readings from WMU 7B indicate eight mild, four moderate and eight severe winters (Figure 3). The most severe winter for both WMUs 6 and 7B was 2013-2014.

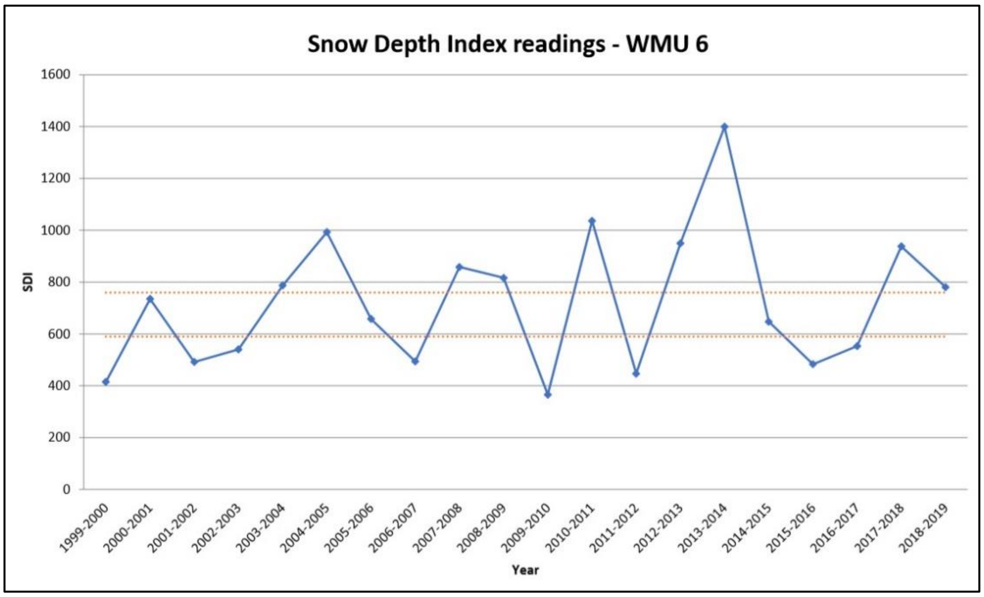


Figure 2 Snow Depth Index range for WMU 6 from 1999/2000 to 2018/2019

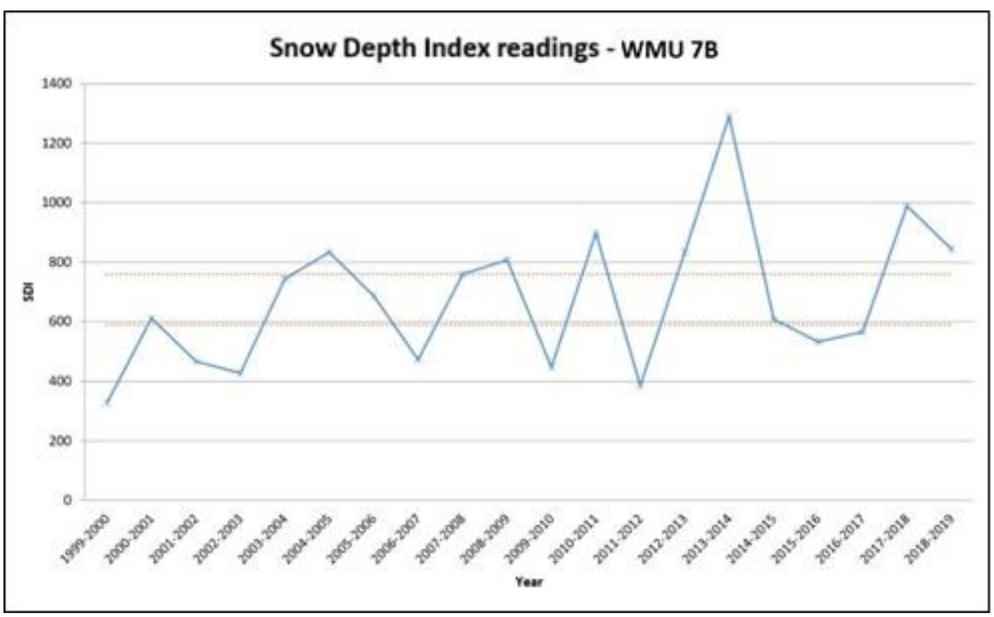


Figure 3 Snow Depth Index range for WMU 7B from 1999/2000 to 2018/2019

2.2 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 Kenora Forest has been surveyed and assigned into strata (Figure 4).

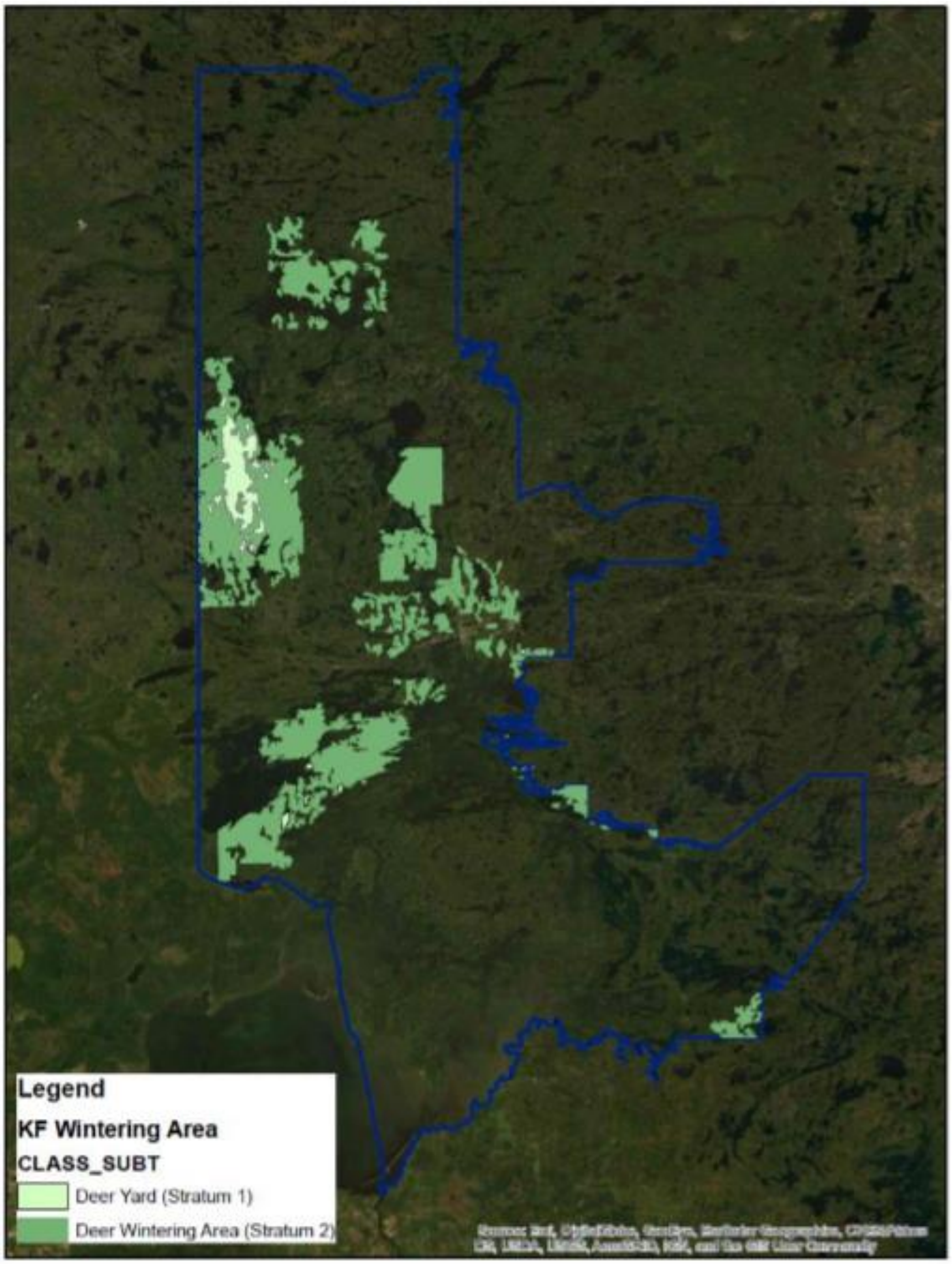


Figure 4 Identified deer winter areas in the Kenora Forest.

Completed deer winter habitat surveys in the Kenora Forest indicate multiple areas consisting of Stratum 2 deer habitat with relatively few areas identified as Stratum 1 habitat. The identification of Stratum 1 habitat formed the basis for the 2012 Kenora Forest FMP DEA and is the basis for the 2022 Kenora Forest FMP DEA also.

3.0 Assessment of Critical Thermal Cover in Kenora Forest 2022 Deer Emphasis Area

As per direction provided in the S&SG regarding the maintenance of Critical Thermal Cover (CTC) within Stratum 1 habitat, various methods were used in delineating which stands would be maintained during the 2022-2032 plan period.

3.1 Kenora Forest 2022 Deer Emphasis Area

The delineation of the 2022 DEA in the Kenora Forest was done through overlapping identified Stratum 1 habitat with forest stand boundaries present in the Kenora Forest 2022 BMI. This was done through using the 'select by location' tool in ArcMAP and resulted in a slightly different DEA outline than that used in the 2012 plan. In addition, for the 2022 Kenora Forest FMP, the portion of Stratum 1 habitat on the Western Peninsula was not considered as it constitutes a relatively small area when separated from the adjoining conservation reserve where no forestry is permitted. The DEA to be applied in the 2022 plan is provided in Figure 5.

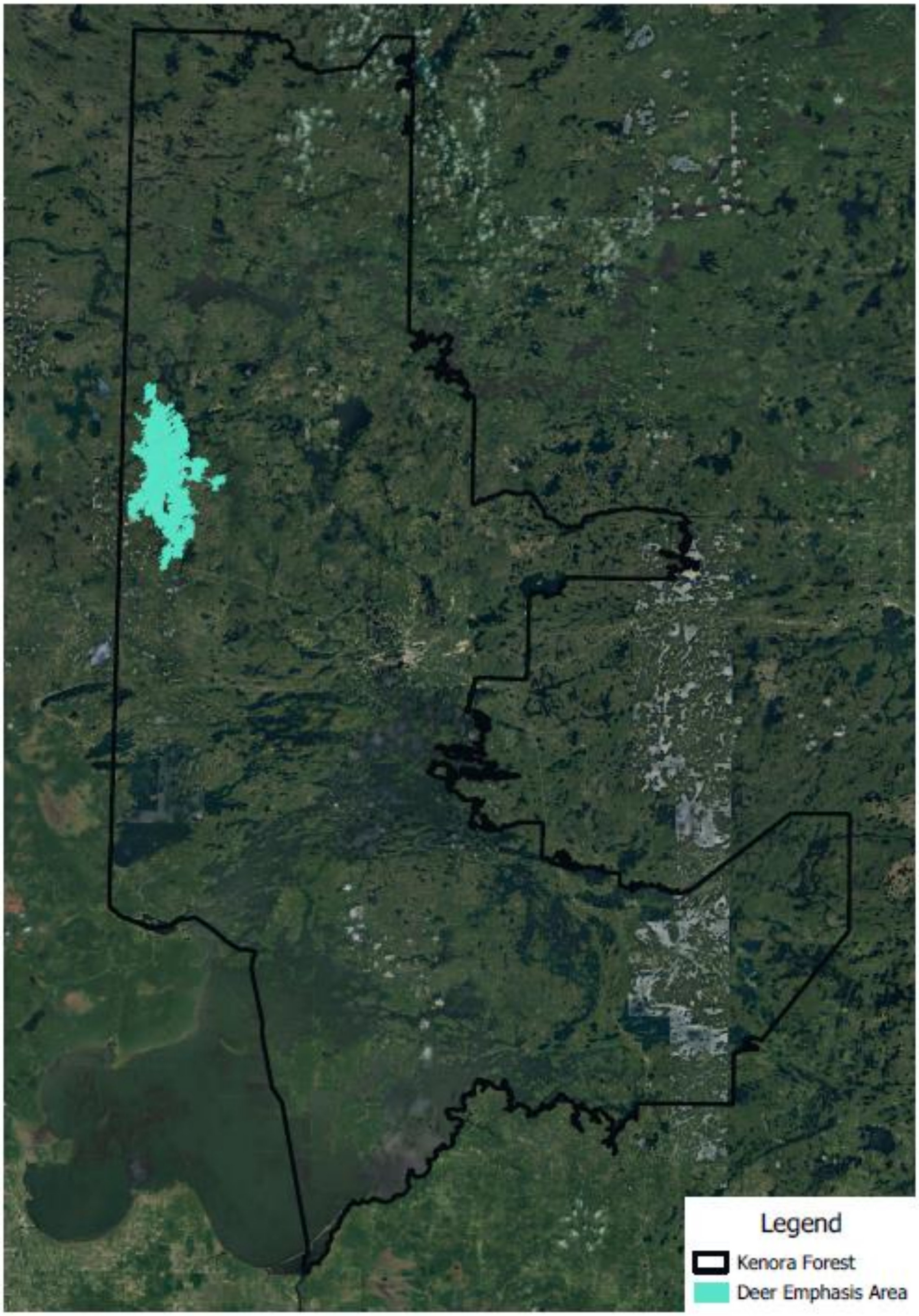


Figure 5. Delineated Deer Emphasis Areas in the 2022 Kenora Forest FMP

3.2 Calculation of Critical Thermal Cover

Two methods of delineating CTC were applied based on direction provided in the S&SG. The first calculation method was based on conifer-dominated stands where conifer stands provided a minimum canopy closure of 60% and have a minimum average height of 10m. Based on these parameters, a custom 'select by attributes' query was used in ArcMAP. The query and results from this analysis is presented in Table 2.

Table 2 Calculated Critical Thermal Cover (CTC) in the 2022 Kenora Forest Deer Emphasis Area. Critical Thermal Cover calculated based on portion of conifer-dominated stands providing a minimum canopy closure 60% and a minimum average height of 10m

CTC calculated based on stands over 10 m tall, canopy closure 60% or over and forest unit is conifer dominated	
"mht" >= 10 AND "mcclo" >= 60 AND ("SFU" = 'BfMx1' OR "SFU" = 'BfPur' OR "SFU" = 'ConMx' OR "SFU" = 'OCLow' OR "SFU" = 'PjDee' OR "SFU" = 'PjMx1' OR "SFU" = 'PjSha' OR "SFU" = 'SbDee' OR "SFU" = 'SbLow' OR "SFU" = 'SbMx1' OR "SFU" = 'SbSha')	
Size of Mapped Stratum 1 (FOR polytype only)	13,833 ha
10% of Mapped Stratum 1 (S&SG lower range)	1383 ha
30% of Mapped Stratum 1 (S&SG upper range)	4149 ha
Calculated Critical Thermal Cover	3273 ha (23.66%)

In the identification of conifer-dominated stands providing a minimum canopy closure of 60% and a minimum average height of 10m, 3273 ha of stands were available. This quantity amounts to 23.66% of forest stands within the Kenora Forest DEA.

The second option provided in the S&SG is to maintain 10 - 30% of Stratum 1 as CTC (Table 3). Calculation methods available for the identification of CTC were based on queries developed in Southern Region. This set of queries classifies different conifer dominated stands as providing varying degrees of winter cover based on stand heights > 10 m and stocking rate. 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.' 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 or having no conifer component.

Calculation of CTC by class indicated 5300 ha of CTC as Class 2-10. Accordingly, 38.31% of forested stands in the DEA are CTC. This amount is in excess of the amount that is to be retained based on the S&SG. Consideration of moderate CTC is based on those stands falling into classes 2-4 and makes up 3122 ha, or 22.57%, of forested stands in the DEA. Severe CTC, based on classes 5-10, amounts to 2179 ha or 15.75% of forested stands in the DEA.

Table 3 Calculated Critical Thermal Cover (CTC) in the 2022 Kenora Forest Deer Emphasis Area. Critical Thermal Cover calculated based queries used to apportion conifer-dominated stands over 10m tall as providing winter habitat qualified on a one-to-ten scale.

CTC 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 severe (5-10) winter cover	
Grp1 = ([m_bf] + [m_sw])* [mstkg] Grp2 = ([m_bf] + [m_sw] + [m_sb] + [m_pw])* [mstkg] Grp3 = ([m_bf] + [m_sw] + [m_sb] + [m_pw]+ [m_pr]+ [m_pj])* [mstkg]	
"mht" >= 10 AND "Grp3" >= 0	(1)
"mht" >= 10 AND "Grp3" >= 30	(2)
"mht" >= 10 AND "Grp2" >= 30	(3)
"mht" >= 10 AND "Grp1" >= 30	(4)
"mht" >= 10 AND "Grp3" >= 60	(5)
"mht" >= 10 AND "Grp3" >= 60 AND "Grp2" >= 30	(6)
"mht" >= 10 AND "Grp3" >= 60 AND "Grp2" >= 60	(7)
"mht" >= 10 AND "Grp3" >= 60 AND "Grp2" >= 30 AND "Grp1" >= 30	(8)
"mht" >= 10 AND "Grp3" >= 60 AND "Grp2" >= 60 AND "Grp1" >= 30	(9)
"mht" >= 10 AND "Grp3" >= 60 AND "Grp2" >= 60 AND "Grp1" >= 60	(10)
Size of Mapped Stratum 1 (FOR polytype only)	13,833 ha
10% of Mapped Stratum 1 (S&SG lower range)	1383 ha
30% of Mapped Stratum 1 (S&SG upper range)	4149 ha
Calculated Critical Thermal Cover (Class 2-10)	5300 ha (38.31%)
Calculated 'Moderate' CTC (Class 2-4)	3122 ha (22.57%)
Calculated 'Severe' CTC (Class 5-10)	2179 ha (15.75%)

Further review of model results based on the identification of access, moderate and severe cover indicated differences in quantity and spatial distribution. Table 4 indicates relatively low proportions (<5%) of CTC being ranked as Class 6 or above and where the stands ranked as Class 5 make up the majority of identified severe CTC. No Class 8 stands and only a single Class 10 stand were identified.

Calculated average stand size indicates severe CTC stands tends to be larger. Based on the average stand size of 17 ha those stands identified as severe CTC are 21 ha. On average Class 5 stands are 22 ha and Class 6 stands are 37 ha each. Class 7-10 stands all have average stand sizes under 17 ha indicating they are smaller than average.

Table 4 Quantity and availability of Critical Thermal Cover in the 2022 Kenora Forest DEA

Cover Class	Cover Type	# stands	Amount (ha)_	Amount (%)	Average (ha)
0	No Class	181	2975	21.50	16
1	Access	312	5559	40.18	18
2	Moderate	80	1493	10.79	19
3	Moderate	79	981	7.09	12
4	Moderate	37	647	4.68	17
5	Severe	69	1489	10.76	22
6	Severe	8	299	2.16	37
7	Severe	21	306	2.21	15
8	Severe	0	0	0.00	0
9	Severe	7	79	0.57	11
10	Severe	1	6	0.04	6
TOTAL		795	13,835	100.00	17
Class 5 – 10 only		106	2179	15.75	21

The review of forest stands identified as severe CTC indicates a large portion as jack pine dominant (64.50%) followed by smaller portions of coniferous mix (11.01%) and black spruce lowland (10.50%) (Table 5). The average size of stands falling into Class 5-10 is 21 ha. Coniferous mix stands are the largest on average at 27 ha (Table 5).

Table 5 Forest Unit breakdown for severe Critical Thermal Cover stands in 2022 Kenora Forest DEA

Forest Unit	# stands	Amount (ha)	Amount (%)	Average (ha)
BFM	**4**	**64**	**2.96**	**16**
BfMx1	3	59	2.69	20
BfPur	1	6	0.27	6
CMX	**9**	**240**	**11.01**	**27**
ConMx	9	240	11.01	27
PJD	**63**	**1405**	**64.50**	**22**
PjDee	38	873	40.04	23
PjSha	25	533	24.45	21
PJM	**9**	**164**	**7.52**	**18**
PjMx1	9	164	7.52	18
SBD	**3**	**44**	**2.03**	**15**
SbDee	3	44	2.03	15
SBL	**16**	**229**	**10.50**	**14**
SbLow	16	229	10.50	14
SBM	**2**	**32**	**1.48**	**16**
SbMx1	2	32	1.48	16
TOTAL	**106**	**2179**	**100.00**	**21**

PLANFU – Bold SFU – not bold

3.3 Identification of Critical Thermal Cover Stands

On March 19, the Landscape Task Team agreed 2179 ha of CTC would be retained for the duration of the 2022-2032 Kenora Forest FMP. The 2179 ha will consist of modelled severe CTC. Where there is a need for access through identified CTC stands, substitute moderate cover habitat may be selected following other operational considerations aimed at avoiding these areas. The Task Team chose not to include CTC as a listed objective in FMP 10 but rather address decisions regarding white-tailed deer habitat management through operational planning and documentation.

Based on preferred stands identified by the SFL on April 29, 2020, relative to harvest likely to occur within the Kenora Forest DEA over the ten-year term of the plan, 2147 ha of the 2179 modelled severe CTC will be retained (Figure 8). A minimum 32 ha of modelled moderate CTC will be retained to compensate for the severe CTC that could not be avoided and where increasing this amount is considered ideal in further meeting deer habitat management objectives. Retained quantities of severe and moderate CTC is within the range identified as a guideline within the S&SG for Stratum 1 deer winter habitat and is required for stable to increasing white-tailed deer population growth in this section of the Kenora Forest.

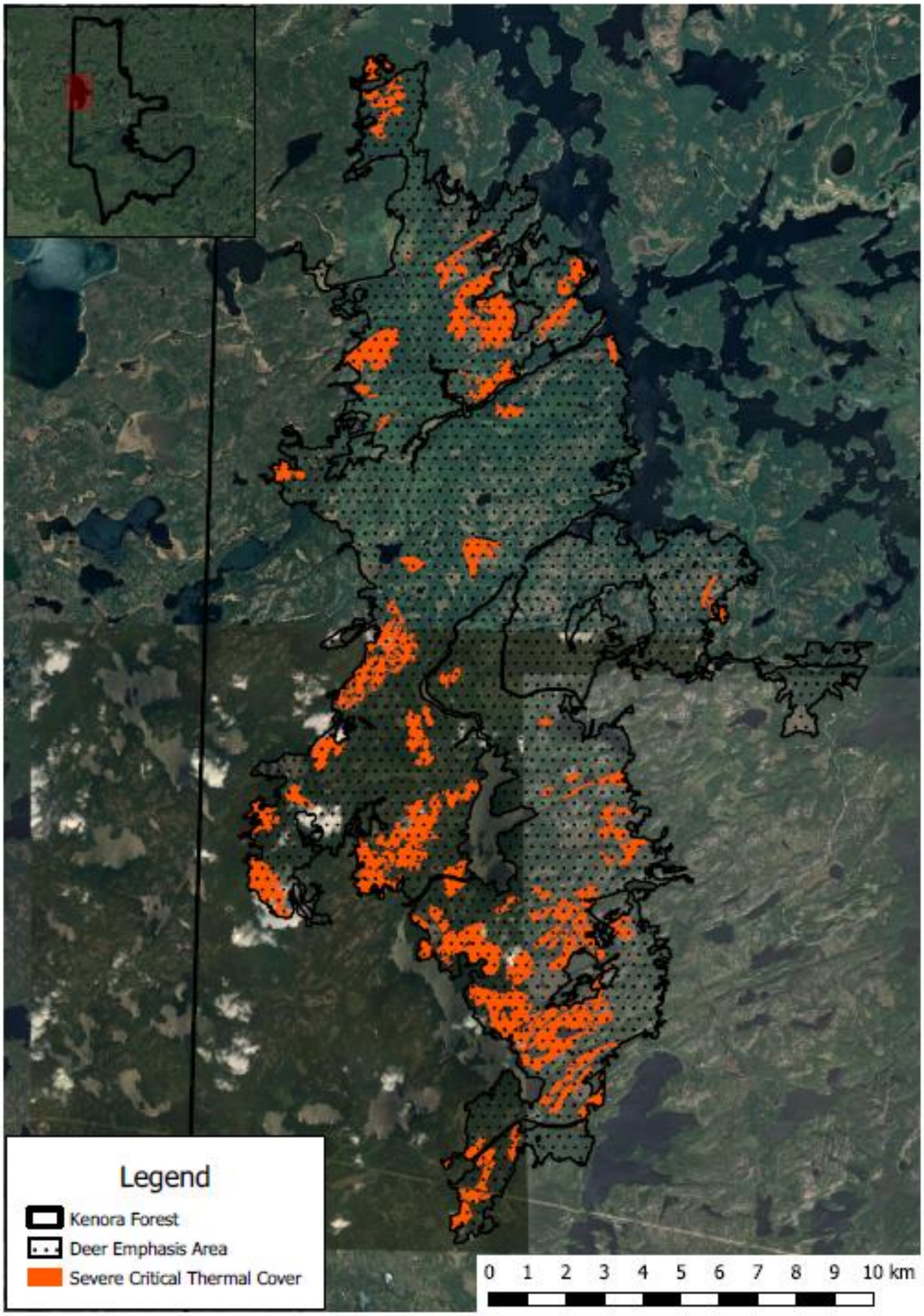


Figure 8 Mapped Severe Critical Thermal Cover in the Kenora Forest 2022 Deer Emphasis Area

Appendix 4

Elk Emphasis Area Delineation

for the 2022 Kenora Forest FMP

Elk Area Delineation for the 2022 Kenora Forest FMP

May 3, 2020

Elk Area Delineation for the 2022 Kenora Forest FMP

Introduction

Elk habitat management in the Kenora Forest is based on consideration of a translocated elk population that occurs in the southern portion of the forest. Over two years in 2000 and 2001, a total of 104 elk were transported from Elk Island National Park for the purpose of establishing an elk population in northwestern Ontario. While the translocated elk population in northwestern Ontario never grew beyond the number of released animals, a stable population of 35-45 animals remains in the area.

For elk there is existing policy on the need to manage habitat in relation to land and resource planning processes. This includes forestry where landscape indicators, based on the Boreal Landscape Guide and Ontario's Landscape Tool, are used to manage Forest Management Units within a simulated range of natural variation. The development of large landscape patches is a complimentary approach where there are additional species-specific population and habitat management objectives that require consideration in habitat/FMP planning. However, unlike woodland caribou, moose and white-tailed deer there is no direction in the Boreal Landscape Guide or Stand and Site Guide for the development of an elk large landscape patch. Elk habitat management based on the 2022 Kenora Forest FMP will therefore be based on stand level guidance informed through ongoing research and monitoring.

Cervid Ecological Framework Overarching Habitat Guidance

Guidance for the management of cervid species in Ontario occurs through the direction of the Cervid Ecological Framework (CEF). The CEF outlines population and habitat direction for cervid species through five different Cervid Ecological Zones (CEZs) in Ontario. Cervid Ecological Framework guidance indicates habitat management occurs through 'land and resource planning practices.' 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 emphasize species-specific cervid habitat direction (e.g. moose) contained in Forest Management Guides."

There are three unique CEZs overlapping the Kenora Forest which dictate unique population and habitat management considerations (Figure 1).

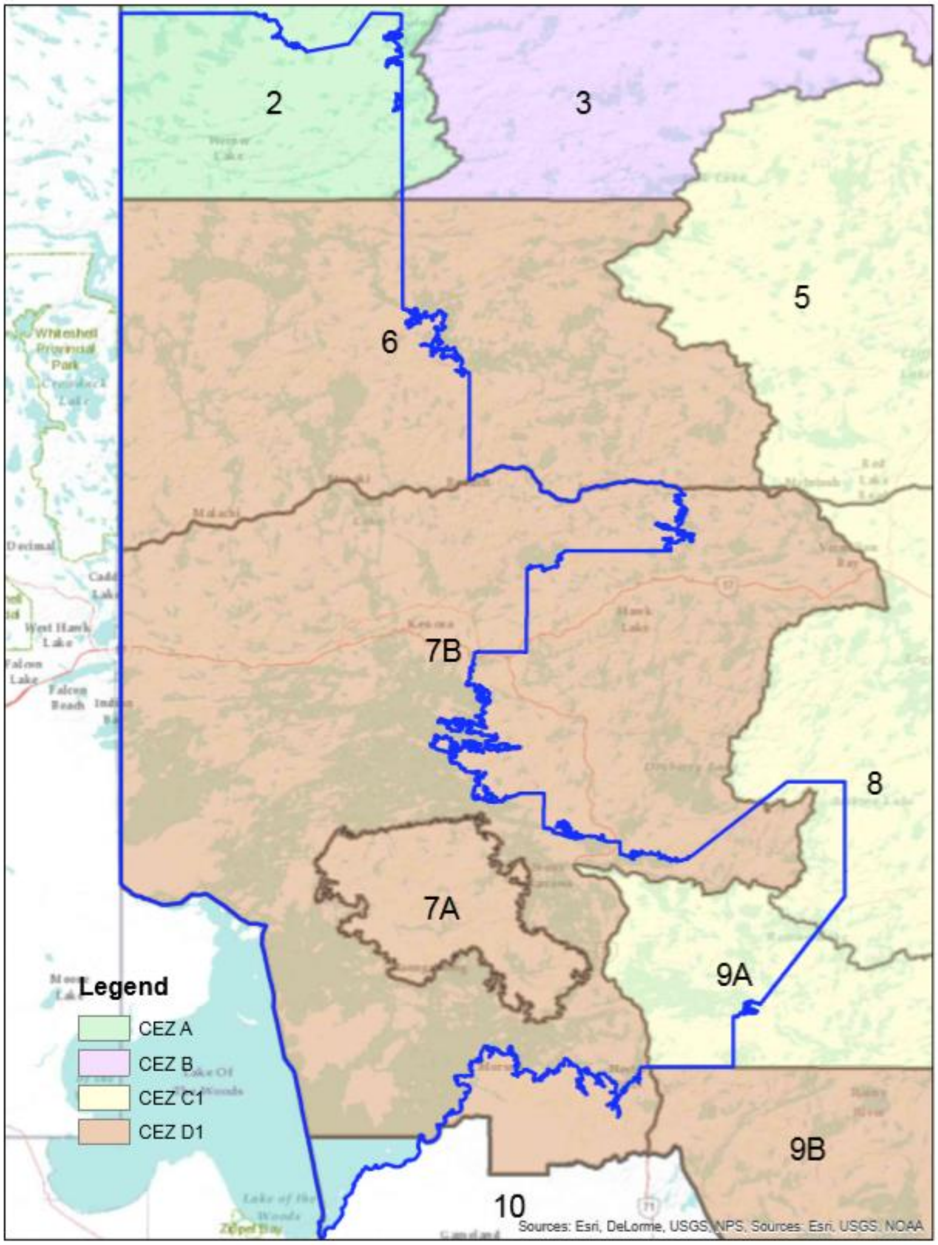


Figure 1 Cervid Ecological Zones and Wildlife Management Units overlapping the Kenora Forest

The habitat direction provided for CEZs A, C1 and D1 indicates how elk habitat should be considered in forest management planning. Direction for CEZ D1 indicates "elk habitat management may be considered and addressed at the local level (where appropriate as per species-specific policy direction)." Alternately for CEZ C1, it is indicated "western edge of zone may be considered for elk in CEZ D1 management." There are no elk considerations in CEZ A.

Ontario's Elk Management Plan, Strategy 3.A, indicates "Integrate elk habitat needs into land use planning and other resource management process to ensure adequate consideration and suitable management of elk habitat." It is the aim for 2022 Kenora Forest FMP to achieve this in the Elk Area.

Delineated Elk Area in the Kenora Forest

The area that will form the basis for elk habitat management in the Kenora Forest is identified in Figure 2. This area is based on the 2000 and 2001 elk release locations and existing policy guidance on where habitat management for elk should take place in Ontario.

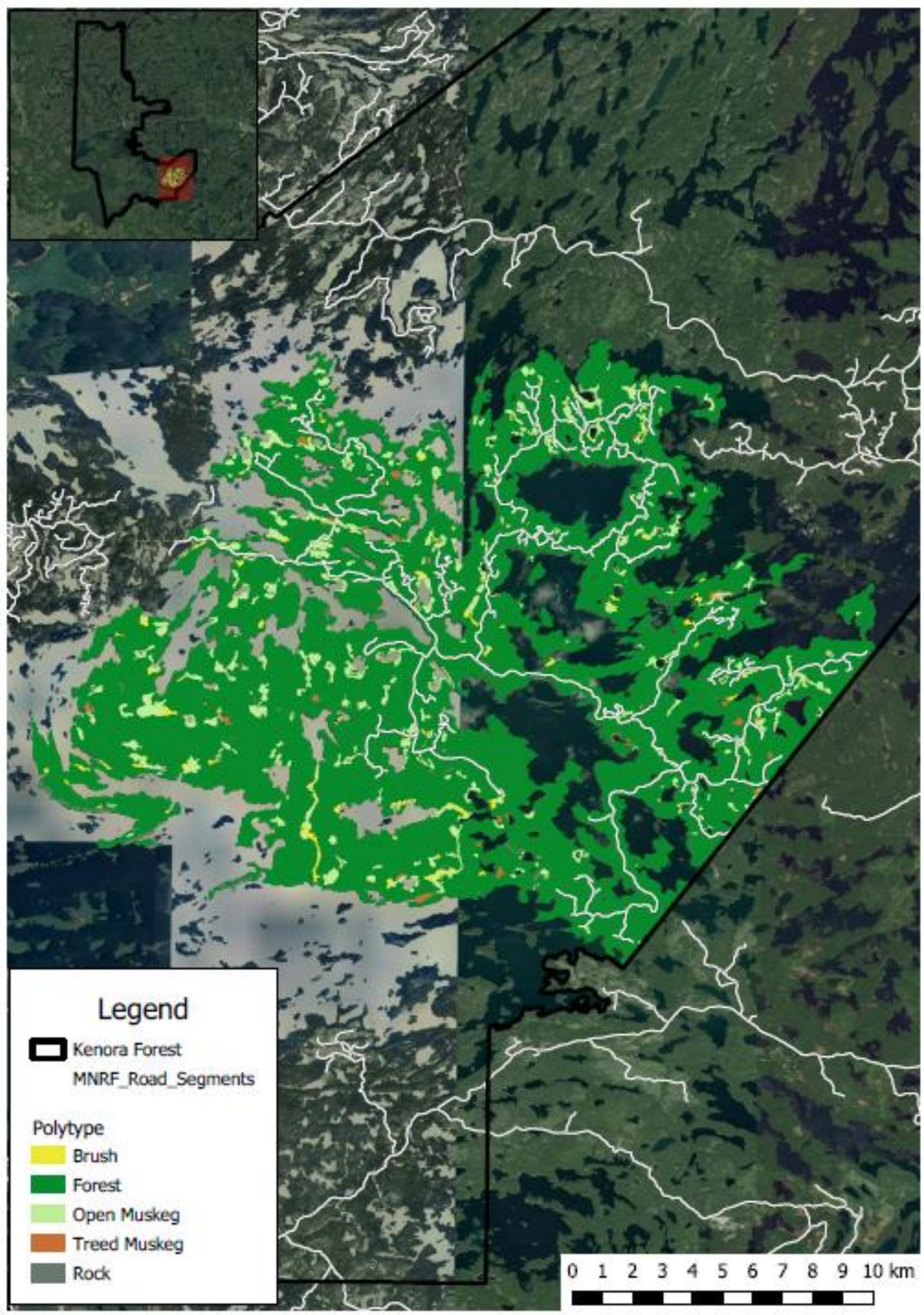


Figure 2 Kenora Forest 2022 Elk Area

Appendix 5

Plan Start Boreal Landscape Guide Indicator Analyses

Boreal Landscape Guide Indicator Analyses

Developing Simulated Range of Natural Variation 2022 Kenora Forest FMP

1.0 Introduction

The Simulated Range of Natural Variation (SRNV) provides the basis for desirable levels and targets of the landscape area amount and pattern desirable levels for the FMP. The *Forest Management Planning Manual* (FMPM), and the *Forest Management Guide for Boreal Landscapes* (Boreal Landscape Guide, BLG) both require the FMP to examine landscape amount and pattern. The SRNV for the Kenora Forest provided targets based on natural fire history, disturbance succession and weather patterns to assess how proposed areas selected for operations will influence the landscape forest composition and landscape pattern and to determine whether the proposed plan was to coincide with forest composition and pattern consistent with Simulated Range of Natural Variation.

2.0 Methodology

Please refer to the OLT Science Packages for methodology and calibration used in developing the SRNV. The Boreal Forest Landscape Dynamics Simulator (BFOLDS), a grid-based, spatially explicit model that contains a simulation module for Crown-fire regimes (FSM) and a vegetation transition module (VTM) was used to estimate ranges of variation in the Boreal Forest Region. BFOLDS simulates the fire regime and fire induced forest cover dynamics at broad spatial and temporal scales (>10 million hectares and >300 years) but used a relatively fine spatial scale for some processes (1-hectare spatial resolution). BFOLDS was a modelling tool developed specifically for modelling stand initiating fire, succession and post fire transitions in the Boreal Forest Region of Ontario.

OLT summarized BFOLDS simulation results for Ontario's Ecological Land Classification (ELC) Ecoregion 3S/4S, in which the Kenora Forest is located. The Kenora Forest is one of several management units that contribute to Ecoregion 3S/4S simulated landscape composition and pattern (map follows on next page).

Crins et al (2009) in *The Ecosystems of Ontario, Part 1: Ecozones and Ecoregions* describe the ecoregion as follows:

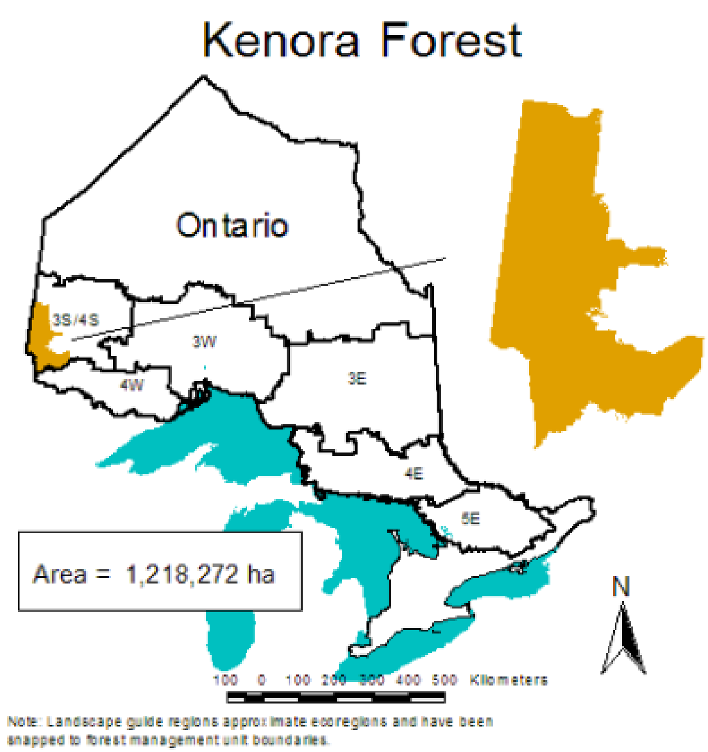
> The climate of the Lake St. Joseph Ecoregion (3S) is relatively dry and cold. The landscape of the ecoregion is characterized as a gently sloping plain of relatively shallow sandy and loamy tills over bedrock, broken at broad intervals by esker and moraine ridges, with pockets of glaciolacustrine clays in lower-lying

topographic positions. Coniferous forest dominates the landscape. Upland coniferous forest fire cycles range between 50 and 187 years, and the fires tend to be stand-replacing.

The climate of Ecoregion 4S (Lake Wabigoon Ecoregion) is relatively dry and cool. Substantial areas, especially in the west, are characterized by bedrock exposures with limited unconsolidated matter. There is a sizable area of bare and sparsely vegetated bedrock-dominated terrain in the western part of this ecoregion, where an intense fire regime, dry climate, and shallow substrate limit forest productivity. Upland coniferous forest fire cycles range between 50 and 187 years, and fires in these ecosystems tend to be stand replacing. Large fires have been common in the recent past, with the 1980s being a notable example.

The boundary between Ecoregions 4S and 3S is strongly correlated with elevation and geological differences, and is also supported by precipitation and temperature variables.

The SRNV calculated within OLT for the Kenora Forest is characteristic of Ecoregion 3S/4S, but is specific to the portion of the ecoregion in which it is located.



OLT Version 3.5.7324 (Jan. 20, 2020) and model inventory imports (linking model fields) was used for the FMP.

2.1 Analysis of 2022-2032 Planned Harvest to Achievement of SRNV

To remain consistent with the BFOLDS modelling foundational to OLT, the Planning Team ensured that only ownerships that are managed by the Crown were used to model the Kenora Forest in OLT. Only inventory polygons for managed Crown land (inventory ownership 1) and Parks and Protected Areas (ownerships 5 and 7) are imported and analyzed in Ontario's Landscape Tool. Patent land (ownerships 2, 3 and 4), Indian land (ownership 6) and Federal land (ownership 9) are deleted from the inventory prior to import and do not contribute to OLT analysis results.

The assessment of disturbance pattern is completed using OLT. This tool generated the measurable values as described above. Three scenarios were run using the tool:

<u>Whole Forest:</u>

Scenario 1:	Kenora Forest Plan Start 2022	(OLT: KF-2022)
Scenario 2:	Kenora Forest Plan End 2032 with LTMD harvest	(OLT: KF-2032 Harvest)

<u>Caribou Zone only:</u>

Scenario 3:	Kenora Forest – Caribou Zone - Plan Start 2022	(OLT: KF-2022car)
Scenario 4:	Kenora Forest – Caribou Zone - Plan End 2032 with LTMD harvest	(OLT: KF-2032car)

Scenarios 1 and 3 use the approved Base Model Inventory to determine existing Plan Start 2022 forest composition and disturbance patterns.

Scenarios 2 and 4 used the BMI aged 10 years to 2032 with the 10-year preferred harvest areas for operations from the LTMD assumed to be harvested (depleted and reflected as 1 year old "young" forest"). This provided a projection of future forest composition and disturbance patterns. Scenarios 2 and 4 included forest description attributes that were updated to reflect depleted age, height, year of origin, stocking and year of depletion. Stand composition was not updated for forecasted silviculture treatments or for expected future forest condition. Forest composition was assumed to stay the same and there were no changes for forest succession included.

The four scenario files were provided to MNRF for review and verification separately from the electronic FMP submission and do not form part of the public FMP.

2.2 Ontario's Landscape Tool Analysis

One of the key directions in the 2017 Forest Management Plan Manual (FMPM) was to develop an FMP with the best available science and information, new legislation, regulation and policy, and changes to forest conditions and land base (FMPM A-29). The Boreal Landscape Guide science package, prepared by science teams, was used as a reference for the estimated natural forest condition.

The goal of the landscape guide was to provide direction to forest managers on how to meet the objective of conserving biodiversity in an effective and efficient manner through landscape-level approaches, thereby contributing to the achievement of forest sustainability in an effective and efficient manner. The direction identifies and helps to set landscape mosaic goals and targets for forest composition (forest tree species groups and age classes), structure and pattern in forest management plans.

Landscape guide indicators measured in the Kenora Forest Management Plan are landscape area (amount) and landscape pattern (texture, or "patchiness") indicators. The following indicators of management objective achievement are measured by Ontario's Landscape Tool (OLT) and have desirable levels identified within OLT:

Indicator 1a - Amount – Caribou Habitat Area
Indicator 1b - Texture – Caribou Winter Habitat
Indicator 1c - Texture – Caribou Refuge Habitat

Indicator 2a - Amount – Landscape Class Area
Indicator 2b - Amount – Old Growth Area
Indicator 2d - Amount – Upland Conifer (Pure Pine and Spruce) Area
Indicator 2e - Amount – Young Forest Area

Indicator 3a – Texture of Mature and Old Forest
Indicator 3b – Frequency of Young Forest Patch Size by Size Class

Indicator 4a – Proportion of Moose Habitat in Moose Emphasis Areas (3 habitat types)
Indicator 4b – Frequency of Young Forest by Size Class in Moose Emphasis Areas

Please refer to the science packages embedded in OLT for a full detail of methodology and result interpretation. The BLG landscape indicator analyses results calculated in OLT are summarized below.

Note: BLG landscape pattern/texture analyses results calculated in OLT are used to assess objective achievement and are recorded in Table FMP-10 Assessment of Management Objectives. Additional discussion and rationale for indicator achievement is in FMP text Section 3.7.3.

Note: Amount of area for various BLG indicators, other than the landscape pattern/texture indicators, are projected within SFMM, as well as being calculated in OLT. BLG indicator areas projected in SFMM are summarized for modelling investigations in this Analysis Package Appendix 7 and in Appendix 8 for the Long-term Management Direction (LTMD). The OLT calculations for BLG indicator areas are discussed in the Analysis Package but were not used for medium-term nor Long-Term Management Direction reporting. OLT indicator area calculations were used to ensure calibration of the SFMM model resulted in similar projections for Plan Start (Analysis Package Section 6.2.6). SFMM projections for BLG indicator area are recorded in Table FMP-10 Assessment of Management Objectives.

The following summarizes the comparative analyses between the desirable levels for the indicator, the forest condition for Plan Start 2022 and Plan End with LTMD preferred harvest:

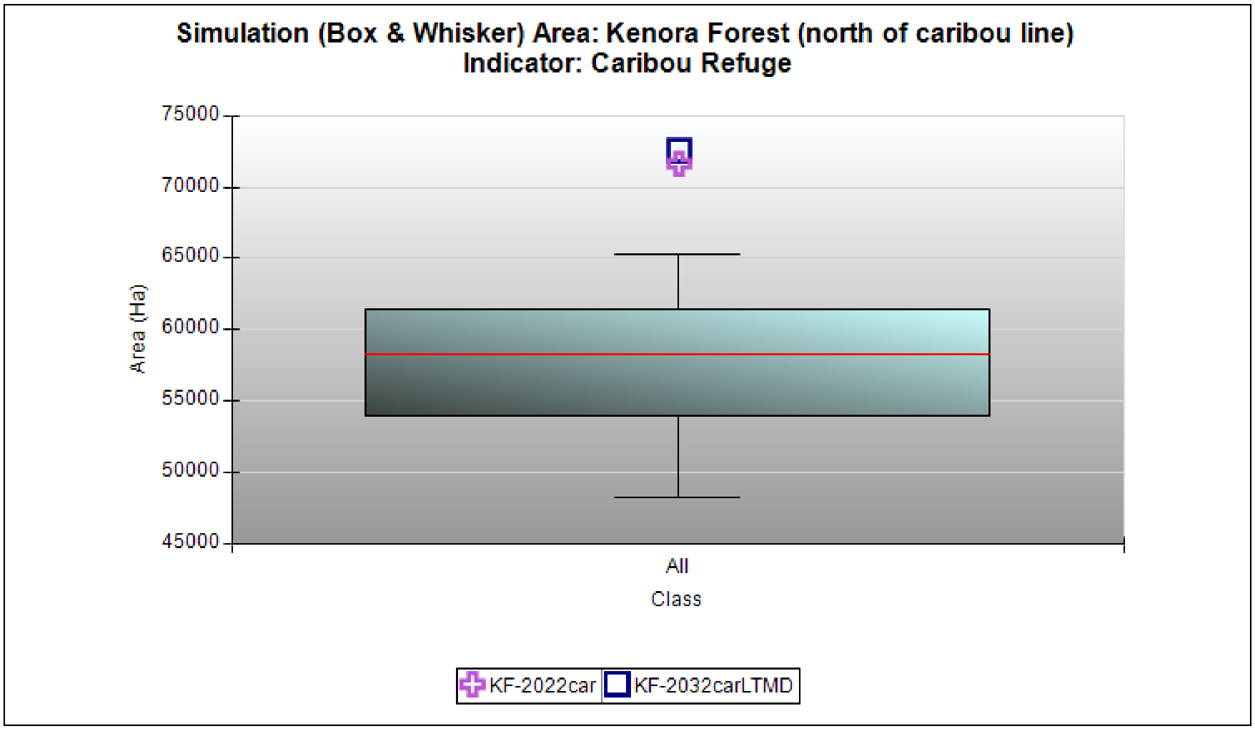
Indicator 1a – Amount - Caribou Habitat Area (refuge, winter-combined)

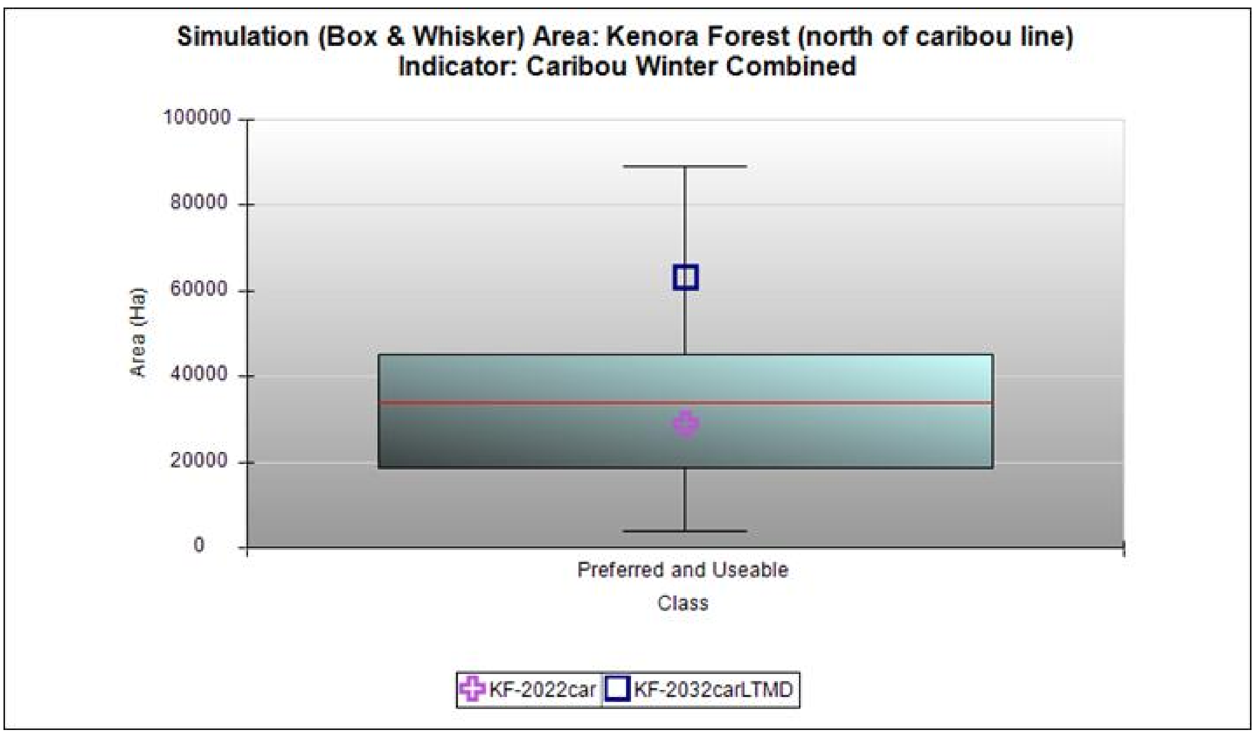
OLT was used to calculate the amount of caribou habitat types for Refuge and Winter Combined. SFMM was used for long-term assessment of objective achievement in Table FMP-10. OLT calculated the lower and higher Interquartile Ranges of the SRNVs for Caribou Refuge and Caribou Winter Combined habitats. These IQRs were used as the indicator desirable levels.

Caribou Habitat - Area

Value	Refuge	Winter Combined	
Lower Range	48,278	4,015	
Lower Quartile	54,045	18,667	min. targets for SFMM
Median	58,316	33,719	
Upper Quartile	61,458	45,161	
Upper Range	65,319	89,149	
KF-2022car	71,574	29,131	Plan Start Value
KF-2032carLTMD	72,457	62,820	Plan End with Harvest

PARTIALLY ACHIEVED: Caribou Refuge habitat is within the IQR (desirable level) and winter habitat is above the IQR at Plan Start. Both habitat types are projected to increase during the plan period with LTMD harvest. As this indicator assesses the provision of caribou habitat, having excess caribou habitat (being high relative to the IQR) is a benefit to caribou.


Simulation (Box & Whisker) Area: Kenora Forest (north of caribou line)
Indicator: Caribou Refuge
75000
70000
65000
60000
55000
50000
45000
Area (Ha)
All
Class
KF-2022car
KF-2032carLTMD


Simulation (Box & Whisker) Area: Kenora Forest (north of caribou line)
Indicator: Caribou Winter Combined
100000
80000
60000
40000
20000
0
Area (Ha)
Preferred and Useable
Class
KF-2022car
KF-2032carLTMD

<u>Indicator 1b – Texture Caribou Winter Habitat</u> and
<u>Indicator 1c – Texture Caribou Refuge Habitat</u>

In general, landscape pattern is an indicator on the degree of fragmentation. Fragmentation and connectivity play a large role on the functionality of a landscape and provide different habitat needs based on the wildlife species present.

Texture of Caribou Winter Combined and Caribou Refuge Habitat was measured at two scales: 6,000 ha (60 km^2 in OLT) and 30,000 ha (300 km^2 in OLT).

For caribou habitat, the smaller scale corresponds with the "*Forest Management Guidelines for the Conservation of Woodland Caribou: A Landscape Approach*" where core winter ranges and summer ranges varied from 40 to 60 km^2. Therefore, reaching the milestone for this smaller scale is crucial for individual home ranges. For the larger 30,000 ha scale, achievement would ensure sufficient connectivity at the range level for caribou, whose ranges span multiple forest management units. Although woodland caribou do not migrate at large scales such as the northern tundra ecotype, having connectivity at the range level is important to have sufficient year round supply of habitat.

Caribou habitat amount and pattern was also measured and reviewed at the Caribou Range Scale. The Red Lake Forest is located within the Berens and the Sydney Ranges. This corresponds with Ontario's Range Management Policy in Support of Woodland Caribou Conservation and Recovery.

The intent of this FMP analysis was to compare the Plan Start 2020 and Plan End 2030 results (without and with planned harvest) with the estimated SRNV (desirable level) provided by MNRF. The measurement is primarily reviewed for 60-80% and 80%+ concentrations added together.

<u>Caribou Habitat – Winter Combined</u> data for this OLT analysis is provided in the following table. Corresponding graphs follow the Caribou Habitat – Refuge table.

For Caribou Winter Habitat texture at the 60 km^2 scale (6,000 hectare hexagon scale), the plan start is at 18% for greater than 60% concentration, moving to 87% >60% concentration at plan end. The SRNV for this indicator is 45% therefore implementation of the planned harvest is projected to move caribou winter habitat pattern to the desirable SRNV level. For the 300 km^2 scale (30,000 hectare hexagon scale), the plan start is at 0% >60% concentration, increasing to 37% after implementation of the planned harvest. The SRNV for this indicator is 40% >60% concentration, therefore at this scale, implementation of the planned harvest will result in movement towards (and exceeding) the desirable SRNV level.

ACHIEVED: Desirable level is overachieved with significant movement towards, then above, the mean proportion of 61-100% concentrations at both assessment scales. Limited harvest in the caribou zone in this 2022-2032 plan period results in forest aging into higher concentrations of coarse texture caribou winter habitat. Target level is achieved. Having dense concentrations of caribou winter habitat on the landscape is a benefit to caribou.

Caribou - Winter Combined - 60 km2 Hexagon:						
Value	.01-20	.21-.40	.41-.60	.61-.80	>.80	
Lower Range						
Mean	17%	17%	22%	30%	15%	45%
Upper Range						
KF-2022car	38%	20%	24%	17%	1%	18%
KF-2032car LTMD	0%	3%	10%	45%	42%	87%
Caribou - Winter Combined - 300 km2 Hexagon:						
Value	.01-20	.21-.40	.41-.60	.61-.80	>.80	
Lower Range						
Mean	8%	22%	32%	34%	6%	31%
Upper Range						
KF-2022car	5%	66%	30%	0%	0%	0%
KF-2032car LTMD	0%	0%	0%	68%	32%	100%

<u>Caribou Habitat – Refuge</u> data for this OLT analysis is provided in the following table: (corresponding graphs follow the Caribou Habitat – Winter Combined graphs)

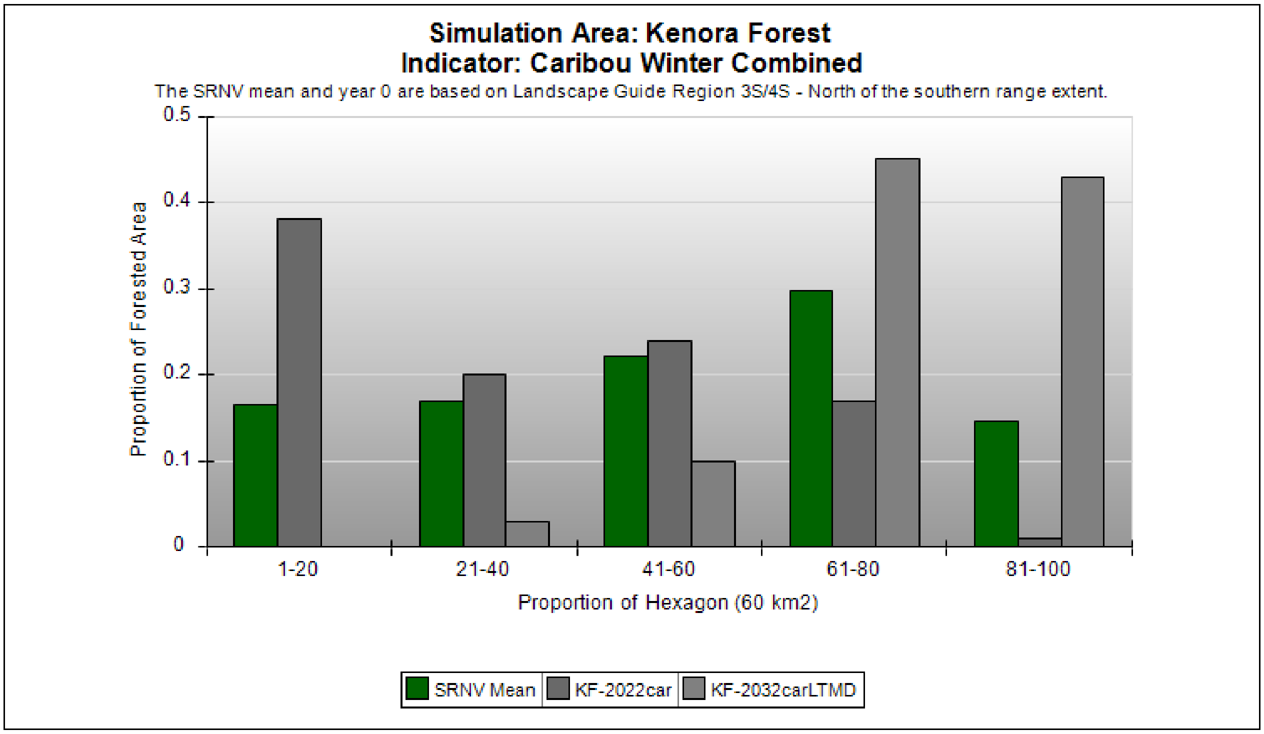
Caribou - Refuge - 60 km2 Hexagon:						
Value	.01-20	.21-.40	.41-.60	.61-.80	>.80	
Lower Range						
Mean	0%	2%	12%	34%	53%	87%
Upper Range						
KF-2022car	0%	0%	0%	17%	83%	100%
KF-2032car LTMD	0%	0%	3%	18%	79%	97%
Caribou - Refuge - 300 km2 Hexagon:						
Value	.01-20	.21-.40	.41-.60	.61-.80	>.80	
Lower Range						
Mean	0%	0%	8%	43%	49%	31%
Upper Range						
KF-2022car	0%	0%	0%	0%	100%	100%
KF-2032car LTMD	0%	0%	0%	0%	100%	100%

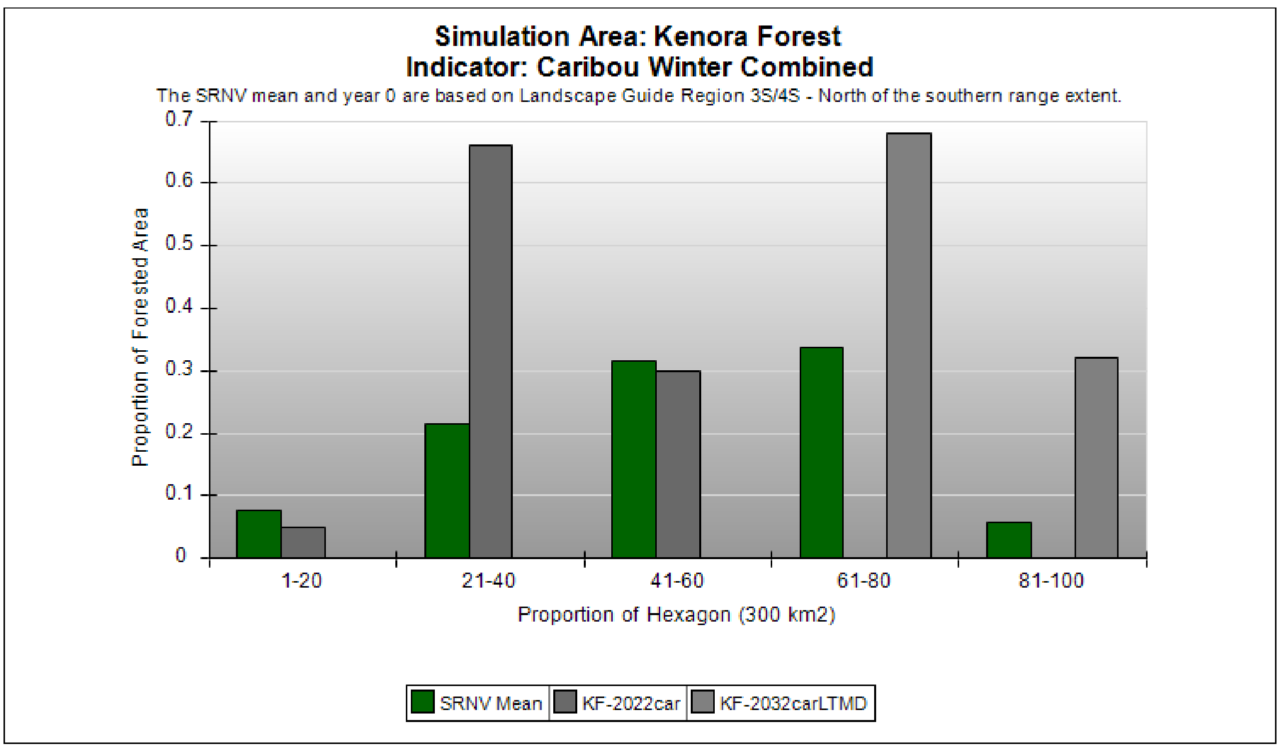
For the caribou refuge habitat, the 6,000 hectare (60 km2) hexagon, the plan start is at 100% >60% concentration (very coarse pattern of habitat), decreasing slightly to 97% at plan end with harvest. The mean SRNV (desirable level) for this indicator is 87% >60% concentration at this scale, therefore preferred harvest will result in movement through plan implementation towards the SRNV. For the 30,000 hectare (300 km2) hexagon, the plan start is at 100% >60% concentration, which is maintained through to 2032. The mean SRNV (desirable level) for this indicator at this scale is 31%, so no movement through plan implementation towards the desirable SRNV level was evident. However, again, exceeding the mean concentration with coarse texture habitat is a benefit to caribou, that allows for additional harvest in the caribou zone to continue to supply highly concentrated caribou refuge habitat for several plan periods to come.

ACHIEVED: Target level is achieved with coarse texture for caribou refuge habitat (very good for caribou). With new forest access and increased harvest levels in the future, achievement of desirable level is projected for the mid- to long-term.

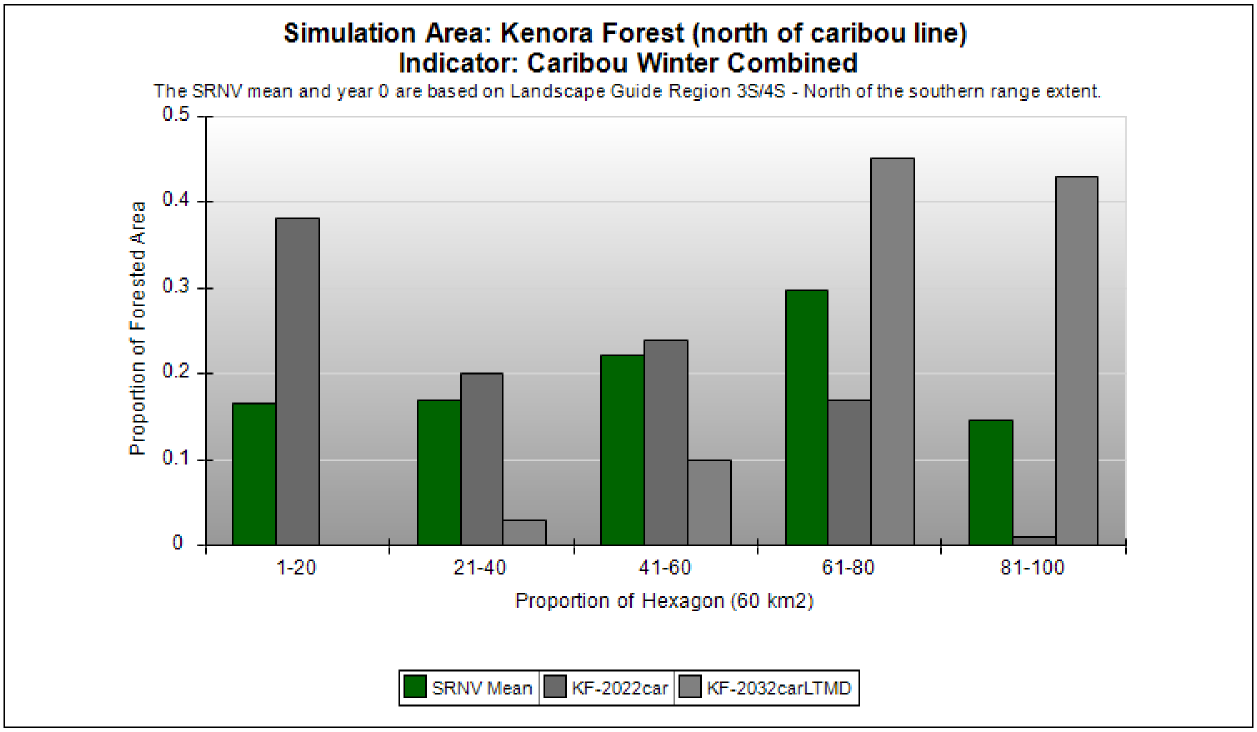
(graphs follow)

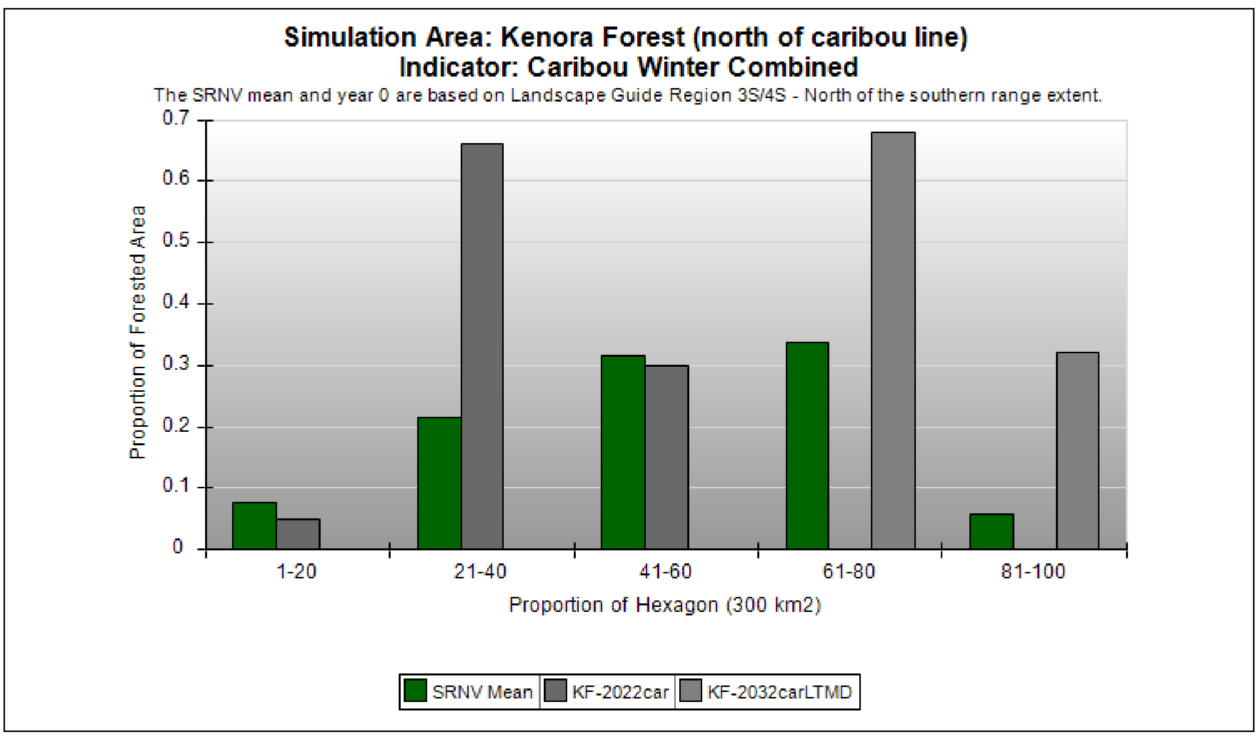
Graphs Caribou Habitat – Winter Combined:





Graphs Caribou Habitat – Refuge:





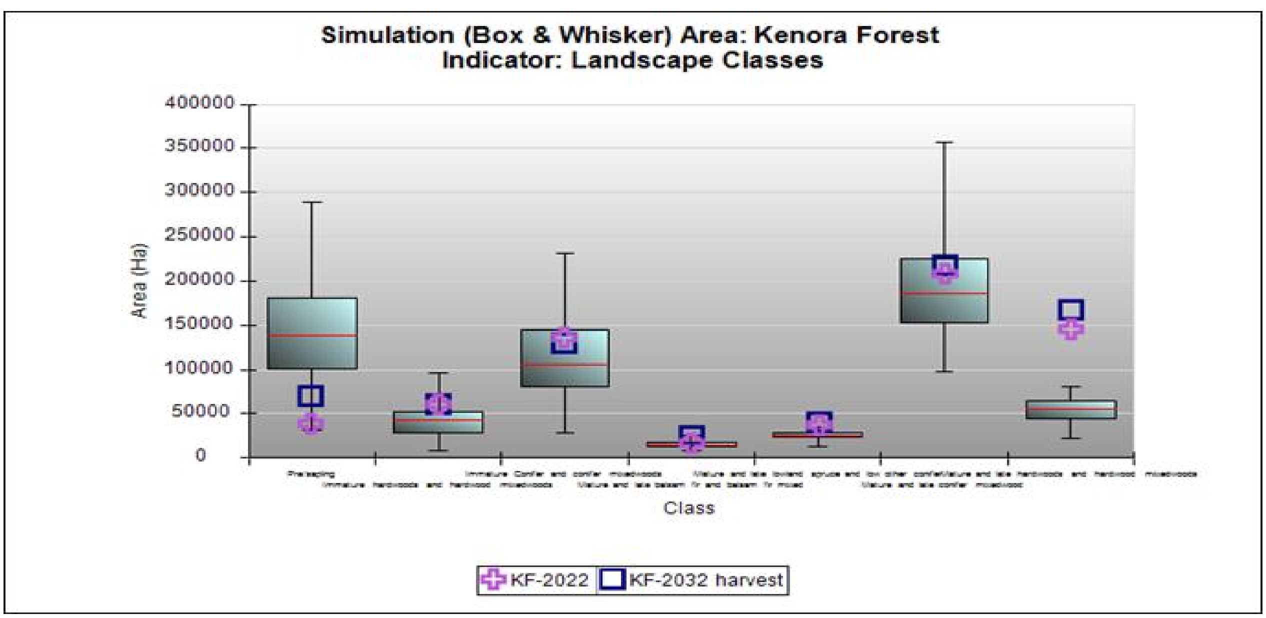
Indicator 22a - Amount – Landscape Class Area

OLT was used to calculate the amount of area for the seven Landscape Classes (combinations of forest composition and age). SFMM was used for long-term assessment of objective achievement for Landscape Classes in Table FMP-10.

OLT calculated the lower and upper Interquartile ranges of the SRNVs for the Landscape Classes. The IQRs for the Mature-Late (ML) classes were used as the indicator desirable levels. Based on the amount of area at Plan Start 2022, only the lower or upper IQR was used in the SFMM strategic modelling to ensure movement towards and into the IQR would be projected to be achieved in all future plan periods.

Desirable levels are achieved in the medium-term for ML lowland conifer and ML upland conifer. ML balsam fir exceeds the IQR, and ML hardwood/mix meet target levels to move towards desirable levels by the end of planning horizon. Overall, with individual components considered, this indicator is assessed as **PARTIALLY ACHIEVED**.

Landscape Classes								
	These LCs are not mgmt obj indicators			These LCs are mgmt objective indicators				
Value	Pre-/Sapling	Immature Hwd	Immature Con	ML Balsam Fir	ML Low Conifer	ML Conifer Mix	ML Hardwood	
Lower Range	31,454	8,693	28,825	7,436	12,275	97,752	22,341	
Lower Quartile	101,058	29,333	81,015	12,782	23,354	152,976	43,706	min. targets for SFMM
Median	138,145	42,332	106,080	14,831	25,922	185,298	55,172	
Upper Quartile	181,443	52,727	145,430	17,982	28,328	224,820	65,315	
Upper Range	288,941	96,264	231,437	25,127	34,674	357,499	81,175	
KF-2022	39,198	61,507	136,344	18,014	38,317	207,290	145,804	Plan Start Value
KF-2032 LTMD	225,893	18,750	93,803	24,957	41,012	216,287	166,566	Plan End with Harvest



Indicator 2b - Amount – Old Growth Area

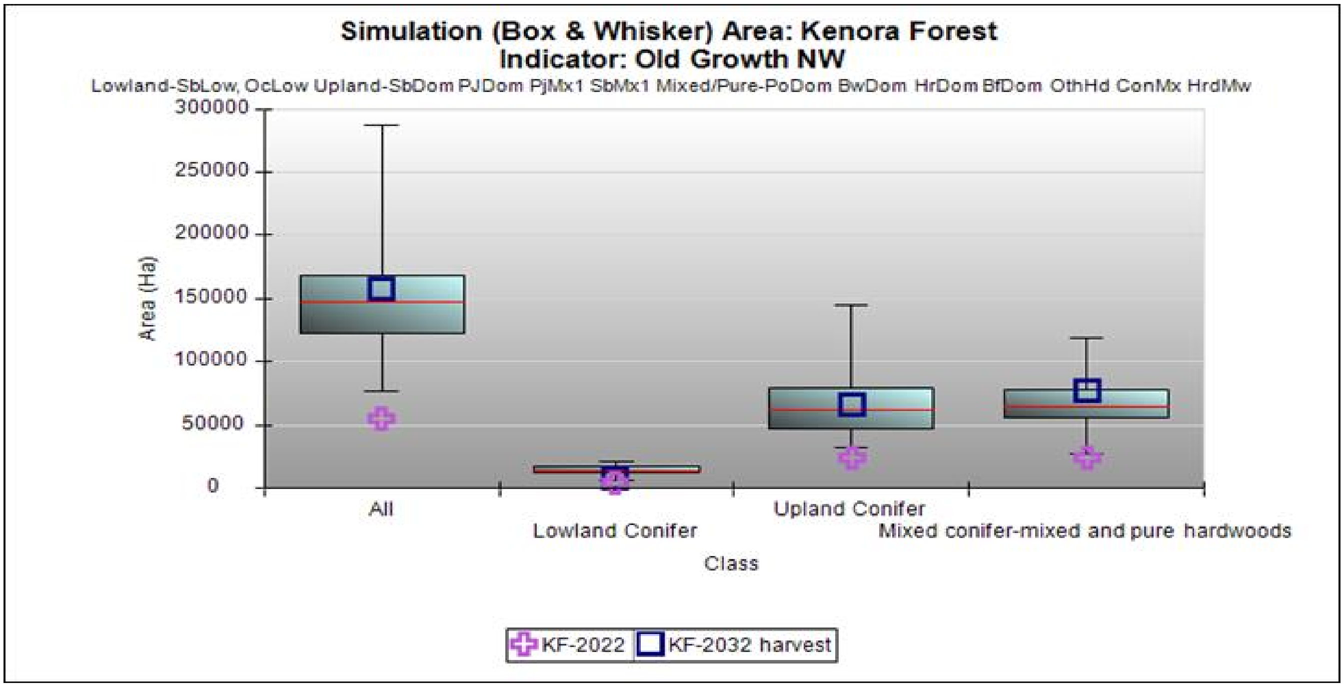
OLT was used to calculate the amount of area for the four regionally accepted Old Growth groupings. The groupings and associated PLANFUs are:

Old Growth:	OGupC	Old Growth Upland Conifer
	OGloC	Old Growth Lowland Conifer
	OGhmx	Old Growth Hardwood and Mix
	OGprw	Old Growth Red Pine-White Pine

OLT calculated the lower Interquartile ranges of the SRNVs for all the Old Growth groupings, except the Big Pines (PRW). See Section 6.2.2.7 of this Analysis Package for the old growth groupings, onset ages and duration of area that is classified in each old growth group. Only the lower IQR was used in the SFMM strategic modelling to ensure that at least the minimum IQR area would be projected to be achieved in all future plan periods.

All old growth groupings are below desirable levels at Plan Start (IQR, OG PRW desirable level is to increase). All old growth areas increase during the plan period with projected LTMD harvest. Lowland conifer increases towards the IQR during the plan period (meets target level). The other three OG groups all increase and meet their desirable levels in the plan period. Indicator is assessed as **ACHIEVED**.

Old Growth					
				not measured in OLT	
Value	**Low_Con**	**Upl_Con**	**Mx_Hwd**	**PW_PR**	(PW_PR = "Big Pines")
Lower Range	6,080	32,345	27,983	-	
Lower Quartile	12,236	47,362	55,649	-	min. targets for SFMM
Median	14,152	61,993	64,821	-	
Upper Quartile	17,281	79,383	78,344	-	
Upper Range	20,980	145,492	119,641	-	
KF-2022	4,194	24,764	24,780	-	Plan Start Value
KF-2032 LTMD	8,352	66,982	78,260	-	Plan End with Harvest



Indicator 2c – All Ages Red Pine and White Pine Forest Unit Area

There are 18,488 ha in the PRW forest unit at Plan Start 2022. The desirable level is to increase towards 39,135 ha. SFMM was used to calculate this indicator area in the long-term strategic modelling (Table FMP-10).

This indicator is not assessed in OLT, but rather is assessed as **ACHIEVED** with projections form BMI plan Start, and SFMM 2032: Area increases for next 100 years, desirable level met. Achievement of estimated 39,135 ha is not possible for approx. 300+ years. Operational strategies will continue 100+ years to ensure continued increase. It is expected that current red pine or white pine stands should continue to persist and increase in area through regeneration efforts to move towards the pre-industrial condition, and actual increase may be operationally greater than strategically modelled.

All Ages Red Pine-White Pine, Upland Conifer and Young Forest

		Pine & Spruce		
Value	**All Ages PR-PW**	**Upland Conifer**	**Young (<36yrs)**	
Lower Range	-	282,359	34,929	
Lower Quartile	-	290,514	129,712	min. targets for SFMM
Median	-	323,845	181,816	
Upper Quartile	-	343,729	227,291	
Upper Range	-	360,120	378,772	
KF-2022	18,488	233,327	83,576	Plan Start Value
KF-2032 harvest	19,101	241,648	97,288	Plan End with Harvest

<u>Indicator 2d - Amount – Upland Conifer (PJD, PJM, SDB, SBM) Area</u> and <u>Indicator 2e - Amount – Young Forest Area</u>

OLT was used to calculate the amount of area for Upland Conifer and Young Forest. SFMM was used to calculate these indicator areas in the long-term strategic modelling. SFMM projections are used for long-term assessment of objective achievement in Table FMP-10.

OLT was used to calculate the lower Interquartile ranges of the SRNVs for Upland Conifer and Young Forest. Only the lower IQR was used in the SFMM strategic modelling to ensure that at least the minimum IQR area would be projected to be achieved in all future plan periods.

The data table for these two indicators is on previous page.
Discussion and graphs for the two indicators follow individually.

<u>Indicator 2d - Amount – Upland Conifer (Pure Pine and Spruce) Area</u>

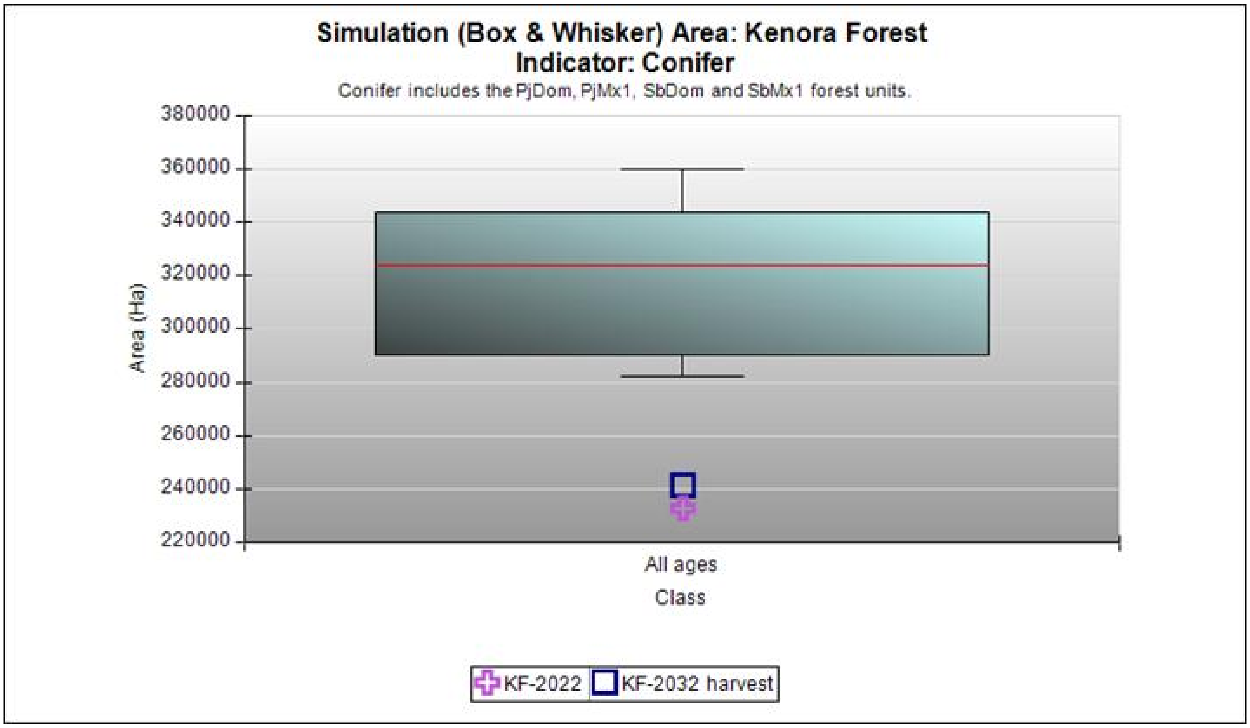
This indicator was intended to influence the supply of upland conifer-dominated forest across the Kenora Forest. The conifer dominated forest is composed of forest unit areas for PJD, PJM, SBD and SBM.

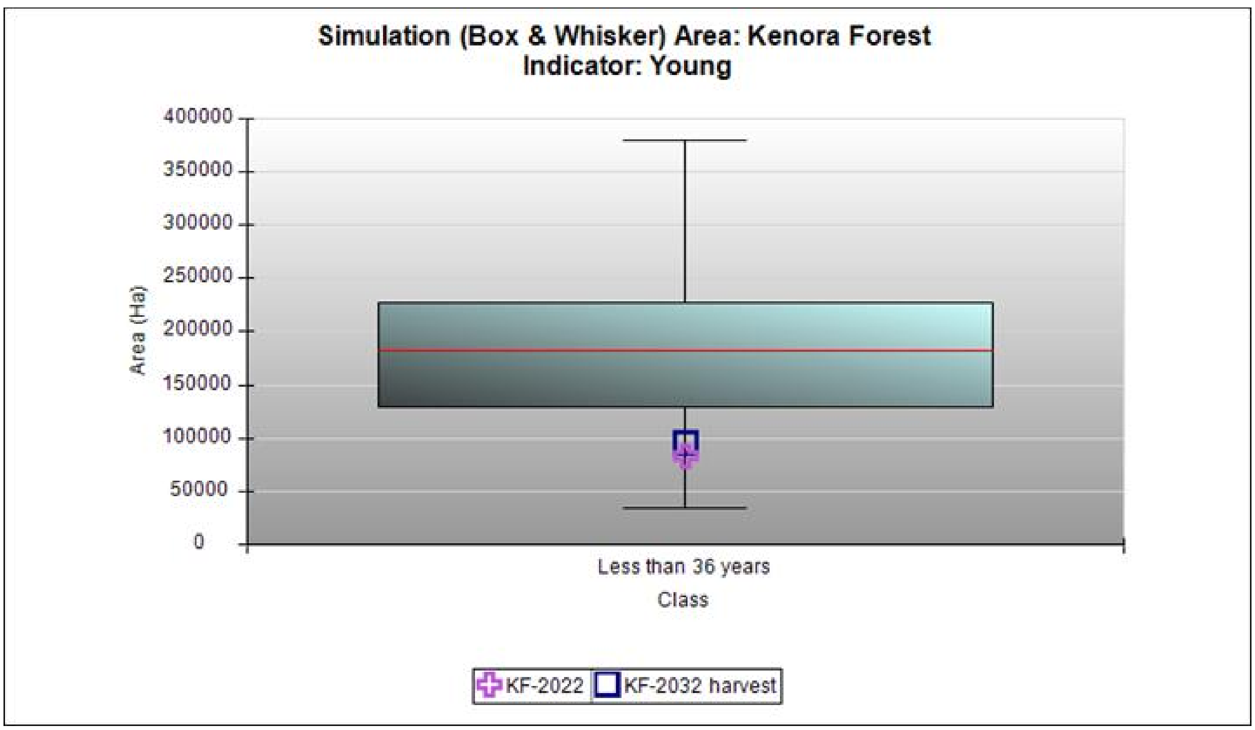
At Plan Start 2022, Upland Conifer area is below the IQR desirable level. At Plan End with Harvest, OLT projects some movement towards the IQR desirable level. Indicator is assessed as **ACHIEVED**.

<u>Indicator 2e - Amount – Young Forest Area</u>

This indicator is intended to influence the supply of young forest on Kenora Forest. Young forest is composed of all forested area < 36 years of age. It is important to ensure that young forest is continually generated, to provide for wildlife habitat benefits of young seral stage forest, as well as to assist in long-term sustainable forest management.

At Plan Start 2022, Young Forest area below the IQR desirable level, primarily due to the under harvest of planned harvest over the past 15 years, as well as resulting from a successful fire suppression program. At Plan End with Harvest, OLT projects an increase in young forest, towards the IQR desirable level. Indicator is assessed as **ACHIEVED**.


Simulation (Box & Whisker) Area: Kenora Forest
Indicator: Conifer
Conifer includes the PjDom, PjMx1, SbDom and SbMx1 forest units.
380000
360000
340000
320000
300000
280000
260000
240000
220000
Area (Ha)
All ages
Class
KF-2022
KF-2032 harvest


Simulation (Box & Whisker) Area: Kenora Forest
Indicator: Young
400000
350000
300000
250000
200000
150000
100000
50000
0
Area (Ha)
Less than 36 years
Class
KF-2022
KF-2032 harvest

Indicator 3a – Texture of Mature and Old Forest

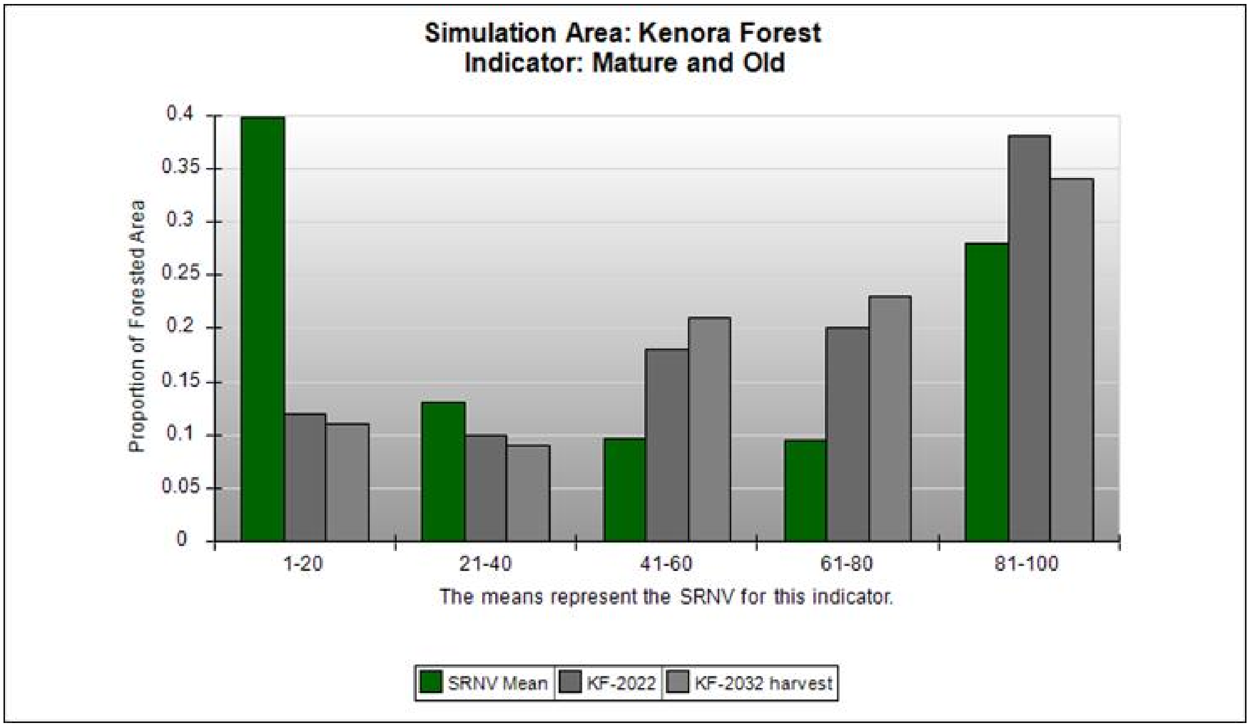
Mature and Old forest indicator is used to provide habitat for certain song birds and wildlife habitat that requires this seral stage. For Mature and Old forest, this is a coarse filter approach where different wildlife species utilize different scales (smaller: marten, larger: wolverines). Therefore, providing two scales provides better categorization of the spatial configuration of the landscape.

500 and 5,000 hectare hexagons are draped on the planning inventory. The measurement is done for 61-80% and 81+% concentrations added together. The SRNV for this indicator is compared to the Plan Start and Plan End with harvest in the table below, and is also depicted graphically, following the table:

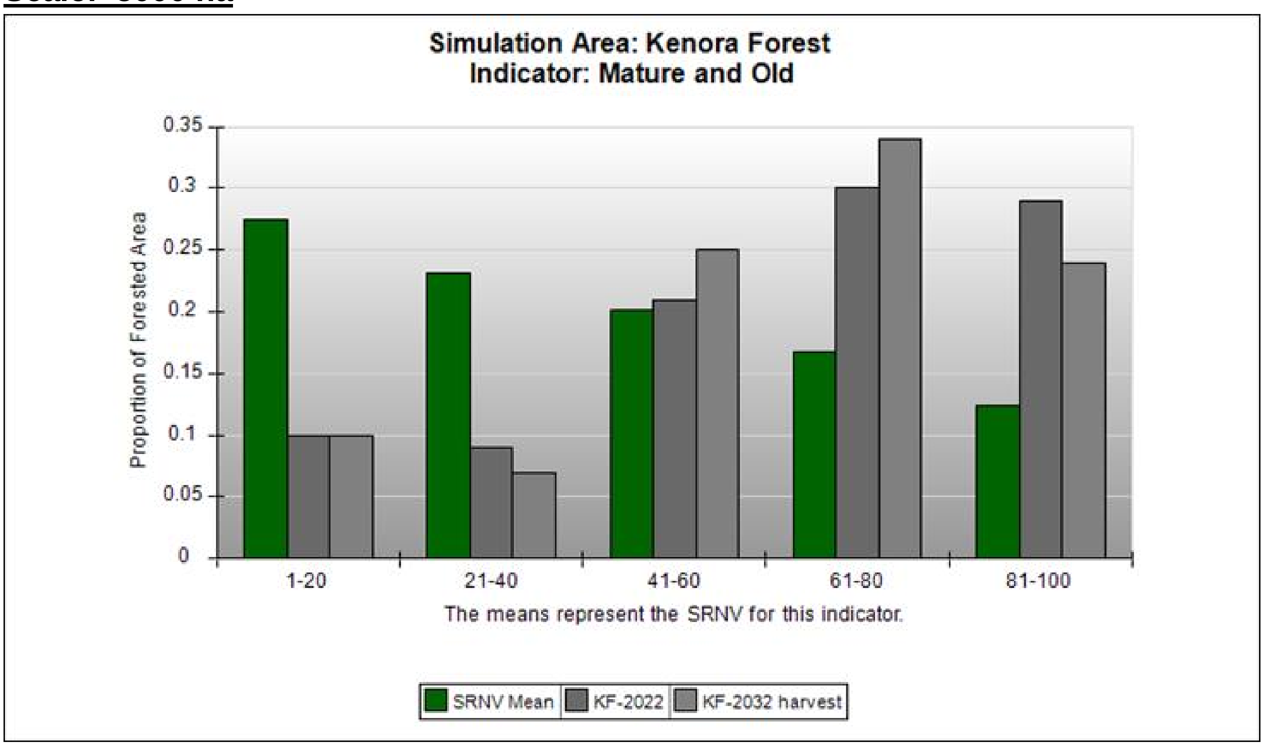
Texture Mature and Old - 500 ha Hexagon:						
Value	.01-20	.21-.40	.41-.60	.61-.80	>.80	
Lower Range	0%	0%	0%	0%	0%	
Mean	40%	13%	10%	10%	28%	38%
Upper Range	0%	0%	0%	0%	0%	
KF-2022	12%	10%	18%	20%	38%	58%
KF-2032 harvest	11%	9%	21%	23%	34%	57%
Texture Mature and Old - 5,000 ha Hexagon:						
Value	.01-20	.21-.40	.41-.60	.61-.80	>.80	
Lower Range	0%	0%	0%	0%	0%	
Mean	28%	23%	20%	17%	12%	31%
Upper Range	0%	0%	0%	0%	0%	
KF-2022	10%	9%	21%	30%	29%	59%
KF-2032 harvest	10%	7%	25%	34%	24%	58%

ACHIEVED: Mature and Old Forest amount and texture is above the desirable level at Plan Start, and is projected to decrease only 1% during this plan period. Target level is achieved with movement towards mean concentration for the >60% concentration classes. The forest is more coarsely textured than the SRNV mean. Strategies are being implemented to defragment certain areas and also to plan harvest areas in patches of currently mature/old forest. Harvest patterns through time will be creating more young forest, and filling up the three other less concentrated classes. There is plenty of coarse texture in the 2 densest classes to support this movement towards the less concentrated classes (more young forest), at the same time maintaining and exceeding the 2 densest classes. Movement towards the mean concentrations in future FMPs is expected to improve.

Scale: 500 ha



Scale: 5000 ha



Indicator 3b – Frequency of Young Forest Patch Size by Size Class

The BLG mentions that patch sizes and shapes can have long-lasting consequences for forests that will require focused efforts over very long time periods. Thus, it is important to document the forests at these early, seral stages of development to assist in long term sustainable forest management.

Patches deal with the *extent* of the homogeneous forest types that make up the general landscape pattern. Patch size can influence the availability of habitat conditions. From the Simulated Range of Natural Variation (SRNV) work done for the Kenora Forest, young forest patch is classified the forest into stands less than 36 years old.

OLT calculates frequency of young forest patches (relative to the total number of patches) in various size classes. The resulting mean SRNV estimated natural landscape pattern for young forest by size class is used as the desirable level for a natural forest landscape pattern for the Kenora Forest.

The young forest frequency by size class of the land base at Plan Start 2022 was compared to the SRNV template for the management unit to determine a baseline distribution of young forest patch size at the start of this planning period (see table below):

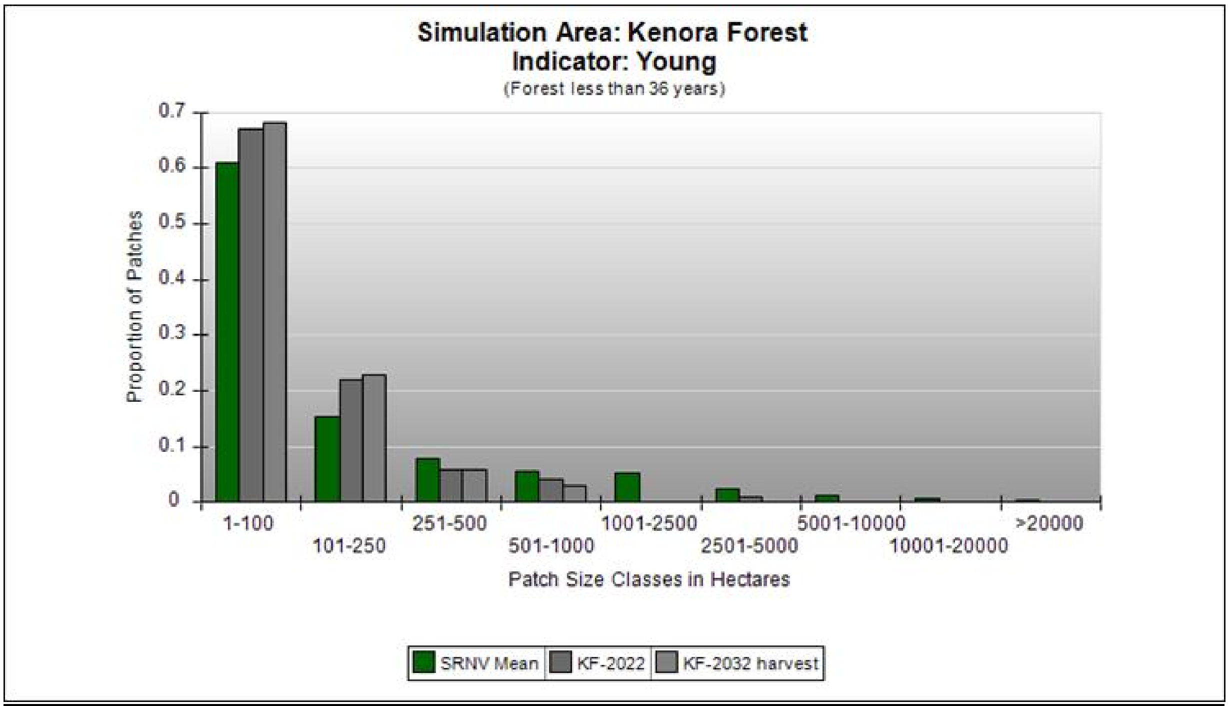
Young Forest - Patch Size (ha) Frequency:									
Value	1-100	101-250	251-500	501-1,000	1,001-2,500	2,501-5,000	5,000-10,000	10,000-20,000	>20,000
Lower Range									
Mean	61%	16%	8%	6%	5%	2%	1%	1%	0%
Upper Range									
KF-2022	67%	22%	6%	4%	0%	1%	0%	0%	0%
KF-2032 harvest	68%	23%	6%	3%	0%	0%	0%	0%	0%

NOT ACHIEVED: Frequency of small patches of young forest are projected to increase (away from mean, desirable level) on the Kenora Forest during the 10-year period. Desirable and target levels are not expected to be achieved until the long-term with implementation of harvest to defragment the forest and create more, larger young forest over many planning periods.

Due to the under harvest in past plan period, and the need to provide new access into certain areas of the Kenora Forest during this 2022-2032 plan period, an increase in the number of small patches is difficult to avoid. As additional harvesting near current young forest occurs over the next 10-20 years, some smaller patches should become classified as larger-sized patches. Achievement of this indicator will likely improve in the next plan period.

Additional Rationale:

Given the very short fire cycle in the Ecoregion 3S/4S (50 to 187 years), there is a high probability of the creation of young forest through natural disturbances, and the creation of larger patches of young forest (through consolidation of smaller patches into larger patches from disturbance of older areas adjacent to young forest). The natural fire cycle is also expected to improve the achievement of this indicator through time.



Indicator 4a – Moose Habitat Proportion in Moose Emphasis Areas (MEAs)

SFMM was used to semi-spatially strategically model forest cover through time. The inventory with preferred LTMD harvest areas depleted was imported into OLT to determine the Plan End 2032 results reported in Table FMP-10 for moose habitat in Moose Emphasis Areas (as per Indicator 4a in table below).

ACHIEVED: Overall achievement is very good. Minor deviations (3) from habitat desirable or target range achievement as noted below. All other MEAs and habitat types are projected to be within the desirable ranges with LTMD preferred harvest implemented.

- MEA #1 - Browse increases to within desirable range, Hwd/Mix is maintained within range, MatCon is maintained 2% above range.

- MEA #2 - Browse and Hwd/Mix are maintained in desirable ranges, MatCon decreases 6% towards range (target achieved) and remains 3% above range.
- MEA #3 - Browse increases to within desirable range, Hwd/Mix is maintained within range, MatCon increases 1% and remains below range.
- MEA #4 - All habitats maintained within desirable ranges.

Indicator	Plan Start 2022	Desirable Level	Plan End 2032 LTMD
(4a) Habitat Proportion by Moose Emphasis Area:		Move towards and maintain range:	
MEA #1 - Aulneau Peninsula:			
Browse Producing Forest	3%	5-30%	5%
Hardwood/Mixedwood Forest	43%	20-55%	41%
Mature Conifer Forest	37%	15-35%	37%
MEA #2 - Maybrun			
Browse Producing Forest	13%	5-30%	19%
Hardwood/Mixedwood Forest	34%	20-55%	31%
Mature Conifer Forest	44%	15-35%	38%
MEA #3 - North English River			
Browse Producing Forest	3%	5-30%	8%
Hardwood/Mixedwood Forest	42%	20-55%	36%
Mature Conifer Forest	8%	15-35%	9%
MEA #4 - South English River			
Browse Producing Forest	13%	5-30%	12%
Hardwood/Mixedwood Forest	36%	20-55%	33%
Mature Conifer Forest	30%	15-35%	31%

Indicator 4b – Frequency of Young Forest in Moose Emphasis Areas (MEAs)

SFMM was used to semi-spatially strategically model forest cover through time. The inventory with preferred LTMD harvest areas depleted was imported into OLT to determine the Plan End 2032 results reported in Table FMP-10 for moose habitat in Moose Emphasis Areas (as per Indicator 4b in table below).

PARTIALLY ACHIEVED: Overall achievement is good. Only MEA #3 moves away from the desirable range, with an 11% increase of larger patches in the 501-1,000 ha size class. All other MEAs are projected to meet desirable level (with all young forest patches <=500 ha) with LTMD preferred harvest implemented.

- MEA #1- achieved with all patches <= 250 ha
- MEA #2 - improved, and achieved with all patches <= 500 ha

- MEA #3 - moves away from desirable level with added 11% young forest frequency in 501-1,000 ha size class at plan end. Harvest pattern may be improved through operational planning.
- MEA #4 - improved, and achieved with all patches <= 500 ha

Indicator	Plan Start 2022	Desirable Level	Plan End 2032 LTMD
(4b) Frequency of Young Forest Patch Size by MEA:		100% of young forest patches in the <100, 101-250, and 251-500 ha size classes	
MEA #1 - Aulneau Penn. <100 ha	93%		91%
101-250 ha	7%		9%
251-500 ha	0%		0%
501-1,000 ha	0%		0%
1,001-2,500 ha	0%		0%
2,501-5,000 ha	0%		0%
5001-10,000 ha	0%		0%
10,001-20,000 ha	0%		0%
>20,000 ha	0%		0%
MEA #2 - Maybrun: < 100 ha	67%		62%
101-250 ha	15%		28%
251-500 ha	11%		10%
501-1,000 ha	7%		0%
1,001-2,500 ha	0%		0%
2,501-5,000 ha	0%		0%
5001-10,000 ha	0%		0%
10,001-20,000 ha	0%		0%
>20,000 ha	0%		0%
MEA #3 - N. English R: <100 ha	64%		48%
101-250 ha	17%		38%
251-500 ha	19%		3%
501-1,000 ha	0%		11%
1,001-2,500 ha	0%		0%
2,501-5,000 ha	0%		0%
5001-10,000 ha	0%		0%
10,001-20,000 ha	0%		0%
>20,000 ha	0%		0%
MEA #4 - S. English R.: <100 ha	37%		83%
101-250 ha	32%		15%
251-500 ha	4%		2%
501-1,000 ha	25%		0%
1,001-2,500 ha	2%		0%
2,501-5,000 ha	0%		0%
5001-10,000 ha	0%		0%
10,001-20,000 ha	0%		0%
>20,000 ha	0%		0%

Appendix 6

Yield Curves

Yield Curves

Final yield curves for the Kenora Forest 2022 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).

2022 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

Table 6 Summary of NAT Yield Curve Peak Volumes (MIST and adjusted MIST)

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

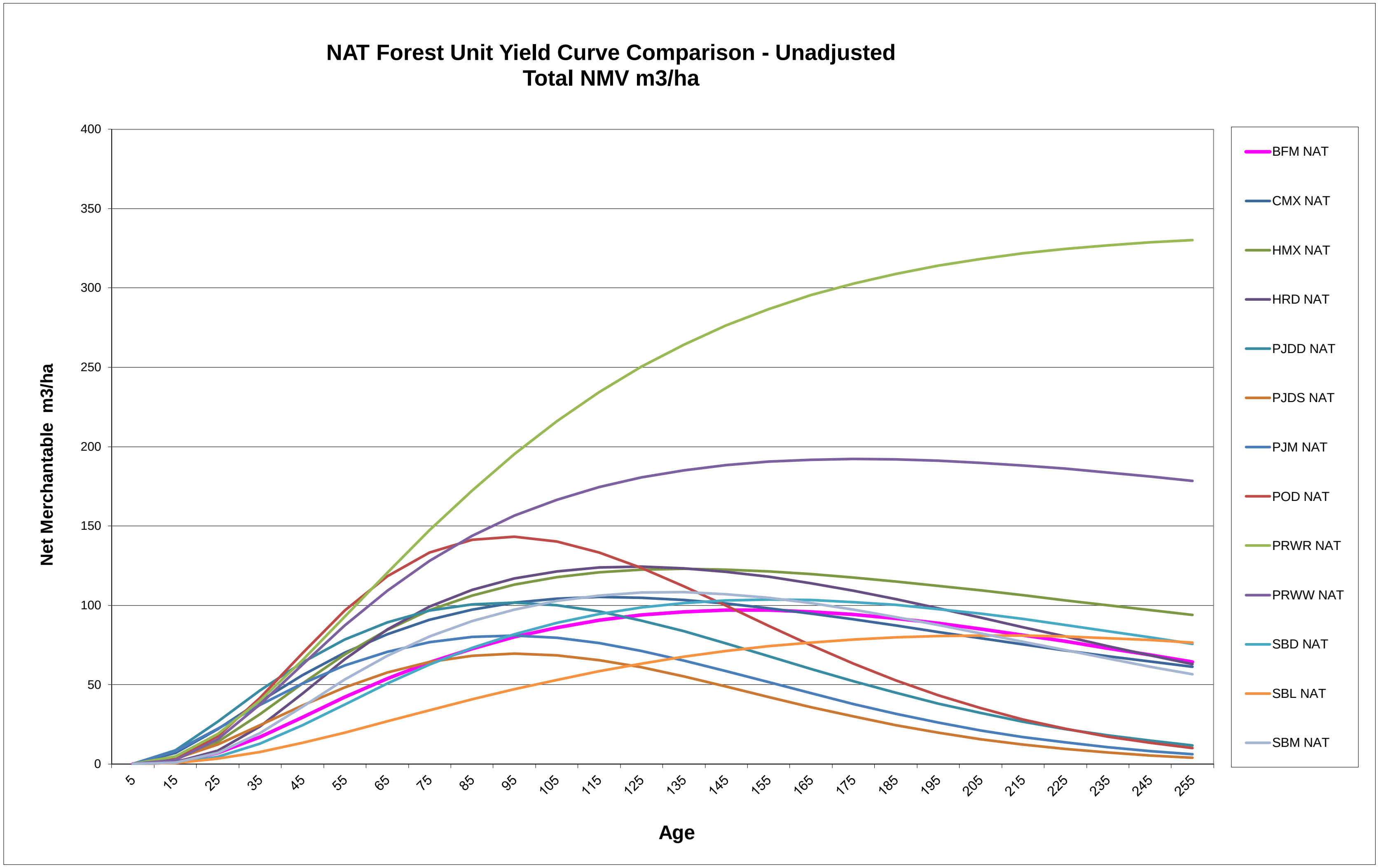
AGE:	BFM NAT	CMX NAT	HMX NAT	HRD NAT	PJDD NAT	PJDS NAT	PJM NAT	POD NAT	PRWR NAT	PRWW NAT	SBD NAT	SBL NAT	SBM NAT
5	0	0	0	0	0	0	0	0	0	0	0	0	0
15	1	7	3	1	9	3	8	3	5	3	1	1	1
25	7	22	14	8	27	12	22	18	19	16	5	3	7
35	17	39	31	24	46	24	37	42	40	37	13	8	19
45	30	56	51	44	64	37	51	70	65	63	24	13	36
55	42	70	69	66	79	48	62	97	93	87	38	20	53
65	54	82	85	85	89	58	71	118	121	109	51	27	68
75	64	91	97	99	97	64	77	133	147	128	63	34	80
85	73	97	106	110	101	68	80	141	172	144	73	41	90
95	80	102	113	117	102	70	81	143	195	156	82	47	97
105	86	104	118	121	100	69	80	140	216	167	89	53	103
115	91	105	121	124	96	66	76	133	234	175	95	59	106
125	94	105	122	124	90	61	71	123	250	181	99	63	108
135	96	103	123	123	84	55	65	112	264	185	102	68	108
145	97	101	123	121	76	49	59	100	276	188	103	71	107
155	97	98	121	118	68	42	52	87	287	191	104	74	105
165	96	95	120	114	60	36	45	75	295	192	103	77	101
175	94	91	118	109	52	30	38	63	303	192	102	78	97
185	92	87	115	104	45	25	32	53	309	192	100	80	93
195	89	83	112	98	38	20	26	43	314	191	98	81	88
205	85	79	109	92	32	16	21	35	318	190	95	81	82
215	81	75	106	86	27	12	17	28	322	188	91	81	77
225	77	72	103	80	22	9	14	22	325	186	88	80	72
235	73	68	100	74	18	7	11	17	327	184	84	79	66
245	69	65	97	69	15	5	8	13	329	181	80	78	61
255	64	61	94	63	12	4	6	10	330	178	76	77	56

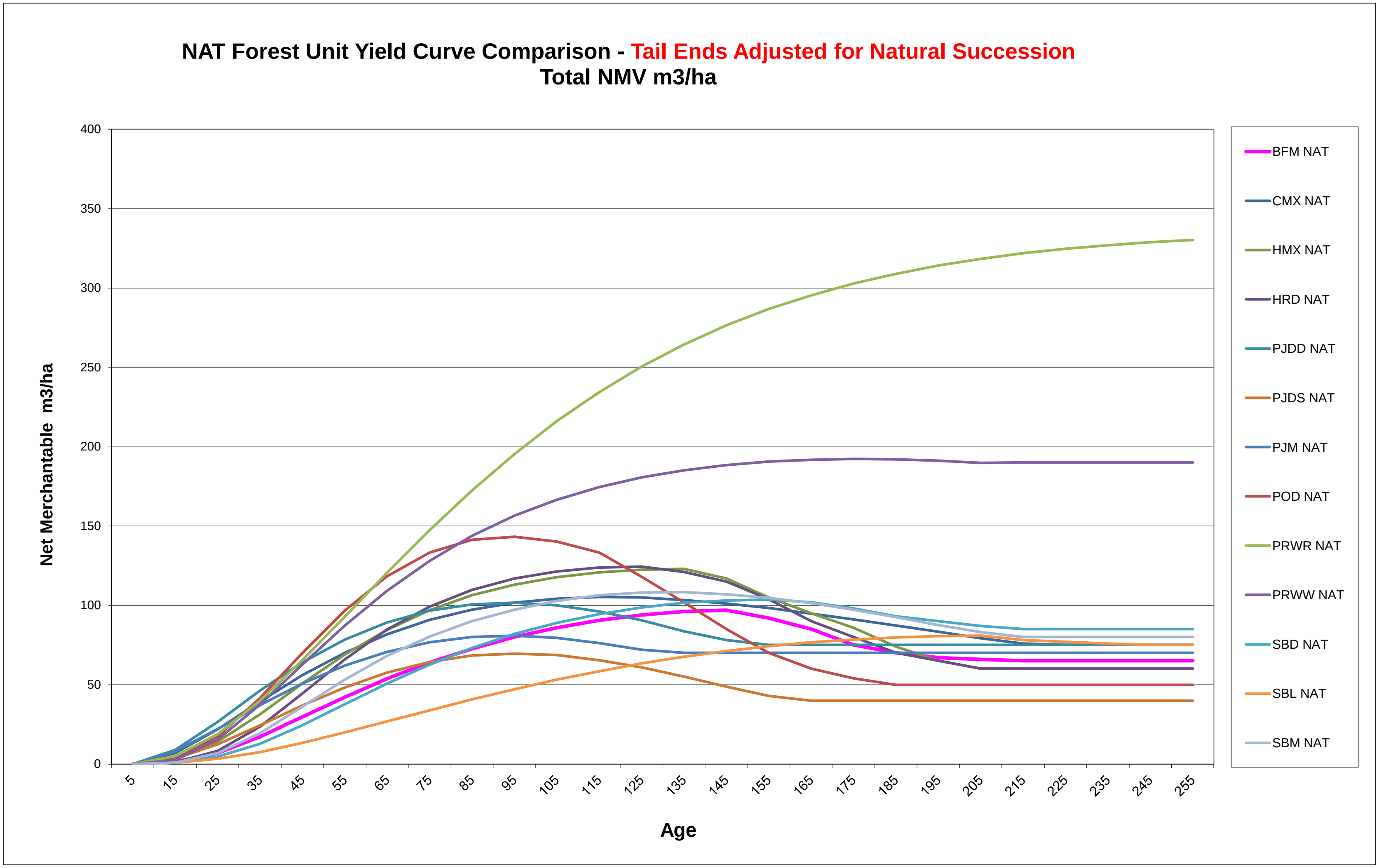
Summary of Total nm Volume/Hectare - With Natural Succession Tail Adjustment

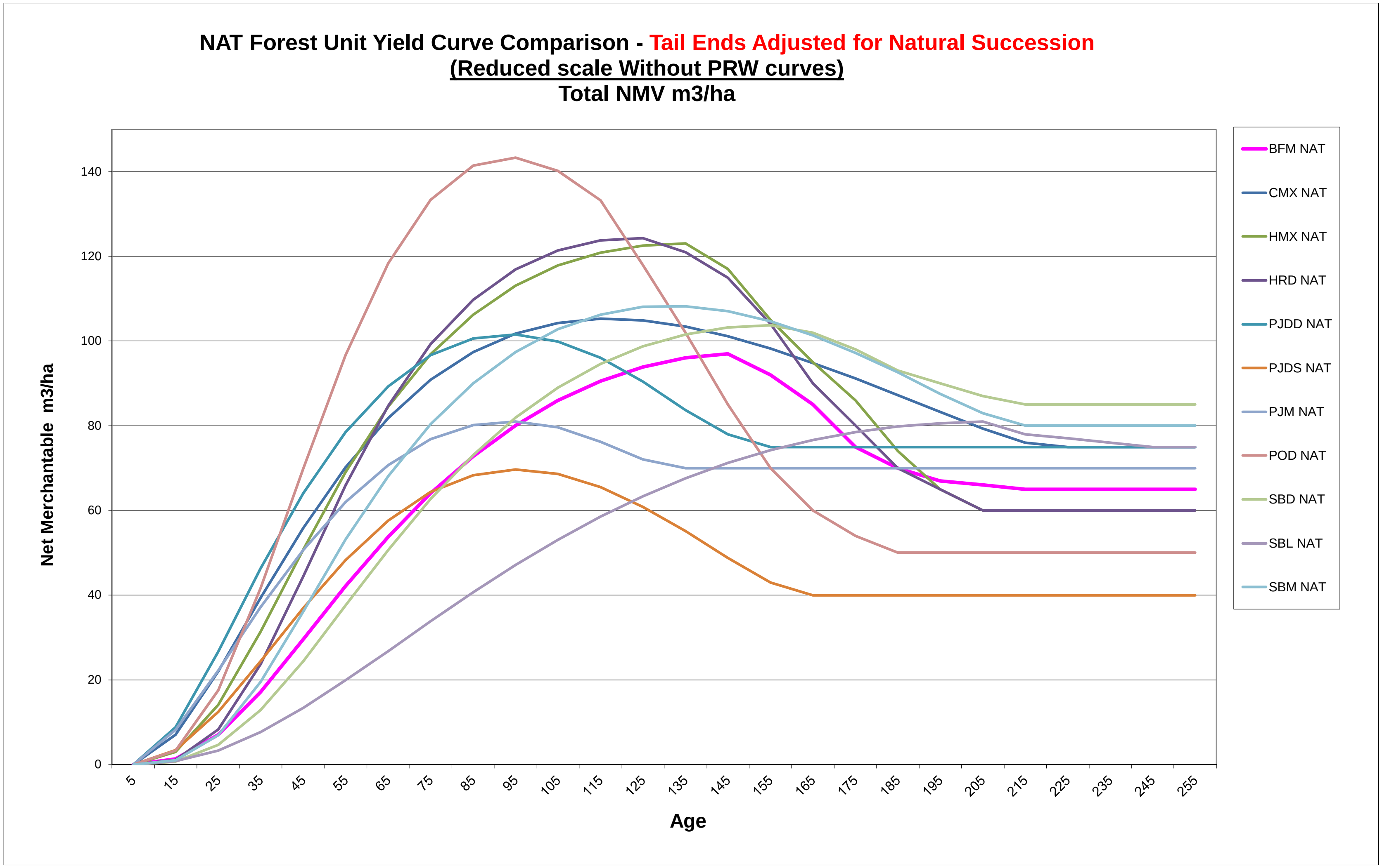
AGE:	BFM NAT	CMX NAT	HMX NAT	HRD NAT	PJDD NAT	PJDS NAT	PJM NAT	POD NAT	PRWR NAT	PRWW NAT	SBD NAT	SBL NAT	SBM NAT
5	0	0	0	0	0	0	0	0	0	0	0	0	0
15	1	7	3	1	9	3	8	3	5	3	1	1	1
25	7	22	14	8	27	12	22	18	19	16	5	3	7
35	17	39	31	24	46	24	37	42	40	37	13	8	19
45	30	56	51	44	64	37	51	70	65	63	24	13	36
55	42	70	69	66	79	48	62	97	93	87	38	20	53
65	54	82	85	85	89	58	71	118	121	109	51	27	68
75	64	91	97	99	97	64	77	133	147	128	63	34	80
85	73	97	106	110	101	68	80	141	172	144	73	41	90
95	80	102	113	117	102	70	81	143	195	156	82	47	97
105	86	104	118	121	100	69	80	140	216	167	89	53	103
115	91	105	121	124	96	66	76	133	234	175	95	59	106
125	94	105	122	124	90	61	72	118	250	181	99	63	108
135	96	103	123	121	84	55	70	102	264	185	102	68	108
145	97	101	117	115	78	49	70	85	276	188	103	71	107
155	92	98	105	104	75	43	70	70	287	191	104	74	105
165	85	95	95	90	75	40	70	60	295	192	102	77	101
175	75	91	86	80	75	40	70	54	303	192	98	78	97
185	70	87	74	70	75	40	70	50	309	192	93	80	93
195	67	83	65	65	75	40	70	50	314	191	90	81	88
205	66	79	60	60	75	40	70	50	318	190	87	81	83
215	65	76	60	60	75	40	70	50	322	190	85	78	80
225	65	75	60	60	75	40	70	50	325	190	85	77	80
235	65	75	60	60	75	40	70	50	327	190	85	76	80
245	65	75	60	60	75	40	70	50	329	190	85	75	80
255	65	75	60	60	75	40	70	50	330	190	85	75	80
Cut Old?	No	Yes	No	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Tail Vol	65	75	60	60	75	40	70	50	330	190	85	75	80
MinAge	80	60	60	60	50	60	60	50	80	60	90	110	75
MinVol	70	75	70	80	75	60	70	80	250	150	80	60	80

Comparison of Kenora Forest 2022 NAT (Prsnt) Yield Curves

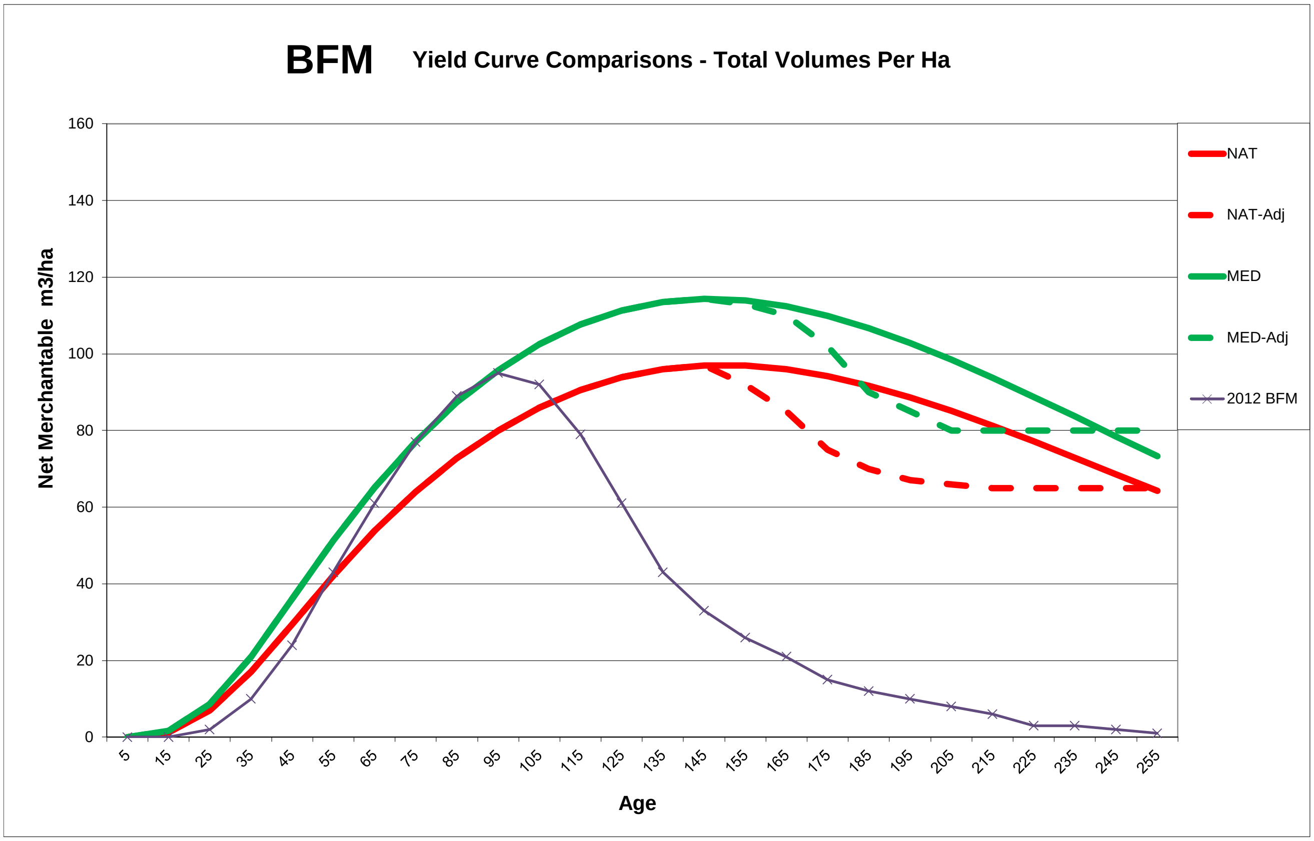
Feb. 13, 2020 Yield Curves (v5)




NAT Forest Unit Yield Curve Comparison - Tail Ends Adjusted for Natural Succession
Total NMV m3/ha
Net Merchantable m3/ha
400
350
300
250
200
150
100
50
0
5
15
25
35
45
55
65
75
85
95
105
115
125
135
145
155
165
175
185
195
205
215
225
235
245
255
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


NAT Forest Unit Yield Curve Comparison - Tail Ends Adjusted for Natural Succession
(Reduced scale Without PRW curves)
Total NMV m3/ha
Net Merchantable m3/ha
Age
BFM NAT
CMX NAT
HMX NAT
HRD NAT
PJDD NAT
PJDS NAT
PJM NAT
POD NAT
SBD NAT
SBL NAT
SBM NAT

Comparison of Kenora Forest 2022 Yield Curves by Forest Unit



FU	AC10	NAT	NAT-Adj	LOW	LOW-Adj	MED	MED-Adj	HIGH	HIGH-Adj	2012 BFM
BFM	5	0	0			0	0			0
BFM	15	1	1			2	2			0
BFM	25	7	7			9	9			2
BFM	35	17	17			21	21			10
BFM	45	30	30			36	36			24
BFM	55	42	42			51	51			43
BFM	65	54	54			65	65			61
BFM	75	64	64			77	77			77
BFM	85	73	73			87	87			89
BFM	95	80	80			96	96			95
BFM	105	86	86			103	103			92
BFM	115	91	91			108	108			79
BFM	125	94	94			111	111			61
BFM	135	96	96			114	114			43
BFM	145	97	97			114	114			33
BFM	155	97	92			114	113			26
BFM	165	96	85			112	110			21
BFM	175	94	75			110	102			15
BFM	185	92	70			107	90			12
BFM	195	89	67			103	85			10
BFM	205	85	66			99	80			8
BFM	215	81	65			94	80			6
BFM	225	77	65			89	80			3
BFM	235	73	65			84	80			3
BFM	245	69	65			78	80			2
BFM	255	64	65			73	80			1

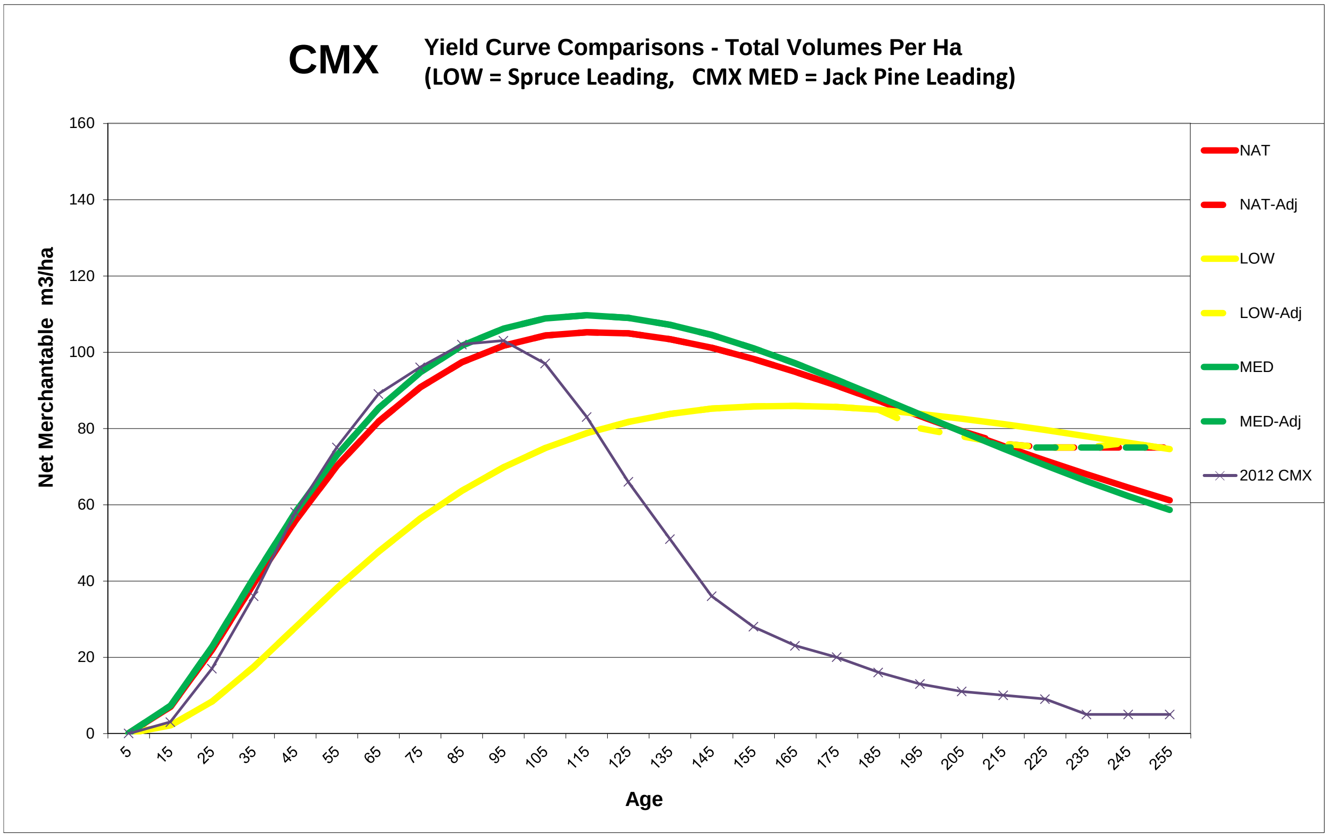
Total net merchantable volume peak of yield curve

Not a valid managed yield curve for this forest unit.

Red Font indicates tail volume adjustment in yield curve.

Inoperable tail volumes

Comparison of Kenora Forest 2022 Yield Curves by Forest Unit



FU	AC10	NAT	NAT-Adj	LOW	LOW-Adj	MED	MED-Adj	HIGH	HIGH-Adj	2012 CMX
CMX	5	0	0	0	0	0	0			0
CMX	15	7	7	2	2	7	7			3
CMX	25	22	22	8	8	23	23			17
CMX	35	39	39	18	18	41	41			36
CMX	45	56	56	28	28	58	58			58
CMX	55	70	70	38	38	73	73			75
CMX	65	82	82	48	48	85	85			89
CMX	75	91	91	56	56	95	95			96
CMX	85	97	97	64	64	102	102			102
CMX	95	102	102	70	70	106	106			103
CMX	105	104	104	75	75	109	109			97
CMX	115	105	105	79	79	110	110			83
CMX	125	105	105	82	82	109	109			66
CMX	135	103	103	84	84	107	107			51
CMX	145	101	101	85	85	104	104			36
CMX	155	98	98	86	86	101	101			28
CMX	165	95	95	86	86	97	97			23
CMX	175	91	91	86	86	93	93			20
CMX	185	87	87	85	85	88	88			16
CMX	195	83	83	84	80	84	84			13
CMX	205	79	79	83	78	79	79			11
CMX	215	75	76	81	76	75	75			10
CMX	225	72	75	80	75	70	75			9
CMX	235	68	75	78	75	66	75			5
CMX	245	65	75	76	76	62	75			5
CMX	255	61	75	75	75	59	75			5

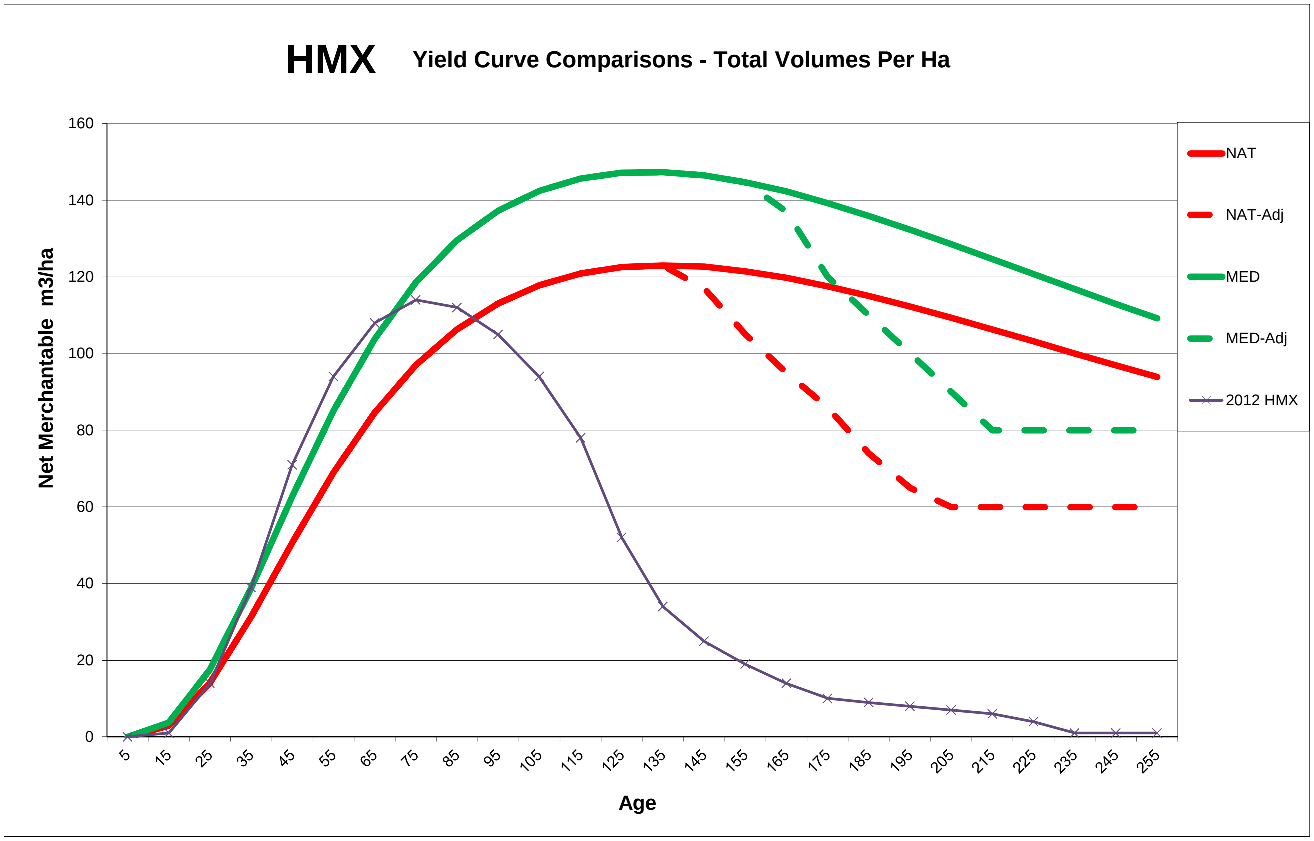
Total net merchantable volume peak of yield curve

Not a valid managed yield curve for this forest unit.

Red Font indicates tail volume adjustment in yield curve.

Operable tail volumes

Comparison of Kenora Forest 2022 Yield Curves by Forest Unit



FU	AC10	NAT	NAT-Adj	LOW	LOW-Adj	MED	MED-Adj	HIGH	HIGH-Adj	2012 HMX
HMX	5	0	0			0	0			0
HMX	15	3	3			4	4			1
HMX	25	14	14			18	18			14
HMX	35	31	31			39	39			39
HMX	45	51	51			63	63			71
HMX	55	69	69			85	85			94
HMX	65	85	85			104	104			108
HMX	75	97	97			118	118			114
HMX	85	106	106			129	129			112
HMX	95	113	113			137	137			105
HMX	105	118	118			143	143			94
HMX	115	121	121			146	146			78
HMX	125	122	122			147	147			52
HMX	135	123	123			147	147			34
HMX	145	123	117			146	146			25
HMX	155	121	105			145	145			19
HMX	165	120	95			142	137			14
HMX	175	118	86			139	120			10
HMX	185	115	74			136	110			9
HMX	195	112	65			132	100			8
HMX	205	109	60			129	90			7
HMX	215	106	60			125	80			6
HMX	225	103	60			121	80			4
HMX	235	100	60			117	80			1
HMX	245	97	60			113	80			1
HMX	255	94	60			109	80			1

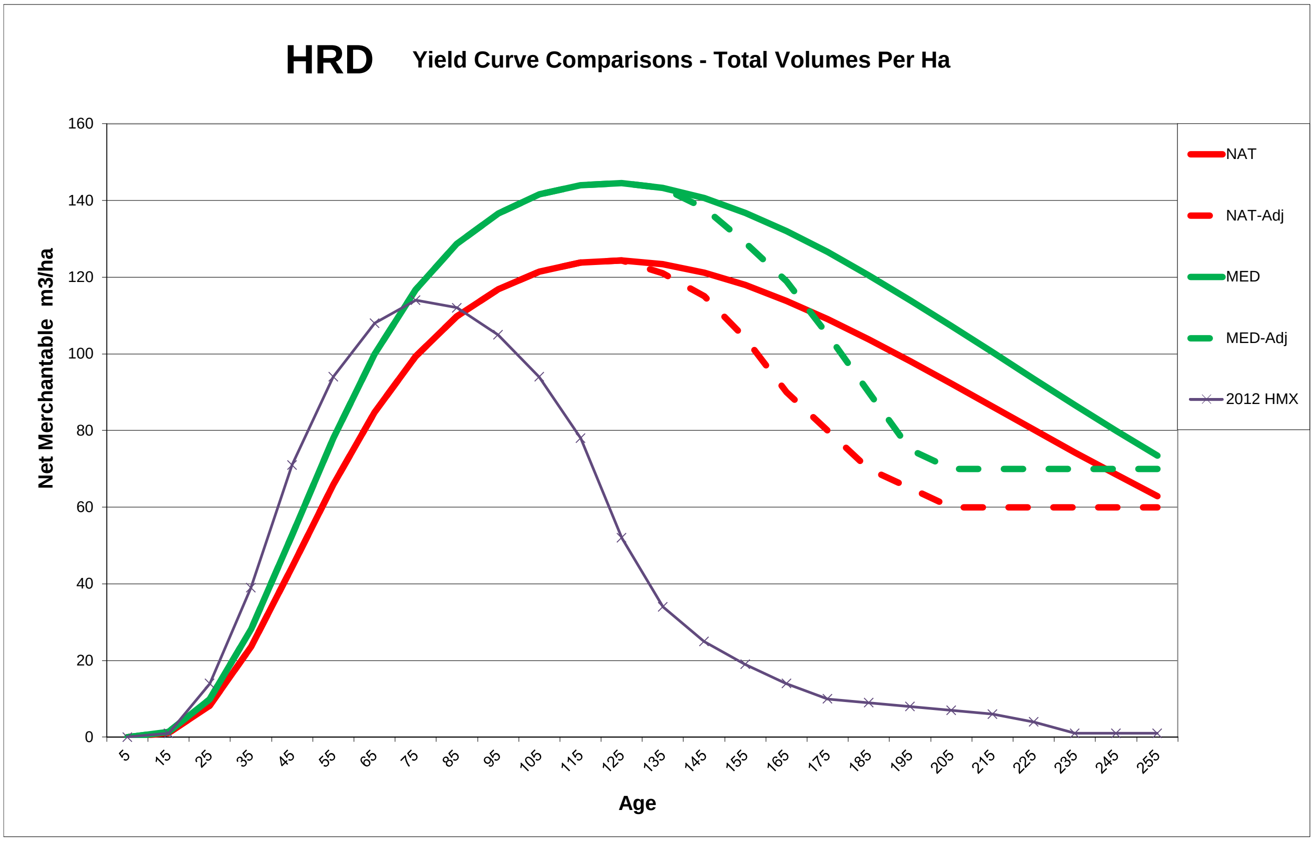
Total net merchantable volume peak of yield curve

Not a valid managed yield curve for this forest unit.

Red Font indicates tail volume adjustment in yield curve.

Inoperable tail volumes

Comparison of Kenora Forest 2022 Yield Curves by Forest Unit



FU	AC10	NAT	NAT-Adj	LOW	LOW-Adj	MED	MED-Adj	HIGH	HIGH-Adj	2012 HMX
HRD	5	0	0			0	0			0
HRD	15	1	1			1	1			1
HRD	25	8	8			10	10			14
HRD	35	24	24			28	28			39
HRD	45	44	44			53	53			71
HRD	55	66	66			78	78			94
HRD	65	85	85			100	100			108
HRD	75	99	99			117	117			114
HRD	85	110	110			129	129			112
HRD	95	117	117			137	137			105
HRD	105	121	121			142	142			94
HRD	115	124	124			144	144			78
HRD	125	124	124			145	145			52
HRD	135	123	121			143	143			34
HRD	145	121	115			141	138			25
HRD	155	118	104			137	129			19
HRD	165	114	90			132	119			14
HRD	175	109	80			127	105			10
HRD	185	104	70			120	90			9
HRD	195	98	65			114	75			8
HRD	205	92	60			107	70			7
HRD	215	86	60			100	70			6
HRD	225	80	60			94	70			4
HRD	235	74	60			87	70			1
HRD	245	69	60			80	70			1
HRD	255	63	60			73	70			1

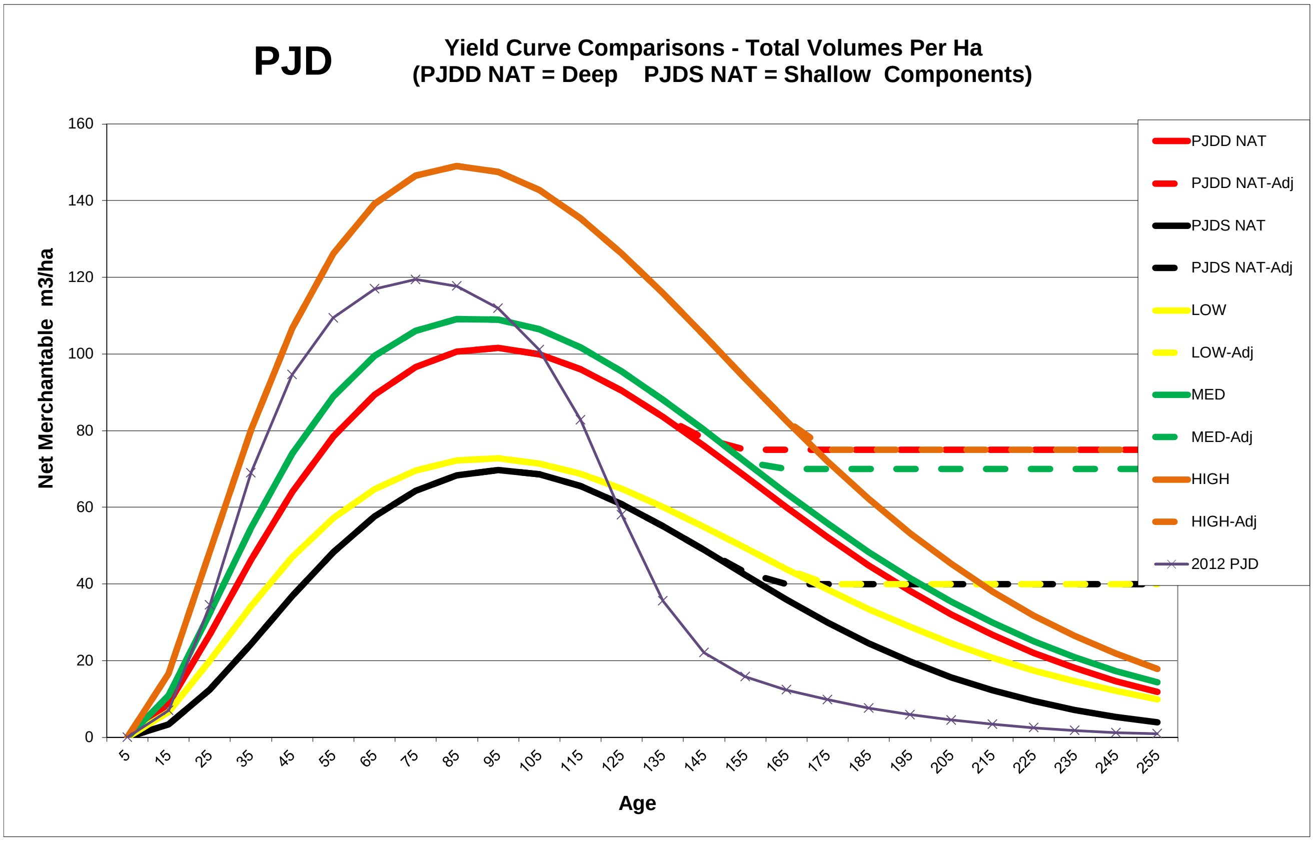
Total net merchantable volume peak of yield curve

Not a valid managed yield curve for this forest unit.

Red Font indicates tail volume adjustment in yield curve.

Inoperable tail volumes

Comparison of Kenora Forest 2022 Yield Curves by Forest Unit

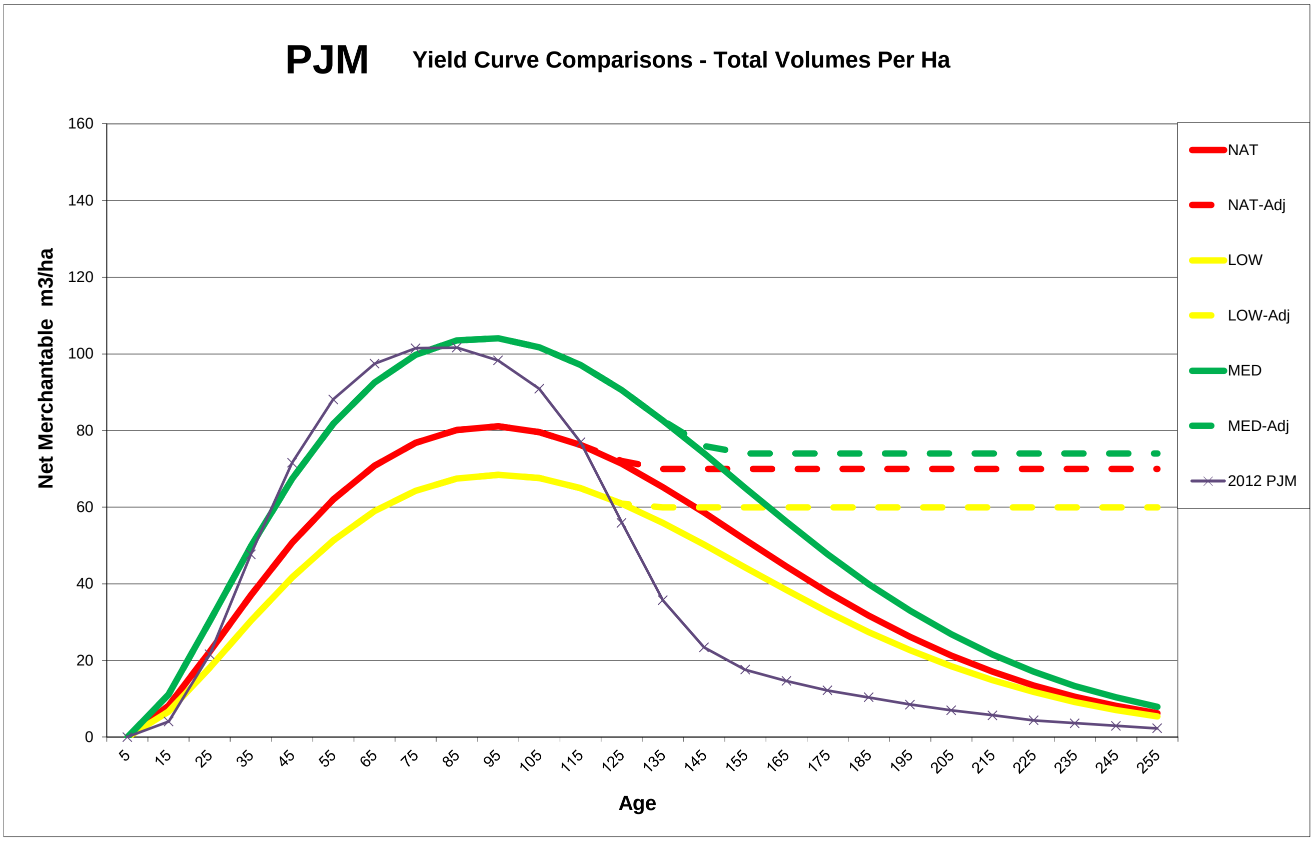


FU	AC10	PJDD NAT	PJDD NAT-Adj	PJDS NAT	PJDS NAT-Adj	LOW	LOW-Adj	MED	MED-Adj	HIGH	HIGH-Adj	2012 PJD
PJD	5	0	0	0	0	0	0	0	0	0	0	0
PJD	15	9	9	3	3	7	7	11	11	17	17	7
PJD	25	27	27	12	12	20	20	32	32	48	48	35
PJD	35	46	46	24	24	34	34	55	55	80	80	69
PJD	45	64	64	37	37	47	47	74	74	107	107	95
PJD	55	79	79	48	48	57	57	89	89	126	126	109
PJD	65	89	89	58	58	65	65	100	100	139	139	117
PJD	75	97	97	64	64	70	70	106	106	147	147	119
PJD	85	101	101	68	68	72	72	109	109	149	149	118
PJD	95	102	102	70	70	73	73	109	109	148	148	112
PJD	105	100	100	69	69	71	71	106	106	143	143	101
PJD	115	96	96	66	66	69	69	102	102	135	135	83
PJD	125	90	90	61	61	65	65	95	95	126	126	58
PJD	135	84	84	55	55	60	60	88	88	116	116	36
PJD	145	76	78	49	49	55	55	80	80	105	105	22
PJD	155	68	75	42	43	49	49	72	72	94	94	16
PJD	165	60	75	36	40	44	44	64	70	83	83	12
PJD	175	52	75	30	40	39	40	56	70	72	75	10
PJD	185	45	75	25	40	33	40	48	70	62	75	8
PJD	195	38	75	20	40	29	40	42	70	53	75	6
PJD	205	32	75	16	40	25	40	35	70	45	75	5
PJD	215	27	75	12	40	21	40	30	70	38	75	3
PJD	225	22	75	9	40	17	40	25	70	32	75	3
PJD	235	18	75	7	40	15	40	21	70	26	75	2
PJD	245	15	75	5	40	12	40	17	70	22	75	1
PJD	255	12	75	4	40	10	40	14	70	18	75	1

Total net merchantable volume peak of yield curve — Not a valid managed yield curve for this forest unit.

Red Font indicates tail volume adjustment in yield curve. — Operable tail volumes

Comparison of Kenora Forest 2022 Yield Curves by Forest Unit



FU	AC10	NAT	NAT-Adj	LOW	LOW-Adj	MED	MED-Adj	HIGH	HIGH-Adj	2012 PJM
PJM	5	0	0	0	0	0	0			0
PJM	15	8	8	7	7	11	11			4
PJM	25	22	22	18	18	30	30			22
PJM	35	37	37	30	30	50	50			48
PJM	45	51	51	42	42	67	67			72
PJM	55	62	62	51	51	82	82			88
PJM	65	71	71	59	59	93	93			97
PJM	75	77	77	64	64	100	100			101
PJM	85	80	80	67	67	103	103			102
PJM	95	81	81	68	68	104	104			98
PJM	105	80	80	68	68	102	102			91
PJM	115	76	76	65	65	97	97			77
PJM	125	71	72	61	61	91	91			56
PJM	135	65	70	56	60	83	83			36
PJM	145	59	70	50	60	74	76			23
PJM	155	52	70	44	60	65	74			18
PJM	165	45	70	38	60	56	74			15
PJM	175	38	70	33	60	48	74			12
PJM	185	32	70	27	60	40	74			10
PJM	195	26	70	23	60	33	74			9
PJM	205	21	70	18	60	27	74			7
PJM	215	17	70	15	60	22	74			6
PJM	225	14	70	12	60	17	74			4
PJM	235	11	70	9	60	13	74			4
PJM	245	8	70	7	60	10	74			3
PJM	255	6	70	5	60	8	74			2

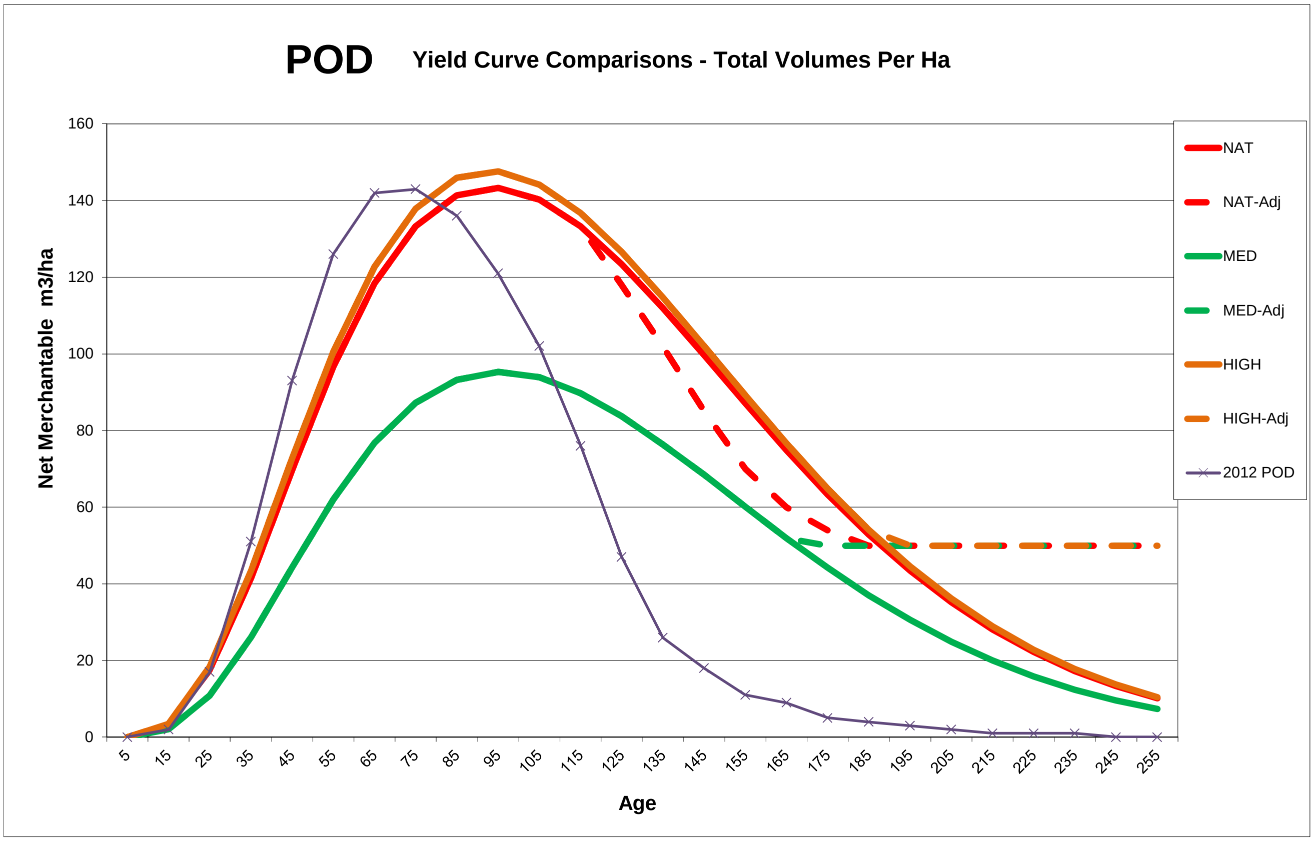
Total net merchantable volume peak of yield curve

Not a valid managed yield curve for this forest unit.

Red Font indicates tail volume adjustment in yield curve.

Operable tail volumes

Comparison of Kenora Forest 2022 Yield Curves by Forest Unit



FU	AC10	NAT	NAT-Adj	LOW	LOW-Adj	MED	MED-Adj	HIGH	HIGH-Adj	2012 POD
POD	5	0	0			0	0	0	0	0
POD	15	3	3			2	2	3	3	2
POD	25	18	18			11	11	18	18	17
POD	35	42	42			26	26	44	44	51
POD	45	70	70			44	44	73	73	93
POD	55	97	97			62	62	101	101	126
POD	65	118	118			77	77	123	123	142
POD	75	133	133			87	87	138	138	143
POD	85	141	141			93	93	146	146	136
POD	95	143	143			95	95	148	148	121
POD	105	140	140			94	94	144	144	102
POD	115	133	133			90	90	137	137	76
POD	125	123	118			84	84	127	127	47
POD	135	112	102			76	76	115	115	26
POD	145	100	85			68	68	102	102	18
POD	155	87	70			60	60	89	89	11
POD	165	75	60			52	52	77	77	9
POD	175	63	54			44	50	65	65	5
POD	185	53	50			37	50	54	54	4
POD	195	43	50			31	50	45	50	3
POD	205	35	50			25	50	36	50	2
POD	215	28	50			20	50	29	50	1
POD	225	22	50			16	50	23	50	1
POD	235	17	50			12	50	18	50	1
POD	245	13	50			10	50	14	50	0
POD	255	10	50			7	50	10	50	0

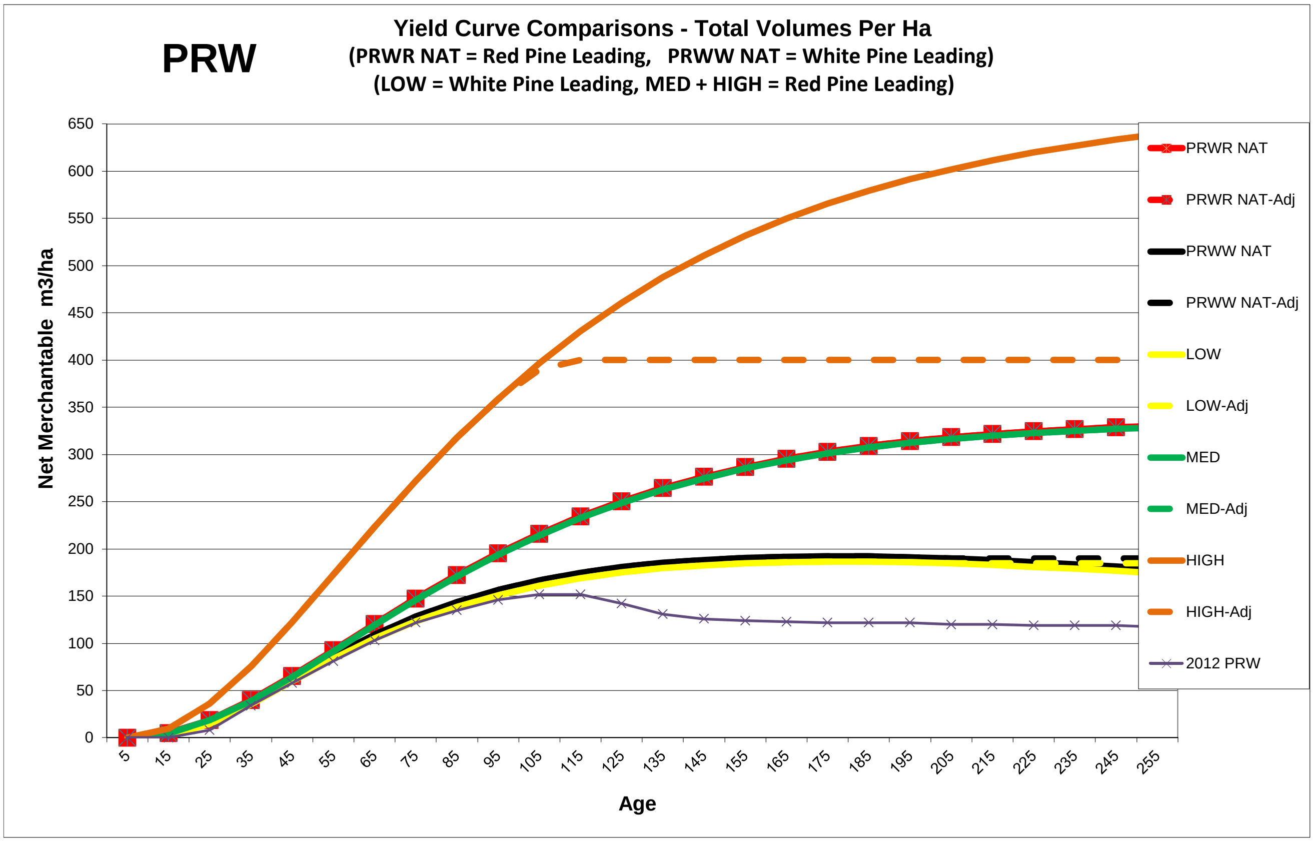
Total net merchantable volume peak of yield curve

Not a valid managed yield curve for this forest unit.

Red Font indicates tail volume adjustment in yield curve.

Inoperable tail volumes

Comparison of Kenora Forest 2022 Yield Curves by Forest Unit



FU	AC10	PRWR NAT	PRWR NAT-Adj	PRWW NAT	PRWW NAT-Adj	LOW	LOW-Adj	MED	MED-Adj	HIGH	HIGH-Adj	2012 PRW
PRW	5	0	0	0	0	0	0	0	0	0	0	0
PRW	15	5	5	3	3	2	2	5	5	9	9	0
PRW	25	19	19	16	16	15	15	18	18	36	36	8
PRW	35	40	40	37	37	36	36	39	39	76	76	34
PRW	45	65	65	63	63	60	60	64	64	123	123	58
PRW	55	93	93	87	87	84	84	92	92	173	173	81
PRW	65	121	121	109	109	105	105	119	119	223	223	103
PRW	75	147	147	128	128	123	123	146	146	272	272	122
PRW	85	172	172	144	144	139	139	171	171	317	317	135
PRW	95	195	195	156	156	151	151	194	194	359	359	146
PRW	105	216	216	167	167	161	161	214	214	397	390	152
PRW	115	234	234	175	175	169	169	233	233	431	400	152
PRW	125	250	250	181	181	175	175	249	249	461	400	142
PRW	135	264	264	185	185	180	180	263	263	487	400	131
PRW	145	276	276	188	188	183	183	275	275	511	400	126
PRW	155	287	287	191	191	185	185	285	285	532	400	124
PRW	165	295	295	192	192	186	186	294	294	550	400	123
PRW	175	303	303	192	192	187	187	301	301	565	400	122
PRW	185	309	309	192	192	186	186	307	307	579	400	122
PRW	195	314	314	191	191	186	186	312	312	592	400	122
PRW	205	318	318	190	190	185	185	317	317	602	400	120
PRW	215	322	322	188	190	183	185	320	320	612	400	120
PRW	225	325	325	186	190	181	185	323	323	620	400	119
PRW	235	327	327	184	190	179	185	325	325	627	400	119
PRW	245	329	329	181	190	177	185	327	327	633	400	119
PRW	255	330	330	178	190	174	185	328	328	639	400	117

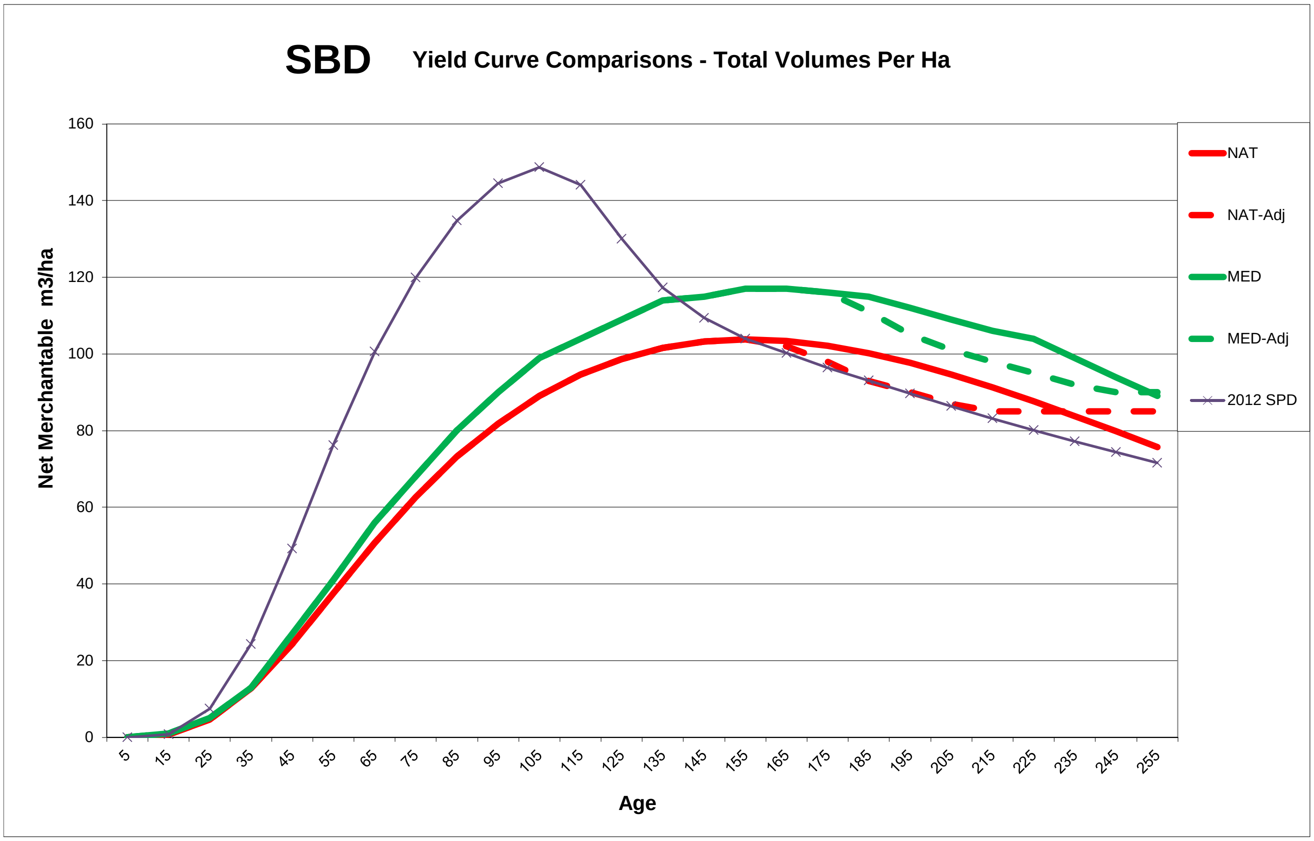
Total net merchantable volume peak of yield curve

Red Font indicates tail volume adjustment in yield curve.

Not a valid managed yield curve for this forest unit.

Operable tail volumes

Comparison of Kenora Forest 2022 Yield Curves by Forest Unit



FU	AC10	NAT	NAT-Adj	LOW	LOW-Adj	MED	MED-Adj	HIGH	HIGH-Adj	2012 SPD
SBD	5	0	0			0	0			0
SBD	15	1	1			1	1			1
SBD	25	5	5			5	5			8
SBD	35	13	13			13	13			24
SBD	45	24	24			27	27			49
SBD	55	38	38			41	41			76
SBD	65	51	51			56	56			101
SBD	75	63	63			68	68			120
SBD	85	73	73			80	80			135
SBD	95	82	82			90	90			145
SBD	105	89	89			99	99			149
SBD	115	95	95			104	104			144
SBD	125	99	99			109	109			130
SBD	135	102	102			114	114			117
SBD	145	103	103			115	115			109
SBD	155	104	104			117	117			104
SBD	165	103	102			117	117			100
SBD	175	102	98			116	116			96
SBD	185	100	93			115	111			93
SBD	195	98	90			112	105			90
SBD	205	95	87			109	101			86
SBD	215	91	85			106	98			83
SBD	225	88	85			104	95			80
SBD	235	84	85			99	92			77
SBD	245	80	85			94	90			74
SBD	255	76	85			89	90			72

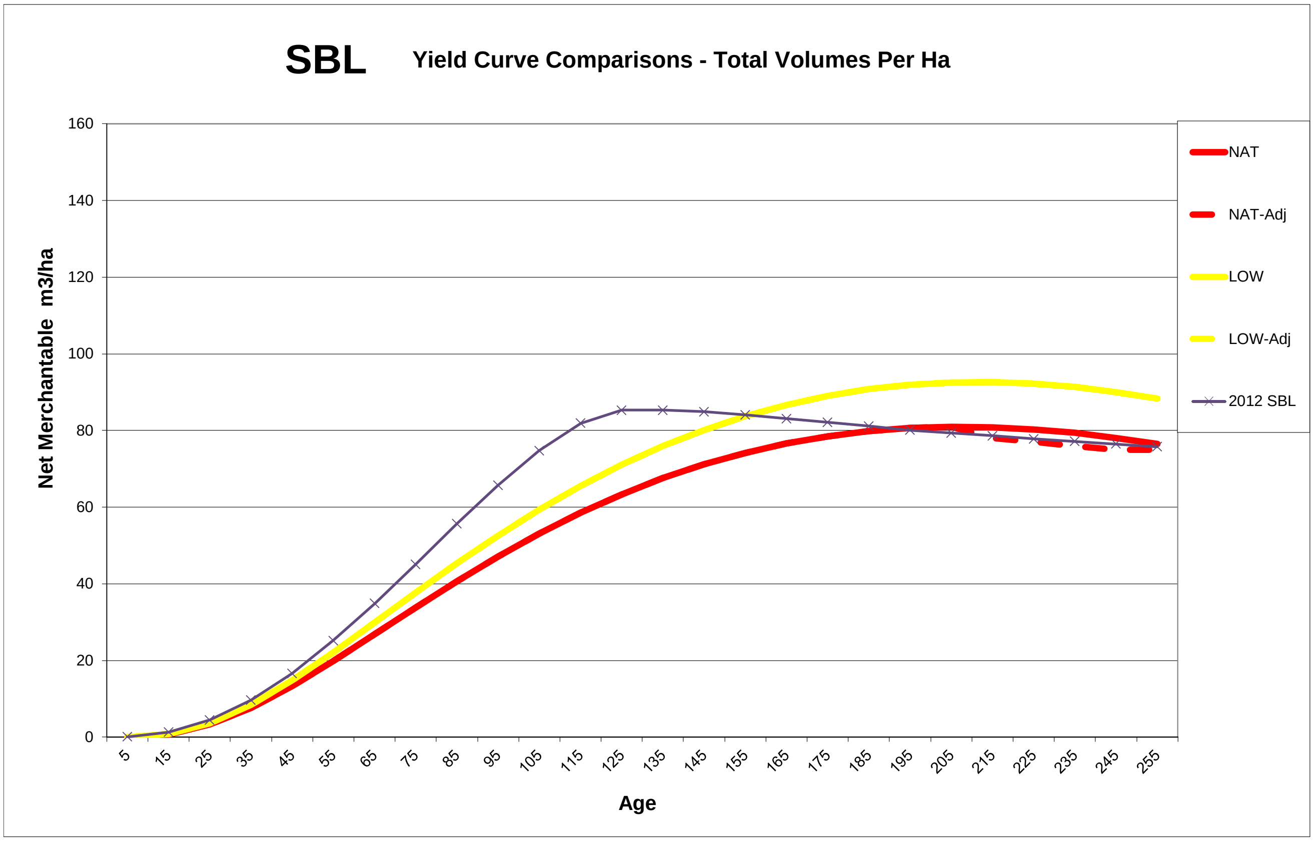
Total net merchantable volume peak of yield curve

Not a valid managed yield curve for this forest unit.

Red Font indicates tail volume adjustment in yield curve.

Operable tail volumes

Comparison of Kenora Forest 2022 Yield Curves by Forest Unit



FU	AC10	NAT	NAT-Adj	LOW	LOW-Adj	MED	MED-Adj	HIGH	HIGH-Adj	2012 SBL
SBL	5	0	0	0	0					0
SBL	15	1	1	1	1					1
SBL	25	3	3	4	4					5
SBL	35	8	8	9	9					10
SBL	45	13	13	15	15					17
SBL	55	20	20	22	22					25
SBL	65	27	27	30	30					35
SBL	75	34	34	38	38					45
SBL	85	41	41	45	45					56
SBL	95	47	47	53	53					66
SBL	105	53	53	59	59					75
SBL	115	59	59	66	66					82
SBL	125	63	63	71	71					85
SBL	135	68	68	76	76					85
SBL	145	71	71	80	80					85
SBL	155	74	74	84	84					84
SBL	165	77	77	87	87					83
SBL	175	78	78	89	89					82
SBL	185	80	80	91	91					81
SBL	195	81	81	92	92					80
SBL	205	81	81	93	93					79
SBL	215	81	78	93	93					79
SBL	225	80	77	92	92					78
SBL	235	79	76	91	91					77
SBL	245	78	75	90	90					76
SBL	255	77	75	88	88					76

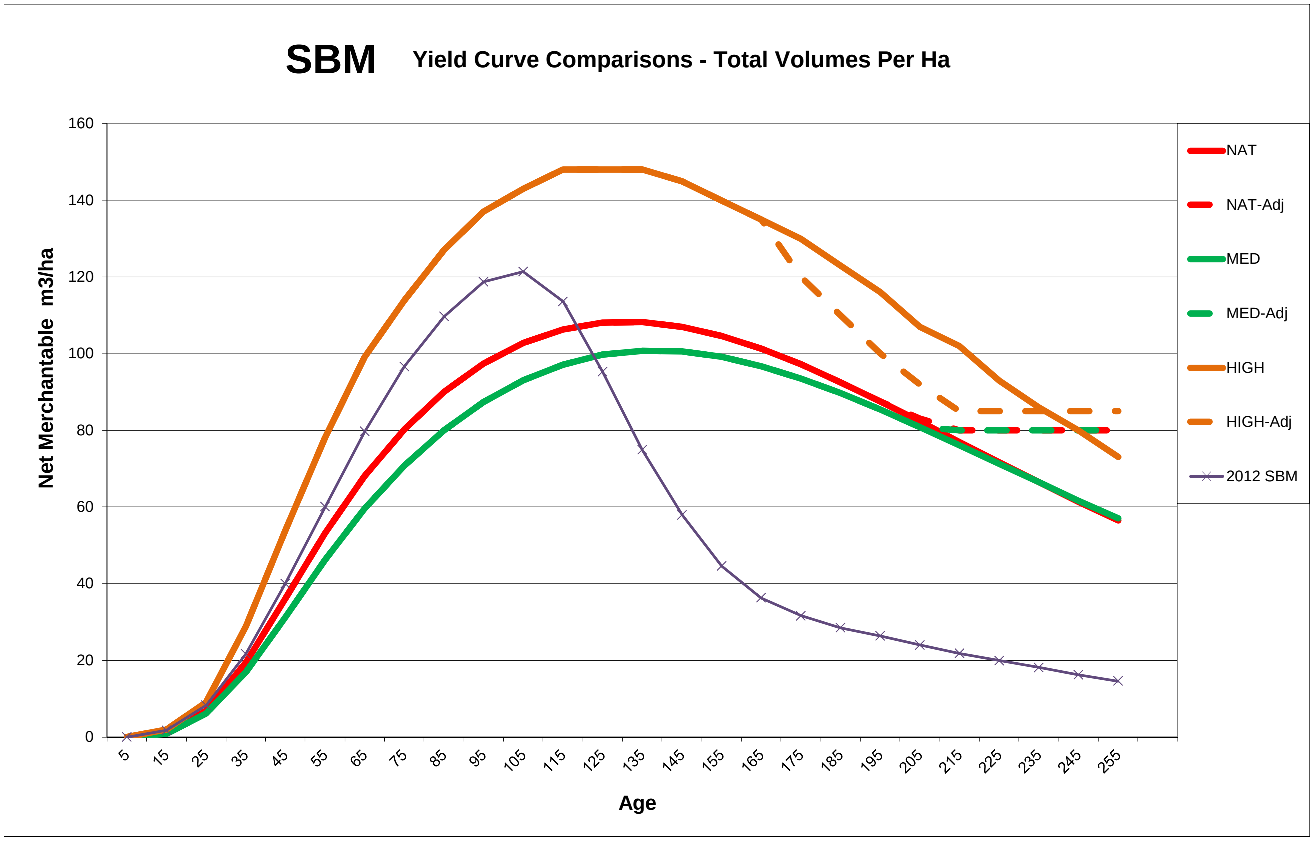
Total net merchantable volume peak of yield curve

Not a valid managed yield curve for this forest unit.

Red Font indicates tail volume adjustment in yield curve.

Operable tail volumes

Comparison of Kenora Forest 2022 Yield Curves by Forest Unit



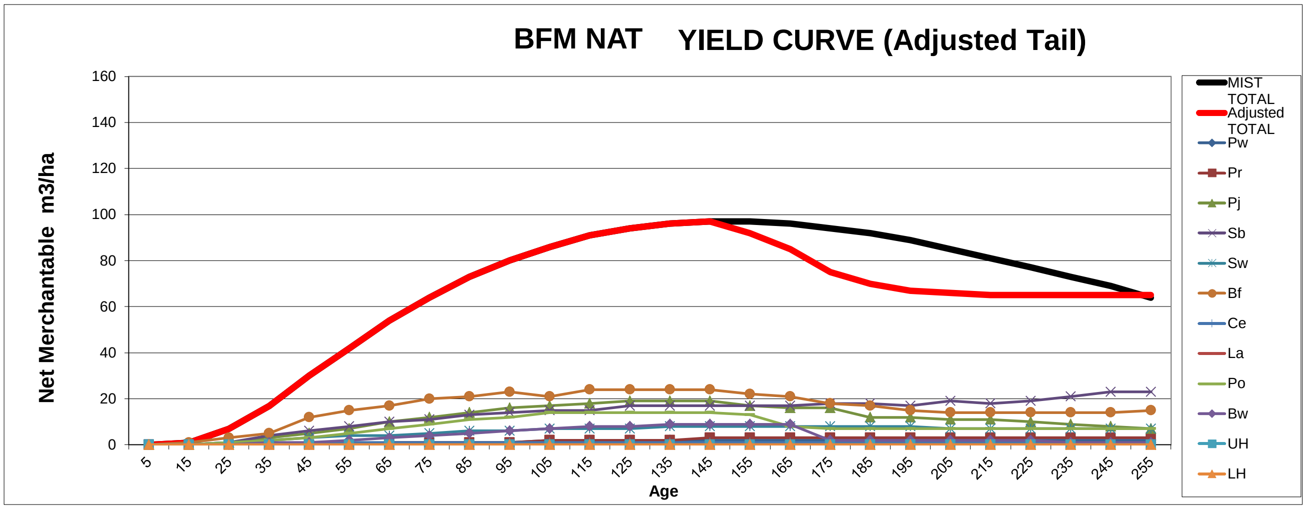
FU	AC10	NAT	NAT-Adj	LOW	LOW-Adj	MED	MED-Adj	HIGH	HIGH-Adj	2012 SBM
SBM	5	0	0			0	0	0	0	0
SBM	15	1	1			1	1	2	2	2
SBM	25	7	7			6	6	9	9	8
SBM	35	19	19			17	17	29	29	22
SBM	45	36	36			31	31	54	54	40
SBM	55	53	53			46	46	78	78	60
SBM	65	68	68			60	60	99	99	80
SBM	75	80	80			71	71	114	114	97
SBM	85	90	90			80	80	127	127	110
SBM	95	97	97			87	87	137	137	119
SBM	105	103	103			93	93	143	143	121
SBM	115	106	106			97	97	148	148	114
SBM	125	108	108			100	100	148	148	95
SBM	135	108	108			101	101	148	148	75
SBM	145	107	107			101	101	145	145	58
SBM	155	105	105			99	99	140	140	45
SBM	165	101	101			97	97	135	135	36
SBM	175	97	97			94	94	130	120	32
SBM	185	93	93			90	90	123	110	29
SBM	195	88	88			85	85	116	100	26
SBM	205	82	83			81	81	107	92	24
SBM	215	77	80			76	80	102	85	22
SBM	225	72	80			71	80	93	85	20
SBM	235	66	80			66	80	86	85	18
SBM	245	61	80			62	80	80	85	16
SBM	255	56	80			57	80	73	85	15

Total net merchantable volume peak of yield curve

Not a valid managed yield curve for this forest unit.

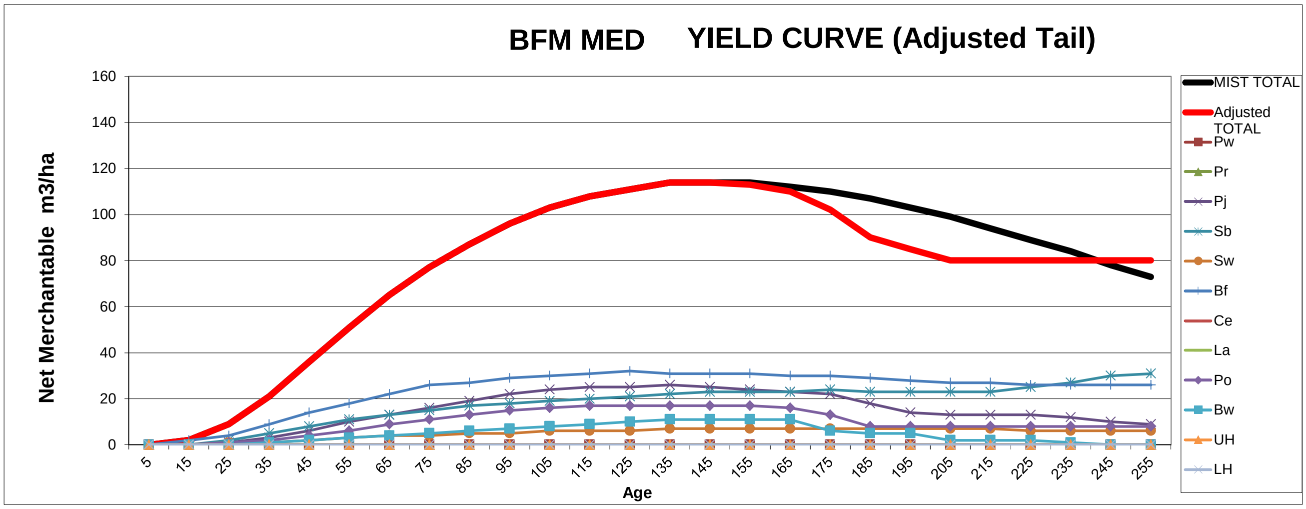
Red Font indicates tail volume adjustment in yield curve.

Operable tail volumes



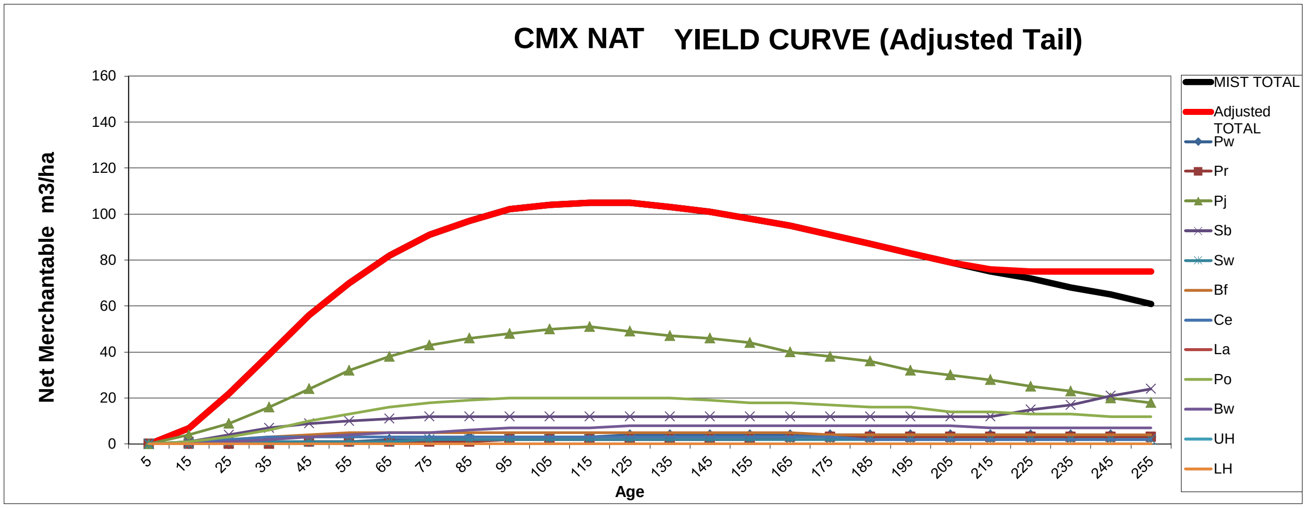
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
BFM NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BFM NAT	15	1	1	0	0	0	0	0	1	0	0	0	0	0	0
BFM NAT	25	7	7	0	0	1	1	1	3	0	0	1	0	0	0
BFM NAT	35	17	17	0	0	3	4	2	5	0	0	2	1	0	0
BFM NAT	45	30	30	0	0	5	6	3	12	0	0	3	1	0	0
BFM NAT	55	42	42	0	0	7	8	4	15	1	0	5	2	0	0
BFM NAT	65	54	54	1	1	10	10	4	17	1	0	7	3	0	0
BFM NAT	75	64	64	1	1	12	11	5	20	1	0	9	4	0	0
BFM NAT	85	73	73	1	1	14	13	6	21	1	0	11	5	0	0
BFM NAT	95	80	80	1	1	16	14	6	23	1	0	12	6	0	0
BFM NAT	105	86	86	2	2	17	15	7	21	1	0	14	7	0	0
BFM NAT	115	91	91	2	2	18	15	7	24	1	0	14	8	0	0
BFM NAT	125	94	94	2	2	19	17	7	24	1	0	14	8	0	0
BFM NAT	135	96	96	2	2	19	17	8	24	1	0	14	9	0	0
BFM NAT	145	97	97	2	3	19	17	8	24	1	0	14	9	0	0
BFM NAT	155	97	**92**	2	3	17	17	8	22	1	0	13	9	0	0
BFM NAT	165	96	**85**	2	3	16	17	8	21	1	0	8	9	0	0
BFM NAT	175	94	**75**	2	3	16	18	8	18	1	0	7	2	0	0
BFM NAT	185	92	**70**	2	3	12	18	8	17	1	0	7	2	0	0
BFM NAT	195	89	**67**	2	3	12	17	8	15	1	0	7	2	0	0
BFM NAT	205	85	**66**	2	3	11	19	7	14	1	0	7	2	0	0
BFM NAT	215	81	**65**	2	3	11	18	7	14	1	0	7	2	0	0
BFM NAT	225	77	**65**	2	3	10	19	7	14	1	0	7	2	0	0
BFM NAT	235	73	**65**	2	3	9	21	7	14	1	0	7	1	0	0
BFM NAT	245	69	**65**	2	3	8	23	7	14	0	0	7	1	0	0
BFM NAT	255	64	**65**	2	3	7	23	7	15	0	0	7	1	0	0

Total net merchantable volume peak of yield curve



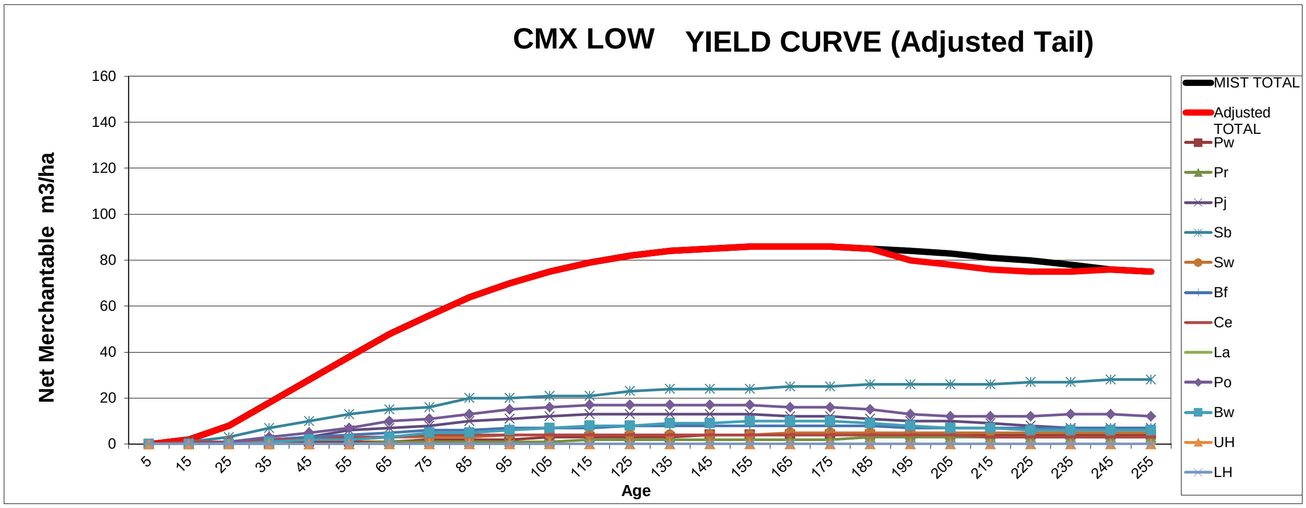
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
BFM MED	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BFM MED	15	2	2	0	0	0	0	0	2	0	0	0	0	0	0
BFM MED	25	9	9	0	0	1	2	1	4	0	0	1	0	0	0
BFM MED	35	21	21	0	0	3	5	1	9	0	0	2	1	0	0
BFM MED	45	36	36	0	0	6	8	2	14	0	0	4	2	0	0
BFM MED	55	51	51	0	0	10	11	3	18	0	0	6	3	0	0
BFM MED	65	65	65	0	0	13	13	4	22	0	0	9	4	0	0
BFM MED	75	77	77	0	0	16	15	4	26	0	0	11	5	0	0
BFM MED	85	87	87	0	0	19	17	5	27	0	0	13	6	0	0
BFM MED	95	96	96	0	0	22	18	5	29	0	0	15	7	0	0
BFM MED	105	103	103	0	0	24	19	6	30	0	0	16	8	0	0
BFM MED	115	108	108	0	0	25	20	6	31	0	0	17	9	0	0
BFM MED	125	111	111	0	0	25	21	6	32	0	0	17	10	0	0
BFM MED	135	114	114	0	0	26	22	7	31	0	0	17	11	0	0
BFM MED	145	114	114	0	0	25	23	7	31	0	0	17	11	0	0
BFM MED	155	114	113	0	0	24	23	7	31	0	0	17	11	0	0
BFM MED	165	112	110	0	0	23	23	7	30	0	0	16	11	0	0
BFM MED	175	110	102	0	0	22	24	7	30	0	0	13	6	0	0
BFM MED	185	107	90	0	0	18	23	7	29	0	0	8	5	0	0
BFM MED	195	103	85	0	0	14	23	7	28	0	0	8	5	0	0
BFM MED	205	99	80	0	0	13	23	7	27	0	0	8	2	0	0
BFM MED	215	94	80	0	0	13	23	7	27	0	0	8	2	0	0
BFM MED	225	89	80	0	0	13	25	6	26	0	0	8	2	0	0
BFM MED	235	84	80	0	0	12	27	6	26	0	0	8	1	0	0
BFM MED	245	78	80	0	0	10	30	6	26	0	0	8	0	0	0
BFM MED	255	73	80	0	0	9	31	6	26	0	0	8	0	0	0

Total net merchantable volume peak of yield curve



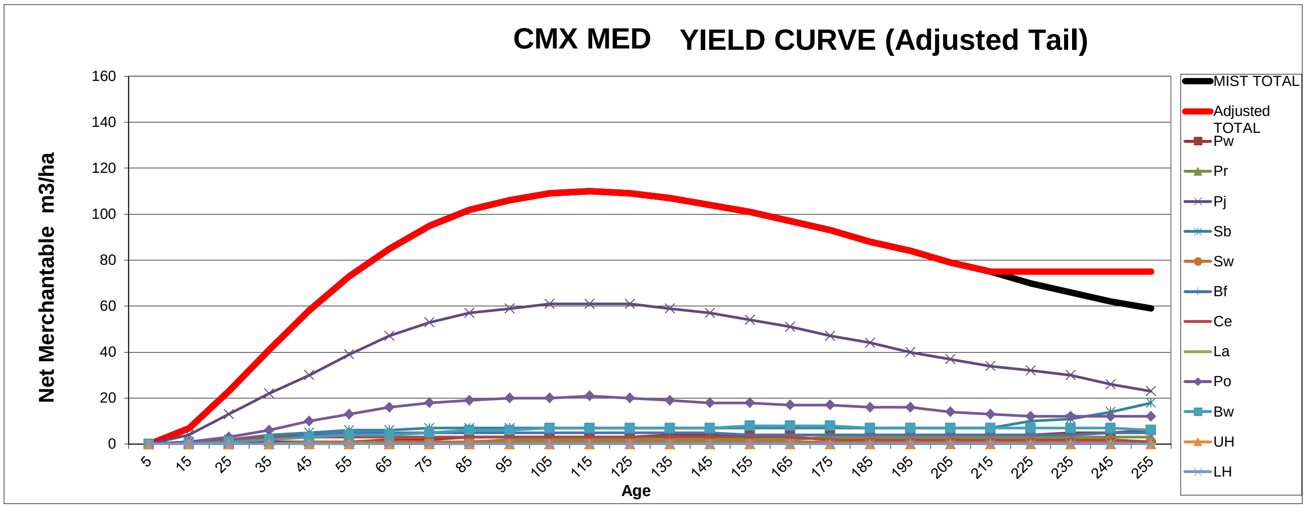
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
CMX NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CMX NAT	15	7	7	0	0	4	1	0	0	1	0	1	0	0	0
CMX NAT	25	22	22	0	0	9	4	1	2	2	0	3	1	0	0
CMX NAT	35	39	39	1	0	16	7	1	3	3	0	6	2	0	0
CMX NAT	45	56	56	1	1	24	9	1	4	3	0	10	3	0	0
CMX NAT	55	70	70	1	1	32	10	1	5	3	0	13	4	0	0
CMX NAT	65	82	82	2	1	38	11	1	5	3	0	16	5	0	0
CMX NAT	75	91	91	2	1	43	12	2	5	3	0	18	5	0	0
CMX NAT	85	97	97	3	1	46	12	2	5	3	0	19	6	0	0
CMX NAT	95	102	102	3	2	48	12	2	5	3	0	20	7	0	0
CMX NAT	105	104	104	3	2	50	12	2	5	3	0	20	7	0	0
CMX NAT	115	105	105	3	2	51	12	2	5	3	0	20	7	0	0
CMX NAT	125	105	105	4	2	49	12	2	5	3	0	20	8	0	0
CMX NAT	135	103	103	4	2	47	12	2	5	3	0	20	8	0	0
CMX NAT	145	101	101	4	2	46	12	2	5	3	0	19	8	0	0
CMX NAT	155	98	98	4	2	44	12	2	5	3	0	18	8	0	0
CMX NAT	165	95	95	4	3	40	12	2	5	3	0	18	8	0	0
CMX NAT	175	91	91	4	3	38	12	2	4	3	0	17	8	0	0
CMX NAT	185	87	87	4	3	36	12	2	4	2	0	16	8	0	0
CMX NAT	195	83	83	4	3	32	12	2	4	2	0	16	8	0	0
CMX NAT	205	79	79	4	3	30	12	2	4	2	0	14	8	0	0
CMX NAT	215	75	76	4	3	28	12	2	4	2	0	14	7	0	0
CMX NAT	225	72	75	4	3	25	15	2	4	2	0	13	7	0	0
CMX NAT	235	68	75	4	3	23	17	2	4	2	0	13	7	0	0
CMX NAT	245	65	75	4	3	20	21	2	4	2	0	12	7	0	0
CMX NAT	255	61	75	3	3	18	24	2	4	2	0	12	7	0	0

Total net merchantable volume peak of yield curve



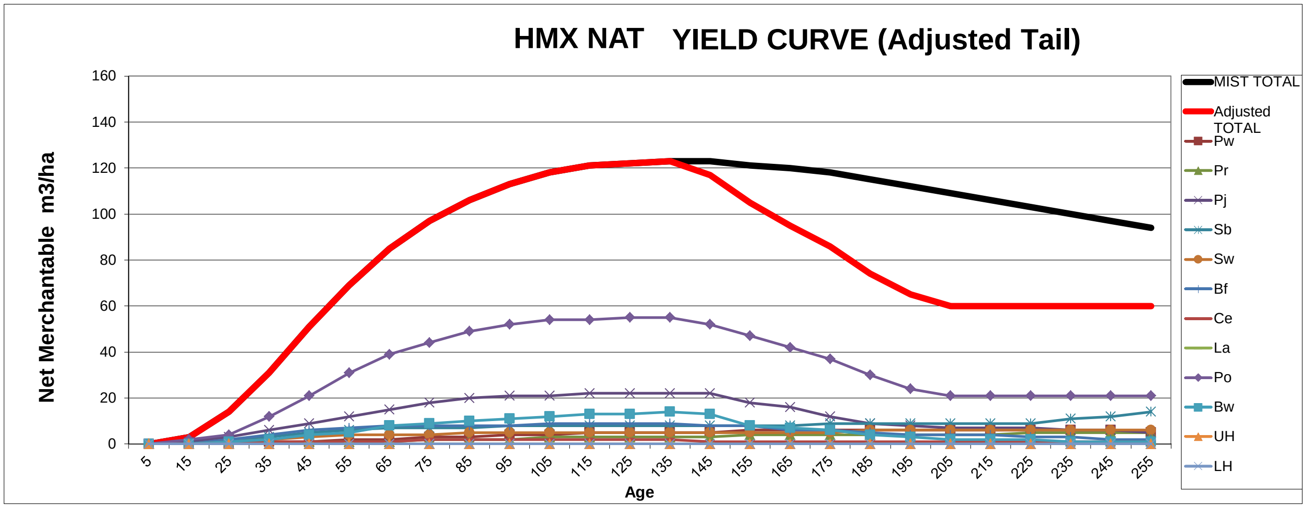
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
CMX LOW	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CMX LOW	15	2	2	0	0	0	1	0	0	1	0	0	0	0	0
CMX LOW	25	8	8	0	0	1	3	1	1	1	0	1	0	0	0
CMX LOW	35	18	18	0	0	2	7	1	2	2	0	3	1	0	0
CMX LOW	45	28	28	1	0	3	10	2	3	2	0	5	2	0	0
CMX LOW	55	38	38	1	0	6	13	2	4	3	0	7	2	0	0
CMX LOW	65	48	48	1	1	7	15	3	5	3	0	10	3	0	0
CMX LOW	75	56	56	2	1	8	16	3	6	4	0	11	5	0	0
CMX LOW	85	64	64	2	1	10	20	3	6	4	0	13	5	0	0
CMX LOW	95	70	70	2	1	11	20	4	7	4	0	15	6	0	0
CMX LOW	105	75	75	3	1	12	21	4	7	4	0	16	7	0	0
CMX LOW	115	79	79	3	2	13	21	4	7	4	0	17	8	0	0
CMX LOW	125	82	82	3	2	13	23	4	8	4	0	17	8	0	0
CMX LOW	135	84	84	3	2	13	24	4	8	4	0	17	9	0	0
CMX LOW	145	85	85	4	2	13	24	4	8	4	0	17	9	0	0
CMX LOW	155	86	86	4	2	13	24	4	8	4	0	17	10	0	0
CMX LOW	165	86	86	4	2	12	25	5	8	4	0	16	10	0	0
CMX LOW	175	86	86	4	2	12	25	5	8	4	0	16	10	0	0
CMX LOW	185	85	85	4	3	11	26	5	8	4	0	15	9	0	0
CMX LOW	195	84	80	4	3	10	26	5	7	4	0	13	8	0	0
CMX LOW	205	83	78	4	3	10	26	5	7	4	0	12	7	0	0
CMX LOW	215	81	76	4	3	9	26	5	7	3	0	12	7	0	0
CMX LOW	225	80	75	4	3	8	27	5	7	3	0	12	6	0	0
CMX LOW	235	78	75	4	3	7	27	5	7	3	0	13	6	0	0
CMX LOW	245	76	76	4	3	7	28	5	7	3	0	13	6	0	0
CMX LOW	255	75	75	4	3	7	28	5	7	3	0	12	6	0	0

Total net merchantable volume peak of yield curve



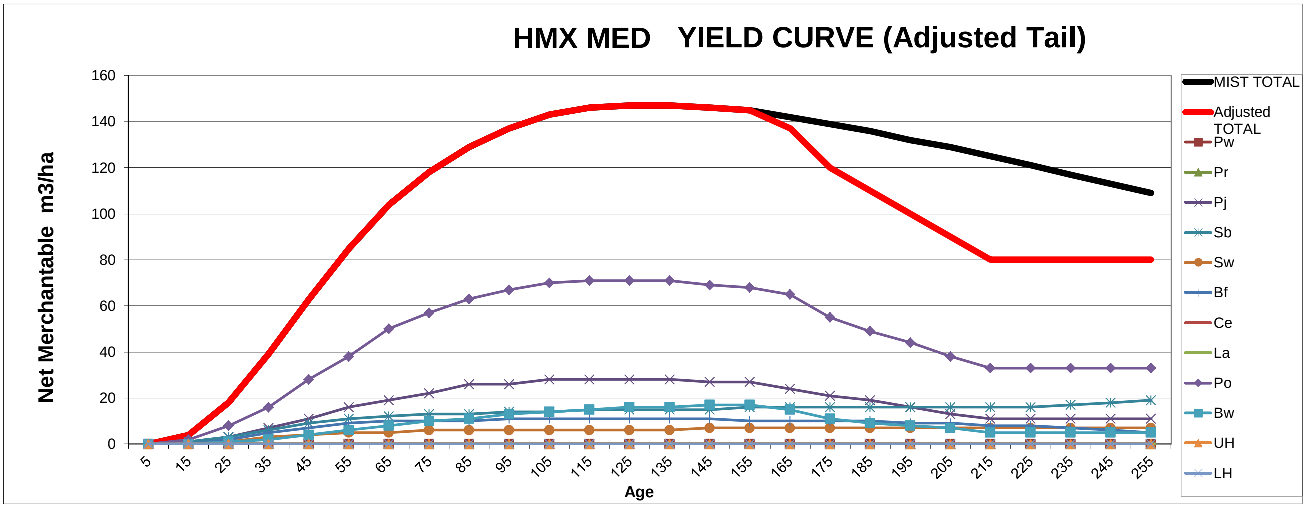
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
CMX MED	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CMX MED	15	7	7	0	0	4	1	0	0	1	0	1	0	0	0
CMX MED	25	23	23	0	0	13	2	0	2	2	0	3	1	0	0
CMX MED	35	41	41	1	0	22	4	0	3	3	0	6	2	0	0
CMX MED	45	58	58	1	1	30	5	1	4	3	0	10	3	0	0
CMX MED	55	73	73	1	1	39	6	1	5	3	0	13	4	0	0
CMX MED	65	85	85	2	1	47	6	1	5	3	0	16	4	0	0
CMX MED	75	95	95	2	1	53	7	1	5	3	0	18	5	0	0
CMX MED	85	102	102	3	1	57	7	1	5	3	0	19	6	0	0
CMX MED	95	106	106	3	2	59	7	1	5	3	0	20	6	0	0
CMX MED	105	109	109	3	2	61	7	1	5	3	0	20	7	0	0
CMX MED	115	110	110	3	2	61	7	1	5	3	0	21	7	0	0
CMX MED	125	109	109	3	2	61	7	1	5	3	0	20	7	0	0
CMX MED	135	107	107	4	2	59	7	1	5	3	0	19	7	0	0
CMX MED	145	104	104	4	2	57	7	1	5	3	0	18	7	0	0
CMX MED	155	101	101	4	2	54	7	1	4	3	0	18	8	0	0
CMX MED	165	97	97	4	2	51	7	1	4	3	0	17	8	0	0
CMX MED	175	93	93	4	3	47	7	1	4	2	0	17	8	0	0
CMX MED	185	88	88	4	3	44	7	1	4	2	0	16	7	0	0
CMX MED	195	84	84	4	3	40	7	1	4	2	0	16	7	0	0
CMX MED	205	79	79	4	3	37	7	1	4	2	0	14	7	0	0
CMX MED	215	75	75	4	3	34	7	1	4	2	0	13	7	0	0
CMX MED	225	70	75	4	3	32	10	1	4	2	0	12	7	0	0
CMX MED	235	66	75	5	3	30	11	1	4	2	0	12	7	0	0
CMX MED	245	62	75	5	3	26	14	1	5	2	0	12	7	0	0
CMX MED	255	59	75	6	3	23	18	1	5	1	0	12	6	0	0

Total net merchantable volume peak of yield curve



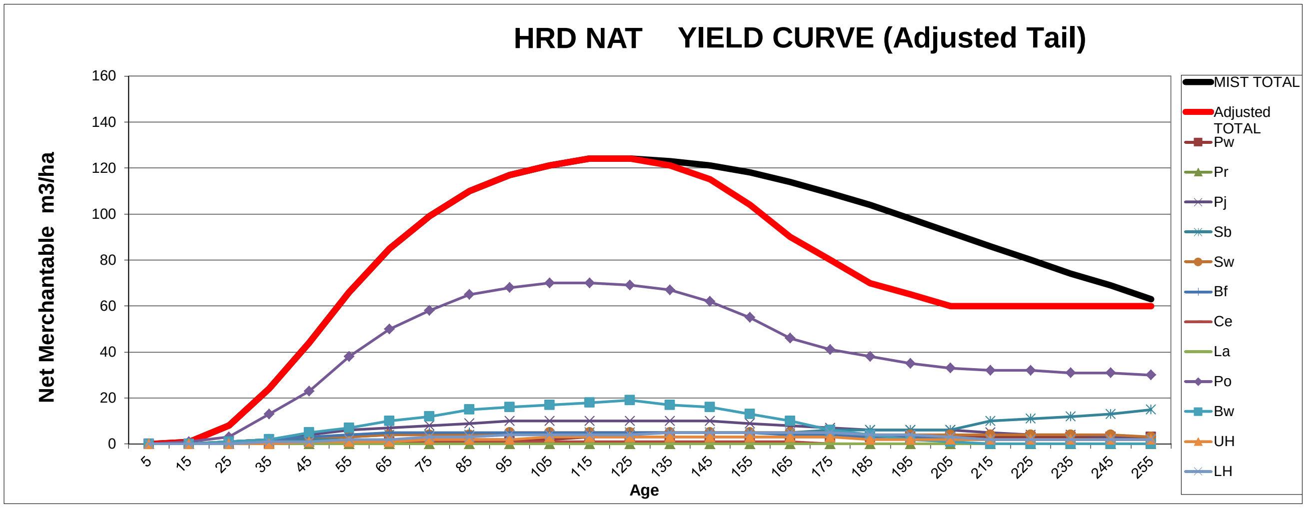
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
HMX NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMX NAT	15	3	3	0	0	1	0	0	0	0	0	2	0	0	0
HMX NAT	25	14	14	0	0	3	2	1	2	1	0	4	1	0	0
HMX NAT	35	31	31	1	0	6	3	2	4	1	0	12	2	0	0
HMX NAT	45	51	51	1	1	9	5	3	6	1	0	21	4	0	0
HMX NAT	55	69	69	2	1	12	6	4	7	1	0	31	5	0	0
HMX NAT	65	85	85	2	1	15	7	4	8	1	0	39	8	0	0
HMX NAT	75	97	97	3	2	18	7	4	8	2	0	44	9	0	0
HMX NAT	85	106	106	3	2	20	7	5	8	2	0	49	10	0	0
HMX NAT	95	113	113	4	2	21	8	5	8	2	0	52	11	0	0
HMX NAT	105	118	118	4	3	21	8	5	9	2	0	54	12	0	0
HMX NAT	115	121	121	5	3	22	8	5	9	2	0	54	13	0	0
HMX NAT	125	122	122	5	3	22	8	5	9	2	0	55	13	0	0
HMX NAT	135	123	123	5	3	22	8	5	9	2	0	55	14	0	0
HMX NAT	145	123	117	5	3	22	8	5	8	1	0	52	13	0	0
HMX NAT	155	121	105	6	4	18	8	5	8	1	0	47	8	0	0
HMX NAT	165	120	95	6	4	16	8	5	6	1	0	42	7	0	0
HMX NAT	175	118	86	6	4	12	9	5	6	1	0	37	6	0	0
HMX NAT	185	115	74	6	4	9	9	6	5	1	0	30	4	0	0
HMX NAT	195	112	65	6	4	8	9	6	4	1	0	24	3	0	0
HMX NAT	205	109	60	6	4	7	9	6	4	1	0	21	2	0	0
HMX NAT	215	106	60	6	4	7	9	6	4	1	0	21	2	0	0
HMX NAT	225	103	60	6	5	7	9	6	3	1	0	21	2	0	0
HMX NAT	235	100	60	6	5	6	11	6	3	1	0	21	1	0	0
HMX NAT	245	97	60	6	5	6	12	6	2	1	0	21	1	0	0
HMX NAT	255	94	60	5	5	5	14	6	2	1	0	21	1	0	0

(Yellow) Total net merchantable volume peak of yield curve



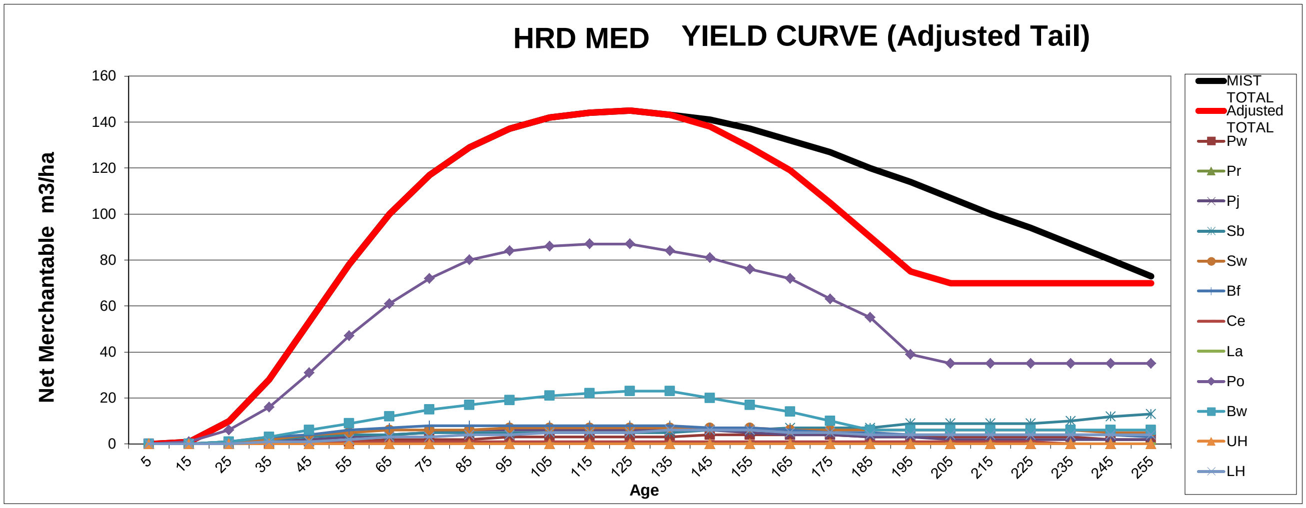
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
HMX MED	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HMX MED	15	4	4	0	0	1	1	0	0	0	0	2	0	0	0
HMX MED	25	18	18	0	0	3	3	1	2	0	0	8	1	0	0
HMX MED	35	39	39	0	0	7	6	3	5	0	0	16	2	0	0
HMX MED	45	63	63	0	0	11	9	4	7	0	0	28	4	0	0
HMX MED	55	85	85	0	0	16	11	5	9	0	0	38	6	0	0
HMX MED	65	104	104	0	0	19	12	5	10	0	0	50	8	0	0
HMX MED	75	118	118	0	0	22	13	6	10	0	0	57	10	0	0
HMX MED	85	129	129	0	0	26	13	6	10	0	0	63	11	0	0
HMX MED	95	137	137	0	0	26	14	6	11	0	0	67	13	0	0
HMX MED	105	143	143	0	0	28	14	6	11	0	0	70	14	0	0
HMX MED	115	146	146	0	0	28	15	6	11	0	0	71	15	0	0
HMX MED	125	147	147	0	0	28	15	6	11	0	0	71	16	0	0
HMX MED	135	147	147	0	0	28	15	6	11	0	0	71	16	0	0
HMX MED	145	146	146	0	0	27	15	7	11	0	0	69	17	0	0
HMX MED	155	145	145	0	0	27	16	7	10	0	0	68	17	0	0
HMX MED	165	142	137	0	0	24	16	7	10	0	0	65	15	0	0
HMX MED	175	139	120	0	0	21	16	7	10	0	0	55	11	0	0
HMX MED	185	136	110	0	0	19	16	7	10	0	0	49	9	0	0
HMX MED	195	132	100	0	0	16	16	7	9	0	0	44	8	0	0
HMX MED	205	129	90	0	0	13	16	7	9	0	0	38	7	0	0
HMX MED	215	125	80	0	0	11	16	7	8	0	0	33	5	0	0
HMX MED	225	121	80	0	0	11	16	7	8	0	0	33	5	0	0
HMX MED	235	117	80	0	0	11	17	7	7	0	0	33	5	0	0
HMX MED	245	113	80	0	0	11	18	7	6	0	0	33	5	0	0
HMX MED	255	109	80	0	0	11	19	7	5	0	0	33	5	0	0

Total net merchantable volume peak of yield curve



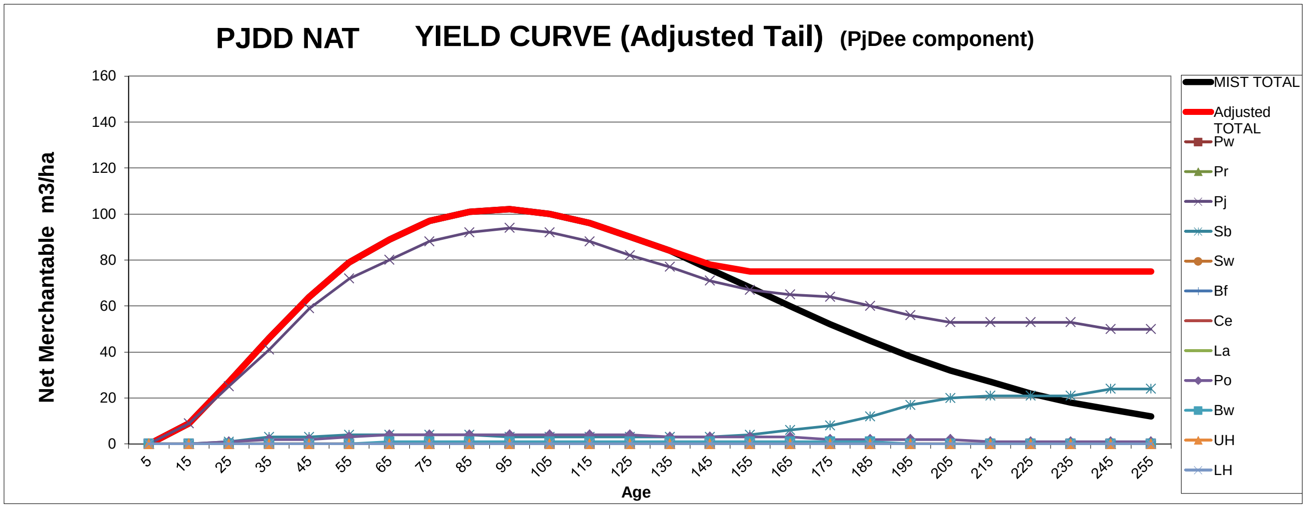
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
HRD NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HRD NAT	15	1	1	0	0	0	0	0	0	0	0	1	0	0	0
HRD NAT	25	8	8	0	0	1	1	1	1	0	0	3	1	0	0
HRD NAT	35	24	24	0	0	2	2	2	2	0	0	13	2	0	1
HRD NAT	45	44	44	1	0	4	2	3	3	1	0	23	5	1	1
HRD NAT	55	66	66	1	0	6	3	3	4	1	0	38	7	1	2
HRD NAT	65	85	85	1	0	7	4	4	5	1	0	50	10	1	2
HRD NAT	75	99	99	2	0	8	4	4	5	1	0	58	12	2	3
HRD NAT	85	110	110	2	0	9	4	4	5	1	0	65	15	2	3
HRD NAT	95	117	117	2	0	10	4	5	5	1	0	68	16	2	4
HRD NAT	105	121	121	2	0	10	4	5	5	1	0	70	17	3	4
HRD NAT	115	124	124	3	0	10	5	5	5	1	0	70	18	3	4
HRD NAT	125	124	124	3	0	10	5	5	5	1	0	69	19	3	4
HRD NAT	135	123	**121**	3	0	10	5	5	5	1	0	67	17	3	5
HRD NAT	145	121	**115**	3	0	10	5	5	5	1	0	62	16	3	5
HRD NAT	155	118	**104**	3	0	9	5	5	5	1	0	55	13	3	5
HRD NAT	165	114	**90**	3	0	8	5	5	4	1	0	46	10	3	5
HRD NAT	175	109	**80**	3	0	7	6	5	4	0	0	41	6	3	5
HRD NAT	185	104	**70**	3	0	6	6	4	3	0	0	38	4	2	4
HRD NAT	195	98	**65**	3	0	6	6	4	3	0	0	35	2	2	4
HRD NAT	205	92	**60**	3	0	6	6	4	2	0	0	33	1	2	3
HRD NAT	215	86	**60**	3	0	5	10	4	2	0	0	32	0	2	2
HRD NAT	225	80	**60**	3	0	4	11	4	2	0	0	32	0	2	2
HRD NAT	235	74	**60**	3	0	4	12	4	2	0	0	31	0	2	2
HRD NAT	245	69	**60**	3	0	3	13	4	2	0	0	31	0	2	2
HRD NAT	255	63	**60**	3	0	3	15	3	2	0	0	30	0	2	2

Total net merchantable volume peak of yield curve



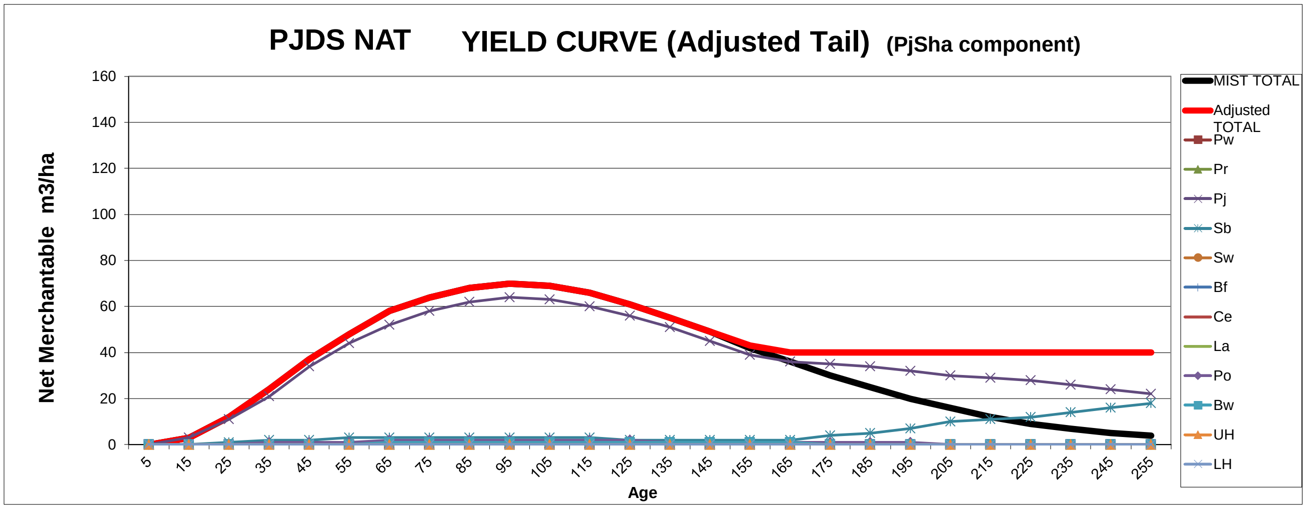
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
HRD MED	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HRD MED	15	1	1	0	0	0	0	0	0	0	0	1	0	0	0
HRD MED	25	10	10	0	0	0	1	1	1	0	0	6	1	0	0
HRD MED	35	28	28	0	0	1	2	2	3	0	0	16	3	0	1
HRD MED	45	53	53	1	0	2	3	4	4	1	0	31	6	0	1
HRD MED	55	78	78	1	0	3	4	5	6	1	0	47	9	0	2
HRD MED	65	100	100	2	0	4	4	6	7	1	0	61	12	0	3
HRD MED	75	117	117	2	0	5	5	6	8	1	0	72	15	0	3
HRD MED	85	129	129	2	0	6	5	6	8	1	0	80	17	0	4
HRD MED	95	137	137	3	0	6	5	7	8	1	0	84	19	0	4
HRD MED	105	142	142	3	0	6	5	7	8	1	0	86	21	0	5
HRD MED	115	144	144	3	0	6	5	7	8	1	0	87	22	0	5
HRD MED	125	145	145	3	0	6	5	7	8	1	0	87	23	0	5
HRD MED	135	143	143	3	0	6	5	7	8	1	0	84	23	0	6
HRD MED	145	141	138	4	0	6	6	7	7	1	0	81	20	0	6
HRD MED	155	137	129	4	0	5	6	7	7	1	0	76	17	0	6
HRD MED	165	132	119	4	0	4	7	6	6	1	0	72	14	0	5
HRD MED	175	127	105	4	0	4	7	6	5	1	0	63	10	0	5
HRD MED	185	120	90	3	0	3	7	6	5	1	0	55	6	0	4
HRD MED	195	114	75	3	0	3	9	6	4	1	0	39	6	0	4
HRD MED	205	107	70	3	0	2	9	6	4	1	0	35	6	0	4
HRD MED	215	100	70	3	0	2	9	6	4	1	0	35	6	0	4
HRD MED	225	94	70	3	0	2	9	6	4	1	0	35	6	0	4
HRD MED	235	87	70	3	0	2	10	6	4	0	0	35	6	0	4
HRD MED	245	80	70	2	0	2	12	5	4	0	0	35	6	0	4
HRD MED	255	73	70	2	0	2	13	5	3	0	0	35	6	0	4

(highlighted) Total net merchantable volume peak of yield curve



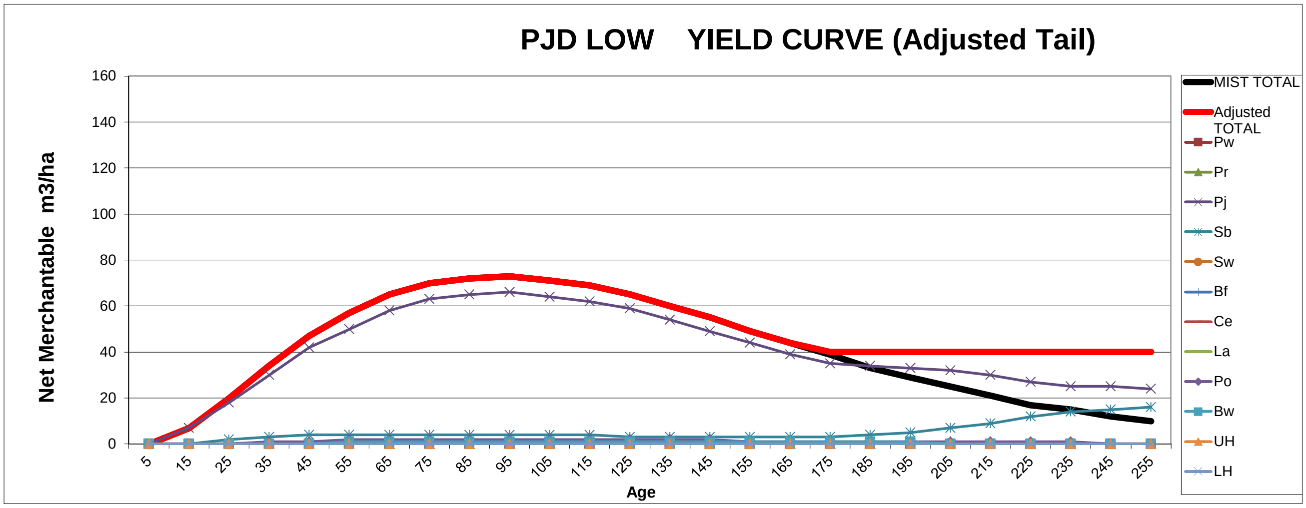
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PJDD NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PJDD NAT	15	9	9	0	0	9	0	0	0	0	0	0	0	0	0
PJDD NAT	25	27	27	0	0	25	1	0	0	0	0	1	0	0	0
PJDD NAT	35	46	46	0	0	41	3	0	0	0	0	2	0	0	0
PJDD NAT	45	64	64	0	0	59	3	0	0	0	0	2	0	0	0
PJDD NAT	55	79	79	0	0	72	4	0	0	0	0	3	0	0	0
PJDD NAT	65	89	89	0	0	80	4	0	0	0	0	4	1	0	0
PJDD NAT	75	97	97	0	0	88	4	0	0	0	0	4	1	0	0
PJDD NAT	85	101	101	0	0	92	4	0	0	0	0	4	1	0	0
PJDD NAT	95	102	102	0	0	94	3	0	0	0	0	4	1	0	0
PJDD NAT	105	100	100	0	0	92	3	0	0	0	0	4	1	0	0
PJDD NAT	115	96	96	0	0	88	3	0	0	0	0	4	1	0	0
PJDD NAT	125	90	90	0	0	82	3	0	0	0	0	4	1	0	0
PJDD NAT	135	84	84	0	0	77	3	0	0	0	0	3	1	0	0
PJDD NAT	145	76	78	0	0	71	3	0	0	0	0	3	1	0	0
PJDD NAT	155	68	75	0	0	67	4	0	0	0	0	3	1	0	0
PJDD NAT	165	60	75	0	0	65	6	0	0	0	0	3	1	0	0
PJDD NAT	175	52	75	0	0	64	8	0	0	0	0	2	1	0	0
PJDD NAT	185	45	75	0	0	60	12	0	0	0	0	2	1	0	0
PJDD NAT	195	38	75	0	0	56	17	0	0	0	0	2	0	0	0
PJDD NAT	205	32	75	0	0	53	20	0	0	0	0	2	0	0	0
PJDD NAT	215	27	75	0	0	53	21	0	0	0	0	1	0	0	0
PJDD NAT	225	22	75	0	0	53	21	0	0	0	0	1	0	0	0
PJDD NAT	235	18	75	0	0	53	21	0	0	0	0	1	0	0	0
PJDD NAT	245	15	75	0	0	50	24	0	0	0	0	1	0	0	0
PJDD NAT	255	12	75	0	0	50	24	0	0	0	0	1	0	0	0

Total net merchantable volume peak of yield curve



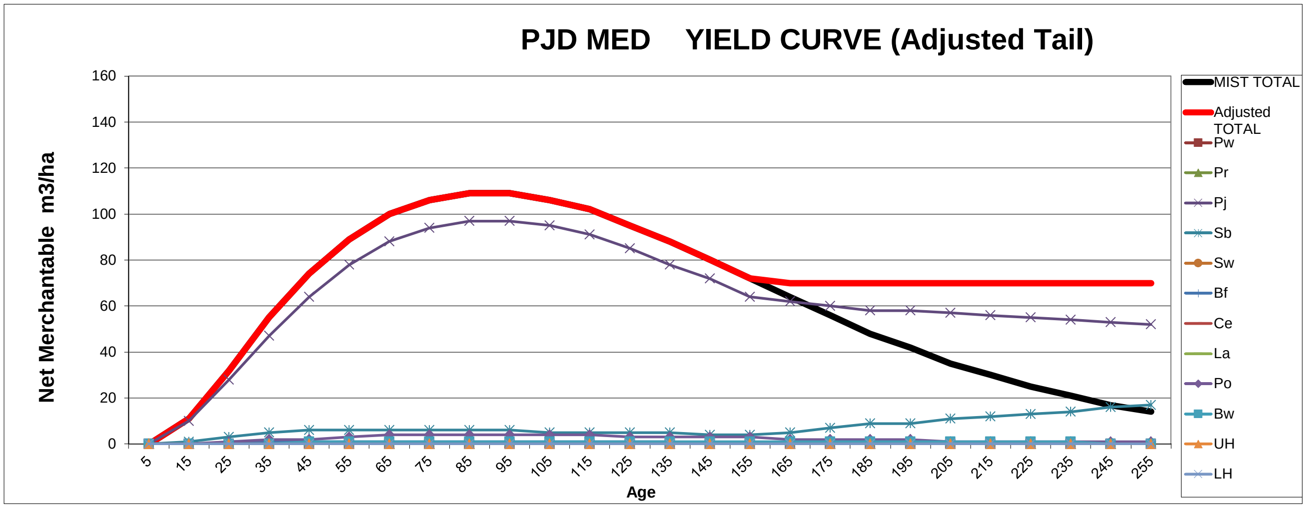
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PJDS NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PJDS NAT	15	3	3	0	0	3	0	0	0	0	0	0	0	0	0
PJDS NAT	25	12	12	0	0	11	1	0	0	0	0	0	0	0	0
PJDS NAT	35	24	24	0	0	21	2	0	0	0	0	1	0	0	0
PJDS NAT	45	37	37	0	0	34	2	0	0	0	0	1	0	0	0
PJDS NAT	55	48	48	0	0	44	3	0	0	0	0	1	0	0	0
PJDS NAT	65	58	58	0	0	52	3	0	0	0	0	2	1	0	0
PJDS NAT	75	64	64	0	0	58	3	0	0	0	0	2	1	0	0
PJDS NAT	85	68	68	0	0	62	3	0	0	0	0	2	1	0	0
PJDS NAT	95	70	70	0	0	64	3	0	0	0	0	2	1	0	0
PJDS NAT	105	69	69	0	0	63	3	0	0	0	0	2	1	0	0
PJDS NAT	115	66	66	0	0	60	3	0	0	0	0	2	1	0	0
PJDS NAT	125	61	61	0	0	56	2	0	0	0	0	2	1	0	0
PJDS NAT	135	55	55	0	0	51	2	0	0	0	0	1	1	0	0
PJDS NAT	145	49	49	0	0	45	2	0	0	0	0	1	1	0	0
PJDS NAT	155	42	43	0	0	39	2	0	0	0	0	1	1	0	0
PJDS NAT	165	36	40	0	0	36	2	0	0	0	0	1	1	0	0
PJDS NAT	175	30	40	0	0	35	4	0	0	0	0	1	0	0	0
PJDS NAT	185	25	40	0	0	34	5	0	0	0	0	1	0	0	0
PJDS NAT	195	20	40	0	0	32	7	0	0	0	0	1	0	0	0
PJDS NAT	205	16	40	0	0	30	10	0	0	0	0	0	0	0	0
PJDS NAT	215	12	40	0	0	29	11	0	0	0	0	0	0	0	0
PJDS NAT	225	9	40	0	0	28	12	0	0	0	0	0	0	0	0
PJDS NAT	235	7	40	0	0	26	14	0	0	0	0	0	0	0	0
PJDS NAT	245	5	40	0	0	24	16	0	0	0	0	0	0	0	0
PJDS NAT	255	4	40	0	0	22	18	0	0	0	0	0	0	0	0

Total net merchantable volume peak of yield curve



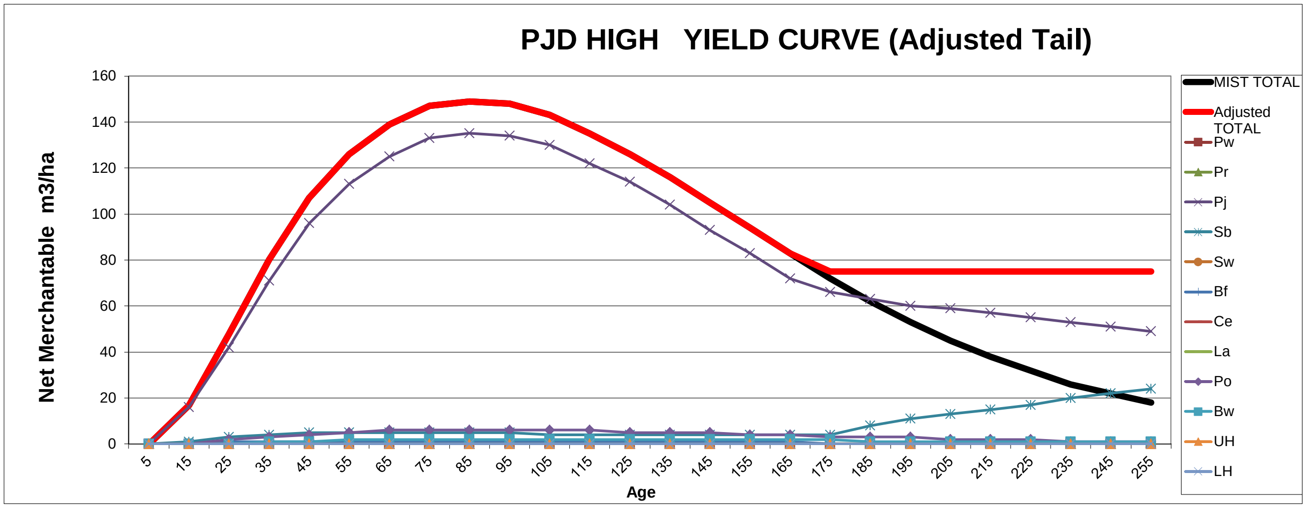
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PJD LOW	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PJD LOW	15	7	7	0	0	7	0	0	0	0	0	0	0	0	0
PJD LOW	25	20	20	0	0	18	2	0	0	0	0	0	0	0	0
PJD LOW	35	34	34	0	0	30	3	0	0	0	0	1	0	0	0
PJD LOW	45	47	47	0	0	42	4	0	0	0	0	1	0	0	0
PJD LOW	55	57	57	0	0	50	4	0	0	0	0	2	1	0	0
PJD LOW	65	65	65	0	0	58	4	0	0	0	0	2	1	0	0
PJD LOW	75	70	70	0	0	63	4	0	0	0	0	2	1	0	0
PJD LOW	85	72	72	0	0	65	4	0	0	0	0	2	1	0	0
PJD LOW	95	73	73	0	0	66	4	0	0	0	0	2	1	0	0
PJD LOW	105	71	71	0	0	64	4	0	0	0	0	2	1	0	0
PJD LOW	115	69	69	0	0	62	4	0	0	0	0	2	1	0	0
PJD LOW	125	65	65	0	0	59	3	0	0	0	0	2	1	0	0
PJD LOW	135	60	60	0	0	54	3	0	0	0	0	2	1	0	0
PJD LOW	145	55	55	0	0	49	3	0	0	0	0	2	1	0	0
PJD LOW	155	49	49	0	0	44	3	0	0	0	0	1	1	0	0
PJD LOW	165	44	44	0	0	39	3	0	0	0	0	1	1	0	0
PJD LOW	175	39	40	0	0	35	3	0	0	0	0	1	1	0	0
PJD LOW	185	33	40	0	0	34	4	0	0	0	0	1	1	0	0
PJD LOW	195	29	40	0	0	33	5	0	0	0	0	1	1	0	0
PJD LOW	205	25	40	0	0	32	7	0	0	0	0	1	0	0	0
PJD LOW	215	21	40	0	0	30	9	0	0	0	0	1	0	0	0
PJD LOW	225	17	40	0	0	27	12	0	0	0	0	1	0	0	0
PJD LOW	235	15	40	0	0	25	14	0	0	0	0	1	0	0	0
PJD LOW	245	12	40	0	0	25	15	0	0	0	0	0	0	0	0
PJD LOW	255	10	40	0	0	24	16	0	0	0	0	0	0	0	0

Total net merchantable volume peak of yield curve



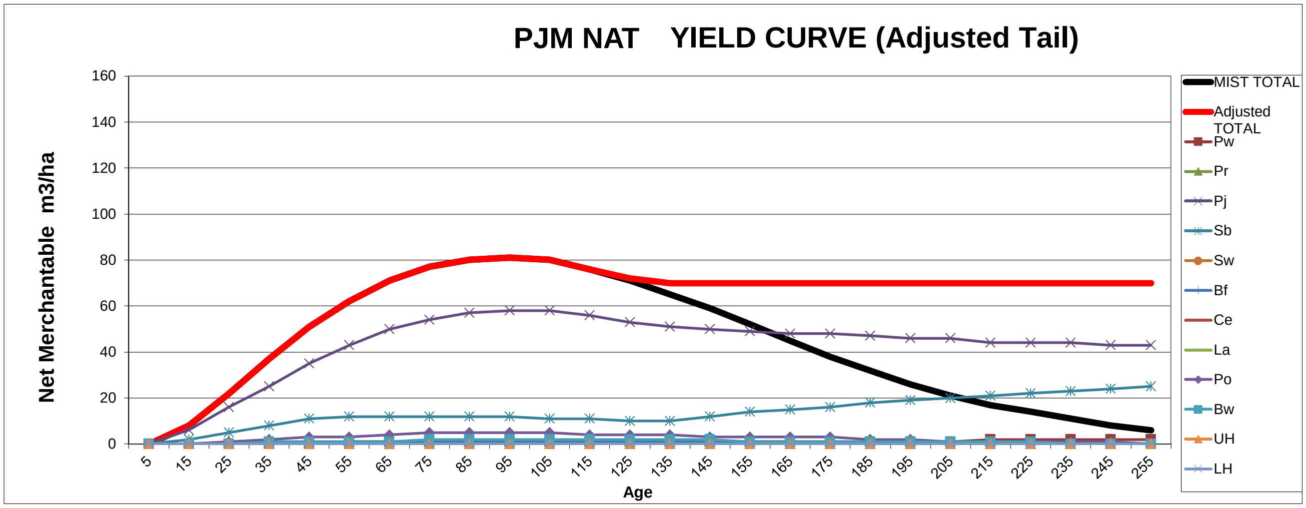
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PJD MED	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PJD MED	15	11	11	0	0	10	1	0	0	0	0	0	0	0	0
PJD MED	25	32	32	0	0	28	3	0	0	0	0	1	0	0	0
PJD MED	35	55	55	0	0	47	5	0	1	0	0	2	0	0	0
PJD MED	45	74	74	0	0	64	6	0	1	0	0	2	1	0	0
PJD MED	55	89	89	0	0	78	6	0	1	0	0	3	1	0	0
PJD MED	65	100	100	0	0	88	6	0	1	0	0	4	1	0	0
PJD MED	75	106	106	0	0	94	6	0	1	0	0	4	1	0	0
PJD MED	85	109	109	0	0	97	6	0	1	0	0	4	1	0	0
PJD MED	95	109	109	0	0	97	6	0	1	0	0	4	1	0	0
PJD MED	105	106	106	0	0	95	5	0	1	0	0	4	1	0	0
PJD MED	115	102	102	0	0	91	5	0	1	0	0	4	1	0	0
PJD MED	125	95	95	0	0	85	5	0	1	0	0	3	1	0	0
PJD MED	135	88	88	0	0	78	5	0	1	0	0	3	1	0	0
PJD MED	145	80	80	0	0	72	4	0	0	0	0	3	1	0	0
PJD MED	155	72	72	0	0	64	4	0	0	0	0	3	1	0	0
PJD MED	165	64	70	0	0	62	5	0	0	0	0	2	1	0	0
PJD MED	175	56	70	0	0	60	7	0	0	0	0	2	1	0	0
PJD MED	185	48	70	0	0	58	9	0	0	0	0	2	1	0	0
PJD MED	195	42	70	0	0	58	9	0	0	0	0	2	1	0	0
PJD MED	205	35	70	0	0	57	11	0	0	0	0	1	1	0	0
PJD MED	215	30	70	0	0	56	12	0	0	0	0	1	1	0	0
PJD MED	225	25	70	0	0	55	13	0	0	0	0	1	1	0	0
PJD MED	235	21	70	0	0	54	14	0	0	0	0	1	1	0	0
PJD MED	245	17	70	0	0	53	16	0	0	0	0	1	0	0	0
PJD MED	255	14	70	0	0	52	17	0	0	0	0	1	0	0	0

Total net merchantable volume peak of yield curve



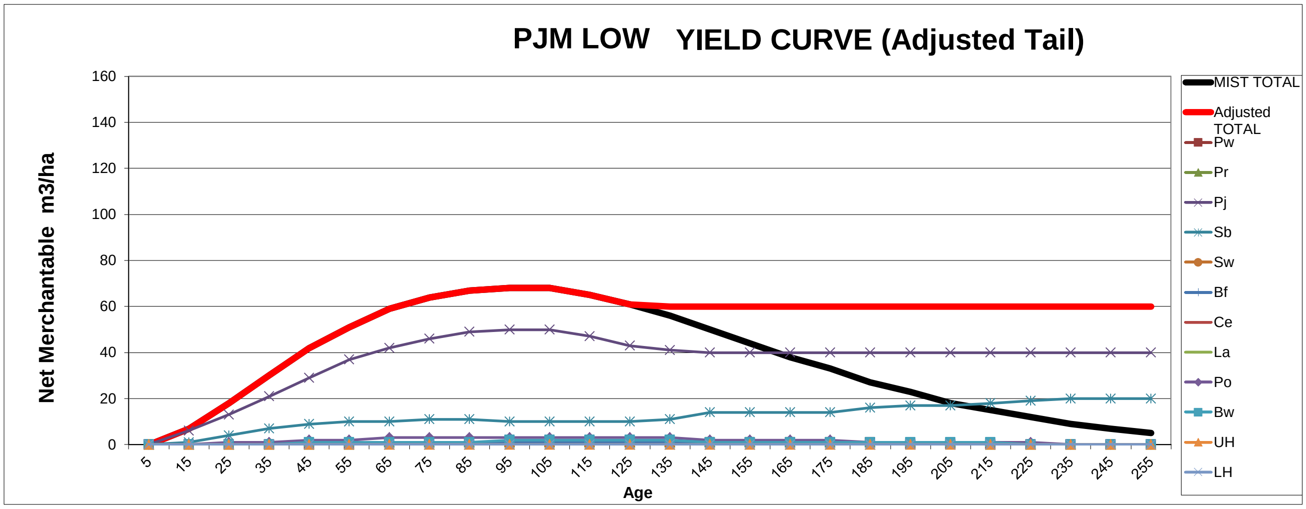
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PJD HIGH	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PJD HIGH	15	17	17	0	0	16	1	0	0	0	0	0	0	0	0
PJD HIGH	25	48	48	0	0	42	3	0	1	0	0	2	0	0	0
PJD HIGH	35	80	80	0	0	71	4	0	1	0	0	3	1	0	0
PJD HIGH	45	107	107	0	0	96	5	0	1	0	0	4	1	0	0
PJD HIGH	55	126	126	0	0	113	5	0	1	0	0	5	2	0	0
PJD HIGH	65	139	139	0	0	125	5	0	1	0	0	6	2	0	0
PJD HIGH	75	147	147	0	0	133	5	0	1	0	0	6	2	0	0
PJD HIGH	85	149	149	0	0	135	5	0	1	0	0	6	2	0	0
PJD HIGH	95	148	148	0	0	134	5	0	1	0	0	6	2	0	0
PJD HIGH	105	143	143	0	0	130	4	0	1	0	0	6	2	0	0
PJD HIGH	115	135	135	0	0	122	4	0	1	0	0	6	2	0	0
PJD HIGH	125	126	126	0	0	114	4	0	1	0	0	5	2	0	0
PJD HIGH	135	116	116	0	0	104	4	0	1	0	0	5	2	0	0
PJD HIGH	145	105	105	0	0	93	4	0	1	0	0	5	2	0	0
PJD HIGH	155	94	94	0	0	83	4	0	1	0	0	4	2	0	0
PJD HIGH	165	83	83	0	0	72	4	0	1	0	0	4	2	0	0
PJD HIGH	175	72	75	0	0	66	4	0	0	0	0	3	2	0	0
PJD HIGH	185	62	75	0	0	63	8	0	0	0	0	3	1	0	0
PJD HIGH	195	53	75	0	0	60	11	0	0	0	0	3	1	0	0
PJD HIGH	205	45	75	0	0	59	13	0	0	0	0	2	1	0	0
PJD HIGH	215	38	75	0	0	57	15	0	0	0	0	2	1	0	0
PJD HIGH	225	32	75	0	0	55	17	0	0	0	0	2	1	0	0
PJD HIGH	235	26	75	0	0	53	20	0	0	0	0	1	1	0	0
PJD HIGH	245	22	75	0	0	51	22	0	0	0	0	1	1	0	0
PJD HIGH	255	18	75	0	0	49	24	0	0	0	0	1	1	0	0

Total net merchantable volume peak of yield curve



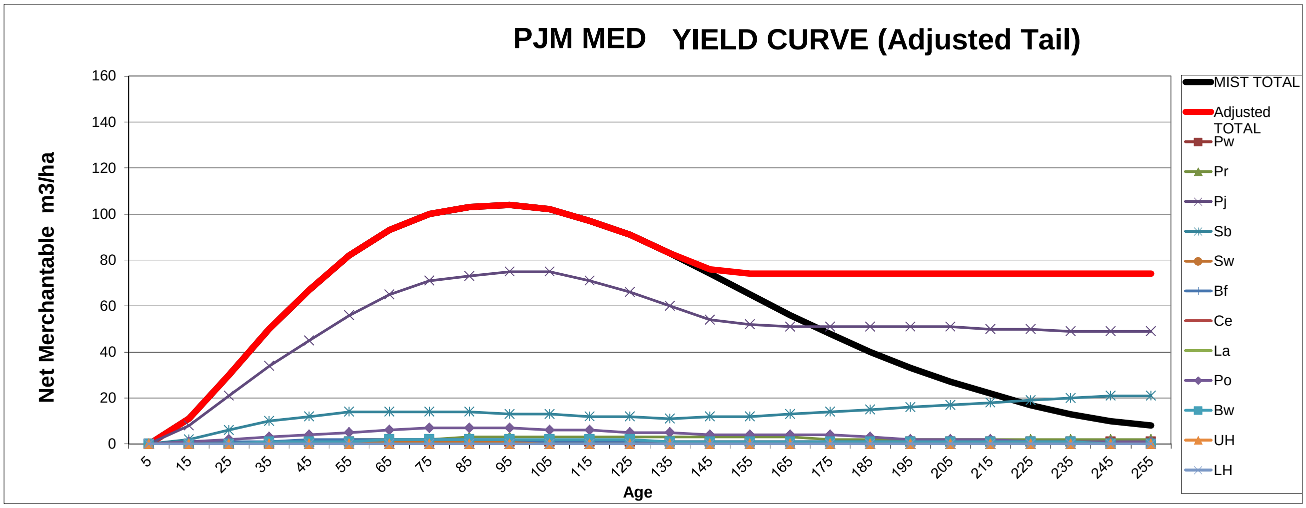
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PJM NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PJM NAT	15	8	8	0	0	6	2	0	0	0	0	0	0	0	0
PJM NAT	25	22	22	0	0	16	5	0	0	0	0	1	0	0	0
PJM NAT	35	37	37	0	0	25	8	0	1	0	0	2	1	0	0
PJM NAT	45	51	51	0	0	35	11	0	1	0	0	3	1	0	0
PJM NAT	55	62	62	1	1	43	12	0	1	0	0	3	1	0	0
PJM NAT	65	71	71	1	1	50	12	1	1	0	0	4	1	0	0
PJM NAT	75	77	77	1	1	54	12	1	1	0	0	5	2	0	0
PJM NAT	85	80	80	1	1	57	12	1	1	0	0	5	2	0	0
PJM NAT	95	81	81	1	1	58	12	1	1	0	0	5	2	0	0
PJM NAT	105	80	80	1	1	58	11	1	1	0	0	5	2	0	0
PJM NAT	115	76	76	1	1	56	11	0	1	0	0	4	2	0	0
PJM NAT	125	71	72	1	1	53	10	0	1	0	0	4	2	0	0
PJM NAT	135	65	70	1	1	51	10	0	1	0	0	4	2	0	0
PJM NAT	145	59	70	1	1	50	12	0	1	0	0	3	2	0	0
PJM NAT	155	52	70	1	1	49	14	0	1	0	0	3	1	0	0
PJM NAT	165	45	70	1	1	48	15	0	1	0	0	3	1	0	0
PJM NAT	175	38	70	1	1	48	16	0	0	0	0	3	1	0	0
PJM NAT	185	32	70	1	1	47	18	0	0	0	0	2	1	0	0
PJM NAT	195	26	70	1	1	46	19	0	0	0	0	2	1	0	0
PJM NAT	205	21	70	1	1	46	20	0	0	0	0	1	1	0	0
PJM NAT	215	17	70	2	1	44	21	0	0	0	0	1	1	0	0
PJM NAT	225	14	70	2	0	44	22	0	0	0	0	1	1	0	0
PJM NAT	235	11	70	2	0	44	23	0	0	0	0	1	0	0	0
PJM NAT	245	8	70	2	0	43	24	0	0	0	0	1	0	0	0
PJM NAT	255	6	70	2	0	43	25	0	0	0	0	0	0	0	0

Total net merchantable volume peak of yield curve



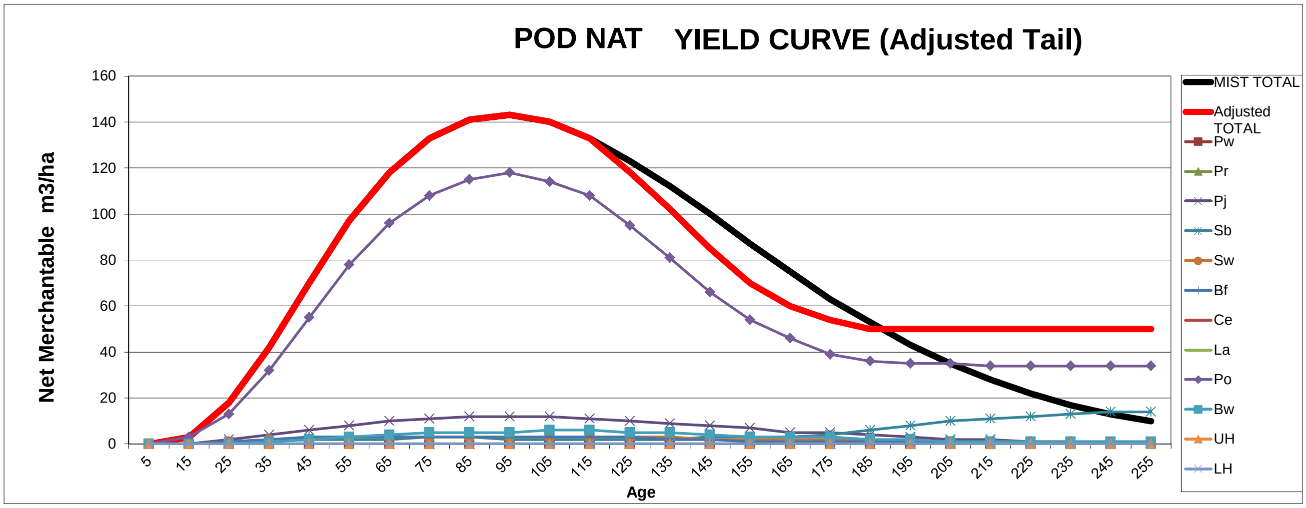
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PJM LOW	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PJM LOW	15	7	7	0	0	6	1	0	0	0	0	0	0	0	0
PJM LOW	25	18	18	0	0	13	4	0	0	0	0	1	0	0	0
PJM LOW	35	30	30	0	0	21	7	0	1	0	0	1	0	0	0
PJM LOW	45	42	42	0	0	29	9	0	1	0	0	2	1	0	0
PJM LOW	55	51	51	0	0	37	10	0	1	0	0	2	1	0	0
PJM LOW	65	59	59	1	1	42	10	0	1	0	0	3	1	0	0
PJM LOW	75	64	64	1	1	46	11	0	1	0	0	3	1	0	0
PJM LOW	85	67	67	1	1	49	11	0	1	0	0	3	1	0	0
PJM LOW	95	68	68	1	1	50	10	0	1	0	0	3	2	0	0
PJM LOW	105	68	68	1	1	50	10	0	1	0	0	3	2	0	0
PJM LOW	115	65	65	1	1	47	10	0	1	0	0	3	2	0	0
PJM LOW	125	61	61	1	1	43	10	0	1	0	0	3	2	0	0
PJM LOW	135	56	60	1	1	41	11	0	1	0	0	3	2	0	0
PJM LOW	145	50	60	1	1	40	14	0	1	0	0	2	1	0	0
PJM LOW	155	44	60	1	1	40	14	0	1	0	0	2	1	0	0
PJM LOW	165	38	60	1	1	40	14	0	1	0	0	2	1	0	0
PJM LOW	175	33	60	1	1	40	14	0	1	0	0	2	1	0	0
PJM LOW	185	27	60	1	1	40	16	0	0	0	0	1	1	0	0
PJM LOW	195	23	60	0	1	40	17	0	0	0	0	1	1	0	0
PJM LOW	205	18	60	0	1	40	17	0	0	0	0	1	1	0	0
PJM LOW	215	15	60	0	0	40	18	0	0	0	0	1	1	0	0
PJM LOW	225	12	60	0	0	40	19	0	0	0	0	1	0	0	0
PJM LOW	235	9	60	0	0	40	20	0	0	0	0	0	0	0	0
PJM LOW	245	7	60	0	0	40	20	0	0	0	0	0	0	0	0
PJM LOW	255	5	60	0	0	40	20	0	0	0	0	0	0	0	0

Total net merchantable volume peak of yield curve



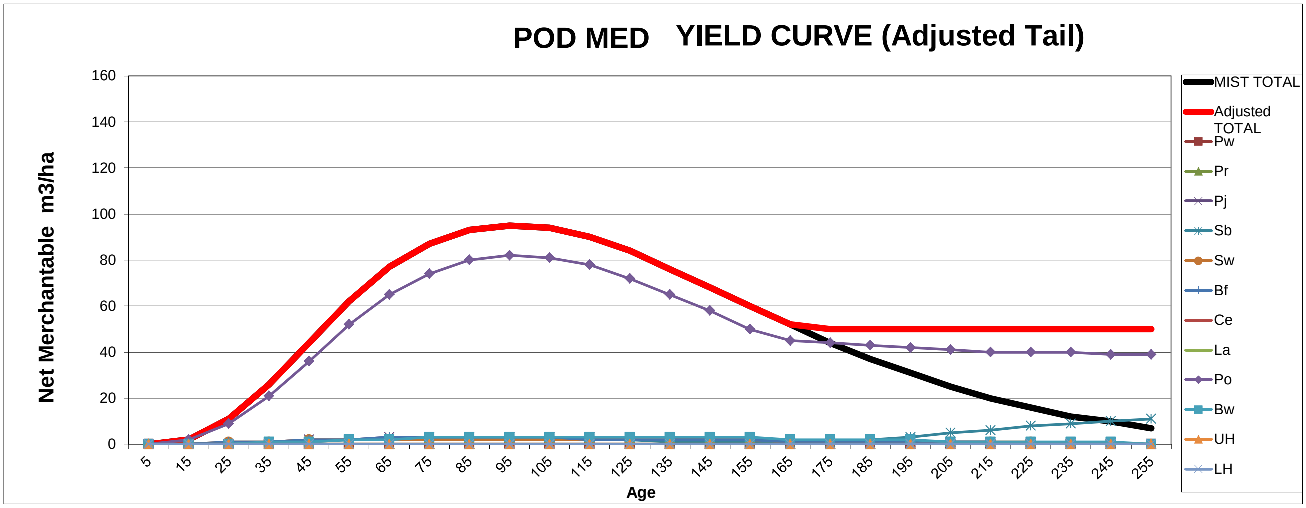
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PJM MED	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PJM MED	15	11	11	0	0	8	2	0	0	0	0	1	0	0	0
PJM MED	25	30	30	0	0	21	6	0	1	0	0	2	0	0	0
PJM MED	35	50	50	0	1	34	10	0	1	0	0	3	1	0	0
PJM MED	45	67	67	1	1	45	12	1	2	0	0	4	1	0	0
PJM MED	55	82	82	1	2	56	14	1	2	0	0	5	1	0	0
PJM MED	65	93	93	1	2	65	14	1	2	0	0	6	2	0	0
PJM MED	75	100	100	1	2	71	14	1	2	0	0	7	2	0	0
PJM MED	85	103	103	1	3	73	14	1	2	0	0	7	2	0	0
PJM MED	95	104	104	1	3	75	13	1	2	0	0	7	2	0	0
PJM MED	105	102	102	1	3	75	13	1	1	0	0	6	2	0	0
PJM MED	115	97	97	1	3	71	12	1	1	0	0	6	2	0	0
PJM MED	125	91	91	1	3	66	12	1	1	0	0	5	2	0	0
PJM MED	135	83	83	1	3	60	11	1	1	0	0	5	1	0	0
PJM MED	145	74	76	1	3	54	12	0	1	0	0	4	1	0	0
PJM MED	155	65	74	1	3	52	12	0	1	0	0	4	1	0	0
PJM MED	165	56	74	1	3	51	13	0	1	0	0	4	1	0	0
PJM MED	175	48	74	1	2	51	14	0	1	0	0	4	1	0	0
PJM MED	185	40	74	1	2	51	15	0	1	0	0	3	1	0	0
PJM MED	195	33	74	1	2	51	16	0	1	0	0	2	1	0	0
PJM MED	205	27	74	1	2	51	17	0	0	0	0	2	1	0	0
PJM MED	215	22	74	1	2	50	18	0	0	0	0	2	1	0	0
PJM MED	225	17	74	1	2	50	19	0	0	0	0	1	1	0	0
PJM MED	235	13	74	1	2	49	20	0	0	0	0	1	1	0	0
PJM MED	245	10	74	1	2	49	21	0	0	0	0	1	0	0	0
PJM MED	255	8	74	1	2	49	21	0	0	0	0	1	0	0	0

Total net merchantable volume peak of yield curve



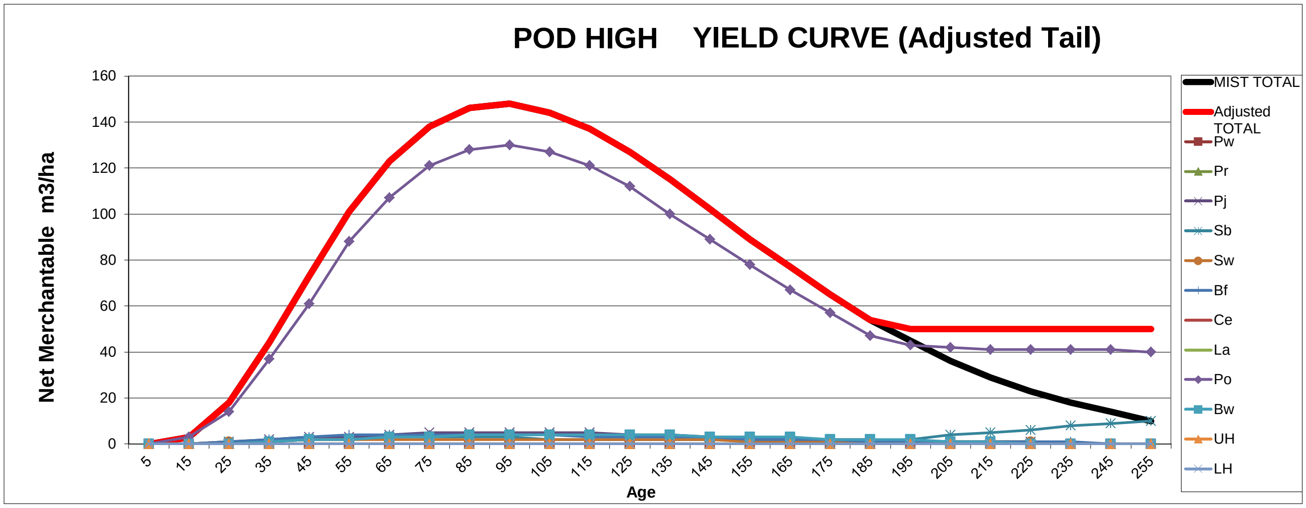
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
POD NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
POD NAT	15	3	3	0	0	0	0	0	0	0	0	3	0	0	0
POD NAT	25	18	18	0	0	2	1	1	1	0	0	13	0	0	0
POD NAT	35	42	42	0	0	4	1	2	2	0	0	32	1	0	0
POD NAT	45	70	70	0	0	6	2	2	3	0	0	55	2	0	0
POD NAT	55	97	97	0	0	8	2	3	3	0	0	78	3	0	0
POD NAT	65	118	118	0	0	10	2	3	3	0	0	96	4	0	0
POD NAT	75	133	133	0	0	11	3	3	3	0	0	108	5	0	0
POD NAT	85	141	141	0	0	12	3	3	3	0	0	115	5	0	0
POD NAT	95	143	143	0	0	12	2	3	3	0	0	118	5	0	0
POD NAT	105	140	140	0	0	12	2	3	3	0	0	114	6	0	0
POD NAT	115	133	133	0	0	11	2	3	3	0	0	108	6	0	0
POD NAT	125	123	118	0	0	10	2	3	3	0	0	95	5	0	0
POD NAT	135	112	102	0	0	9	2	3	2	0	0	81	5	0	0
POD NAT	145	100	85	0	0	8	3	2	2	0	0	66	4	0	0
POD NAT	155	87	70	0	0	7	3	2	1	0	0	54	3	0	0
POD NAT	165	75	60	0	0	5	3	2	1	0	0	46	3	0	0
POD NAT	175	63	54	0	0	5	4	2	1	0	0	39	3	0	0
POD NAT	185	53	50	0	0	4	6	1	1	0	0	36	2	0	0
POD NAT	195	43	50	0	0	3	8	1	1	0	0	35	2	0	0
POD NAT	205	35	50	0	0	2	10	1	1	0	0	35	1	0	0
POD NAT	215	28	50	0	0	2	11	1	1	0	0	34	1	0	0
POD NAT	225	22	50	0	0	1	12	1	1	0	0	34	1	0	0
POD NAT	235	17	50	0	0	1	13	1	0	0	0	34	1	0	0
POD NAT	245	13	50	0	0	1	14	0	0	0	0	34	1	0	0
POD NAT	255	10	50	0	0	1	14	0	0	0	0	34	1	0	0

Total net merchantable volume peak of yield curve



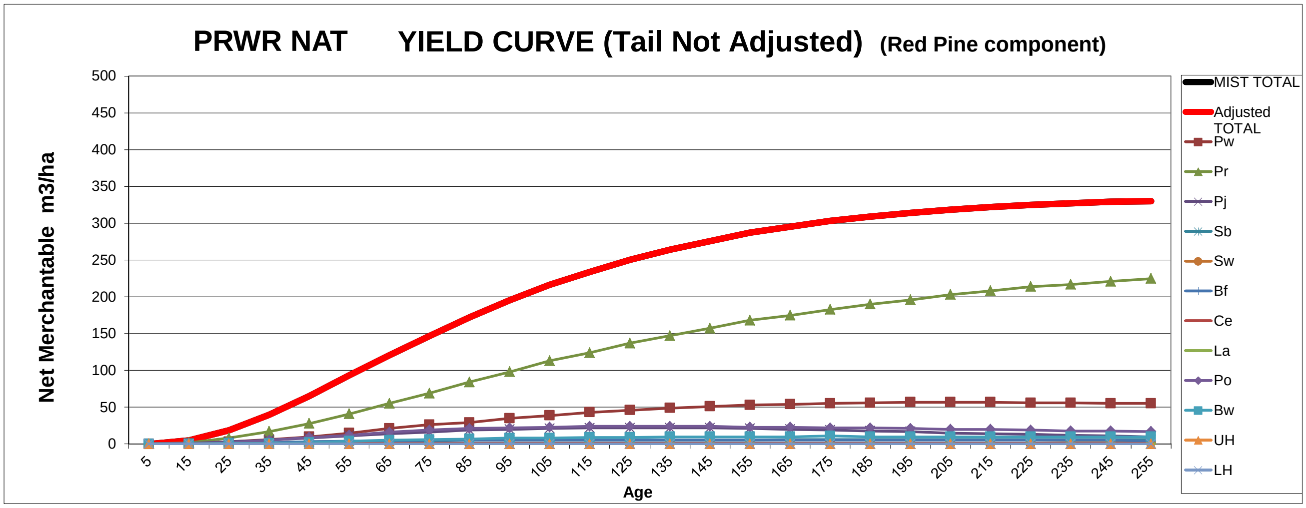
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
POD MED	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
POD MED	15	2	2	0	0	0	0	0	0	0	0	2	0	0	0
POD MED	25	11	11	0	0	0	0	1	1	0	0	9	0	0	0
POD MED	35	26	26	0	0	1	1	1	1	0	0	21	1	0	0
POD MED	45	44	44	0	0	2	1	2	2	0	0	36	1	0	0
POD MED	55	62	62	0	0	2	2	2	2	0	0	52	2	0	0
POD MED	65	77	77	0	0	3	2	2	3	0	0	65	2	0	0
POD MED	75	87	87	0	0	3	2	2	3	0	0	74	3	0	0
POD MED	85	93	93	0	0	3	2	2	3	0	0	80	3	0	0
POD MED	95	95	95	0	0	3	2	2	3	0	0	82	3	0	0
POD MED	105	94	94	0	0	3	2	2	3	0	0	81	3	0	0
POD MED	115	90	90	0	0	3	2	2	2	0	0	78	3	0	0
POD MED	125	84	84	0	0	3	2	2	2	0	0	72	3	0	0
POD MED	135	76	76	0	0	3	1	2	2	0	0	65	3	0	0
POD MED	145	68	68	0	0	2	1	2	2	0	0	58	3	0	0
POD MED	155	60	60	0	0	2	1	2	2	0	0	50	3	0	0
POD MED	165	52	52	0	0	2	1	1	1	0	0	45	2	0	0
POD MED	175	44	50	0	0	1	1	1	1	0	0	44	2	0	0
POD MED	185	37	50	0	0	1	2	1	1	0	0	43	2	0	0
POD MED	195	31	50	0	0	1	3	1	1	0	0	42	2	0	0
POD MED	205	25	50	0	0	1	5	1	1	0	0	41	1	0	0
POD MED	215	20	50	0	0	1	6	1	1	0	0	40	1	0	0
POD MED	225	16	50	0	0	0	8	1	0	0	0	40	1	0	0
POD MED	235	12	50	0	0	0	9	0	0	0	0	40	1	0	0
POD MED	245	10	50	0	0	0	10	0	0	0	0	39	1	0	0
POD MED	255	7	50	0	0	0	11	0	0	0	0	39	0	0	0

Total net merchantable volume peak of yield curve



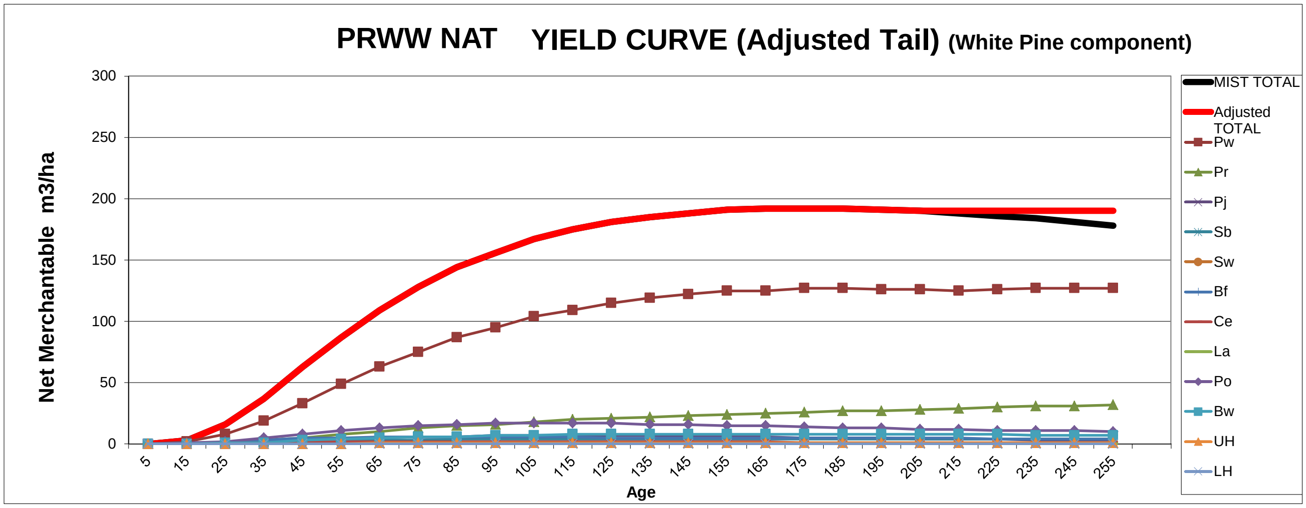
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
POD HIGH	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
POD HIGH	15	3	3	0	0	0	0	0	0	0	0	3	0	0	0
POD HIGH	25	18	18	0	0	1	1	1	1	0	0	14	0	0	0
POD HIGH	35	44	44	0	0	2	1	1	2	0	0	37	1	0	0
POD HIGH	45	73	73	0	0	3	2	2	3	0	0	61	2	0	0
POD HIGH	55	101	101	0	0	3	2	2	4	0	0	88	2	0	0
POD HIGH	65	123	123	0	0	4	3	2	4	0	0	107	3	0	0
POD HIGH	75	138	138	0	0	5	3	2	4	0	0	121	3	0	0
POD HIGH	85	146	146	0	0	5	3	2	4	0	0	128	4	0	0
POD HIGH	95	148	148	0	0	5	3	2	4	0	0	130	4	0	0
POD HIGH	105	144	144	0	0	5	2	2	4	0	0	127	4	0	0
POD HIGH	115	137	137	0	0	5	2	2	3	0	0	121	4	0	0
POD HIGH	125	127	127	0	0	4	2	2	3	0	0	112	4	0	0
POD HIGH	135	115	115	0	0	4	2	2	3	0	0	100	4	0	0
POD HIGH	145	102	102	0	0	3	2	2	3	0	0	89	3	0	0
POD HIGH	155	89	89	0	0	3	2	1	2	0	0	78	3	0	0
POD HIGH	165	77	77	0	0	2	2	1	2	0	0	67	3	0	0
POD HIGH	175	65	65	0	0	2	1	1	2	0	0	57	2	0	0
POD HIGH	185	54	54	0	0	2	1	1	1	0	0	47	2	0	0
POD HIGH	195	45	50	0	0	1	2	1	1	0	0	43	2	0	0
POD HIGH	205	36	50	0	0	1	4	1	1	0	0	42	1	0	0
POD HIGH	215	29	50	0	0	1	5	1	1	0	0	41	1	0	0
POD HIGH	225	23	50	0	0	1	6	1	1	0	0	41	0	0	0
POD HIGH	235	18	50	0	0	0	8	0	1	0	0	41	0	0	0
POD HIGH	245	14	50	0	0	0	9	0	0	0	0	41	0	0	0
POD HIGH	255	10	50	0	0	0	10	0	0	0	0	40	0	0	0

Total net merchantable volume peak of yield curve



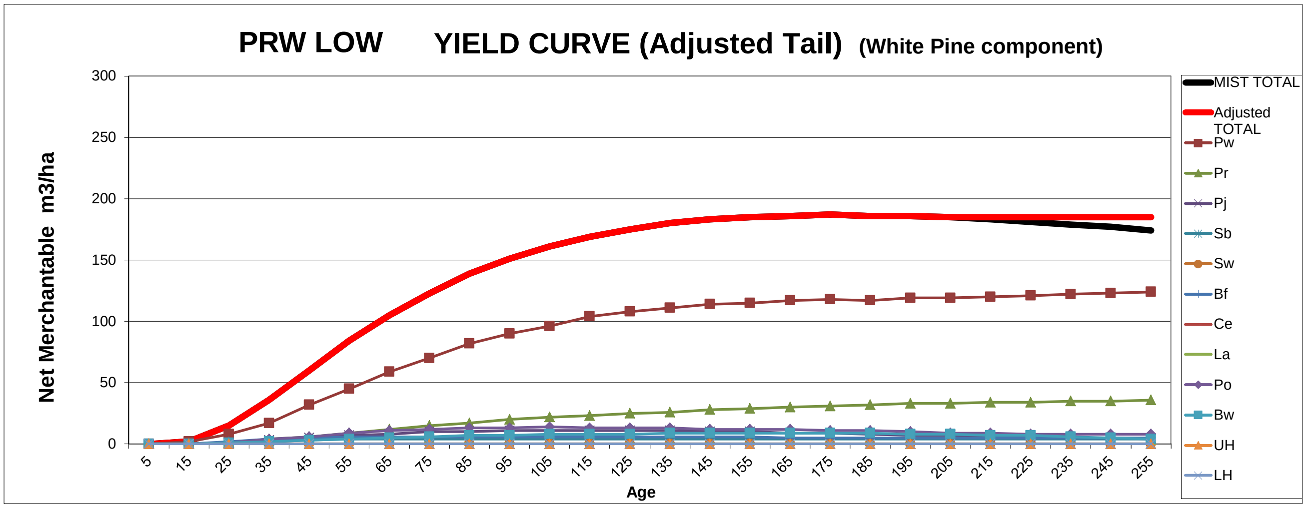
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PRWR NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PRWR NAT	15	5	5	1	2	1	0	0	0	0	0	1	0	0	0
PRWR NAT	25	19	19	3	8	3	1	0	1	0	0	2	1	0	0
PRWR NAT	35	40	40	6	17	5	2	1	2	1	0	5	1	0	0
PRWR NAT	45	65	65	10	28	8	3	1	3	1	0	9	2	0	0
PRWR NAT	55	93	93	15	41	11	4	1	4	1	0	12	4	0	0
PRWR NAT	65	121	121	21	55	14	4	1	4	1	0	16	5	0	0
PRWR NAT	75	147	147	26	69	16	4	1	5	1	0	19	6	0	0
PRWR NAT	85	172	172	29	84	19	5	1	5	1	0	21	7	0	0
PRWR NAT	95	195	195	35	98	20	5	1	5	1	0	22	8	0	0
PRWR NAT	105	216	216	39	113	21	5	1	5	1	0	23	8	0	0
PRWR NAT	115	234	234	43	124	22	5	1	5	1	0	24	9	0	0
PRWR NAT	125	250	250	46	137	22	5	1	5	1	0	24	9	0	0
PRWR NAT	135	264	264	49	147	22	5	1	5	1	0	24	10	0	0
PRWR NAT	145	276	276	51	157	22	5	1	5	1	0	24	10	0	0
PRWR NAT	155	287	287	53	168	21	5	1	5	1	0	23	10	0	0
PRWR NAT	165	295	295	54	175	20	6	1	5	1	0	23	10	0	0
PRWR NAT	175	303	303	55	183	19	6	1	5	1	0	22	11	0	0
PRWR NAT	185	309	309	56	190	18	6	1	5	1	0	22	10	0	0
PRWR NAT	195	314	314	57	196	17	6	1	5	1	0	21	10	0	0
PRWR NAT	205	318	318	57	203	15	6	1	5	1	0	20	10	0	0
PRWR NAT	215	322	322	57	208	14	6	1	5	1	0	20	10	0	0
PRWR NAT	225	325	325	56	214	13	6	1	5	1	0	19	10	0	0
PRWR NAT	235	327	327	56	217	12	6	2	5	1	0	18	10	0	0
PRWR NAT	245	329	329	55	221	11	6	2	5	1	0	18	10	0	0
PRWR NAT	255	330	330	55	225	10	6	2	4	1	0	17	10	0	0

Total net merchantable volume peak of yield curve



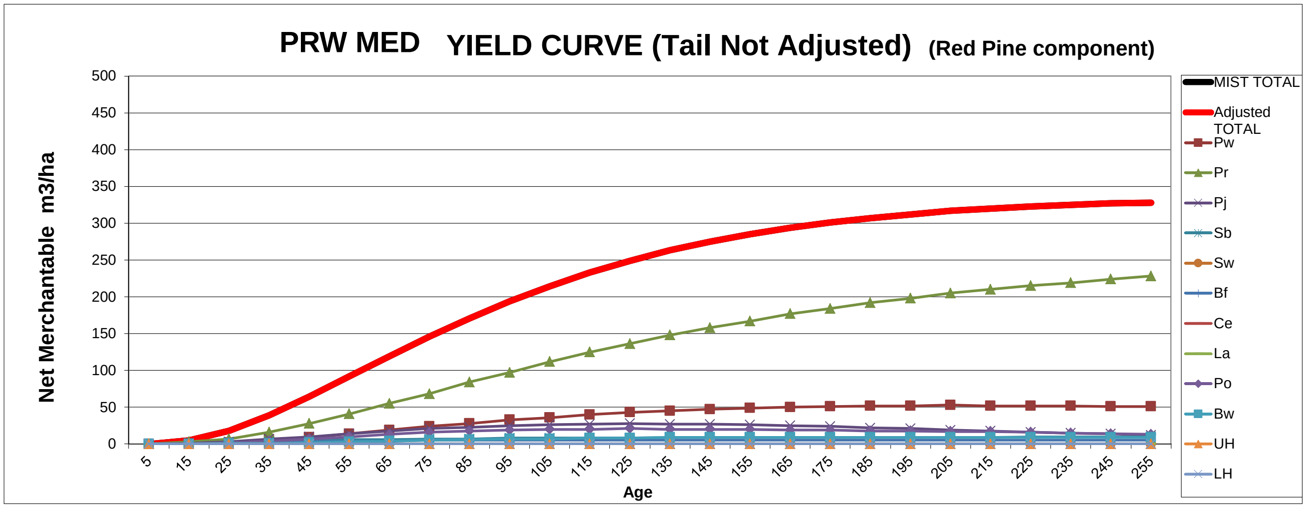
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PRWW NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PRWW NAT	15	3	3	2	0	0	0	0	0	0	0	1	0	0	0
PRWW NAT	25	16	16	8	1	1	1	0	1	1	0	2	1	0	0
PRWW NAT	35	37	37	19	3	2	2	1	3	1	0	5	1	0	0
PRWW NAT	45	63	63	33	5	3	3	1	5	2	0	8	3	0	0
PRWW NAT	55	87	87	49	8	4	3	1	5	2	0	11	4	0	0
PRWW NAT	65	109	109	63	10	5	3	1	6	2	0	13	5	1	0
PRWW NAT	75	128	128	75	13	6	3	1	6	2	0	15	6	1	0
PRWW NAT	85	144	144	87	15	6	4	1	6	2	0	16	6	1	0
PRWW NAT	95	156	156	95	16	7	4	1	6	2	0	17	7	1	0
PRWW NAT	105	167	167	104	18	7	4	1	6	2	0	17	7	1	0
PRWW NAT	115	175	175	109	20	7	4	1	6	2	0	17	8	1	0
PRWW NAT	125	181	181	115	21	7	4	1	5	2	0	17	8	1	0
PRWW NAT	135	185	185	119	22	7	4	1	5	2	0	16	8	1	0
PRWW NAT	145	188	188	122	23	6	4	1	5	2	0	16	8	1	0
PRWW NAT	155	191	191	125	24	6	4	1	5	2	0	15	8	1	0
PRWW NAT	165	192	192	125	25	6	4	1	5	2	0	15	8	1	0
PRWW NAT	175	192	192	127	26	5	4	1	5	1	0	14	8	1	0
PRWW NAT	185	192	192	127	27	5	4	1	5	1	0	13	8	1	0
PRWW NAT	195	191	191	126	27	5	4	1	5	1	0	13	8	1	0
PRWW NAT	205	190	190	126	28	4	4	1	5	1	0	12	8	1	0
PRWW NAT	215	188	190	125	29	4	4	1	5	1	0	12	8	1	0
PRWW NAT	225	186	190	126	30	4	4	1	4	1	0	11	8	1	0
PRWW NAT	235	184	190	127	31	3	4	1	4	1	0	11	7	1	0
PRWW NAT	245	181	190	127	31	3	4	1	4	1	0	11	7	1	0
PRWW NAT	255	178	190	127	32	3	4	1	4	1	0	10	7	1	0

Total net merchantable volume peak of yield curve



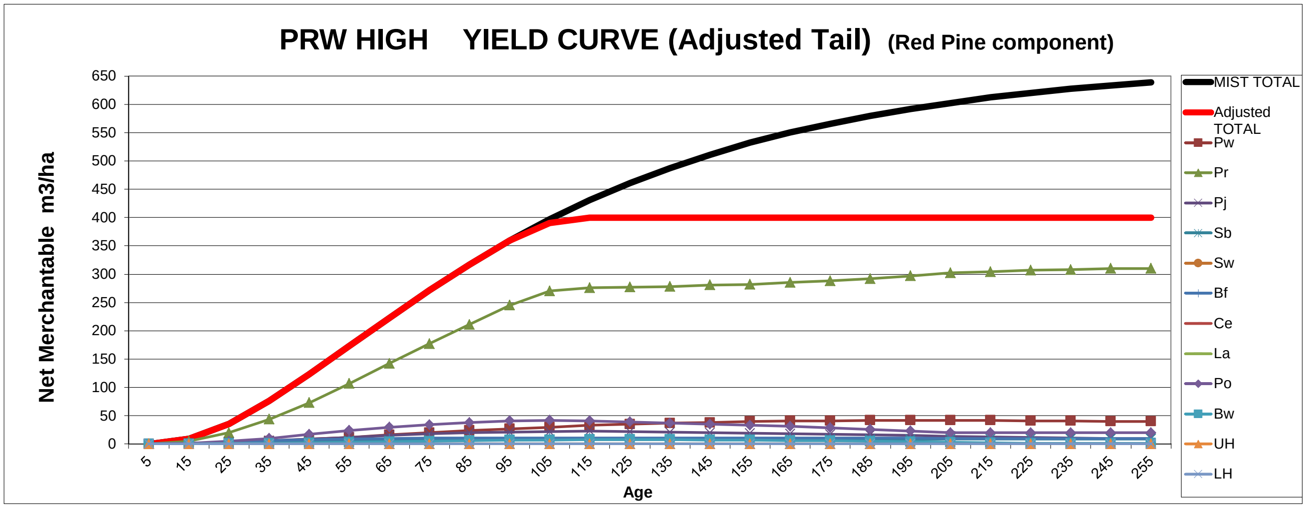
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PRW LOW	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PRW LOW	15	2	2	2	0	0	0	0	0	0	0	0	0	0	0
PRW LOW	25	15	15	8	1	1	1	0	2	0	0	1	1	0	0
PRW LOW	35	36	36	17	4	3	2	0	4	0	0	4	2	0	0
PRW LOW	45	60	60	32	6	5	3	0	5	0	0	6	3	0	0
PRW LOW	55	84	84	45	9	7	4	0	6	0	0	9	4	0	0
PRW LOW	65	105	105	59	12	8	4	0	6	0	0	11	5	0	0
PRW LOW	75	123	123	70	15	10	4	0	6	0	0	12	6	0	0
PRW LOW	85	139	139	82	17	10	4	0	6	0	0	13	7	0	0
PRW LOW	95	151	151	90	20	11	4	0	6	0	0	13	7	0	0
PRW LOW	105	161	161	96	22	11	4	0	6	0	0	14	8	0	0
PRW LOW	115	169	169	104	23	11	4	0	6	0	0	13	8	0	0
PRW LOW	125	175	175	108	25	11	4	0	6	0	0	13	8	0	0
PRW LOW	135	180	180	111	26	11	4	0	6	0	0	13	9	0	0
PRW LOW	145	183	183	114	28	10	4	0	6	0	0	12	9	0	0
PRW LOW	155	185	185	115	29	10	4	0	6	0	0	12	9	0	0
PRW LOW	165	186	186	117	30	9	4	0	5	0	0	12	9	0	0
PRW LOW	175	187	187	118	31	9	4	0	5	0	0	11	9	0	0
PRW LOW	185	186	186	117	32	8	4	0	5	0	0	11	9	0	0
PRW LOW	195	186	186	119	33	7	4	0	5	0	0	10	8	0	0
PRW LOW	205	185	185	119	33	7	4	0	5	0	0	9	8	0	0
PRW LOW	215	183	185	120	34	6	4	0	5	0	0	9	7	0	0
PRW LOW	225	181	185	121	34	6	4	0	5	0	0	8	7	0	0
PRW LOW	235	179	185	122	35	5	4	0	5	0	0	8	6	0	0
PRW LOW	245	177	185	123	35	5	4	0	5	0	0	8	5	0	0
PRW LOW	255	174	185	124	36	4	4	0	5	0	0	8	4	0	0

Total net merchantable volume peak of yield curve



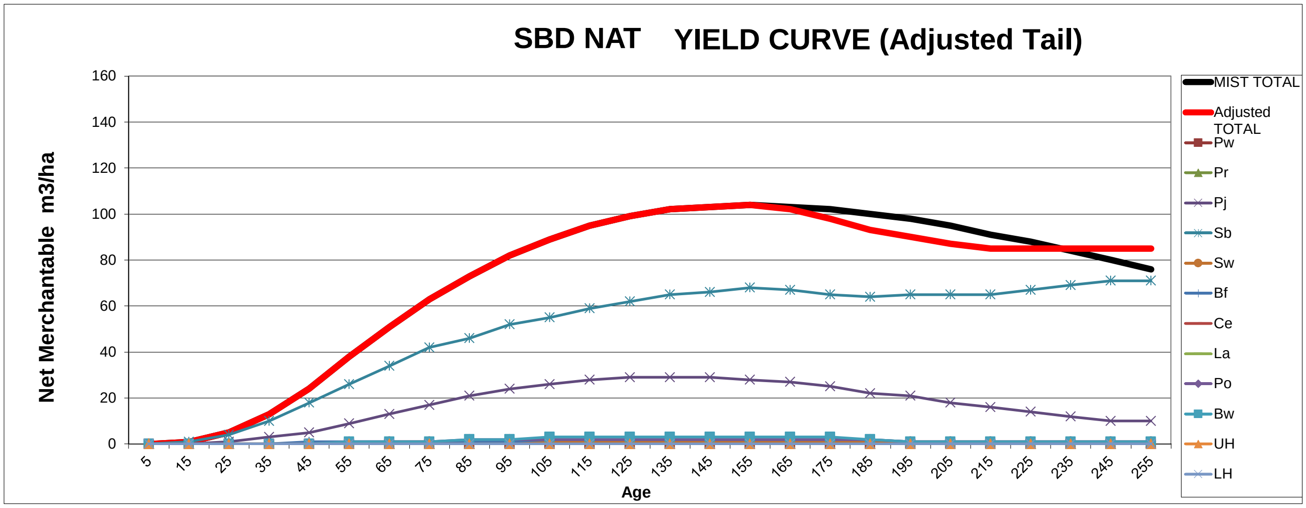
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PRW MED	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PRW MED	15	5	5	1	3	1	0	0	0	0	0	0	0	0	0
PRW MED	25	18	18	2	7	3	2	0	1	0	0	2	1	0	0
PRW MED	35	39	39	6	16	7	3	0	2	0	0	4	1	0	0
PRW MED	45	64	64	9	28	10	5	0	3	0	0	7	2	0	0
PRW MED	55	92	92	14	41	14	6	0	4	0	0	10	3	0	0
PRW MED	65	119	119	19	55	18	6	0	4	0	0	13	4	0	0
PRW MED	75	146	146	24	68	21	7	0	5	0	0	16	5	0	0
PRW MED	85	171	171	28	84	23	7	0	5	0	0	18	6	0	0
PRW MED	95	194	194	33	97	25	8	0	5	0	0	19	7	0	0
PRW MED	105	214	214	36	112	26	8	0	5	0	0	20	7	0	0
PRW MED	115	233	233	40	125	27	8	0	5	0	0	20	8	0	0
PRW MED	125	249	249	43	136	28	8	0	5	0	0	21	8	0	0
PRW MED	135	263	263	45	148	27	9	0	5	0	0	20	9	0	0
PRW MED	145	275	275	47	158	27	9	0	5	0	0	20	9	0	0
PRW MED	155	285	285	49	167	26	9	0	5	0	0	20	9	0	0
PRW MED	165	294	294	50	177	25	9	0	5	0	0	19	9	0	0
PRW MED	175	301	301	51	184	24	9	0	5	0	0	19	9	0	0
PRW MED	185	307	307	52	192	22	9	0	5	0	0	18	9	0	0
PRW MED	195	312	312	52	198	21	9	0	5	0	0	18	9	0	0
PRW MED	205	317	317	53	205	19	9	0	5	0	0	17	9	0	0
PRW MED	215	320	320	52	210	18	9	0	5	0	0	17	9	0	0
PRW MED	225	323	323	52	215	16	10	0	5	0	0	16	9	0	0
PRW MED	235	325	325	52	219	15	10	0	5	0	0	15	9	0	0
PRW MED	245	327	327	51	224	14	10	0	5	0	0	14	9	0	0
PRW MED	255	328	328	51	228	12	10	0	5	0	0	13	9	0	0

Total net merchantable volume peak of yield curve



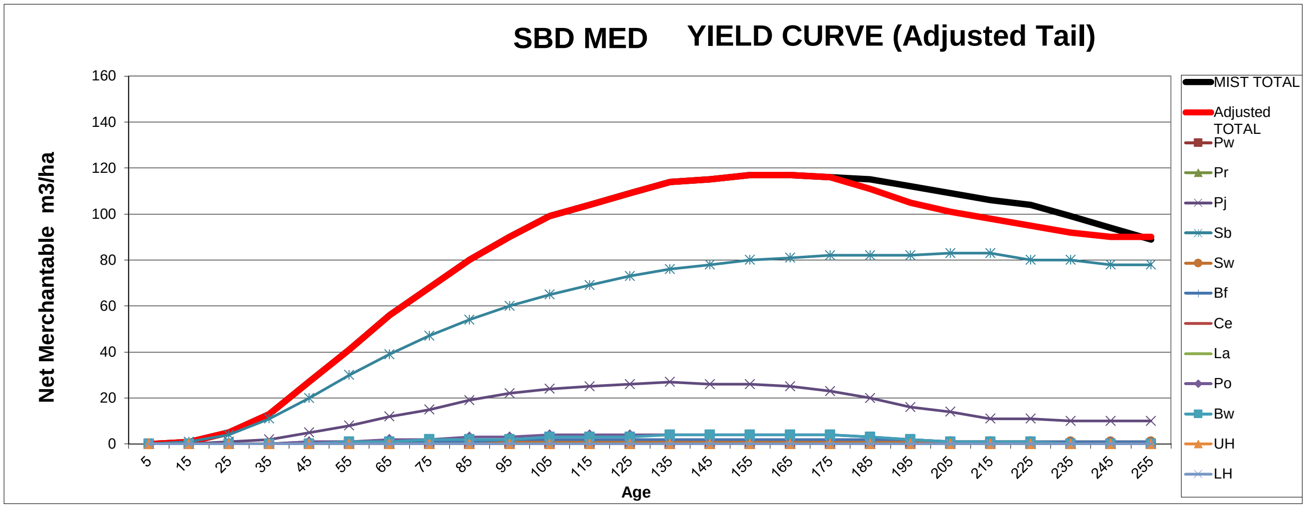
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
PRW HIGH	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PRW HIGH	15	9	9	1	5	1	0	0	1	0	0	1	0	0	0
PRW HIGH	25	36	36	2	20	3	2	0	3	0	0	5	1	0	0
PRW HIGH	35	76	76	5	44	6	4	0	6	0	0	10	1	0	0
PRW HIGH	45	123	123	9	73	9	5	0	8	0	0	17	2	0	0
PRW HIGH	55	173	173	12	107	12	6	0	9	0	0	24	3	0	0
PRW HIGH	65	223	223	16	142	15	6	0	10	0	0	30	4	0	0
PRW HIGH	75	272	272	20	177	18	7	0	11	0	0	34	5	0	0
PRW HIGH	85	317	317	24	211	20	7	0	11	0	0	38	6	0	0
PRW HIGH	95	359	359	27	245	21	7	0	11	0	0	41	7	0	0
PRW HIGH	105	397	390	30	270	22	8	0	11	0	0	42	7	0	0
PRW HIGH	115	431	400	33	276	23	8	0	11	0	0	41	8	0	0
PRW HIGH	125	461	400	35	277	22	8	0	11	0	0	39	8	0	0
PRW HIGH	135	487	400	37	278	21	8	0	11	0	0	37	8	0	0
PRW HIGH	145	511	400	38	281	20	8	0	11	0	0	35	7	0	0
PRW HIGH	155	532	400	40	282	19	8	0	11	0	0	33	7	0	0
PRW HIGH	165	550	400	41	285	18	8	0	11	0	0	31	6	0	0
PRW HIGH	175	565	400	41	288	17	8	0	11	0	0	29	6	0	0
PRW HIGH	185	579	400	42	292	16	8	0	11	0	0	26	5	0	0
PRW HIGH	195	592	400	42	297	15	8	0	11	0	0	23	4	0	0
PRW HIGH	205	602	400	42	302	14	9	0	10	0	0	20	3	0	0
PRW HIGH	215	612	400	42	304	13	9	0	10	0	0	20	2	0	0
PRW HIGH	225	620	400	41	307	12	9	0	10	0	0	20	1	0	0
PRW HIGH	235	627	400	41	308	11	9	0	10	0	0	20	1	0	0
PRW HIGH	245	633	400	40	310	10	9	0	10	0	0	20	1	0	0
PRW HIGH	255	639	400	40	310	10	9	0	10	0	0	20	1	0	0

Total net merchantable volume peak of yield curve



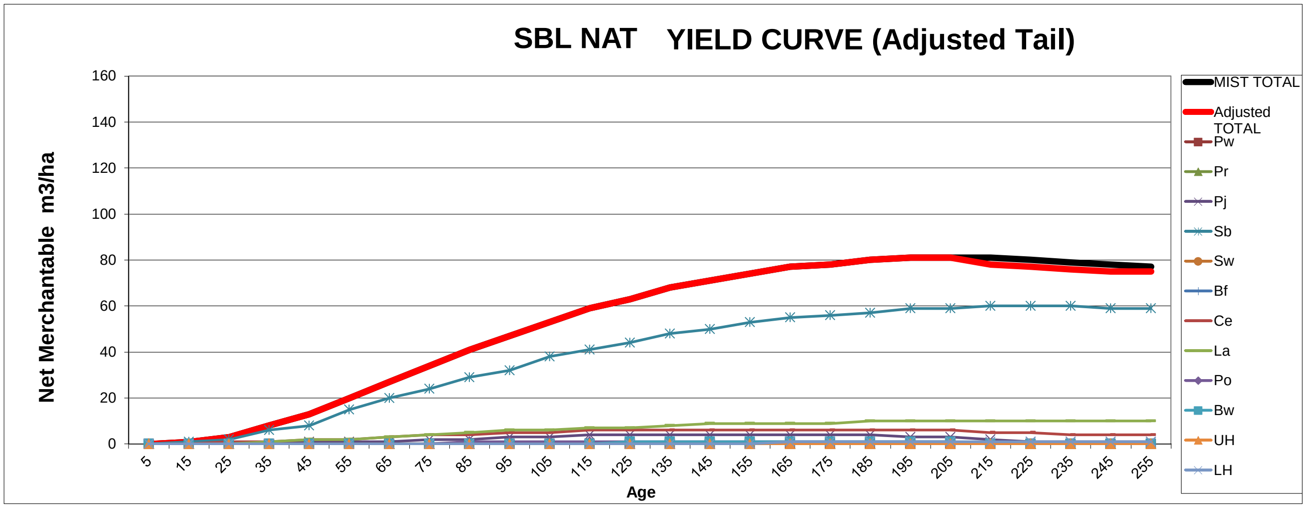
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
SBD NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBD NAT	15	1	1	0	0	0	1	0	0	0	0	0	0	0	0
SBD NAT	25	5	5	0	0	1	4	0	0	0	0	0	0	0	0
SBD NAT	35	13	13	0	0	3	10	0	0	0	0	0	0	0	0
SBD NAT	45	24	24	0	0	5	18	0	1	0	0	0	0	0	0
SBD NAT	55	38	38	0	0	9	26	0	1	0	0	1	1	0	0
SBD NAT	65	51	51	0	0	13	34	1	1	0	0	1	1	0	0
SBD NAT	75	63	63	0	0	17	42	1	1	0	0	1	1	0	0
SBD NAT	85	73	73	0	0	21	46	1	1	0	0	2	2	0	0
SBD NAT	95	82	82	0	0	24	52	1	1	0	0	2	2	0	0
SBD NAT	105	89	89	0	0	26	55	1	2	0	0	2	3	0	0
SBD NAT	115	95	95	0	0	28	59	1	2	0	0	2	3	0	0
SBD NAT	125	99	99	0	0	29	62	1	2	0	0	2	3	0	0
SBD NAT	135	102	102	0	0	29	65	1	2	0	0	2	3	0	0
SBD NAT	145	103	103	0	0	29	66	1	2	0	0	2	3	0	0
SBD NAT	155	104	104	0	0	28	68	1	2	0	0	2	3	0	0
SBD NAT	165	103	**102**	0	0	27	67	1	2	0	0	2	3	0	0
SBD NAT	175	102	**98**	0	0	25	65	1	2	0	0	2	3	0	0
SBD NAT	185	100	**93**	0	0	22	64	1	2	0	0	2	2	0	0
SBD NAT	195	98	**90**	0	0	21	65	1	1	0	0	1	1	0	0
SBD NAT	205	95	**87**	0	0	18	65	1	1	0	0	1	1	0	0
SBD NAT	215	91	**85**	0	0	16	65	1	1	0	0	1	1	0	0
SBD NAT	225	88	**85**	0	0	14	67	1	1	0	0	1	1	0	0
SBD NAT	235	84	**85**	0	0	12	69	1	1	0	0	1	1	0	0
SBD NAT	245	80	**85**	0	0	10	71	1	1	0	0	1	1	0	0
SBD NAT	255	76	**85**	0	0	10	71	1	1	0	0	1	1	0	0

Total net merchantable volume peak of yield curve



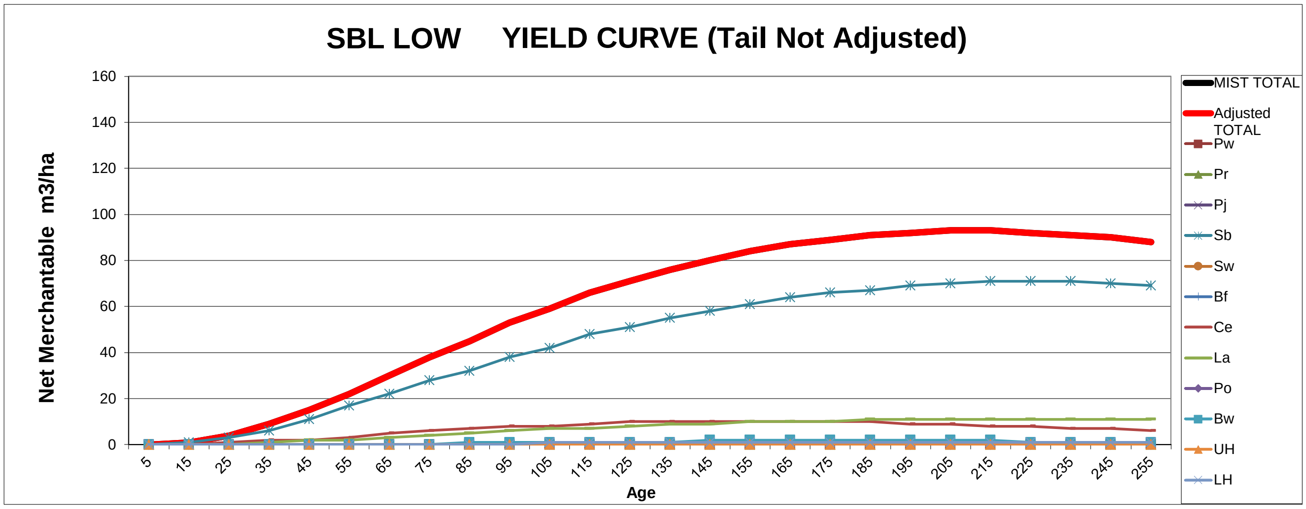
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
SBD MED	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBD MED	15	1	1	0	0	0	1	0	0	0	0	0	0	0	0
SBD MED	25	5	5	0	0	1	4	0	0	0	0	0	0	0	0
SBD MED	35	13	13	0	0	2	11	0	0	0	0	0	0	0	0
SBD MED	45	27	27	0	0	5	20	0	1	0	0	1	0	0	0
SBD MED	55	41	41	0	0	8	30	0	1	0	0	1	1	0	0
SBD MED	65	56	56	0	0	12	39	1	1	0	0	2	1	0	0
SBD MED	75	68	68	0	0	15	47	1	1	0	0	2	2	0	0
SBD MED	85	80	80	0	0	19	54	1	1	0	0	3	2	0	0
SBD MED	95	90	90	0	0	22	60	1	2	0	0	3	2	0	0
SBD MED	105	99	99	0	0	24	65	1	2	0	0	4	3	0	0
SBD MED	115	104	104	0	0	25	69	1	2	0	0	4	3	0	0
SBD MED	125	109	109	0	0	26	73	1	2	0	0	4	3	0	0
SBD MED	135	114	114	0	0	27	76	1	2	0	0	4	4	0	0
SBD MED	145	115	115	0	0	26	78	1	2	0	0	4	4	0	0
SBD MED	155	117	117	0	0	26	80	1	2	0	0	4	4	0	0
SBD MED	165	117	117	0	0	25	81	1	2	0	0	4	4	0	0
SBD MED	175	116	116	0	0	23	82	1	2	0	0	4	4	0	0
SBD MED	185	115	111	0	0	20	82	1	2	0	0	3	3	0	0
SBD MED	195	112	105	0	0	16	82	1	2	0	0	2	2	0	0
SBD MED	205	109	101	0	0	14	83	1	1	0	0	1	1	0	0
SBD MED	215	106	98	0	0	11	83	1	1	0	0	1	1	0	0
SBD MED	225	104	95	0	0	11	80	1	1	0	0	1	1	0	0
SBD MED	235	99	92	0	0	10	80	1	1	0	0	0	0	0	0
SBD MED	245	94	90	0	0	10	78	1	1	0	0	0	0	0	0
SBD MED	255	89	90	0	0	10	78	1	1	0	0	0	0	0	0

Total net merchantable volume peak of yield curve



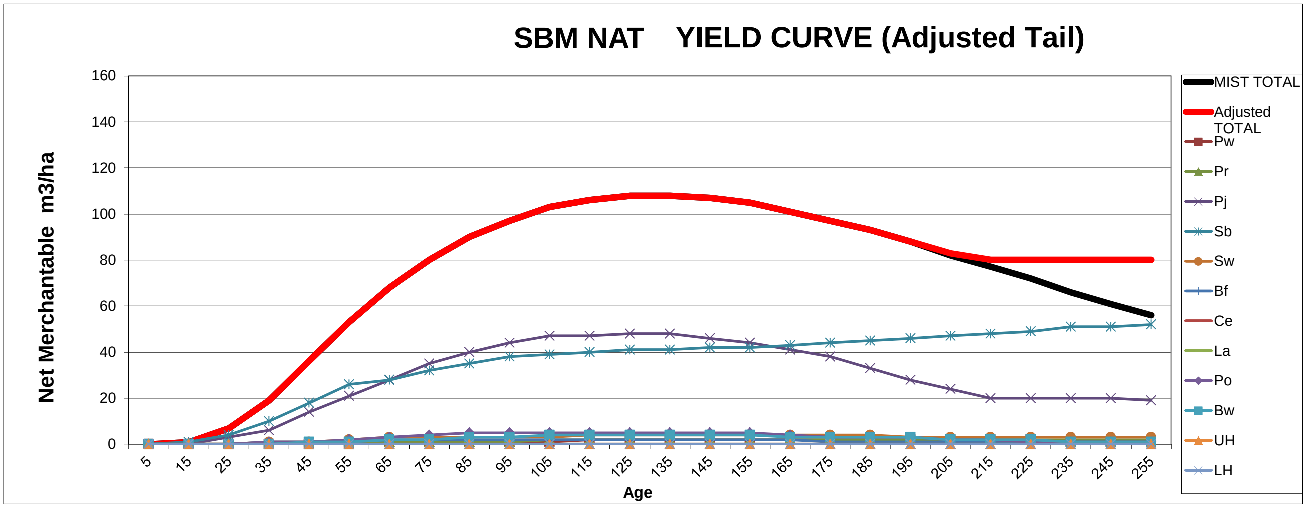
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
SBL NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBL NAT	15	1	1	0	0	0	1	0	0	0	0	0	0	0	0
SBL NAT	25	3	3	0	0	0	2	0	0	1	0	0	0	0	0
SBL NAT	35	8	8	0	0	0	6	0	0	1	1	0	0	0	0
SBL NAT	45	13	13	0	0	1	8	0	0	2	2	0	0	0	0
SBL NAT	55	20	20	0	0	1	15	0	0	2	2	0	0	0	0
SBL NAT	65	27	27	0	0	1	20	0	0	3	3	0	0	0	0
SBL NAT	75	34	34	0	0	2	24	0	0	4	4	0	0	0	0
SBL NAT	85	41	41	0	0	2	29	0	0	4	5	1	0	0	0
SBL NAT	95	47	47	0	0	3	32	0	0	5	6	1	0	0	0
SBL NAT	105	53	53	0	0	3	38	0	0	5	6	1	0	0	0
SBL NAT	115	59	59	0	0	4	41	0	0	6	7	1	0	0	0
SBL NAT	125	63	63	0	0	4	44	0	0	6	7	1	1	0	0
SBL NAT	135	68	68	0	0	4	48	0	0	6	8	1	1	0	0
SBL NAT	145	71	71	0	0	4	50	0	0	6	9	1	1	0	0
SBL NAT	155	74	74	0	0	4	53	0	0	6	9	1	1	0	0
SBL NAT	165	77	77	0	0	4	55	0	0	6	9	1	1	0	1
SBL NAT	175	78	78	0	0	4	56	0	0	6	9	1	1	0	1
SBL NAT	185	80	80	0	0	4	57	0	0	6	10	1	1	0	1
SBL NAT	195	81	81	0	0	3	59	0	0	6	10	1	1	0	1
SBL NAT	205	81	81	0	0	3	59	0	0	6	10	1	1	0	1
SBL NAT	215	81	78	0	0	2	60	0	0	5	10	0	0	0	1
SBL NAT	225	80	77	0	0	1	60	0	0	5	10	0	0	0	1
SBL NAT	235	79	76	0	0	1	60	0	0	4	10	0	0	0	1
SBL NAT	245	78	75	0	0	1	59	0	0	4	10	0	0	0	1
SBL NAT	255	77	75	0	0	1	59	0	0	4	10	0	0	0	1

Total net merchantable volume peak of yield curve



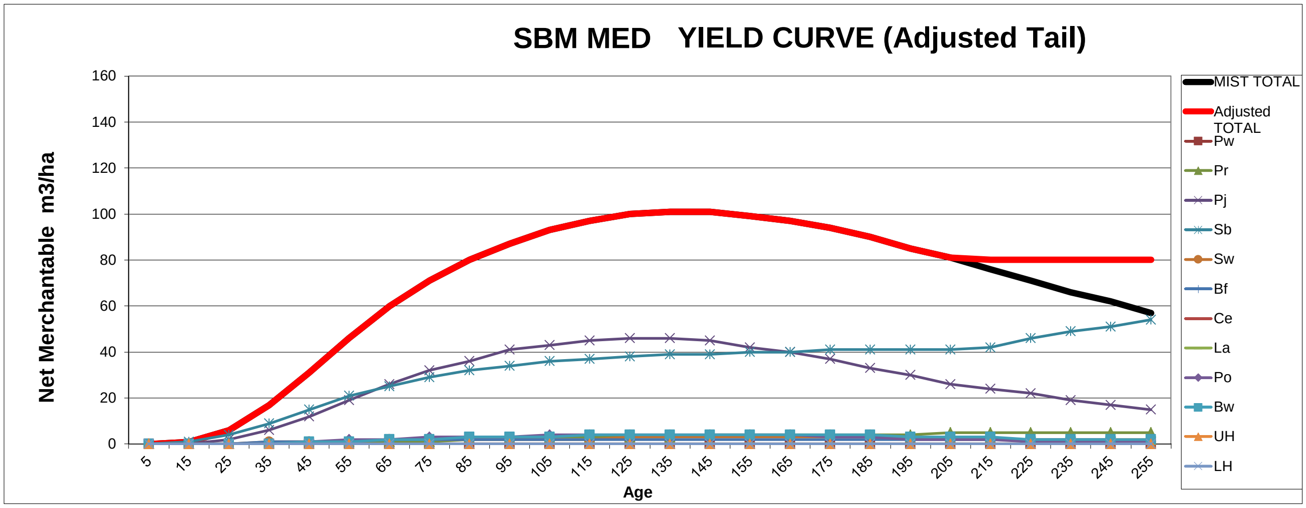
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
SBL LOW	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBL LOW	15	1	1	0	0	0	1	0	0	0	0	0	0	0	0
SBL LOW	25	4	4	0	0	0	3	0	0	1	0	0	0	0	0
SBL LOW	35	9	9	0	0	0	6	0	0	2	1	0	0	0	0
SBL LOW	45	15	15	0	0	0	11	0	0	2	2	0	0	0	0
SBL LOW	55	22	22	0	0	0	17	0	0	3	2	0	0	0	0
SBL LOW	65	30	30	0	0	0	22	0	0	5	3	0	0	0	0
SBL LOW	75	38	38	0	0	0	28	0	0	6	4	0	0	0	0
SBL LOW	85	45	45	0	0	0	32	0	0	7	5	0	1	0	0
SBL LOW	95	53	53	0	0	0	38	0	0	8	6	0	1	0	0
SBL LOW	105	59	59	0	0	0	42	0	0	8	7	0	1	0	1
SBL LOW	115	66	66	0	0	0	48	0	0	9	7	0	1	0	1
SBL LOW	125	71	71	0	0	0	51	0	0	10	8	0	1	0	1
SBL LOW	135	76	76	0	0	0	55	0	0	10	9	0	1	0	1
SBL LOW	145	80	80	0	0	0	58	0	0	10	9	0	2	0	1
SBL LOW	155	84	84	0	0	0	61	0	0	10	10	0	2	0	1
SBL LOW	165	87	87	0	0	0	64	0	0	10	10	0	2	0	1
SBL LOW	175	89	89	0	0	0	66	0	0	10	10	0	2	0	1
SBL LOW	185	91	91	0	0	0	67	0	0	10	11	0	2	0	1
SBL LOW	195	92	92	0	0	0	69	0	0	9	11	0	2	0	1
SBL LOW	205	93	93	0	0	0	70	0	0	9	11	0	2	0	1
SBL LOW	215	93	93	0	0	0	71	0	0	8	11	0	2	0	1
SBL LOW	225	92	92	0	0	0	71	0	0	8	11	0	1	0	1
SBL LOW	235	91	91	0	0	0	71	0	0	7	11	0	1	0	1
SBL LOW	245	90	90	0	0	0	70	0	0	7	11	0	1	0	1
SBL LOW	255	88	88	0	0	0	69	0	0	6	11	0	1	0	1

Total net merchantable volume peak of yield curve



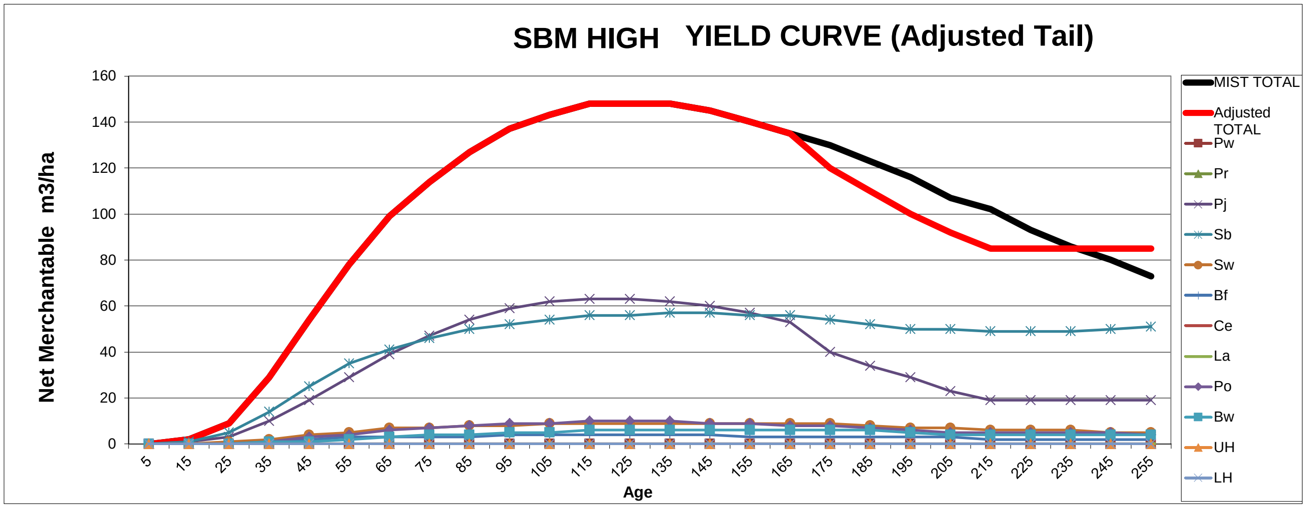
FU	AC10	MIST TOTAL	Adjusted TOTAL	Pw	Pr	Pj	Sb	Sw	Bf	Ce	La	Po	Bw	UH	LH
SBM NAT	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBM NAT	15	1	1	0	0	0	1	0	0	0	0	0	0	0	0
SBM NAT	25	7	7	0	0	3	4	0	0	0	0	0	0	0	0
SBM NAT	35	19	19	0	0	6	10	1	1	0	0	1	0	0	0
SBM NAT	45	36	36	0	0	14	18	1	1	0	0	1	1	0	0
SBM NAT	55	53	53	0	0	21	26	2	1	0	0	2	1	0	0
SBM NAT	65	68	68	1	1	28	28	3	2	0	0	3	2	0	0
SBM NAT	75	80	80	1	1	35	32	3	2	0	0	4	2	0	0
SBM NAT	85	90	90	1	1	40	35	3	2	0	0	5	3	0	0
SBM NAT	95	97	97	1	1	44	38	3	2	0	0	5	3	0	0
SBM NAT	105	103	103	1	2	47	39	3	2	0	0	5	4	0	0
SBM NAT	115	106	106	2	2	47	40	4	2	0	0	5	4	0	0
SBM NAT	125	108	108	2	2	48	41	4	2	0	0	5	4	0	0
SBM NAT	135	108	108	2	2	48	41	4	2	0	0	5	4	0	0
SBM NAT	145	107	107	2	2	46	42	4	2	0	0	5	4	0	0
SBM NAT	155	105	105	2	2	44	42	4	2	0	0	5	4	0	0
SBM NAT	165	101	101	2	2	41	43	4	2	0	0	4	3	0	0
SBM NAT	175	97	97	2	2	38	44	4	1	0	0	3	3	0	0
SBM NAT	185	93	93	2	2	33	45	4	1	0	0	3	3	0	0
SBM NAT	195	88	88	2	2	28	46	3	1	0	0	3	3	0	0
SBM NAT	205	82	83	2	2	24	47	3	1	0	0	2	2	0	0
SBM NAT	215	77	**80**	2	2	20	48	3	1	0	0	2	2	0	0
SBM NAT	225	72	**80**	2	2	20	49	3	1	0	0	1	2	0	0
SBM NAT	235	66	**80**	1	2	20	51	3	1	0	0	1	1	0	0
SBM NAT	245	61	**80**	1	2	20	51	3	1	0	0	1	1	0	0
SBM NAT	255	56	**80**	1	2	19	52	3	1	0	0	1	1	0	0

(highlighted) 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	1	1	0	0	0	1	0	0	0	0	0	0	0	0
SBM MED	25	6	6	0	0	2	4	0	0	0	0	0	0	0	0
SBM MED	35	17	17	0	0	6	9	1	1	0	0	0	0	0	0
SBM MED	45	31	31	0	0	12	15	1	1	0	0	1	1	0	0
SBM MED	55	46	46	0	1	19	21	1	1	0	0	2	1	0	0
SBM MED	65	60	60	0	1	26	25	2	2	0	0	2	2	0	0
SBM MED	75	71	71	0	1	32	29	2	2	0	0	3	2	0	0
SBM MED	85	80	80	0	2	36	32	2	2	0	0	3	3	0	0
SBM MED	95	87	87	0	2	41	34	2	2	0	0	3	3	0	0
SBM MED	105	93	93	0	3	43	36	2	2	0	0	4	3	0	0
SBM MED	115	97	97	0	3	45	37	2	2	0	0	4	4	0	0
SBM MED	125	100	100	0	3	46	38	3	2	0	0	4	4	0	0
SBM MED	135	101	101	0	3	46	39	3	2	0	0	4	4	0	0
SBM MED	145	101	101	0	4	45	39	3	2	0	0	4	4	0	0
SBM MED	155	99	99	0	4	42	40	3	2	0	0	4	4	0	0
SBM MED	165	97	97	0	4	40	40	3	2	0	0	4	4	0	0
SBM MED	175	94	94	0	4	37	41	3	2	0	0	3	4	0	0
SBM MED	185	90	90	0	4	33	41	3	2	0	0	3	4	0	0
SBM MED	195	85	85	0	4	30	41	3	2	0	0	2	3	0	0
SBM MED	205	81	81	0	5	26	41	2	2	0	0	2	3	0	0
SBM MED	215	76	80	0	5	24	42	2	2	0	0	2	3	0	0
SBM MED	225	71	80	0	5	22	46	2	2	0	0	1	2	0	0
SBM MED	235	66	80	0	5	19	49	2	2	0	0	1	2	0	0
SBM MED	245	62	80	0	5	17	51	2	2	0	0	1	2	0	0
SBM MED	255	57	80	0	5	15	54	2	1	0	0	1	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
SBM HIGH	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBM HIGH	15	2	2	0	0	1	1	0	0	0	0	0	0	0	0
SBM HIGH	25	9	9	0	0	3	5	1	0	0	0	0	0	0	0
SBM HIGH	35	29	29	0	0	10	14	2	1	0	0	1	1	0	0
SBM HIGH	45	54	54	0	0	19	25	4	2	0	0	3	1	0	0
SBM HIGH	55	78	78	0	0	29	35	5	3	0	0	4	2	0	0
SBM HIGH	65	99	99	0	0	39	41	7	3	0	0	6	3	0	0
SBM HIGH	75	114	114	0	0	47	46	7	3	0	0	7	4	0	0
SBM HIGH	85	127	127	0	0	54	50	8	3	0	0	8	4	0	0
SBM HIGH	95	137	137	0	0	59	52	8	4	0	0	9	5	0	0
SBM HIGH	105	143	143	0	0	62	54	9	4	0	0	9	5	0	0
SBM HIGH	115	148	148	0	0	63	56	9	4	0	0	10	6	0	0
SBM HIGH	125	148	148	0	0	63	56	9	4	0	0	10	6	0	0
SBM HIGH	135	148	148	0	0	62	57	9	4	0	0	10	6	0	0
SBM HIGH	145	145	145	0	0	60	57	9	4	0	0	9	6	0	0
SBM HIGH	155	140	140	0	0	57	56	9	3	0	0	9	6	0	0
SBM HIGH	165	135	135	0	0	53	56	9	3	0	0	8	6	0	0
SBM HIGH	175	130	**120**	0	0	40	54	9	3	0	0	8	6	0	0
SBM HIGH	185	123	**110**	0	0	34	52	8	3	0	0	7	6	0	0
SBM HIGH	195	116	**100**	0	0	29	50	7	3	0	0	6	5	0	0
SBM HIGH	205	107	**92**	0	0	23	50	7	3	0	0	5	4	0	0
SBM HIGH	215	102	**85**	0	0	19	49	6	2	0	0	5	4	0	0
SBM HIGH	225	93	**85**	0	0	19	49	6	2	0	0	5	4	0	0
SBM HIGH	235	86	**85**	0	0	19	49	6	2	0	0	5	4	0	0
SBM HIGH	245	80	**85**	0	0	19	50	5	2	0	0	5	4	0	0
SBM HIGH	255	73	**85**	0	0	19	51	5	2	0	0	4	4	0	0

Total net merchantable volume peak of yield curve

Appendix 7

Summary of Investigation and LTMD Development Results

KENORA FOREST 2022 FMP	**SUMMARY of SFMM INVESTIGATION**

Case Name: **00-noHARV** — **Date:** April 4, 2020.

Purpose: Base model inputs check. Revised with BASE06 inputs

Specific Inputs: Land base, forest dynamics, base silvic. Solved for Natural Succession through forest aging only (no harvest). BASE05 inputs revised for subunit timing, YIELD.

Group:	Mm3/yr
PWR	
SPF	
PO	
TOTAL	

Vol. Flow

Z01 subunit OFF all terms (islands), corrected between BASE05 and BASE06
NAT yield classification was corrected in BASE06.
Error introduced after forecast depeltions added, land bse reconciliation / AVAIL forest unchanged FMP-1-5 correct.

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 BLG indicator achievement for Mature-Late. Poor for Old Growth as area succeeds. Upland Conifer never reaches lower IQR. Early Landscape Classes and young forest are not achieved, due to no transition to revert forest to young (i.e. harvest). Cannot create more PRW.

(2a) Area by Landscape Class (Productive ha)

Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	40,952	136,142	68,484	18,070	208,260	141,825	38,522
T2	23,195	127,974	62,335	23,299	220,646	155,933	38,872
T3	15,338	123,386	46,645	29,914	226,198	171,571	39,144
T4	0	108,500	27,101	35,239	250,584	191,008	39,626
T5	0	34,600	18,118	41,619	314,397	199,034	43,991
T6	0	25,258	8,575	50,122	321,695	201,396	44,227
T7	0	16,781	1,287	60,421	327,385	200,292	44,372
T8	0	1,013	0	79,298	343,409	180,536	45,724
T9	0	0	0	94,440	359,330	149,862	45,724
T10	0	0	0	104,040	371,672	127,189	45,724
T11	0	0	0	111,676	387,012	102,615	45,724
T12	0	0	0	118,048	399,850	81,393	45,724
T13	0	0	0	125,260	405,200	68,479	45,724
T14	0	0	0	133,695	410,477	54,161	45,724
T15	0	0	0	136,573	416,552	45,040	45,724
T16	0	0	0	138,563	420,832	38,557	45,724
T17	0	0	0	140,874	426,901	29,351	45,724
BLG Upper	181,443	52,727	145,430	17,982	224,820	65,215	28,328
BLG Lower	101,058	29,333	81,015	12,782	152,976	43,706	23,354

(2b) Old Growth by Grouping (Prod. ha) / (2d) / (2e)

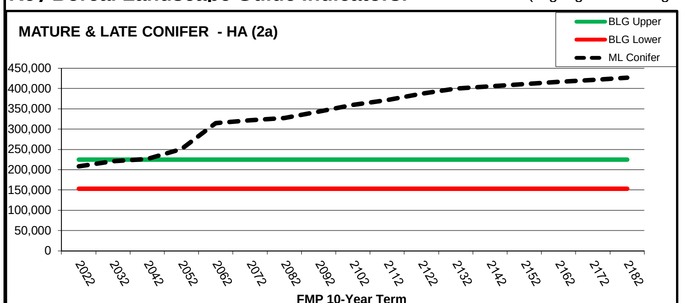
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs
T1	30,442	4,217	25,043	1,953	241,172	104,723
T2	78,355	7,589	75,275	3,471	241,172	49,444
T3	125,086	11,399	140,410	6,367	243,496	33,863
T4	143,300	17,506	178,842	8,902	247,403	12,702
T5	153,580	20,791	203,643	11,642	248,293	0
T6	156,500	27,688	210,769	13,850	249,559	0
T7	175,272	32,559	180,861	15,152	251,980	0
T8	226,500	36,110	154,839	15,584	255,803	0
T9	216,773	37,856	131,700	15,834	260,221	0
T10	197,562	38,667	110,787	16,003	263,799	0
T11	174,303	38,954	94,668	16,195	264,055	0
T12	142,003	39,192	74,263	16,559	263,465	0
T13	117,609	39,817	48,530	17,149	265,728	0
T14	112,014	44,155	29,022	17,682	267,612	0
T15	91,178	44,377	18,892	18,488	268,507	0
T16	49,178	44,521	6,890	18,488	268,898	0
T17	48,109	45,724	1,249	18,488	268,441	0
BLG Upper	79,383	17,281	78,344	99,999	343,729	227,291
BLG Lower	47,362	12,236	55,649	1,969	290,514	129,712
				5,000 ha used		

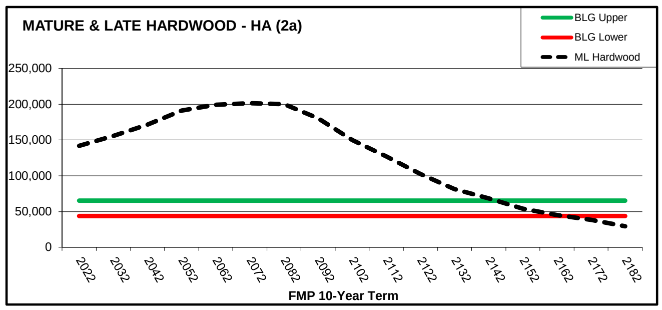
(6a) Available Forest:

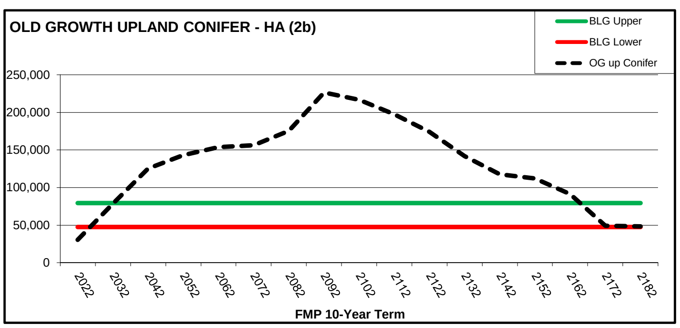
Term	
T1	503,772
T2	503,772
T3	503,772
T4	503,772
T5	503,772
T6	503,772
T7	503,772
T8	503,772
T9	503,772
T10	503,772
T11	503,772
T12	503,772
T13	503,772
T14	503,772
T15	503,772
T16	503,772
T17	503,772

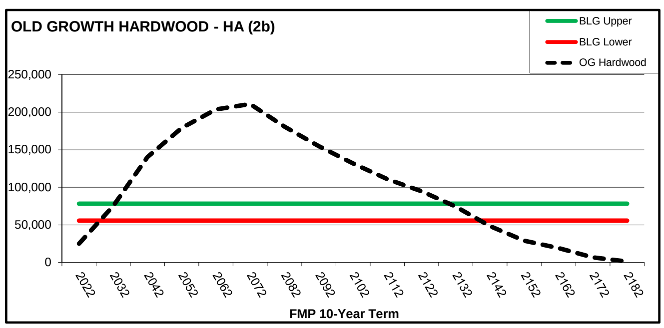
Key Boreal Landscape Guide Indicators:

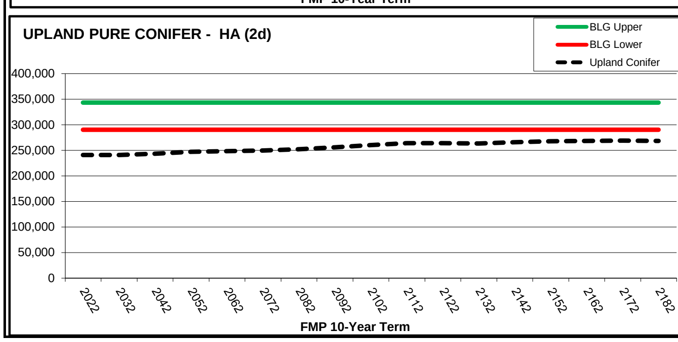
(Highlights challenges)

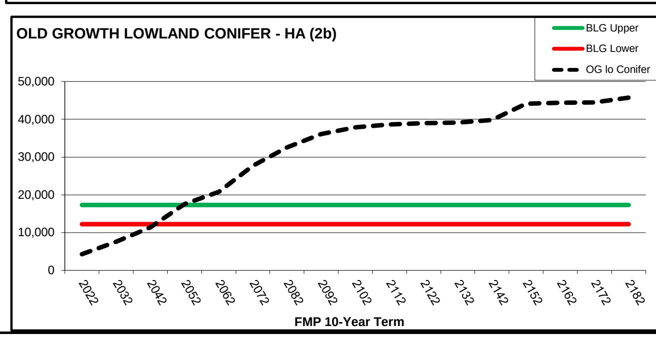










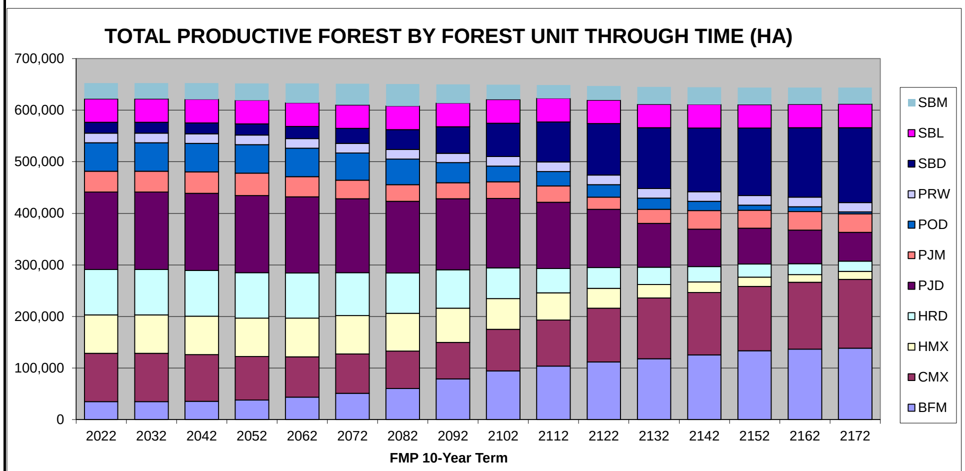


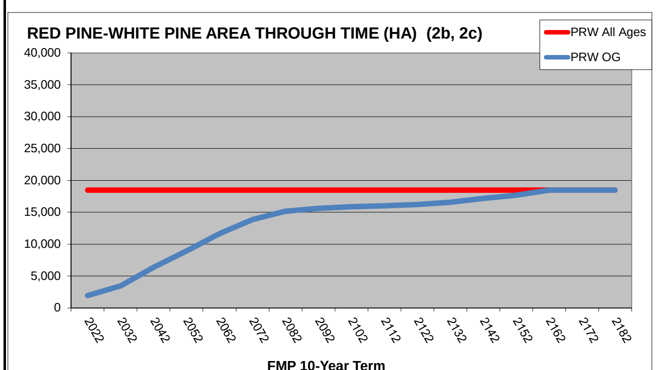
KENORA FOREST 2022 FMP **SUMMARY of SFMM INVESTIGATION**

Case Name: **00-noHARV** **Date:** April 4, 2020.

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	652,254	34,934	93,667	74,582	88,202	150,031	39,912	55,484	18,488	20,977	45,724	30,253
T2	652,254	34,934	93,667	74,582	88,202	150,031	39,912	55,484	18,488	20,977	45,724	30,253
T3	652,196	35,748	90,523	74,573	88,174	149,672	41,618	55,469	18,488	21,146	45,724	31,060
T4	652,059	38,191	84,143	74,683	88,109	149,024	43,753	55,317	18,488	21,603	45,724	33,024
T5	651,760	43,454	78,648	74,772	87,396	147,690	39,166	54,983	18,488	23,833	45,724	37,605
T6	651,273	51,216	76,314	74,608	82,528	143,719	36,030	52,835	18,488	28,683	45,724	41,127
T7	650,537	60,421	72,345	73,286	78,287	139,106	31,847	50,006	18,488	38,527	45,724	42,500
T8	649,980	79,298	70,131	66,801	74,605	137,125	30,998	39,130	18,488	51,247	45,724	36,432
T9	649,356	94,440	80,621	59,907	59,577	134,461	31,953	30,378	18,488	65,100	45,724	28,707
T10	648,625	104,040	89,384	52,635	46,987	128,383	31,841	27,567	18,488	77,790	45,724	25,786
T11	647,027	111,676	104,468	38,312	40,167	113,270	23,483	24,136	18,488	99,883	45,724	27,419
T12	645,015	118,048	117,897	26,047	33,705	84,551	27,470	21,640	18,488	117,926	45,724	33,518
T13	644,663	125,260	120,983	20,656	29,892	72,651	35,798	17,930	18,488	123,771	45,724	33,508
T14	644,057	133,695	124,376	17,999	25,787	69,430	34,324	10,375	18,488	130,565	45,724	33,293
T15	643,889	136,573	129,557	15,248	20,906	65,393	36,063	8,885	18,488	134,637	45,724	32,413
T16	643,677	138,563	133,446	15,232	19,826	55,924	36,072	3,499	18,488	145,114	45,724	31,787
T17	642,850	140,874	139,972	10,154	19,198	32,264	37,537	0	18,488	167,993	45,724	30,648

(1a) Caribou Habitat (Caribou Zone):		
Term	**Refuge**	**Winter**
T1	71,994	29,678
T2	73,946	65,493
T3	74,478	65,833
T4	75,156	66,443
T5	79,104	67,675
T6	79,335	67,870
T7	79,946	68,635
T8	80,707	68,610
T9	81,083	68,705
T10	81,468	69,066
T11	81,763	68,799
T12	81,694	68,557
T13	81,944	68,770
T14	82,318	69,169
T15	82,581	69,184
T16	82,517	69,127
T17	81,858	68,376
BLG Upper	61,458	45,161
BLG Lower	54,045	18,667





All ages PRW - desirable level "to increase"
Target in SFMM to not decrease.

Old Growth PRW - desirable level "to increase"
used 5,000 ha in SFMM

KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: 00-noHARV **Date:** April 4, 2020.

HARVEST AREA and VOLUME RESULTS:
Implications on Wood Supply - NO HARVEST

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

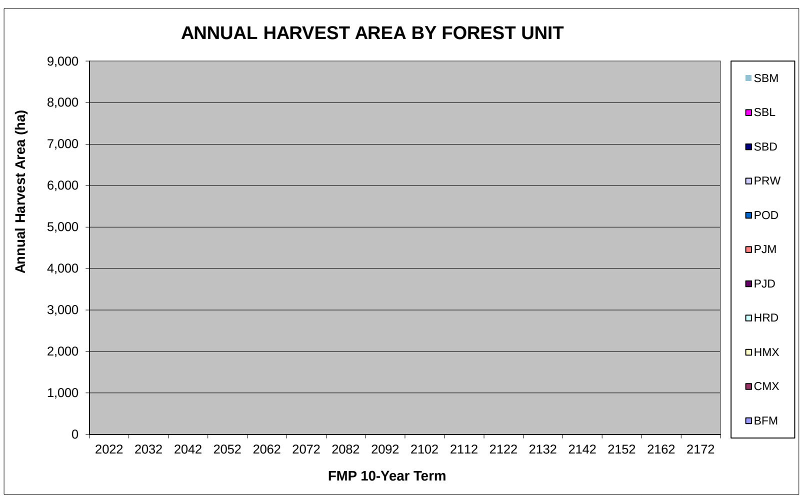
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 (6b)	0	0	0	0	0	0	0	0	0	0	0	0
T2	0	0	0	0	0	0	0	0	0	0	0	0
T3	0	0	0	0	0	0	0	0	0	0	0	0
T4	0	0	0	0	0	0	0	0	0	0	0	0
T5	0	0	0	0	0	0	0	0	0	0	0	0
T6	0	0	0	0	0	0	0	0	0	0	0	0
T7	0	0	0	0	0	0	0	0	0	0	0	0
T8	0	0	0	0	0	0	0	0	0	0	0	0
T9	0	0	0	0	0	0	0	0	0	0	0	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

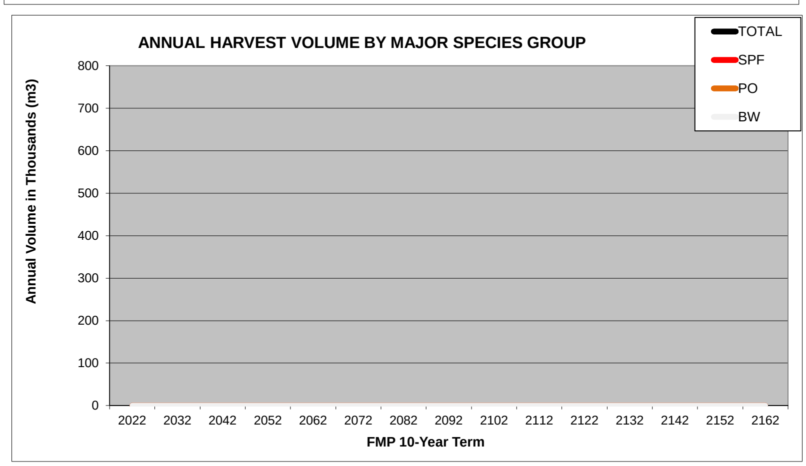
Annual Harvest Volumes by Major Species Groups

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
A1				
A2				
B1				
B2				
C				
D				
DEA1				
E				
ELK				
MEA1				
MEA2				
MEA3				
MEA4				
Z01				
Z02				
Z03				
Z04				
Z05				
Z06				
Z07				
Z08				
Z09				
Z10				
Z11				
Z12				
Z13				
Z14				
Z15				
TOTAL	-	-	-	-

KENORA FOREST 2022 FMP	SUMMARY of SFMM INVESTIGATION

Case Name: 01-BLG-30 **Date:** April 4, 2020.

Purpose: Investigation to see how soon BLG indicators can be achieved.

Specific Inputs: Lower IQR targets (binding) included for all indicators from T4 onwards (except Upland Conifer T7 onwards, since time needed to allow forestactivities to make enough upland conifer (PJD, PJM, SBD, SBM). No volume flow controls, nor volume targets.

Group:	Mm3/yr
PWR	
SPF	
PO	
TOTAL	

Vol. Flow

BLG Targets and Achievement: (others achieve by T2)
ML class a T2 onwards
OGupC, OGhmx and OGprw all T2 onwards
PurCn T7 onwards
PRW used 25,000 ha limit T10 onwards
OGprw used target of 7,000 ha T4 onwards

Budget: Balanced to revenues

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 BLG indicator achievement - All by T2 or earlier (except PurCn T7 and OGloC T4), and higher than lower IQR.
Consider subunit timing and operational issues first, then Task Team to consider forcing additional BLG achievement (higher or earlier)

(2a) Area by Landscape Class (Productive ha)

Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	40,952	136,142	68,484	18,070	208,260	141,825	38,522
T2	121,281	127,974	62,335	23,208	175,306	100,072	37,446
T3	125,883	127,868	88,870	27,956	155,100	83,224	35,863
T4	117,985	117,470	90,558	30,779	163,135	90,263	32,911
T5	91,425	94,055	91,045	30,141	212,513	92,187	29,885
T6	80,928	121,655	88,631	32,260	195,101	94,475	26,514
T7	98,396	136,329	86,500	19,765	184,880	89,222	23,727
T8	97,579	142,426	56,503	29,425	177,052	111,871	23,354
T9	108,308	122,071	40,814	35,747	198,896	107,505	23,914
T10	90,895	115,634	47,428	40,332	214,038	103,832	24,203
T11	87,297	121,352	46,136	43,290	213,140	97,033	26,488
T12	90,192	127,412	47,474	45,277	205,679	84,500	32,190
T13	101,283	124,687	49,768	46,437	196,897	79,350	33,949
T14	97,042	116,068	54,969	47,232	201,496	80,383	34,576
T15	89,546	115,006	44,566	46,856	210,058	92,320	33,245
T16	117,515	118,618	41,428	46,655	216,714	65,147	25,307
T17	105,814	121,272	63,119	45,613	210,376	60,152	24,213
BLG Upper	181,443	52,727	145,430	17,982	224,820	65,215	28,328
BLG Lower	101,058	29,333	81,015	12,782	152,976	43,706	23,354

(2b) Old Growth by Grouping (Prod. ha) / (2d) / (2e)

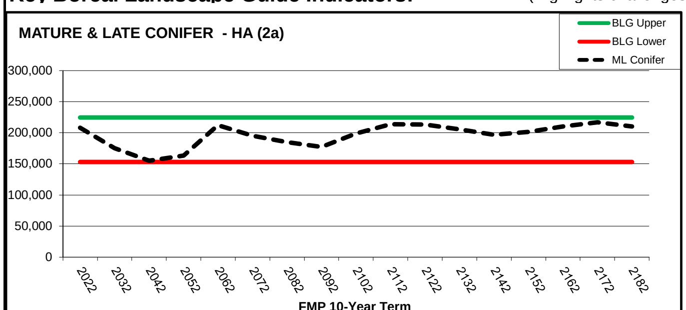
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs
T1	30,442	4,217	25,043	1,953	241,172	104,723
T2	59,001	7,451	55,649	3,471	257,181	147,530
T3	85,141	9,290	64,914	6,367	264,744	191,115
T4	89,510	13,337	75,909	8,902	269,624	203,113
T5	88,324	12,236	82,337	11,642	274,029	174,763
T6	81,741	12,236	84,402	13,850	276,446	129,712
T7	91,506	13,538	59,733	11,262	290,514	129,712
T8	112,600	14,028	59,431	11,693	290,514	131,648
T9	84,937	14,992	55,649	11,941	290,514	146,926
T10	70,497	14,124	55,649	12,110	290,514	138,962
T11	62,909	14,191	55,649	12,247	290,514	129,712
T12	47,362	13,864	55,649	12,399	290,514	130,467
T13	47,362	14,228	55,649	12,575	290,514	138,528
T14	47,362	16,295	55,649	13,010	290,514	139,360
T15	47,362	16,305	55,649	13,768	290,514	130,720
T16	47,362	15,222	55,649	16,486	290,514	152,828
T17	47,362	15,734	55,649	17,174	290,514	156,735
BLG Upper	79,383	17,281	78,344	99,999	343,729	227,291
BLG Lower	47,362	12,236	55,649	1,969	290,514	129,712
				7,000 ha used		

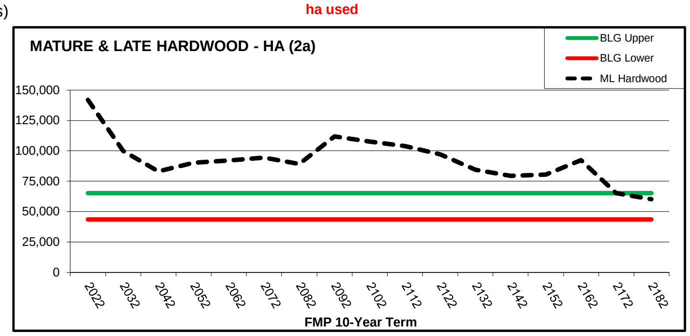
(6a) Available Forest:

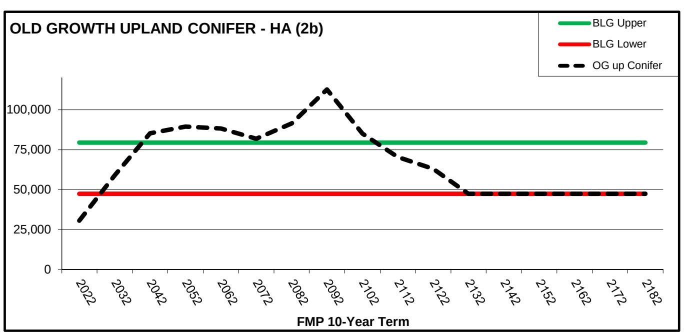
Term	
T1	503,772
T2	499,140
T3	496,340
T4	494,812
T5	493,264
T6	492,064
T7	492,054
T8	492,002
T9	491,670
T10	491,508
T11	491,480
T12	491,480
T13	491,480
T14	491,480
T15	491,480
T16	491,480
T17	491,480

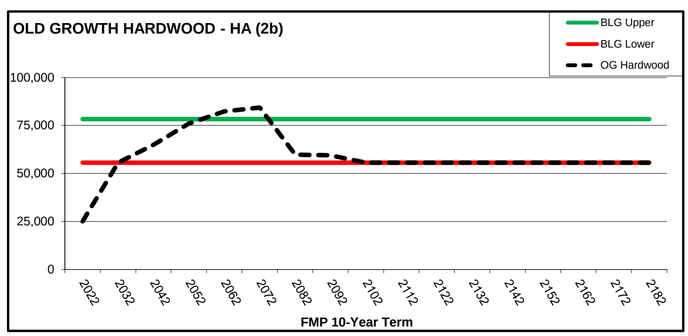
Key Boreal Landscape Guide Indicators:

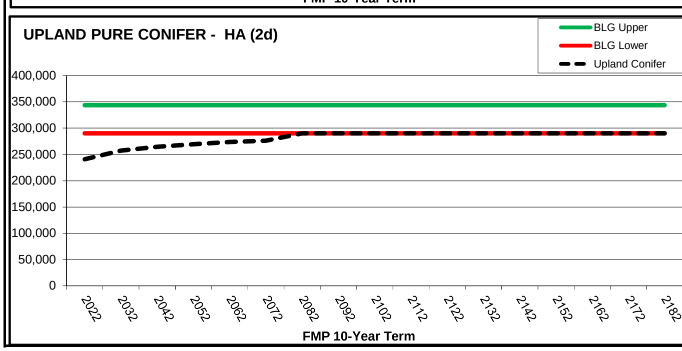
(Highlights challenges)

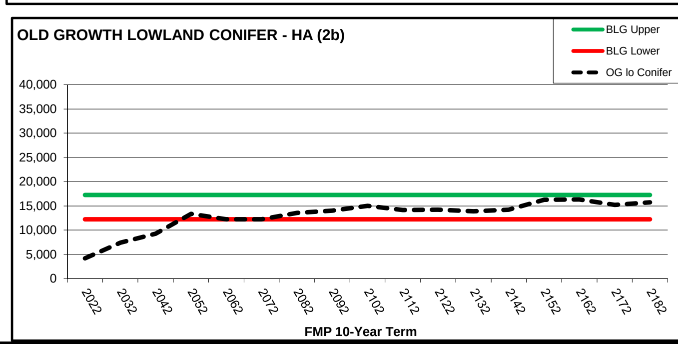












KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

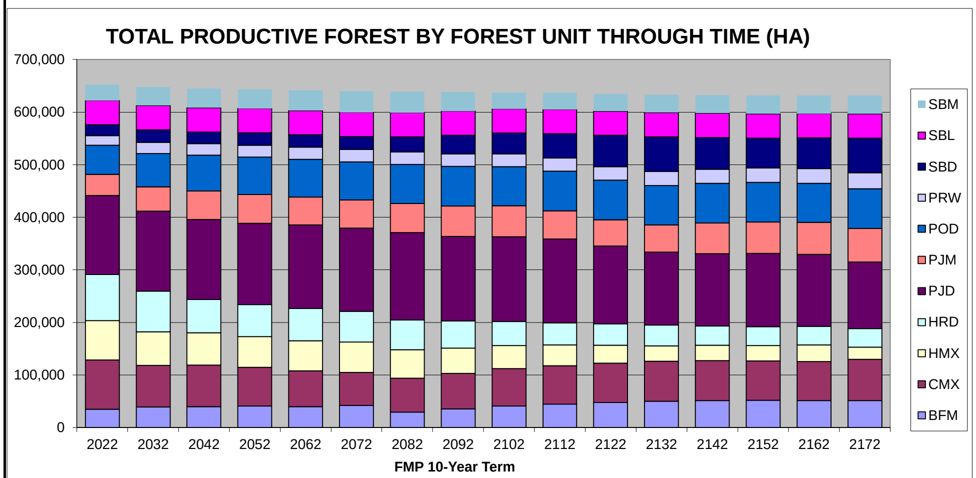
Case Name: 01-BLG-30

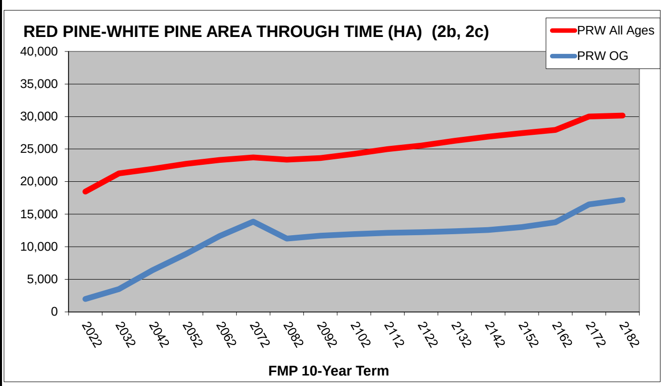
Date: April 4, 2020.

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	652,254	34,934	93,667	74,582	88,202	150,031	39,912	55,484	18,488	20,977	45,724	30,253
T2	647,622	39,326	79,148	63,390	77,654	152,391	45,827	63,587	21,261	23,851	46,075	35,113
T3	644,765	39,987	78,598	61,908	63,424	152,057	54,283	67,994	21,948	22,034	46,162	36,370
T4	643,100	41,119	73,224	58,859	60,435	154,642	55,254	70,998	22,718	23,399	46,124	36,329
T5	641,252	40,004	67,691	57,629	61,392	158,760	53,221	71,340	23,325	23,620	45,841	38,429
T6	639,565	42,200	62,715	57,496	58,754	158,047	54,004	72,399	23,744	24,309	45,812	40,086
T7	638,820	29,520	64,110	54,722	56,133	166,210	55,427	74,551	23,398	28,963	45,871	39,914
T8	638,210	35,279	67,478	48,483	51,474	160,968	57,557	75,471	23,622	35,700	45,889	36,290
T9	637,255	40,752	71,196	44,171	45,659	161,164	58,834	74,749	24,281	39,393	45,932	31,123
T10	636,362	44,907	72,436	39,690	42,302	159,083	53,828	75,529	25,000	46,204	45,983	31,399
T11	634,736	47,884	74,446	34,314	40,458	148,055	50,020	75,578	25,528	59,477	46,012	32,962
T12	632,723	49,849	76,334	29,067	39,661	138,655	52,040	74,960	26,264	66,220	46,074	33,600
T13	632,371	51,006	76,262	29,208	36,828	137,646	57,895	75,479	26,909	60,613	46,165	34,360
T14	631,765	51,888	75,151	28,650	36,285	139,580	59,158	75,603	27,452	56,844	46,225	34,932
T15	631,597	51,177	74,678	31,233	35,522	136,960	60,782	74,265	27,927	58,422	46,280	34,349
T16	631,385	51,509	78,172	23,136	35,716	126,422	63,621	75,957	30,000	65,815	46,380	34,656
T17	630,559	50,187	80,908	23,203	35,653	118,077	71,045	73,556	30,129	64,644	46,408	36,748

(1a) Caribou Habitat (Caribou Zone):

Term	Refuge	Winter
T1	71,994	29,678
T2	72,314	61,739
T3	67,138	55,414
T4	67,253	54,753
T5	70,552	55,228
T6	68,837	51,655
T7	73,379	57,236
T8	74,189	57,707
T9	73,360	52,017
T10	74,211	55,539
T11	74,372	54,674
T12	71,935	50,377
T13	71,369	52,651
T14	71,267	54,237
T15	71,569	54,709
T16	72,304	58,364
T17	72,957	61,014
BLG Upper	61,458	45,161
BLG Lower	54,045	18,667





All ages PRW - desirable level "to increase"
Target in SFMM to not decrease.

Old Growth PRW - desirable level "to increase"
used 5,000 ha in SFMM

KENORA FOREST 2022 FMP	SUMMARY of SFMM INVESTIGATION
Case Name: 01-BLG-30	Date: April 4, 2020.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply -

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

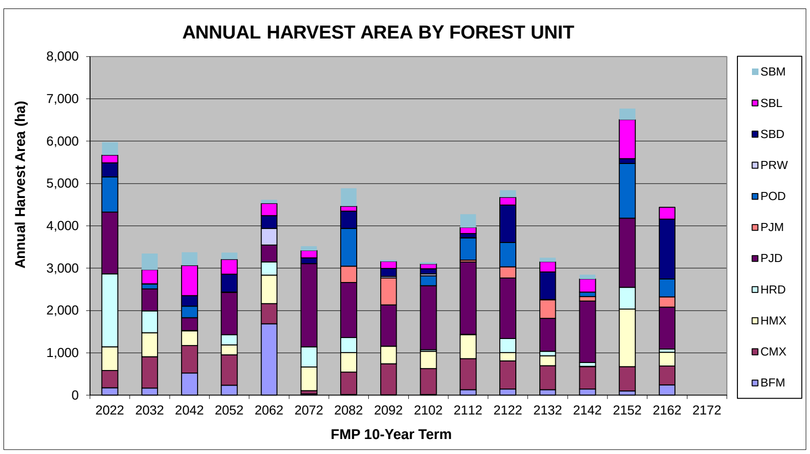
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 (6b)	5,976	174	406	565	1,722	1,459	0	832	0	334	180	305
T2	3,349	170	739	564	516	523	0	114	0	3	332	388
T3	3,373	522	650	353	8	301	0	274	0	245	713	309
T4	3,366	233	721	235	243	995	0	7	0	426	350	156
T5	4,616	1,688	472	678	306	404	0	0	395	296	293	85
T6	3,522	33	74	564	471	1,970	0	0	0	133	171	108
T7	4,884	15	532	459	355	1,303	386	887	0	406	119	421
T8	3,194	8	735	419	0	974	636	0	31	192	165	35
T9	3,144	18	615	402	42	1,509	0	237	41	126	109	44
T10	4,274	130	731	567	9	1,710	40	528	5	98	140	315
T11 (6b)	4,839	144	664	197	336	1,428	261	579	0	882	182	166
T12	3,250	132	566	236	106	779	438	0	5	653	236	100
T13	2,845	145	528	9	93	1,446	111	101	0	5	307	100
T14	6,768	103	570	1,359	517	1,634	0	1,292	0	111	920	262
T15	4,436	245	441	325	79	990	242	421	0	1,412	280	0
T16	0	0	0	0	0	0	0	0	0	0	0	0

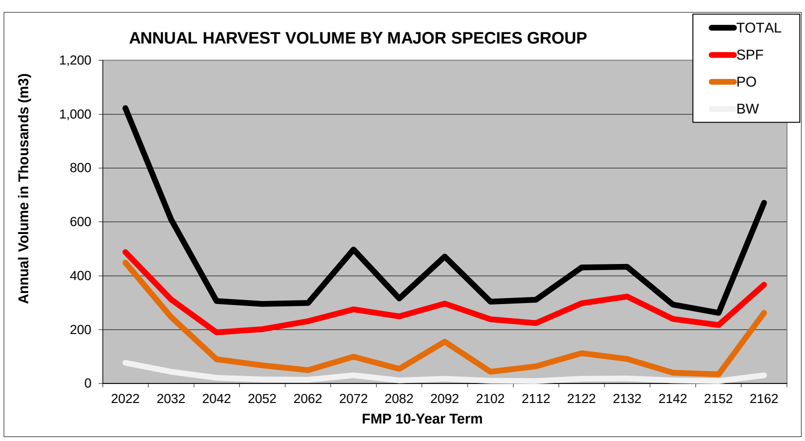
Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	Small	Large
						0.96	0.04
T1 (6c)	1,023.1	488.2	449.3	77.6	1.6	0.94	0.06
T2	609.0	312.5	246.8	44.0	0.7	1.00	0.00
T3	306.9	190.4	89.6	21.3	0.3	1.00	0.00
T4	295.6	201.8	67.9	15.0	0.0	0.99	0.01
T5	298.9	231.1	49.4	14.2	0.0	0.90	0.10
T6	498.0	275.5	99.1	30.7	88.7	1.00	0.00
T7	316.1	249.6	54.7	11.5	0.0	0.99	0.01
T8	471.4	297.0	154.9	17.6	0.9	0.98	0.02
T9	304.2	238.0	43.8	10.4	9.5	0.98	0.02
T10	311.5	224.2	63.8	9.7	12.5	0.89	0.11
T11 (6c)	431.0	297.5	113.0	17.3	2.1	0.90	0.10
T12	433.0	322.4	91.0	18.7	0.1	0.98	0.02
T13	293.8	239.2	39.7	11.4	1.6	0.94	0.06
T14	262.6	216.9	34.7	8.9	0.0	0.99	0.01
T15	671.4	367.1	262.5	30.9	0.0	0.97	0.03
T16	392.7	305.8	71.8	12.8	0.0	0.00	0.00
Average	432.4	278.6	120.8	22.0	7.4		

Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal ha	Natural ha	Plant ha	Seed ha
T1	3,515	3,515	0	**9,809**	6,437	1,474	1,898
T2	2,203	2,203	0	**5,917**	3,501	676	1,739
T3	1,282	1,282	0	**3,316**	1,937	364	1,014
T4	1,348	1,348	0	**3,340**	1,755	282	1,302
T5	1,472	1,472	0	**3,358**	1,533	158	1,667
T6	2,559	2,559	0	**4,616**	1,509	669	2,438
T7	1,568	1,568	0	**3,521**	1,680	240	1,601
T8	1,974	1,974	0	**4,876**	2,647	314	1,916
T9	1,576	1,576	0	**3,190**	1,409	288	1,494
T10	1,534	1,534	0	**3,144**	1,435	336	1,373
T11	1,944	1,944	0	**4,274**	2,077	379	1,819
T12	2,053	2,053	0	**4,839**	2,424	199	2,216
T13	1,510	1,510	0	**3,250**	1,433	176	1,640
T14	1,355	1,355	0	**2,845**	1,263	158	1,423
T15	2,557	2,557	0	**6,768**	4,948	1,165	655
T16	1,933	1,933	0	**4,436**	1,906	101	2,429





TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
A1				
A2				
B1	151	270		
B2	303	541		
C			130	122
D				
DEA1	213	204	112	25
E				
ELK	699	55	86	123
MEA1	2,062	915	492	289
MEA2	812	229	168	99
MEA3	82	107	75	72
MEA4	95	79	63	97
Z02	252	350	167	179
Z03	61	60	13	7
Z04	421	448	243	132
Z05	385	207	114	175
Z06	492	71	114	102
Z07	632	317	201	512
Z08	495	189	105	107
Z09	407	108	96	133
Z10	707	195	407	241
Z11	520	369	268	286
Z12	841	471	253	330
Z13	151	90	35	94
Z14		575	118	123
Z15	126	126	89	128
Z01				
TOTAL	9,908	5,976	3,349	3,373

KENORA FOREST 2022 FMP **SUMMARY of SFMM INVESTIGATION**

Case Name: 01-BLG-40 **Date:** April 4, 2020.

Purpose: Investigation to see forest condition results, with BLG targets and achievement relaxed 1-2 terms later than best achievement (01-BLG-20-30) (to allow solution space in strategic modelling)

Specific Inputs: Lower IQR targets (binding) included for all indicators from T4 onwards (except Upland Conifer T9 onwards, since time needed to allow forest activities to make enough upland conifer (PJD, PJM, SBD, SBM). No volume flow controls, nor volume targets.

Group:	Mm3/yr
PWR	
SPF	
PO	
TOTAL	

Vol. Flow

BLG Targets and Achievement: (others achieve by T2)

PRW T14 onwards set at 25,000 ha.
OGupC T4 onwards
OGloC T4 onwards
OGhmx T4 onwards
OGprw T4 onwards, set at 7,000 ha
PurCn T8 onwards

Budget: Balanced to revenues

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 BLG indicator achievement - All by T3 or earlier, and higher than lower IQR except Upland Conifer is only fixed indicator with later achievement (T7). PRW all ages achieves 25K at T14 (shows increase). Task Team to consider forcing additional BLG achievement (higher or earlier).

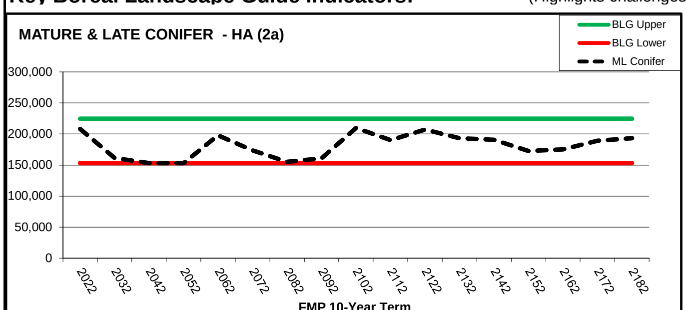
(2a) Area by Landscape Class (Productive ha)

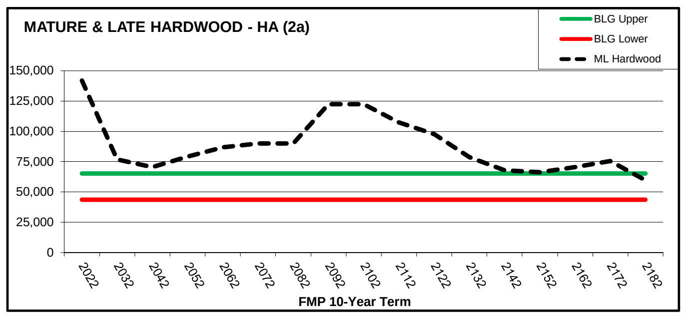
Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	40,952	136,142	68,484	18,070	208,260	141,825	38,522
T2	160,936	127,974	62,335	20,380	161,313	76,772	35,987
T3	127,793	128,139	104,287	25,964	152,976	70,388	34,319
T4	135,669	116,255	97,742	27,559	152,976	79,247	32,519
T5	76,883	116,744	99,651	28,747	197,848	86,743	33,917
T6	95,522	130,905	93,413	27,425	173,833	89,971	27,355
T7	101,875	150,765	93,294	22,558	155,029	89,921	24,246
T8	101,874	153,666	44,541	30,238	161,004	122,368	23,354
T9	87,878	118,632	37,910	36,015	209,945	122,354	23,354
T10	109,321	129,270	34,808	40,089	190,312	107,496	23,912
T11	95,056	119,411	45,569	43,629	207,052	97,676	25,176
T12	119,692	124,982	44,167	43,311	193,311	78,689	27,403
T13	103,383	135,660	57,319	43,084	190,766	67,837	33,155
T14	138,911	116,028	61,217	42,154	172,457	66,322	33,510
T15	106,814	135,921	63,714	43,431	175,132	70,438	34,982
T16	89,714	142,436	52,666	43,778	188,921	75,489	37,215
T17	94,896	147,396	52,154	43,877	193,397	59,626	38,046
BLG Upper	181,443	52,727	145,430	17,982	224,820	65,215	28,328
BLG Lower	101,058	29,333	81,015	12,782	152,976	43,706	23,354

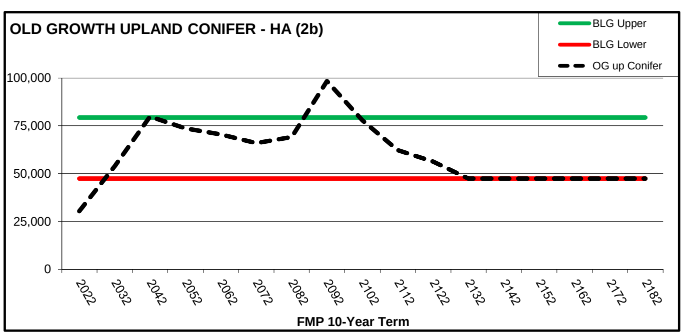
(2b) Old Growth by Grouping (Prod. ha)	Lower Old Growth Age (Years):				(2d)	(2e)	(6a) Available Forest:	
Term:	OGupC	OGloC	OGhmx	OGprw	Upland Conifer	Young <36 yrs	Term	
T1	30,442	4,217	25,043	1,953	241,172	104,723	T1	503,772
T2	53,941	5,137	42,922	3,471	261,085	187,185	T2	497,215
T3	79,896	8,134	62,868	6,367	266,640	208,713	T3	495,442
T4	73,717	12,236	76,996	8,902	269,541	226,768	T4	493,681
T5	70,467	12,546	86,008	11,621	271,584	171,689	T5	492,545
T6	65,991	12,236	84,221	13,828	275,391	129,712	T6	490,924
T7	69,129	13,828	63,366	12,444	283,662	133,408	T7	490,922
T8	98,305	14,222	58,786	10,991	290,514	129,712	T8	490,837
T9	77,761	13,543	55,649	11,238	290,514	129,712	T9	490,503
T10	62,352	13,715	56,126	11,408	290,514	150,847	T10	490,355
T11	56,253	13,785	55,649	11,545	290,514	134,684	T11	490,314
T12	47,362	13,845	55,649	11,696	290,514	160,997	T12	490,314
T13	47,362	14,210	55,649	11,873	290,514	161,739	T13	490,314
T14	47,362	16,127	55,649	12,307	290,514	183,375	T14	490,314
T15	47,362	16,137	55,649	13,065	290,514	161,686	T15	490,314
T16	47,362	15,222	55,649	14,837	290,514	129,712	T16	490,314
T17	47,362	15,734	55,649	15,059	290,514	136,477	T17	490,314
BLG Upper	79,383	17,281	78,344	99,999	343,729	227,291		
BLG Lower	47,362	12,236	55,649	1,969	290,514	129,712		
				5,000 ha used				

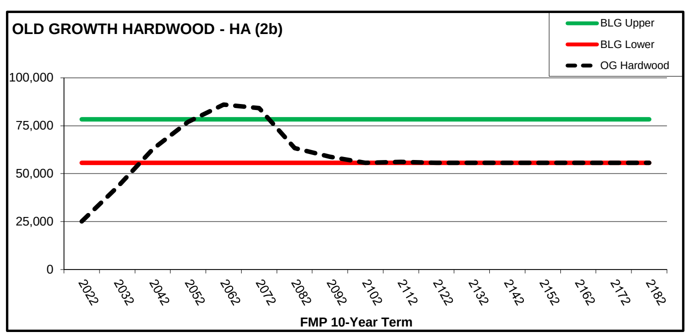
Key Boreal Landscape Guide Indicators:

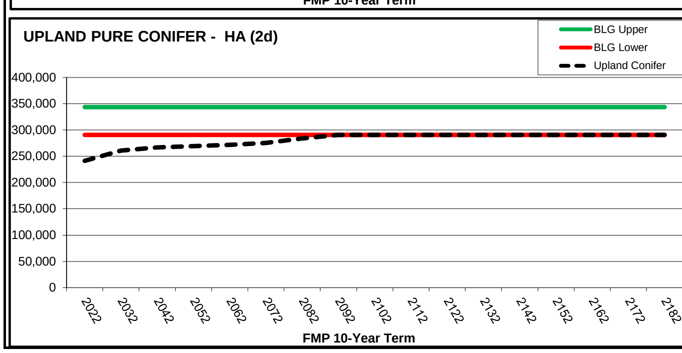
(Highlights challenges)

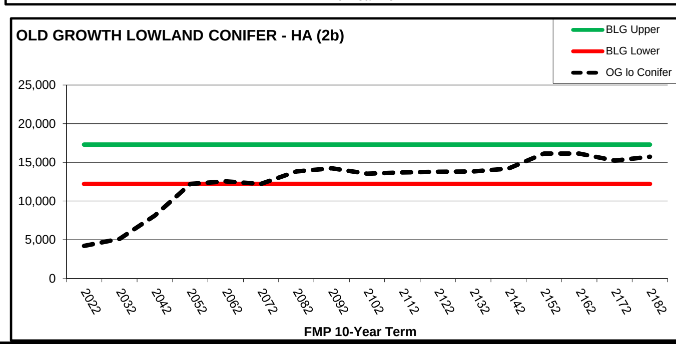












KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: 01-BLG-40

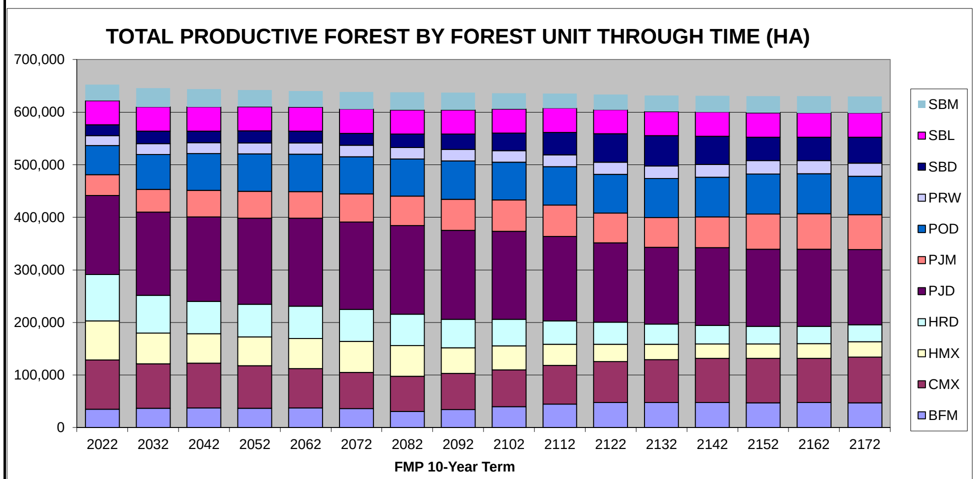
Date: April 4, 2020.

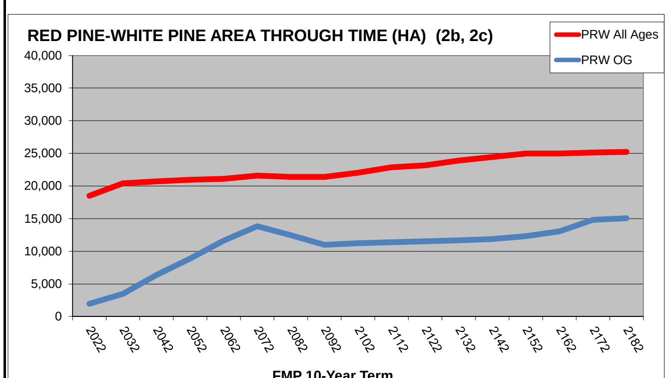
Productive Forest Area Through Time Data (hectares): by Forest Unit

Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW (Indicator (2c))	SBD	SBL	SBM
T1	652,254	34,934	93,667	74,582	88,202	150,031	39,912	55,484	18,488	20,977	45,724	30,253
T2	645,697	36,769	84,709	58,487	71,605	158,112	43,280	66,658	20,395	23,919	45,990	35,774
T3	643,867	37,647	85,197	55,669	61,517	160,798	50,236	70,487	20,699	21,662	46,010	33,944
T4	641,969	37,005	80,632	54,816	62,130	163,921	51,166	70,935	20,938	22,693	45,973	31,760
T5	640,533	37,630	74,589	57,098	61,485	167,808	50,336	71,115	21,118	22,697	45,914	30,743
T6	638,425	36,264	68,878	59,069	60,945	166,006	53,535	70,538	21,593	23,054	45,747	32,797
T7	637,688	30,814	67,068	58,440	59,521	168,196	56,114	70,992	21,413	26,025	45,779	33,328
T8	637,045	34,639	68,305	48,895	54,351	169,297	58,891	73,116	21,420	29,631	45,806	32,694
T9	636,088	39,962	70,058	45,509	50,587	167,403	59,466	71,613	22,014	33,548	45,831	30,097
T10	635,208	44,586	73,861	40,157	44,081	160,752	59,564	73,238	22,859	42,491	45,912	27,707
T11	633,569	47,964	77,474	33,336	41,562	150,948	56,815	73,649	23,152	53,856	45,919	28,896
T12	631,557	47,848	81,540	28,876	38,731	146,106	56,295	74,181	23,889	57,687	45,978	30,426
T13	631,205	47,999	83,700	27,285	35,631	147,688	58,236	75,576	24,447	53,511	46,053	31,079
T14	630,599	46,994	84,598	27,796	33,155	146,564	67,099	76,414	25,000	44,990	46,128	31,861
T15	630,431	47,898	83,751	27,967	32,741	146,745	67,487	76,411	25,000	44,421	46,150	31,860
T16	630,219	47,428	86,939	28,860	32,462	143,304	66,201	72,720	25,110	49,332	46,185	31,677
T17	629,392	47,458	87,687	27,471	33,389	129,411	71,948	71,439	25,242	57,288	46,194	31,866

(1a) Caribou Habitat (Caribou Zone):

Term	Refuge	Winter
T1	71,994	29,678
T2	71,310	62,296
T3	65,840	54,520
T4	65,719	53,574
T5	68,862	53,738
T6	68,016	49,357
T7	72,946	55,426
T8	73,440	56,527
T9	72,751	51,450
T10	74,051	55,326
T11	74,093	54,016
T12	72,010	50,889
T13	70,761	53,670
T14	70,548	55,417
T15	70,995	56,660
T16	72,420	59,463
T17	72,874	60,050
BLG Upper	61,458	45,161
BLG Lower	54,045	18,667





All ages PRW - desirable level "to increase"
Target in SFMM to not decrease.
Used 25,000 ha as target T14 onwards

Old Growth PRW - desirable level "to increase"
used 7,000 ha in SFMM T4 onwards

KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: 01-BLG-40 **Date:** April 4, 2020.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - Significant variation in harvest volume and area T1 to T2, etc. Need to add flow constraints to harvest volume.

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

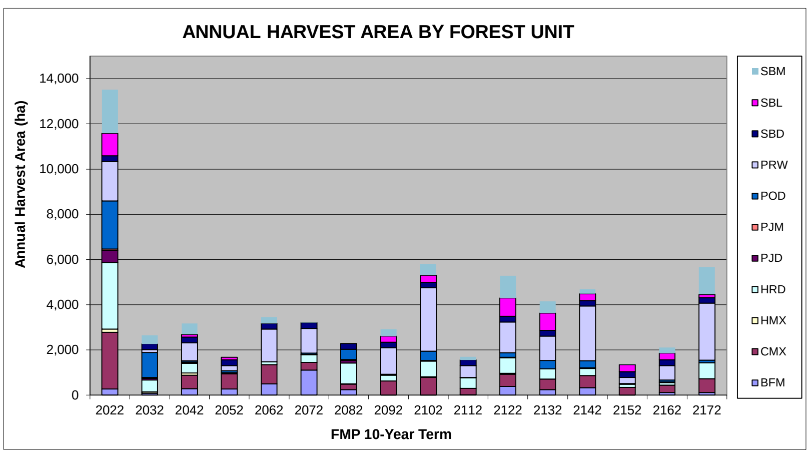
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 (6b)	13,913	280	2,503	135	2,956	534	51	2,128	1,754	250	991	1,930
T2	3,748	92	4	54	517	71	42	1,105	136	250	0	381
T3	3,961	286	600	91	433	22	31	56	795	250	125	478
T4	2,676	276	663	42	0	7	7	85	234	250	115	0
T5	4,553	507	848	0	117	0	0	13	1,443	250	0	275
T6	4,186	1,108	336	0	343	0	15	60	1,089	250	0	6
T7	2,918	246	247	6	921	114	47	455	0	250	0	0
T8	3,605	3	624	6	249	0	0	40	1,174	250	266	311
T9	6,482	4	776	28	703	0	29	400	2,809	250	307	496
T10	1,935	19	287	0	467	0	10	0	527	250	0	140
T11 (6b)	5,888	384	542	36	683	15	18	194	1,370	250	802	988
T12	5,112	249	466	3	447	0	0	372	1,079	250	768	513
T13	6,370	336	532	0	312	24	6	306	2,422	250	296	204
T14	1,742	11	339	0	132	0	6	31	264	250	319	14
T15	2,303	122	323	1	119	24	0	76	642	250	301	256
T16	6,418	123	604	0	702	6	0	112	2,520	250	138	1,206

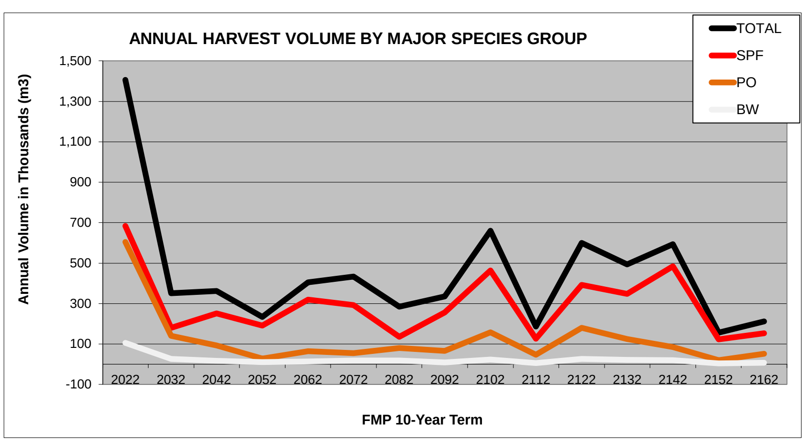
Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	Small	Large
						0.96	0.04
T1 (6c)	1,407.0	683.9	605.2	105.3	1.3	0.98	0.02
T2	352.0	180.6	141.1	26.9	0.6	1.00	0.00
T3	362.8	250.8	93.5	16.4	0.5	0.99	0.01
T4	234.8	191.2	28.1	10.6	0.8	0.99	0.01
T5	405.7	319.5	64.8	13.8	0.0	0.90	0.10
T6	434.5	293.1	55.7	19.1	62.0	0.92	0.08
T7	285.2	135.7	80.0	18.6	48.1	1.00	0.00
T8	336.1	256.7	66.0	9.5	0.2	0.97	0.03
T9	660.8	464.5	157.6	24.0	13.3	0.99	0.01
T10	186.4	127.1	47.7	6.7	4.2	0.89	0.11
T11 (6c)	600.1	392.1	180.4	26.8	0.0	0.94	0.06
T12	494.7	348.4	124.3	21.1	0.0	0.98	0.02
T13	593.6	484.9	84.5	20.0	0.0	0.96	0.04
T14	156.7	123.2	20.7	5.0	7.0	0.99	0.01
T15	211.6	152.7	51.3	7.2	0.0	0.99	0.01
T16	638.5	423.7	193.6	19.9	0.0	0.00	0.00
Average	460.0	301.8	124.7	21.9	8.6		

Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal ha	Natural ha	Plant ha	Seed ha
T1	4,898	4,898	0	13,774	8,313	1,627	3,835
T2	1,274	1,274	0	3,711	2,291	431	989
T3	1,630	1,630	0	3,922	1,849	143	1,929
T4	1,212	1,212	0	2,649	1,009	40	1,600
T5	2,035	2,035	0	4,545	2,007	163	2,375
T6	2,384	2,384	0	4,186	1,297	474	2,415
T7	1,338	1,338	0	2,916	1,562	673	681
T8	1,637	1,637	0	3,597	1,716	249	1,632
T9	3,095	3,095	0	6,479	2,953	585	2,941
T10	858	858	0	1,935	979	220	735
T11	2,573	2,573	0	5,888	2,844	426	2,618
T12	2,246	2,246	0	5,112	2,386	255	2,471
T13	3,036	3,036	0	6,370	2,614	211	3,545
T14	829	829	0	1,742	658	50	1,034
T15	979	979	0	2,303	1,055	30	1,218
T16	2,771	2,771	0	6,418	2,965	205	3,247





TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
A1				
A2				
B1	179	258		
B2	294	619		
C			165	154
D				
DEA1	375	54	120	39
E				
ELK	835	49	35	17
MEA1	2,802	340	353	367
MEA2	958	72	217	52
MEA3	177	65	74	43
MEA4	194	46	107	101
Z02	507	211	54	61
Z03	113	18	3	5
Z04	690	311	135	72
Z05	551	120	144	84
Z06	565	82	42	18
Z07	910	102	359	389
Z08	634	75	195	65
Z09	549	66	112	110
Z10	922	231	296	271
Z11	821	216	355	240
Z12	1,320	142	646	313
Z13	288	30	150	53
Z14		533	276	123
Z15	230	106	121	102
Z01				
TOTAL	13,913	3,748	3,961	2,676

KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: 10_BalObj **Date:** April 4, 2020.

Purpose: Initial balanced objective scenario, on which to build, review and refine the LTMD.

Specific Inputs: Built on 11-BalObj with tighter volume flow constraints, binding volume targets, and improved earlier BLG achievement -

Group:	Mm3/yr		Vol. Flow
PWR			
SPF	240.0	T1-T5	+/- 15%
PO	150.0	T1-T5	+/- 25%
TOTAL	450.0	All terms	
		Non-Binding.	

BLG Targets and Achievement: (others achieve by T2)

MLc T5 onwards
OGupC T2 onwards
OGloC T4 onwards
OGhmx T3 onwards
OGprw T3 onwards, set at 5,000 ha
PurCn T7 onwards

Budget: Balanced to revenues

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 - Overall very good BLG indicator achievement. Consider improving MLupC, all ages PRW, ML area more critical than OG area (likely more on landscape than recorded, and more in small patches not in inventory)
Consider subunit timing and operational issues first (leave as BASE06), then Task Team to consider forcing additional BLG achievement (higher or earlier).
Review harvest area by subunit, and AUs

(2a) Area by Landscape Class (Productive ha)

Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	40,952	136,142	68,484	18,070	208,260	141,825	38,522
T2	101,929	127,974	62,335	23,208	184,485	112,053	36,549
T3	122,802	126,266	77,083	28,750	153,057	102,448	35,232
T4	134,022	114,440	78,382	27,516	154,568	100,398	33,808
T5	114,938	86,127	86,444	28,745	196,622	93,023	34,928
T6	99,017	116,945	89,175	30,600	179,038	92,323	31,924
T7	94,671	142,068	92,026	24,974	165,273	90,139	29,127
T8	93,174	154,184	69,779	28,051	166,706	102,383	23,354
T9	92,869	136,794	54,739	34,643	188,235	106,044	23,354
T10	94,440	125,741	45,713	38,653	202,934	104,973	23,354
T11	98,743	120,261	41,898	42,872	209,132	97,268	23,987
T12	106,990	118,846	43,193	44,991	205,796	85,948	26,387
T13	117,179	122,200	50,860	45,374	192,092	75,534	28,558
T14	119,815	123,631	55,757	46,648	184,843	71,382	29,115
T15	116,374	125,967	57,987	45,010	180,692	69,566	35,428
T16	104,412	138,394	58,065	44,795	183,710	64,479	36,957
T17	100,569	145,177	59,150	45,182	183,468	58,390	38,049
BLG Upper	181,443	52,727	145,430	17,982	224,820	65,215	28,328
BLG Lower	101,058	29,333	81,015	12,782	152,976	43,706	23,354

(2b) Old Growth by Grouping (Prod. ha) / **(2d)** / **(2e)**

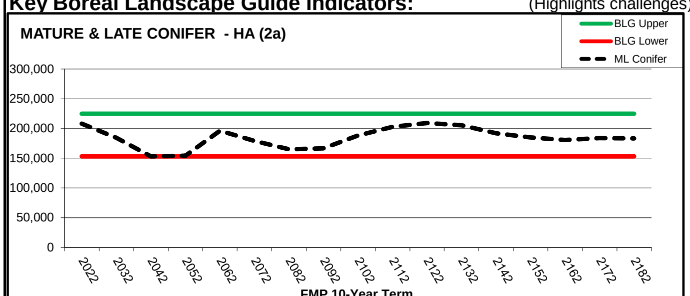
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs
T1	30,442	4,217	25,043	1,953	241,172	104,723
T2	58,655	5,708	55,649	3,471	253,723	128,178
T3	81,693	8,947	73,911	6,346	259,271	174,645
T4	74,699	12,734	78,073	8,880	264,864	203,945
T5	72,724	12,767	85,636	11,621	269,669	195,424
T6	69,759	15,847	87,399	13,828	272,623	161,546
T7	74,979	17,396	67,979	10,628	282,902	144,685
T8	102,858	13,750	59,026	10,803	290,514	133,522
T9	80,064	13,765	55,649	11,051	290,514	129,712
T10	65,278	13,856	55,649	11,220	290,514	130,320
T11	58,249	13,875	55,649	11,357	290,514	135,159
T12	47,362	13,835	55,649	11,509	290,514	148,339
T13	47,362	14,054	55,649	11,685	290,514	164,976
T14	47,362	16,127	55,649	12,119	290,514	170,234
T15	47,362	16,137	55,649	12,878	290,514	164,748
T16	47,362	15,222	55,649	14,068	290,514	151,372
T17	47,362	16,461	55,649	14,731	290,514	145,736
BLG Upper	79,383	17,281	78,344	99,999	343,729	227,291
BLG Lower	47,362	12,236	55,649	1,969	290,514	129,712

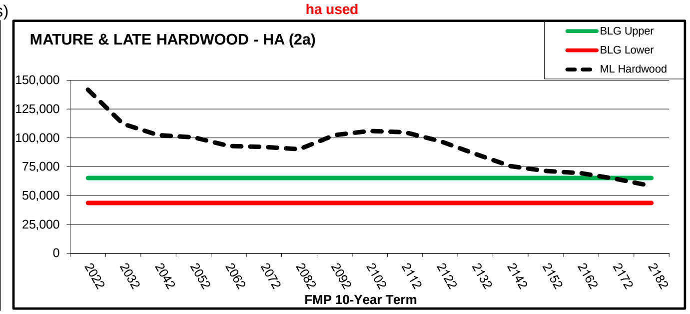
5,000 ha used

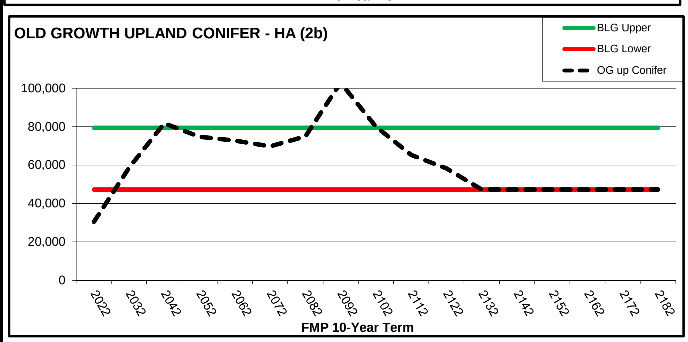
(6a) Available Forest:

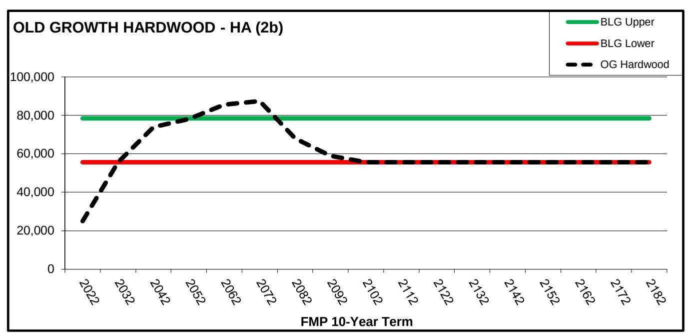
Term	Available Forest
T1	503,772
T2	500,051
T3	497,214
T4	494,845
T5	492,840
T6	491,521
T7	491,512
T8	491,423
T9	491,093
T10	490,955
T11	490,906
T12	490,906
T13	490,906
T14	490,906
T15	490,906
T16	490,906
T17	490,906

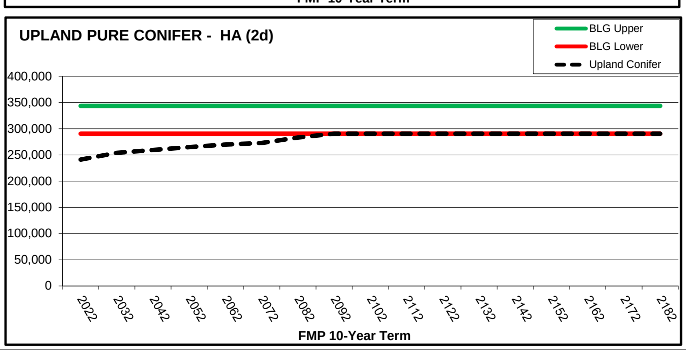
Key Boreal Landscape Guide Indicators: (Highlights challenges)

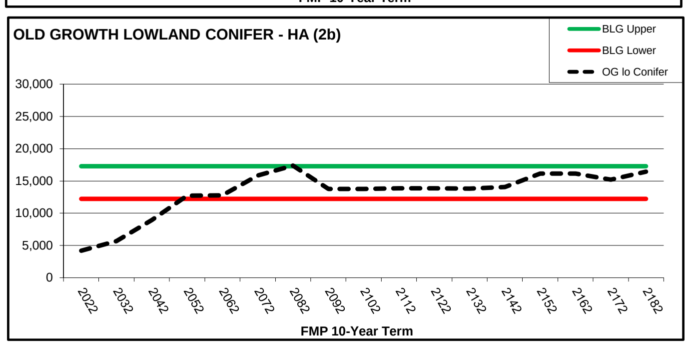












KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: 10_BalObj

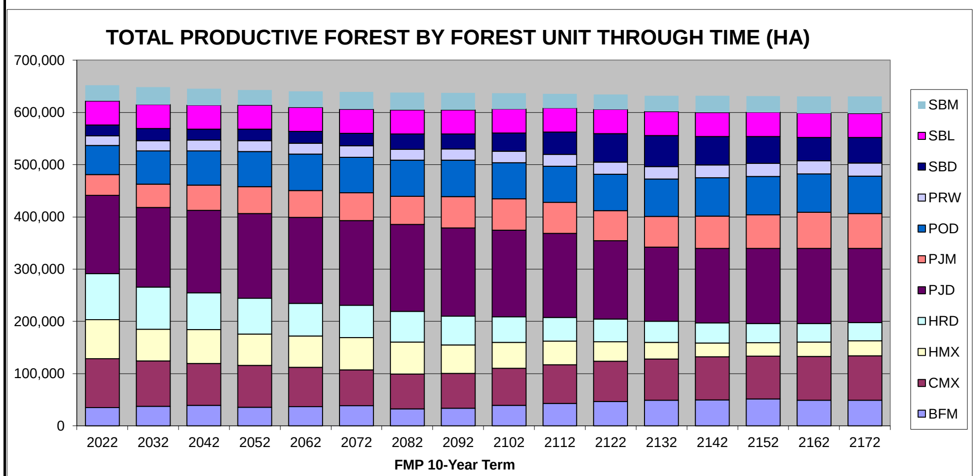
Date: April 4, 2020.

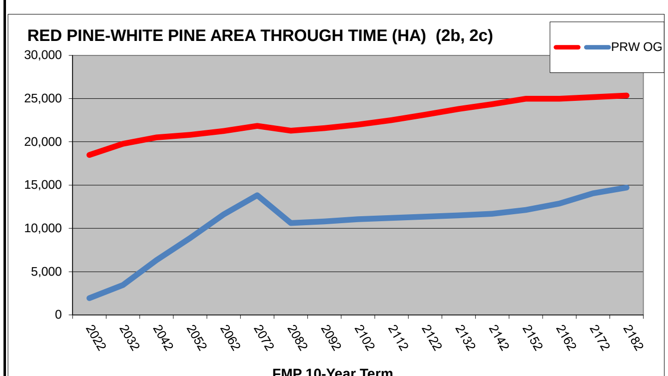
Productive Forest Area Through Time Data (hectares): by Forest Unit

Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	Indicator PRW	SBD	SBL	SBM
T1	652,254	34,934	93,667	74,582	88,202	150,031	39,912	55,484	18,488	20,977	45,724	30,253
T2	648,533	37,724	86,632	60,402	80,790	152,657	44,475	63,633	19,779	22,904	45,849	33,687
T3	645,638	39,234	80,271	64,827	70,243	157,784	48,797	65,303	20,526	20,967	45,964	31,723
T4	643,133	35,810	79,897	60,236	68,340	162,467	51,051	67,250	20,805	22,224	45,930	29,123
T5	640,828	37,135	75,112	60,041	62,176	164,747	51,320	69,524	21,261	22,601	45,910	31,002
T6	639,023	38,953	68,074	61,764	61,779	162,678	53,097	68,093	21,857	23,918	45,879	32,930
T7	638,277	32,793	66,641	61,212	58,384	166,325	53,894	69,143	21,295	29,368	45,907	33,314
T8	637,632	33,487	66,950	54,745	54,620	169,419	59,605	69,807	21,600	28,812	45,909	32,678
T9	636,678	38,982	71,070	49,848	48,743	166,102	59,662	69,581	22,009	34,460	45,931	30,289
T10	635,808	42,899	74,021	45,519	45,008	161,143	59,127	69,371	22,504	42,826	45,971	27,418
T11	634,161	46,633	76,922	37,668	43,229	150,001	57,515	70,059	23,140	54,577	45,997	28,422
T12	632,149	48,921	79,328	31,578	40,544	142,044	58,620	71,411	23,796	59,395	46,056	30,455
T13	631,797	49,671	82,433	26,631	38,288	142,778	61,649	73,768	24,373	54,368	46,119	31,719
T14	631,191	51,296	81,930	25,882	36,600	144,044	64,148	73,776	25,000	51,304	46,193	31,017
T15	631,023	49,316	83,398	27,486	35,815	143,592	69,553	73,272	25,000	44,906	46,222	32,463
T16	630,811	49,045	85,125	28,575	34,855	141,949	67,179	71,251	25,182	48,685	46,265	32,701
T17	629,985	49,152	86,314	28,042	34,777	131,507	69,159	69,554	25,338	57,664	46,294	32,185

(1a) Caribou Habitat (Caribou Zone):

Term	Refuge	Winter
T1	71,994	29,678
T2	73,140	63,843
T3	66,568	54,530
T4	66,068	53,424
T5	69,390	53,748
T6	67,638	48,139
T7	72,927	56,136
T8	73,551	56,773
T9	72,539	51,645
T10	74,062	55,617
T11	74,162	54,151
T12	72,355	50,782
T13	71,349	53,365
T14	71,121	55,169
T15	71,250	56,221
T16	72,210	58,792
T17	73,099	61,342
BLG Upper	61,458	45,161
BLG Lower	54,045	18,667





All ages PRW - desirable level "to increase"
Target in SFMM to not decrease.

Old Growth PRW - desirable level "to increase"
used 5,000 ha in SFMM

KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: 10_BalObj **Date:** April 4, 2020.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply -

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

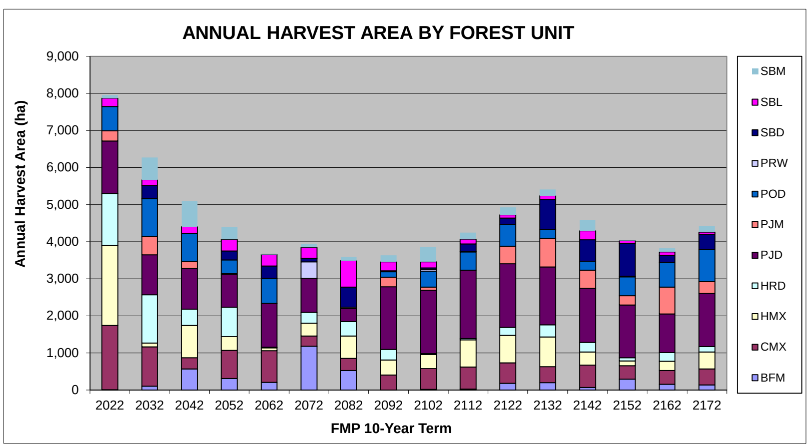
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 (6b)	7,953	9	1,732	2,152	1,409	1,406	281	651	0	0	224	88
T2	6,267	98	1,066	97	1,303	1,081	492	1,023	2	353	154	598
T3	5,097	563	306	869	445	1,093	187	751	0	3	185	695
T4	4,399	308	759	371	791	886	24	364	0	245	314	337
T5	3,659	206	848	81	15	1,182	0	676	0	331	314	6
T6	3,939	1,183	273	345	293	911	0	0	451	96	294	93
T7	3,586	522	327	607	384	357	0	0	31	549	711	100
T8	3,630	0	403	408	279	1,694	258	142	21	3	243	178
T9	3,859	15	564	376	24	1,709	84	436	41	39	170	402
T10	4,246	25	591	737	34	1,846	0	488	10	210	122	183
T11 (6b)	4,921	181	549	743	217	1,713	476	584	5	171	82	200
T12	5,403	193	431	805	325	1,560	773	240	1	805	104	166
T13	4,577	70	601	354	256	1,457	494	241	0	572	241	290
T14	4,035	293	364	129	85	1,422	250	503	25	872	81	11
T15	3,824	150	371	255	232	1,042	727	658	0	194	94	101
T16	4,426	133	429	460	145	1,437	314	867	0	408	65	168

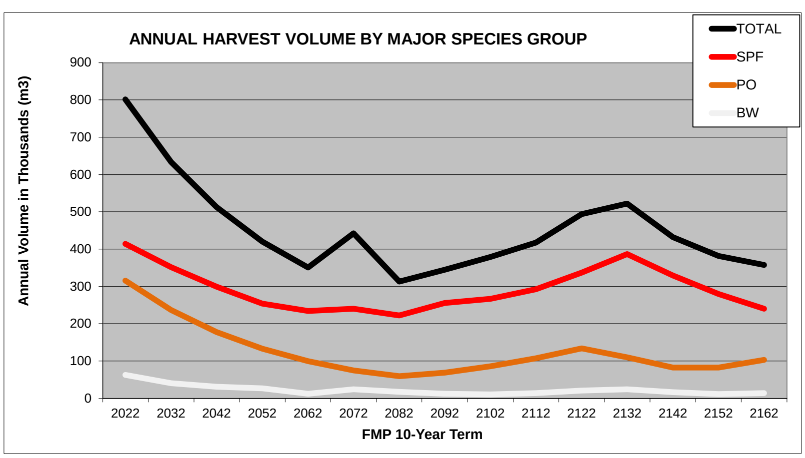
Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	(6d) Prop. By Size Small	Large
T1 (6c)	801.5	413.8	316.1	63.0	0.9	0.98	0.02
T2	633.9	351.8	237.1	41.0	0.9	0.93	0.07
T3	512.6	299.0	177.8	31.3	1.2	0.95	0.05
T4	420.5	254.2	133.3	27.3	0.2	1.00	0.00
T5	350.5	233.8	100.0	12.2	0.0	0.99	0.01
T6	442.6	240.0	75.0	24.4	99.1	0.87	0.13
T7	313.5	222.1	59.7	17.2	6.7	0.98	0.02
T8	344.4	255.4	68.5	11.9	6.5	0.98	0.02
T9	378.7	266.7	85.7	11.0	13.6	0.96	0.04
T10	417.4	292.8	107.1	13.7	2.9	0.99	0.01
T11 (6c)	493.8	336.7	133.9	21.2	1.4	0.95	0.05
T12	522.4	387.2	109.8	24.1	0.2	0.93	0.07
T13	431.9	329.1	82.4	17.0	0.0	0.95	0.05
T14	382.0	279.7	82.5	11.2	7.7	0.98	0.02
T15	357.3	240.0	103.1	13.8	0.0	0.94	0.06
T16	420.2	276.0	128.8	14.3	0.0	0.99	0.01
Average	451.5	292.4	125.0	22.2	8.8		

Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	PRW M$	Renewal ha	Natural ha	Plant ha	Seed ha
T1	2,916	2,916	0	7,873	4,670	1,072	2,131
T2	2,419	2,419	0	6,205	3,377	482	2,346
T3	2,035	2,035	0	5,046	2,539	345	2,162
T4	1,717	1,717	0	4,355	2,276	343	1,737
T5	1,541	1,541	0	3,651	1,854	212	1,585
T6	2,404	2,404	0	3,939	1,166	692	2,081
T7	1,507	1,507	0	3,584	1,755	375	1,455
T8	1,681	1,681	0	3,622	1,692	309	1,621
T9	1,824	1,824	0	3,856	1,793	322	1,741
T10	1,912	1,912	0	4,246	2,091	390	1,765
T11	2,197	2,197	0	4,921	2,368	420	2,133
T12	2,469	2,469	0	5,403	2,404	364	2,635
T13	2,093	2,093	0	4,577	2,087	270	2,220
T14	1,846	1,846	0	4,035	1,641	55	2,339
T15	1,564	1,564	0	3,824	1,868	122	1,835
T16	1,810	1,810	0	4,426	2,176	151	2,099





TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
A1				
A2				
B1	82	359		
B2	117	793		
C			182	137
D				
DEA1	199	173	151	36
E				
ELK	634	130	94	38
MEA1	1,503	956	834	448
MEA2	652	350	159	109
MEA3	57	70	77	118
MEA4	88	73	120	118
Z02	208	250	193	150
Z03	43	54	27	15
Z04	363	216	375	250
Z05	308	164	201	168
Z06	337	119	136	107
Z07	478	318	506	686
Z08	438	204	159	121
Z09	313	120	218	112
Z10	647	197	341	451
Z11	493	338	347	384
Z12	711	710	418	503
Z13	178	97	121	132
Z14		474	277	162
Z15	105	101	160	154
Z01				
TOTAL	7,953	6,267	5,097	4,399

Limit harvest in MEA1 and Z12 to even out between terms T1-T4.
Raise minimum harvest volume to imrove volumes over time
(to indirectly reduce T1).

Even out SBL harvest area - flow on SBL_ not working well (as more SBLC being harvested)

KENORA FOREST 2022 FMP **SUMMARY of SFMM INVESTIGATION**

Case Name: 11_BalObj_10 **Date:** April 4, 2020.

Purpose: Initial balanced objective scenario, on which to build, review and refine the LTMD.

Specific Inputs: Built on 10-BalObj with tighter volume flow constraints, binding volume targets.

Group:	Mm3/yr		Vol. Flow
PWR			
SPF	240.0	T1-T5	+/- 15%
PO	150.0	T1-T5	+/- 25%
TOTAL	450.0	All terms	+/- 10%
		Non-Binding	

BLG Targets and Achievement: SAME AS 10_BalObj

MLc	T5 onwards
OGupC	T2 onwards
OGloC	T4 onwards
OGhmx	T3 onwards
OGprw	T3 onwards, set at 5,000 ha
PurCn	T7 onwards

Budget: Balanced to revenues

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 - Overall very good BLG indicator achievement. Consider improving MLupC, all ages PRW, ML area more critical than OG area (likely more on landscape than recorded, and more in small patches not in inventory)

Consider subunit timing and operational issues first (leave as BASE05), then Task Team to consider forcing additional BLG achievement (higher or earlier)

(2a) Area by Landscape Class (Productive ha)

Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	40,952	136,142	68,484	18,070	208,260	141,825	38,522
T2	87,172	127,974	62,335	23,208	193,876	117,820	36,819
T3	108,089	125,710	74,448	28,778	165,765	107,946	35,703
T4	123,348	113,608	74,870	30,646	164,747	102,206	34,382
T5	121,760	74,102	83,095	28,258	202,052	96,137	35,803
T6	112,790	103,238	87,436	30,037	177,352	95,331	32,991
T7	105,193	130,987	90,040	28,872	163,729	90,876	28,730
T8	99,960	149,301	69,471	28,167	164,853	102,681	23,354
T9	94,736	147,341	56,120	34,539	177,146	103,591	23,354
T10	92,360	139,772	49,194	38,970	192,068	100,239	23,354
T11	93,584	132,894	44,321	43,228	202,566	94,129	23,589
T12	98,996	124,978	46,004	46,024	205,885	84,879	25,535
T13	110,874	119,479	51,395	47,086	199,929	76,137	27,047
T14	116,492	117,840	54,715	47,032	192,443	72,944	29,876
T15	118,475	119,445	55,116	45,534	185,828	70,772	36,004
T16	109,694	130,541	54,915	45,608	185,446	67,153	37,603
T17	103,280	141,470	55,781	45,667	183,742	61,442	38,752
BLG Upper	181,443	52,727	145,430	17,982	224,820	65,215	28,328
BLG Lower	101,058	29,333	81,015	12,782	152,976	43,706	23,354

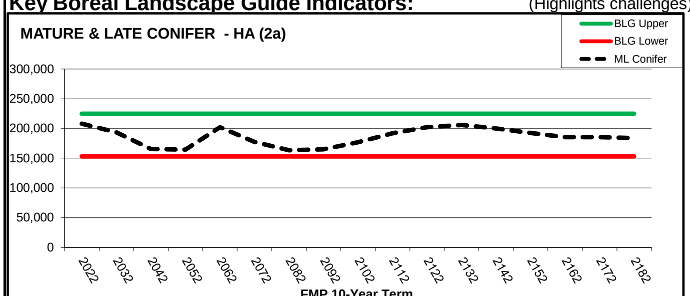
(2b) Old Growth by Grouping (Prod. ha) / **(2d)** / **(2e)**

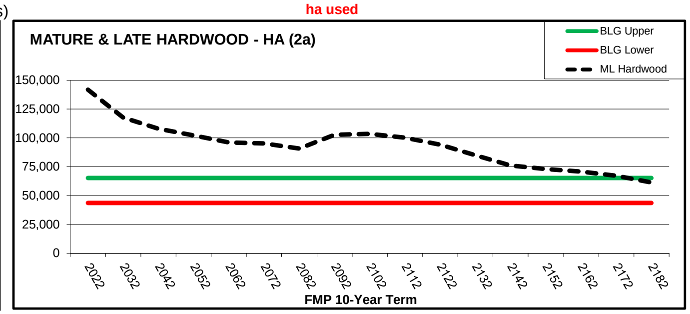
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs
T1	30,442	4,217	25,043	1,953	241,172	104,723
T2	64,108	6,316	55,649	3,471	250,611	113,421
T3	87,609	9,516	77,891	6,367	255,603	156,741
T4	79,307	13,473	86,788	8,902	262,971	188,927
T5	74,521	13,740	86,121	11,307	271,305	194,250
T6	70,492	17,009	86,817	12,302	273,669	176,203
T7	75,293	17,098	70,356	11,543	281,400	158,601
T8	101,918	13,750	59,056	10,803	290,514	144,670
T9	78,827	14,051	55,649	11,051	290,514	133,298
T10	63,416	13,827	55,649	11,220	290,514	129,712
T11	57,294	13,777	55,649	11,357	290,514	133,099
T12	47,362	13,835	55,649	11,509	290,514	141,568
T13	47,362	14,054	55,649	11,685	290,514	155,930
T14	47,362	16,127	55,649	12,119	290,514	162,668
T15	47,362	16,137	55,649	12,878	290,514	162,630
T16	47,362	15,591	55,649	13,884	290,514	155,166
T17	47,362	16,303	55,649	14,390	290,514	150,090
BLG Upper	79,383	17,281	78,344	99,999	343,729	227,291
BLG Lower	47,362	12,236	55,649	1,969	290,514	129,712
				7,000 ha used		

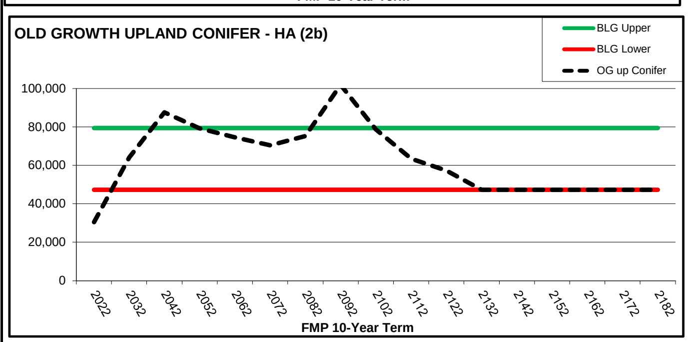
(6a) Available Forest:

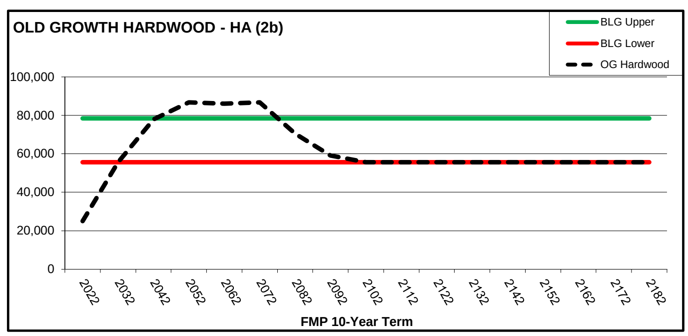
Term	
T1	503,772
T2	500,723
T3	498,014
T4	495,518
T5	493,220
T6	491,673
T7	491,662
T8	491,577
T9	491,243
T10	491,103
T11	491,056
T12	491,056
T13	491,056
T14	491,056
T15	491,056
T16	491,056
T17	491,056

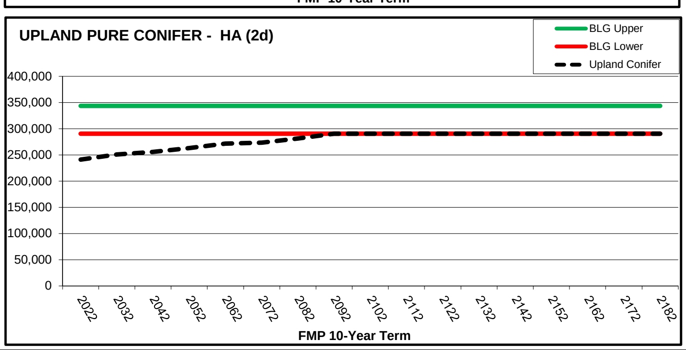
Key Boreal Landscape Guide Indicators: (Highlights challenges)

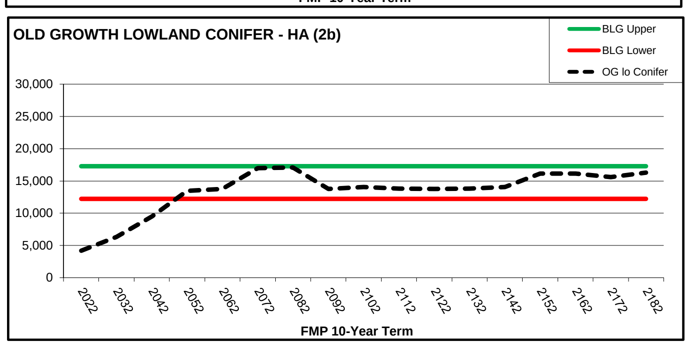












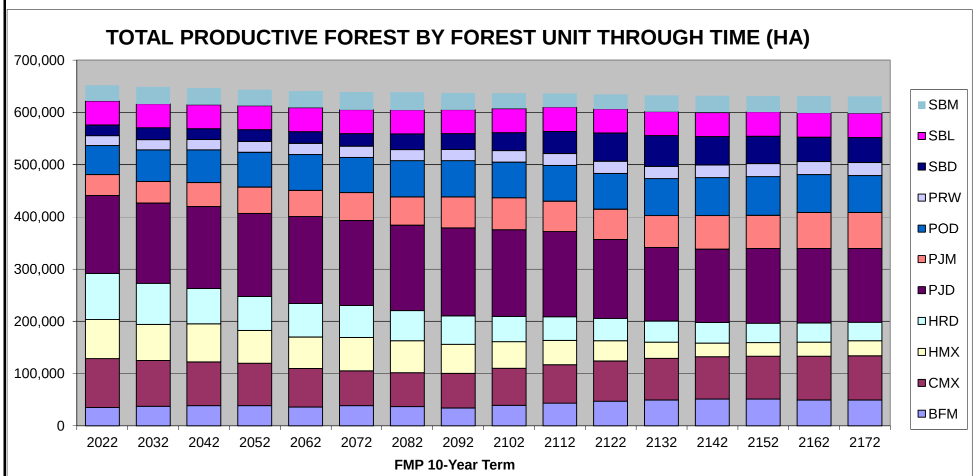
KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

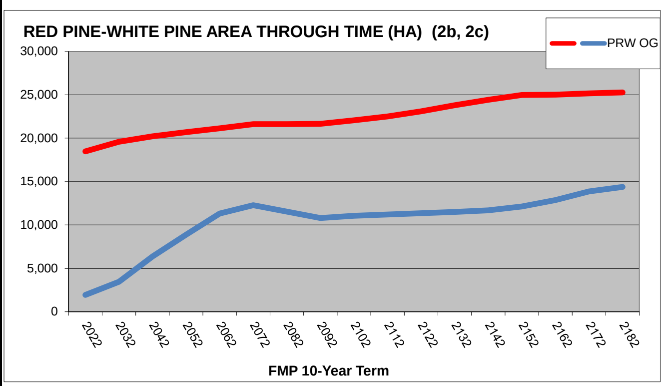
Case Name: 11_BalObj_10

Date: April 4, 2020.

Productive Forest Area Through Time Data (hectares): by Forest Unit									Indicator			
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1	652,254	34,934	93,667	74,582	88,202	150,031	39,912	55,484	18,488	20,977	45,724	30,253
T2	649,205	37,168	88,032	68,940	78,891	153,449	41,652	60,127	19,602	22,452	45,834	33,059
T3	646,439	38,606	83,700	72,988	67,158	157,773	45,697	62,213	20,222	20,382	45,948	31,752
T4	643,806	38,629	81,281	62,639	64,853	159,382	50,663	66,791	20,706	21,884	45,935	31,043
T5	641,208	36,473	73,252	60,762	63,622	166,164	50,865	68,732	21,129	22,395	45,933	31,882
T6	639,174	38,364	66,952	63,464	61,429	162,746	53,521	67,765	21,611	23,506	45,920	33,896
T7	638,428	36,792	65,161	61,203	57,134	163,904	54,078	69,156	21,615	29,582	45,968	33,835
T8	637,786	34,200	66,195	55,876	54,086	168,463	59,456	69,285	21,667	29,931	45,962	32,664
T9	636,828	39,450	70,608	50,825	48,802	165,763	60,946	68,604	22,053	34,243	45,973	29,561
T10	635,957	43,441	73,452	46,650	45,262	162,506	59,317	68,112	22,514	42,740	46,012	25,951
T11	634,311	47,040	77,029	38,814	42,943	151,109	57,800	68,848	23,088	53,841	46,036	27,764
T12	632,299	49,902	79,180	31,203	40,836	140,595	60,557	70,779	23,784	58,677	46,101	30,684
T13	631,947	51,244	81,190	26,274	38,972	141,117	63,103	73,169	24,414	54,456	46,170	31,838
T14	631,341	51,537	82,097	25,295	37,604	142,659	64,474	73,060	25,000	52,847	46,234	30,534
T15	631,173	49,821	83,572	27,003	36,698	141,901	69,991	72,301	25,002	46,609	46,262	32,013
T16	630,961	49,854	84,558	28,314	35,867	140,826	69,486	70,361	25,185	47,672	46,308	32,530
T17	630,135	49,445	85,556	27,747	36,975	130,013	71,768	68,302	25,282	56,969	46,314	31,763

(1a) Caribou Habitat (Caribou Zone):		
Term	Refuge	Winter
T1	71,994	29,678
T2	73,287	63,724
T3	66,538	54,536
T4	66,241	53,558
T5	69,374	53,755
T6	67,422	48,391
T7	72,904	55,867
T8	73,467	56,413
T9	72,485	51,546
T10	73,993	55,458
T11	74,070	54,072
T12	72,483	51,063
T13	71,828	53,152
T14	71,576	54,997
T15	71,695	56,066
T16	72,398	58,096
T17	72,318	59,001
BLG Upper	61,458	45,161
BLG Lower	54,045	18,667





All ages PRW - desirable level "to increase"
Target in SFMM to not decrease.
used target of 25,000 ha (increase)

Old Growth PRW - desirable level "to increase"
used 7,000 ha in SFMM

KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: 11_BalObj_10 **Date:** April 4, 2020.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply -

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

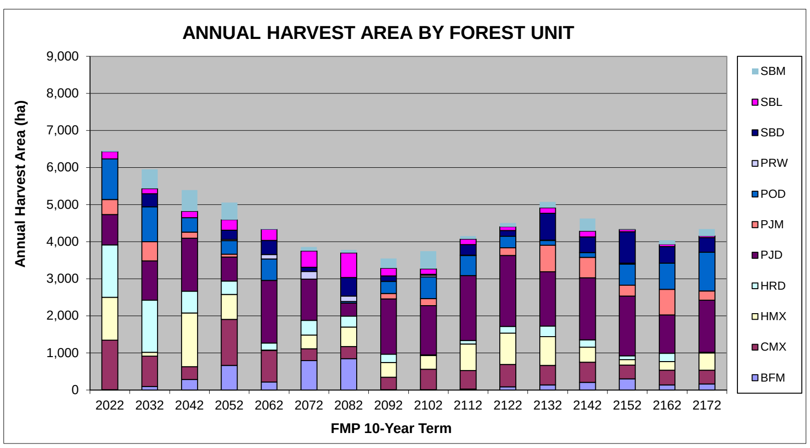
Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1 (6b)	6,462	9	1,331	1,162	1,407	823	405	1,090	0	0	198	37
T2	5,950	96	819	97	1,405	1,068	509	947	0	353	135	521
T3	5,389	285	343	1,447	584	1,437	157	388	0	3	175	570
T4	5,052	662	1,241	671	367	640	83	364	32	245	285	462
T5	4,348	215	848	11	189	1,691	0	582	116	382	296	17
T6	3,852	795	316	367	398	1,113	0	0	206	112	440	104
T7	3,777	846	323	524	293	357	0	45	144	497	671	77
T8	3,541	4	335	402	218	1,493	149	324	0	146	214	256
T9	3,740	8	552	371	11	1,327	193	585	41	29	150	473
T10	4,152	23	498	720	98	1,749	0	538	10	281	154	83
T11 (6b)	4,501	85	606	841	181	1,914	206	313	2	154	100	100
T12	5,071	136	527	776	279	1,465	721	130	9	720	152	156
T13	4,618	202	547	401	205	1,665	558	131	0	414	162	333
T14	4,323	298	369	147	103	1,611	294	570	24	847	60	0
T15	4,040	134	400	233	219	1,038	692	707	0	448	57	112
T16	4,337	162	374	460	21	1,405	248	1,040	0	403	39	185

Annual Harvest Volumes by Major Species Groups / **(6d) Prop. By Size**

Term	TOTAL	SPF	PO	BW	PRW	Small	Large
T1 (6c)	667.0	303.2	306.4	51.5	0.8	0.96	0.04
T2	600.3	326.9	229.8	40.0	0.5	0.94	0.06
T3	540.2	322.8	176.3	36.5	1.0	0.98	0.02
T4	486.2	305.7	135.2	30.9	7.8	0.99	0.01
T5	437.6	289.3	101.4	15.9	26.4	0.95	0.05
T6	393.8	245.9	76.1	22.1	44.6	0.93	0.07
T7	354.4	231.8	63.4	19.6	31.8	0.95	0.05
T8	332.8	240.0	79.3	11.3	0.5	0.99	0.01
T9	366.1	240.6	99.1	11.1	13.3	0.96	0.04
T10	402.7	275.7	110.0	13.0	2.9	0.99	0.01
T11 (6c)	442.9	317.0	105.5	19.2	0.5	0.94	0.06
T12	483.6	364.6	93.1	21.9	2.6	0.94	0.06
T13	444.0	354.6	69.8	17.4	0.0	0.96	0.04
T14	408.9	301.4	87.3	12.2	7.3	0.95	0.05
T15	379.8	256.2	109.1	14.0	0.0	0.96	0.04
T16	417.8	267.5	136.3	13.5	0.0	0.97	0.03
Average	447.4	290.2	123.6	21.9	8.8		

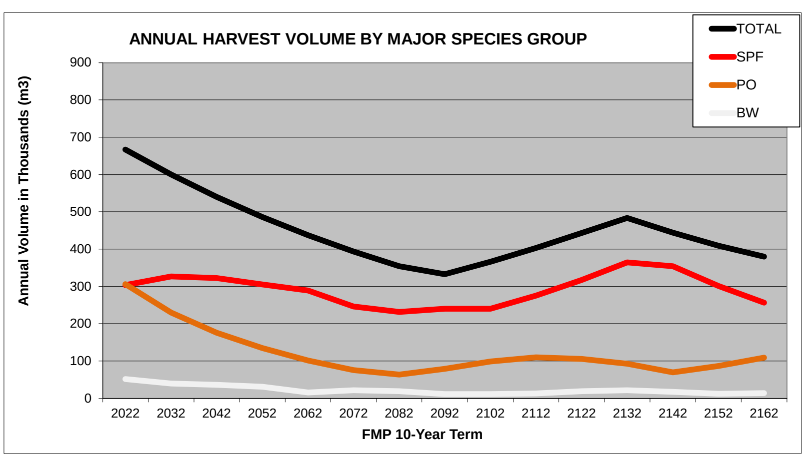
Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	PRW M$	Renewal ha	Natural ha	Plant ha	Seed ha
T1	2,219	2,219	0	6,398	4,051	841	1,505
T2	2,257	2,257	0	5,890	3,250	457	2,183
T3	2,180	2,180	0	5,335	2,787	561	1,986
T4	2,101	2,101	0	5,001	2,312	334	2,355
T5	2,104	2,104	0	4,339	1,991	421	1,927
T6	1,980	1,980	0	3,852	1,539	492	1,821
T7	1,785	1,785	0	3,775	1,607	443	1,725
T8	1,546	1,546	0	3,533	1,741	251	1,541
T9	1,681	1,681	0	3,737	1,846	301	1,591
T10	1,812	1,812	0	4,152	2,126	384	1,642
T11	2,040	2,040	0	4,501	2,172	405	1,924
T12	2,335	2,335	0	5,071	2,271	364	2,437
T13	2,228	2,228	0	4,618	1,908	265	2,445
T14	1,977	1,977	0	4,323	1,765	55	2,503
T15	1,668	1,668	0	4,040	1,937	113	1,990
T16	1,764	1,764	0	4,337	2,132	120	2,084



TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
A1				
A2				
B1	97	338		
B2	128	785		
C			163	156
D				
DEA1	181	195	100	94
E				
ELK	403	198	103	154
MEA1	1,440	736	1,004	545
MEA2	374	389	289	190
MEA3	65	63	80	103
MEA4	90	57	87	125
Z02	141	243	211	201
Z03	14	54	54	15
Z04	224	291	356	312
Z05	216	153	240	239
Z06	310	128	128	137
Z07	362	309	449	567
Z08	368	154	227	185
Z09	263	118	211	168
Z10	431	226	312	521
Z11	484	293	263	420
Z12	627	547	631	468
Z13	148	93	104	111
Z14		475	224	173
Z15	108	134	173	184
Z01				
TOTAL	6,474	5,981	5,409	5,068



Limit harvest in MEA1 and Z12 to even out between terms T1-T4. Raise minimum harvest volume to improve volumes over time (to indirectly reduce T1).

Even out SBL harvest area - flow on SBL_ not working well (as more SBLC being harvested)

KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: LTMD-06 — **Not Used** — **Date:** April 1, 2020.

Purpose: Refinement of LTMD-04 to provide better balance of PJD harvest area with min. PJDS harvest of 250 ha per year.

Specific Inputs: Built on LTMD-04. Added minimum 250 ha PJDS harvest area every term.

		Group:	Mm3/yr		Vol. Flow
		PWR			
		SPF	240.0	T1-T2	+/- 10%
T7 on	90	PO	150.0	T1-T2	+/- 15%
T4 on	400	TOTAL	500.0	T1	+/- 10%
		PWR	2.0	Binding.	

BLG Targets and Achievement:
Relaxed PRW all ages to 29,100 ha T17 to solve.
Min. PJDS AHA all terms = 250 ha

Budget: Balanced to revenues

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 - Overall very good BLG indicator achievement. PRW all ages steady increase, but cannot go above 30,000 ha T17 with current other constraints.

Good achievement, though some conifer-related indicator within IQR but slightly lower achievement than LTMD-04 (as per purpose of run).

(2a) Area by Landscape Class (Productive ha)

Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	40,952	136,142	68,484	18,070	208,260	141,825	38,522
T2	72,098	127,974	62,335	23,294	198,020	128,173	38,050
T3	83,434	125,324	69,091	28,836	180,999	122,922	37,253
T4	87,221	113,593	66,745	32,673	187,249	122,671	35,720
T5	85,508	65,244	71,865	34,831	235,319	115,148	35,869
T6	87,719	81,341	73,515	34,835	224,799	108,377	31,231
T7	90,609	97,932	75,778	33,442	213,857	100,594	28,852
T8	93,969	106,434	63,674	34,636	208,151	106,314	27,260
T9	95,644	109,484	52,988	39,281	211,003	104,938	26,126
T10	99,409	112,237	43,984	43,784	212,946	100,382	25,839
T11	97,055	118,401	39,187	47,252	215,869	92,663	26,492
T12	94,681	123,020	38,732	44,739	218,061	86,827	28,847
T13	94,201	126,139	38,949	40,171	223,018	81,285	30,793
T14	96,523	124,234	41,454	41,140	224,485	74,537	31,576
T15	100,169	121,584	45,006	42,170	223,706	68,938	32,207
T16	101,232	123,297	47,381	43,042	224,220	63,891	30,506
T17	107,627	120,882	48,462	43,485	231,754	57,178	23,354
BLG Upper	181,443	52,727	145,430	17,982	224,820	65,215	28,328
BLG Lower	101,058	29,333	81,015	12,782	152,976	43,706	23,354

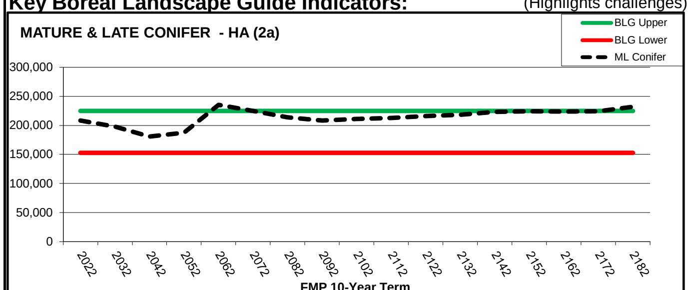
(2b) Old Growth by Grouping (Prod. ha)

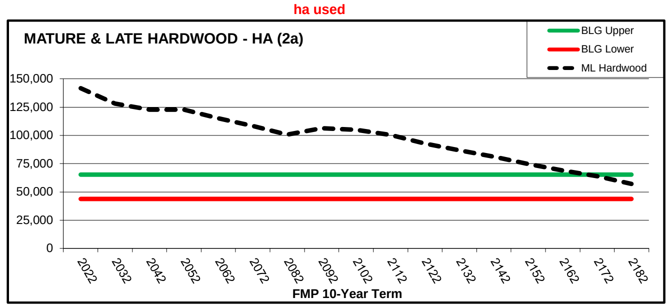
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs	(6a) Available Forest: Term	
T1	30,442	4,217	25,043	1,953	241,172	104,723	T1	503,772
T2	68,503	6,883	63,507	3,437	248,276	98,347	T2	501,463
T3	102,427	10,172	92,763	6,280	256,835	126,343	T3	499,435
T4	106,346	13,845	103,111	8,776	263,448	144,660	T4	497,583
T5	105,640	12,854	108,586	11,451	268,642	145,446	T5	495,797
T6	101,606	14,847	101,573	13,539	275,118	138,050	T6	494,316
T7	106,744	17,200	83,075	14,730	283,385	134,031	T7	494,298
T8	135,400	17,646	69,045	15,152	290,712	133,211	T8	494,230
T9	106,328	18,012	56,779	14,764	292,900	132,009	T9	493,879
T10	84,928	17,345	55,745	14,365	294,376	132,735	T10	493,727
T11	70,962	16,912	58,000	13,029	297,235	132,155	T11	493,664
T12	56,870	15,376	58,000	12,059	302,759	132,734	T12	493,664
T13	50,000	13,311	58,000	12,227	310,000	135,111	T13	493,664
T14	51,629	14,750	58,000	11,680	311,053	135,817	T14	493,664
T15	50,000	14,761	58,000	12,403	310,000	139,888	T15	493,664
T16	50,000	13,667	58,000	13,849	310,000	143,893	T16	493,664
T17	50,000	14,180	58,000	15,071	310,000	149,823	T17	493,664
BLG Upper	79,383	17,281	78,344	99,999	343,729	227,291		
BLG Lower	47,362	12,236	55,649	1,969	290,514	129,712		

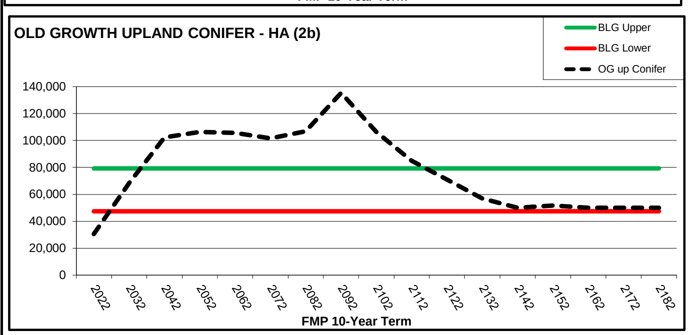
5,000
ha used

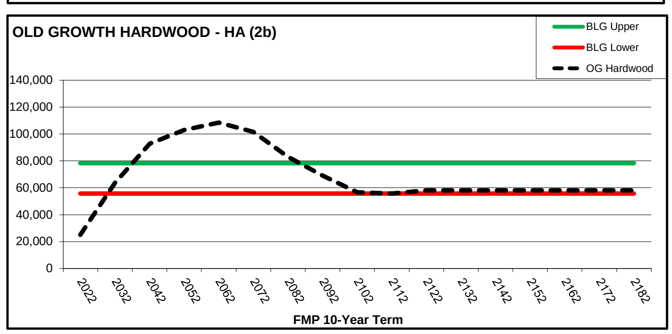
Key Boreal Landscape Guide Indicators:

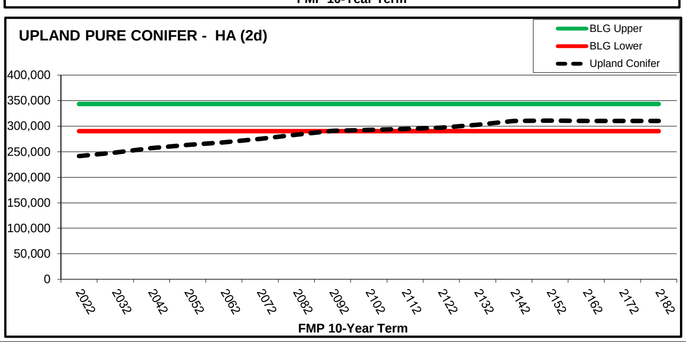
(Highlights challenges)

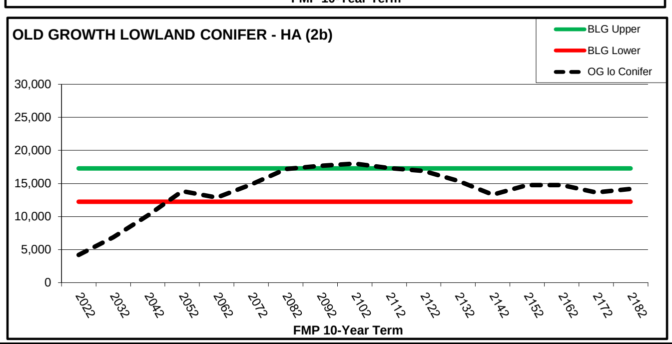












KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: LTMD-06 — **Not Used** — **Date:** April 1, 2020.

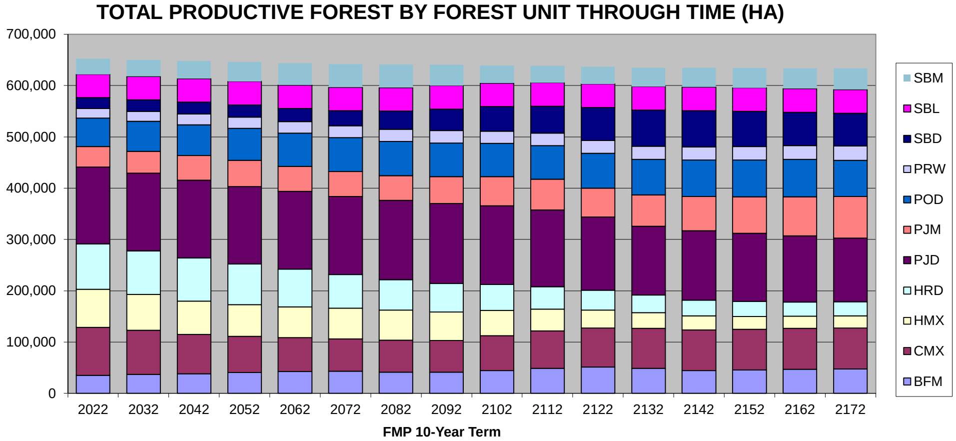
Productive Forest Area Through Time Data (hectares): by Forest Unit — Indicator (2c)

Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1	652,254	34,934	93,667	74,582	88,202	150,031	39,912	55,484	18,488	20,977	45,724	30,253
T2	649,945	36,868	86,088	70,112	84,696	151,292	42,903	58,147	19,892	22,014	45,866	32,066
T3	647,859	38,289	76,481	65,010	84,136	151,970	47,743	60,065	21,077	22,833	45,966	34,289
T4	645,871	40,499	70,582	61,897	78,964	151,220	51,000	62,657	21,836	23,454	45,988	37,774
T5	643,785	42,706	65,767	60,356	73,361	151,814	48,616	64,489	22,562	25,327	45,901	42,885
T6	641,817	42,952	63,319	59,979	65,422	152,383	48,619	66,041	23,168	29,021	45,819	45,095
T7	641,063	41,202	62,317	58,623	59,664	154,370	48,449	66,404	23,593	35,661	45,875	44,905
T8	640,438	41,044	62,125	55,234	55,820	155,856	52,380	65,662	23,945	42,017	45,896	40,460
T9	639,464	44,644	67,660	49,719	49,925	153,885	56,796	64,488	24,213	47,458	45,916	34,760
T10	638,581	48,690	72,953	42,648	43,666	149,848	59,377	65,653	24,626	52,309	45,970	32,842
T11	636,919	51,621	76,028	34,956	38,344	142,879	56,085	67,828	24,930	64,399	45,976	33,873
T12	634,907	48,884	77,798	30,473	34,219	134,480	60,836	69,488	25,253	70,799	46,031	36,644
T13	634,555	44,333	79,042	27,528	30,679	135,328	66,854	71,177	25,703	70,435	46,092	37,383
T14	633,949	45,557	79,497	24,848	29,043	132,974	71,229	71,430	26,357	68,676	46,164	38,175
T15	633,781	46,717	79,942	24,004	27,284	129,048	76,417	72,507	27,093	64,958	46,235	39,576
T16	633,569	47,581	79,838	23,693	27,495	123,811	81,090	70,707	27,949	63,736	46,306	41,363
T17	632,742	48,196	80,436	21,350	26,563	112,343	83,443	70,719	29,100	72,356	46,379	41,858

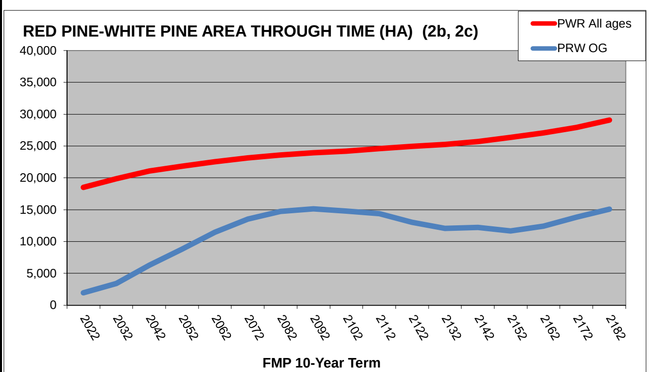
(1a) Caribou Habitat (Caribou Zone):

Term	Refuge	Winter
T1	71,994	29,678
T2	72,933	64,310
T3	71,194	62,544
T4	71,651	62,574
T5	74,800	62,395
T6	73,527	58,616
T7	75,211	61,100
T8	75,317	61,178
T9	74,331	54,804
T10	74,846	56,408
T11	74,590	55,112
T12	70,489	48,706
T13	70,576	54,045
T14	70,532	55,748
T15	70,999	57,271
T16	73,924	62,165
T17	74,705	62,871
BLG Upper	61,458	45,161
BLG Lower	54,045	18,667

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"
Target in SFMM T17 of 29,100 ha
BLG incr towards ~39,000 ha

Old Growth PRW - desirable level "to increase"
used 5,000 ha in SFMM (overachieved)

PRW all ages and Old Growth projections meet desirable levels "to increase".

KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: LTMD-06 — Not Used — **Date:** April 1, 2020.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - Good distribution of harvest area by forest unit, through time. Improved over LTMD-03.
Harvest volumes by species groups look good. Good distribution between OMZ subunits.
Force more Plant, or reduce Natural T1 (balance of treatmetns is low for Plant). Aim Natural ~50%, Plant and Seed ~25% each.

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)	4,940	0	1,326	873	744	755	8	1,048	7	39	80	59
T2	4,402	99	1,194	885	387	845	10	734	6	55	104	83
T3	3,988	91	664	619	758	1,000	13	513	6	77	195	50
T4	3,832	296	670	434	700	775	17	359	6	108	406	60
T5	3,891	562	539	303	649	849	23	252	7	152	470	84
T6	3,751	864	374	313	483	916	29	176	15	212	252	118
T7	3,790	770	279	325	374	1,116	38	126	7	297	293	166
T8	3,728	166	310	423	319	1,376	49	164	65	416	208	232
T9	3,894	20	421	550	401	1,234	64	115	74	583	145	286
T10	3,712	66	514	715	411	996	45	120	187	350	136	172
T11 (6b)	3,812	640	496	503	331	863	32	156	113	398	177	103
T12	4,042	747	395	481	395	1,047	22	203	13	351	285	103
T13	3,872	98	513	479	286	1,286	29	264	101	491	180	144
T14	4,169	22	504	352	304	1,597	20	343	7	674	234	110
T15	4,328	59	655	374	173	1,215	14	446	7	848	382	155
T16	4,550	163	529	487	257	925	10	580	7	509	866	216

	Natural	Plant	Seed
T1	66%	14%	19%
T2	61%	15%	25%
T3	59%	14%	27%
T4	56%	13%	31%

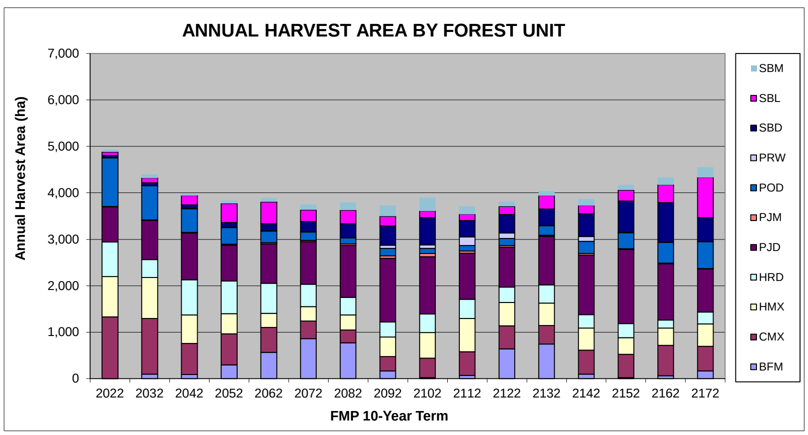
* See AU breakdown of treated area below.

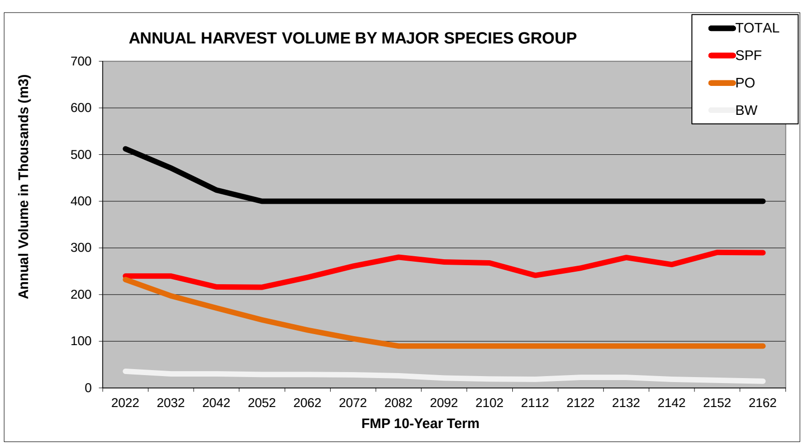
Annual Harvest Volumes by Major Species Groups / (6d) Prop. By Size

Term	TOTAL	SPF	PO	BW	PRW	Small	Large
T1 (6c)	512.7	240.0	232.1	35.7	2.0	0.96	0.04
T2	471.2	240.0	197.3	30.4	2.0	0.93	0.07
T3	424.1	216.4	171.6	30.6	2.0	0.91	0.09
T4	400.0	215.8	145.9	29.3	2.0	0.95	0.05
T5	400.0	237.4	124.0	29.0	2.0	0.94	0.06
T6	400.0	261.2	105.4	28.0	4.2	0.91	0.09
T7	400.0	280.1	90.0	25.9	2.0	0.91	0.09
T8	400.0	270.0	90.0	21.6	16.8	0.86	0.14
T9	400.0	268.2	90.0	19.1	21.0	0.93	0.07
T10	400.0	241.4	90.0	18.8	48.5	0.90	0.10
T11 (6c)	400.0	257.2	90.0	22.9	29.0	0.90	0.10
T12	400.0	279.6	90.0	22.8	4.1	0.95	0.05
T13	400.0	264.7	90.0	18.6	25.2	0.89	0.11
T14	400.0	290.7	90.0	16.5	2.0	0.92	0.08
T15	400.0	289.6	90.0	14.6	2.0	0.96	0.04
T16	400.0	270.1	101.4	15.7	2.0	0.97	0.03
Average	413.0	257.7	118.0	23.7	10.4		

Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal ha	Natural ha	Plant ha	Seed ha
T1	1,748	1,748	0	4,890	3,244	696	950
T2	1,700	1,700	0	4,358	2,639	650	1,068
T3	1,542	1,542	0	3,948	2,326	544	1,078
T4	1,526	1,526	0	3,794	2,125	511	1,158
T5	1,635	1,635	0	3,884	1,975	416	1,494
T6	1,747	1,747	0	3,751	1,557	326	1,869
T7	1,827	1,827	0	3,789	1,473	331	1,985
T8	1,886	1,886	0	3,719	1,507	507	1,705
T9	1,909	1,909	0	3,890	1,713	521	1,656
T10	1,980	1,980	0	3,712	1,570	690	1,452
T11	1,911	1,911	0	3,812	1,537	473	1,802
T12	1,846	1,846	0	4,042	1,760	351	1,932
T13	1,922	1,922	0	3,872	1,907	595	1,370
T14	1,876	1,876	0	4,169	2,145	350	1,673
T15	1,880	1,880	0	4,328	2,324	382	1,621
T16	1,807	1,807	0	4,550	2,948	616	987





TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
A1				
A2				
B1	156	171		
B2	97	310		
C			70	164
D				
DEA1	177	99	78	115
E				
ELK	364	166	58	113
MEA1	210	458	404	477
MEA2	574	115	205	179
MEA3	27	54	61	35
MEA4	55	47	34	45
Z01	273	54	133	128
Z02	118	153	168	167
Z03	13	4	55	24
Z04	211	168	205	317
Z05	132	91	153	151
Z06	164	140	98	153
Z07	322	158	617	268
Z08	272	199	191	136
Z09	194	117	134	113
Z10	316	286	278	309
Z11	367	222	242	274
Z12	577	415	310	195
Z13	123	71	41	42
Z14		474	86	181
Z15	62	77	67	68
TOTAL	4,804	4,049	3,689	3,655

Harvest area good for T1-T4 for MEA1 and Z12

KENORA FOREST 2022 FMP		SUMMARY of SFMM INVESTIGATION		
Case Name:	LTMD-06	Not Used	Date:	April 1, 2020.

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				1							0						
A65				30			30				99						
A75				9		1	2			6	96						
A85		552		394	34	13	196			2	331						
A95		475		439	128	16	305	375	250		522						37
A105		23	66					84									23
A115		63			4			14				2					
A125		60	38		5			29				1		11			
A135		10	27		6							1		27			
A145		1	5		2			2						2	11		
A155	0	3	2		1			1				0			31		
A165	0		0		1							0			20		
A175		0			0										15		
A185															3		
A195																	
A205																	
A215																	
A225																	
A235																	
A245												2					
A255																	
	0	1.188	138	873	181	30	533	505	250	8	1.048	7	0	39	80	0	59
																Total:	**4.940**

Renewal Area by Treatment Type

	Total	Natural	Plant	Seed
BFM_	0	-	-	0
CMX_	1,176	470	353	353
CMXC	137	69	68	-
HMX_	865	648	216	-
HRDA	179	134	45	-
HRDB	30	22	7	-
HRD_	527	527	-	-
PJDD	500	150	-	350
PJDS	248	74	-	173
PJM_	8	2	-	5
POD_	1,037	1,037	-	-
PRWR	7	-	7	-
PRWW	-	-	-	-
SBD_	39	12	-	27
SBL_	79	79	-	-
SBLC	-	-	-	-
SBM	59	18	-	41
	4,890	3,244	696	950

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	0	1,188	138	873	181	30	533	505	250	8	1,048	7		39	80		59
T2	99	948	245	885	9	5	373	595	250	10	734	6		55	104		83
T3	91	664		619	262	12	485	750	250	13	513	6		77	135	60	50
T4	296	670		434	74		626	525	250	17	359	6		108	175	231	60
T5	562	534	5	303	187	24	438	599	250	23	252	7		152	228	243	84
T6	864	374		313	7	32	444	666	250	29	176	15		212	252		118
T7	770	279		325	31	33	311	866	250	38	126	7		297	293		166
T8	166	310		423		2	318	1,126	250	49	164	65		416	208		232
T9	20	403	18	550	11	57	333	984	250	64	115	74		583	145		286
T10	66	418	96	715	85	50	276	746	250	45	120	187		350	136		172
T11	640	491	4	503	50	20	261	613	250	32	156	113		398	177		103
T12	747	395		481	45	10	340	797	250	22	203	13		351	230	54	103
T13	98	513		479	33	8	245	1,036	250	29	264	101		491	180		144
T14	22	504	0	352	95	2	207	1,347	250	20	343	7		674	234		110
T15	59	655		374	17	1	155	965	250	14	446	7		848	304	78	155
T16	163	529		487	51	5	202	675	250	10	580	7		509	395	472	216

KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: LTMD-07 **Date:** April 3, 2020.

Purpose: LTMD-06 with Z01 subunit OFF all terms (islands) and corrected YIELD, other inputs the same (volumes revised as slightly underachieved versus LTMD-06 due to smaller eligible land base).

Specific Inputs: Built on LTMD-06. Avail land base revised (had previously mis-classified NAT as managed where BMI had NULL field (error was introduced after yield curve development, so only a later model issue after depletions added. Does not affect counting of BLG area at all, only harvest volumes / area). TOTAL volume target reduced.

		Group:	Mm3/yr		Vol. Flow
		PWR	2.0		
		SPF	240.0	T1	+/- 10%
T6 on	90	PO	150.0	T1	+/- 15%
T7 on	375+	TOTAL	475.0	T1	+/- 10%
				Binding.	

BLG Targets and Achievement:
PRW 24,000 ha T17 (reduced as harvest / conversion reduced)

Budget: Balanced to revenues

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 - Overall very good BLG indicator achievement. PRW all ages steady increase, but cannot go above 24,000 ha T17 with current other constraints and reduced managed, land base in SFMM (less Z01 SU).

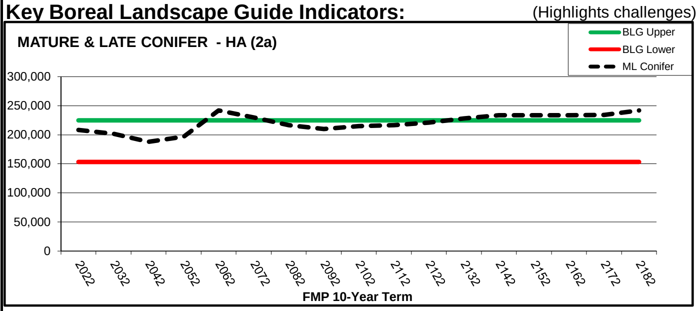
(2a) Area by Landscape Class (Productive ha)

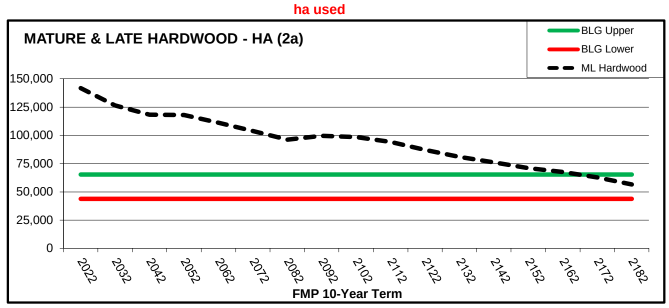
Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	40,952	136,142	68,484	18,070	208,260	141,825	38,522
T2	71,296	127,974	62,335	22,356	201,568	126,430	37,991
T3	83,480	124,584	68,340	27,940	188,104	118,297	37,116
T4	87,465	111,983	66,320	29,060	196,817	118,109	36,109
T5	86,422	64,500	71,548	30,212	241,764	111,148	38,122
T6	92,801	79,599	73,985	30,805	229,619	103,904	30,863
T7	95,458	95,688	76,685	31,579	216,531	96,103	28,795
T8	96,357	105,916	65,775	35,663	209,839	99,432	27,224
T9	91,399	112,787	55,748	40,052	214,809	98,332	26,112
T10	93,250	115,342	48,773	44,492	216,797	94,169	25,553
T11	93,562	118,394	43,889	48,155	220,884	87,103	24,737
T12	91,813	119,822	43,403	46,890	228,113	80,773	23,899
T13	91,525	117,655	43,794	42,291	233,647	76,129	29,319
T14	92,046	117,454	45,549	43,598	233,746	71,101	30,260
T15	94,174	115,300	47,154	44,702	233,323	67,447	31,486
T16	94,456	116,467	49,031	45,098	234,358	62,673	31,290
T17	100,015	113,384	50,528	45,379	241,715	56,588	24,937
BLG Upper	181,443	52,727	145,430	17,982	224,820	65,215	28,328
BLG Lower	101,058	29,333	81,015	12,782	152,976	43,706	23,354

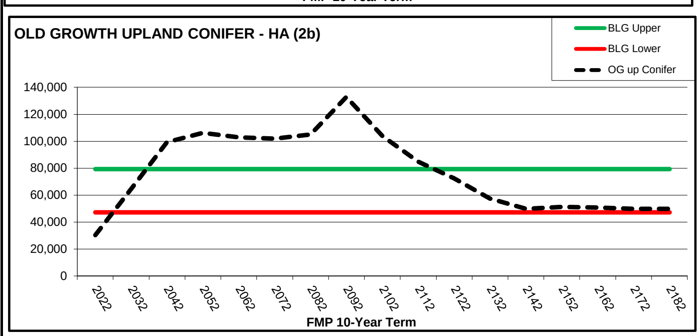
(2b) Old Growth by Grouping (Prod. ha), (2d), (2e), (6a)

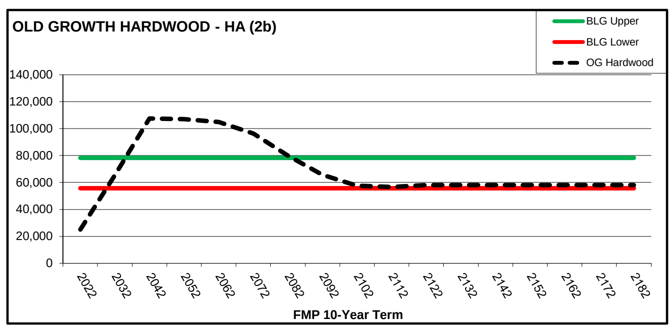
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs	(6a) Available Forest: Term	
T1	30,442	4,217	25,043	1,953	241,172	104,723	T1	503,772
T2	64,587	7,543	65,495	3,325	245,886	97,545	T2	501,468
T3	99,305	10,703	107,532	6,136	253,738	124,897	T3	499,437
T4	106,354	14,954	107,129	8,532	263,799	142,869	T4	497,575
T5	102,941	15,215	104,869	11,261	270,650	145,702	T5	495,730
T6	102,002	14,463	96,365	13,404	276,657	142,984	T6	494,075
T7	104,980	17,058	80,042	12,471	284,625	139,162	T7	494,073
T8	132,777	17,614	65,720	12,248	290,712	136,484	T8	493,997
T9	103,877	18,042	57,640	11,889	292,502	132,333	T9	493,654
T10	84,770	17,135	56,724	12,058	294,820	129,740	T10	493,522
T11	72,559	16,333	58,000	10,931	296,969	129,712	T11	493,468
T12	57,511	13,841	58,000	10,671	302,308	129,712	T12	493,468
T13	50,000	14,060	58,000	10,847	310,000	131,584	T13	493,468
T14	51,423	16,127	58,000	10,990	311,188	131,666	T14	493,468
T15	50,752	16,137	58,000	11,075	310,772	133,985	T15	493,468
T16	50,000	15,222	58,000	11,734	310,000	136,493	T16	493,468
T17	50,000	15,734	58,000	12,585	310,000	141,496	T17	493,468
BLG Upper	79,383	17,281	78,344	99,999	343,729	227,291		
BLG Lower	47,362	12,236	55,649	1,969	290,514	129,712		
				5,000 ha used				

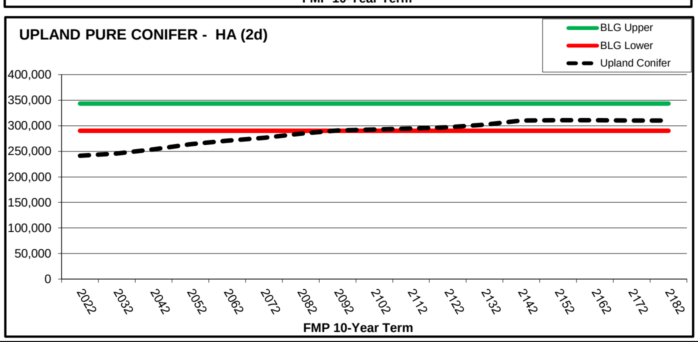
Key Boreal Landscape Guide Indicators: (Highlights challenges)

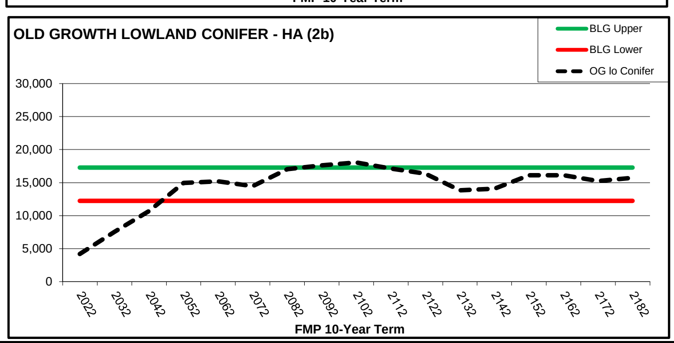












KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

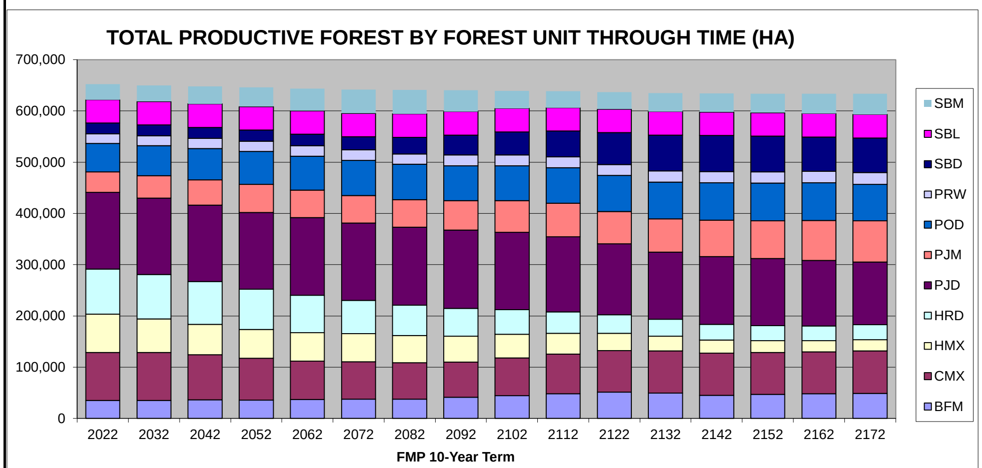
Case Name: LTMD-07 **Date:** April 3, 2020.

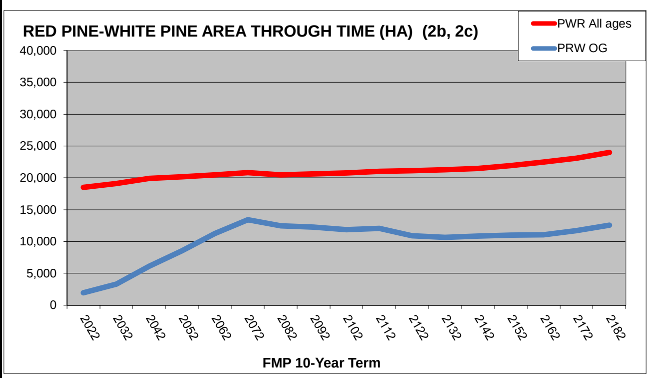
Productive Forest Area Through Time Data (hectares): by Forest Unit — Indicator (2c): PRW

Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1	652,254	34,934	93,667	74,582	88,202	150,031	39,912	55,484	18,488	20,977	45,724	30,253
T2	649,950	35,189	93,547	65,138	86,924	149,107	43,872	58,398	19,101	21,253	45,767	31,653
T3	647,861	36,497	87,715	59,326	83,600	148,996	49,244	61,235	19,901	21,400	45,848	34,100
T4	645,863	35,820	81,572	56,234	78,457	149,732	55,140	63,949	20,150	21,429	45,882	37,498
T5	643,717	36,908	75,136	55,144	73,340	151,621	53,142	66,192	20,465	22,498	45,882	43,389
T6	641,576	37,551	72,971	54,682	64,944	151,198	53,732	68,250	20,849	25,410	45,673	46,316
T7	640,838	37,751	70,884	53,332	58,860	152,515	53,273	69,184	20,495	32,344	45,707	46,493
T8	640,205	41,035	68,756	50,384	54,394	152,749	57,311	68,571	20,646	39,247	45,707	41,405
T9	639,239	44,231	73,805	45,927	48,473	150,819	61,956	67,841	20,761	45,361	45,698	34,365
T10	638,375	48,005	77,688	40,576	41,555	146,733	65,664	68,978	21,035	50,416	45,718	32,006
T11	636,724	51,142	80,989	33,734	36,546	138,446	62,798	70,492	21,125	62,574	45,726	33,151
T12	634,712	49,501	82,550	28,107	33,104	130,943	65,073	72,096	21,303	70,393	45,743	35,899
T13	634,360	45,126	82,139	25,892	30,551	132,338	70,539	73,345	21,500	70,754	45,808	36,368
T14	633,754	46,800	81,564	23,283	29,622	130,491	73,876	73,473	21,953	69,815	45,871	37,006
T15	633,586	48,188	81,668	21,851	29,010	127,263	78,056	73,690	22,483	66,830	45,922	38,622
T16	633,373	48,753	82,772	22,290	29,140	121,974	80,737	71,374	23,068	67,132	45,976	40,157
T17	632,547	49,188	83,189	21,536	28,278	109,790	81,081	70,314	24,000	77,798	46,041	41,331

(1a) Caribou Habitat (Caribou Zone):

Term	Refuge	Winter
T1	71,994	29,678
T2	72,246	62,576
T3	70,061	60,218
T4	70,379	59,854
T5	73,525	59,823
T6	72,140	55,137
T7	74,354	58,541
T8	74,544	59,066
T9	73,705	52,656
T10	74,841	56,290
T11	74,732	54,570
T12	71,550	49,338
T13	72,324	54,457
T14	72,500	56,434
T15	72,900	57,599
T16	75,748	61,694
T17	73,832	57,543
BLG Upper	61,458	45,161
BLG Lower	54,045	18,667





All ages PRW - desirable level "to increase"
Target in SFMM T17 of 24,000 ha
BLG incr towards ~39,000 ha

Old Growth PRW - desirable level "to increase"
used 5,000 ha in SFMM (overachieved)

PRW all ages and Old Growth projections meet desirable levels "to increase". More PRW is expected to be produced operationally, than is projected in SFMM transitions.

KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: LTMD-07 **Date:** April 3, 2020.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - Good distribution of harvest area by forest unit, through time.
Harvest volumes by species groups look good. Good distribution between OMZ subunits. (improved with removal of Z01)
Reduced long-term TOTAL volumes, resulting form removal of Z01, however is still slightly higher than projected in 2012 FMP 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 (6b)	4,859	91	501	1,332	509	1,144	4	991	14	77	86	111
T2	4,337	94	786	933	656	876	5	693	8	108	111	67
T3	3,953	369	484	653	748	906	7	485	13	103	145	40
T4	3,999	428	796	457	678	881	9	340	1	144	228	38
T5	4,288	465	432	320	769	1,070	12	238	6	201	722	53
T6	3,721	729	303	224	492	910	15	248	224	282	221	74
T7	3,670	477	265	261	407	1,108	20	274	70	395	290	103
T8	3,713	216	229	339	259	1,365	26	318	61	552	201	144
T9	3,744	30	320	441	347	1,310	34	229	21	633	178	202
T10	3,692	28	350	574	395	1,083	24	297	141	416	232	153
T11 (6b)	3,686	547	439	582	260	833	17	216	83	300	319	92
T12	3,910	708	540	435	323	1,008	22	280	8	301	187	99
T13	3,725	68	513	460	201	1,302	28	364	97	421	131	138
T14	3,921	26	437	387	162	1,531	36	474	7	589	170	102
T15	4,049	86	462	271	144	1,504	26	616	8	571	222	140
T16	4,318	173	484	321	215	1,128	18	729	7	342	816	84

	Natural	Plant	Seed
T1	63%	13%	24%
T2	62%	14%	24%
T3	55%	9%	35%
T4	50%	7%	43%

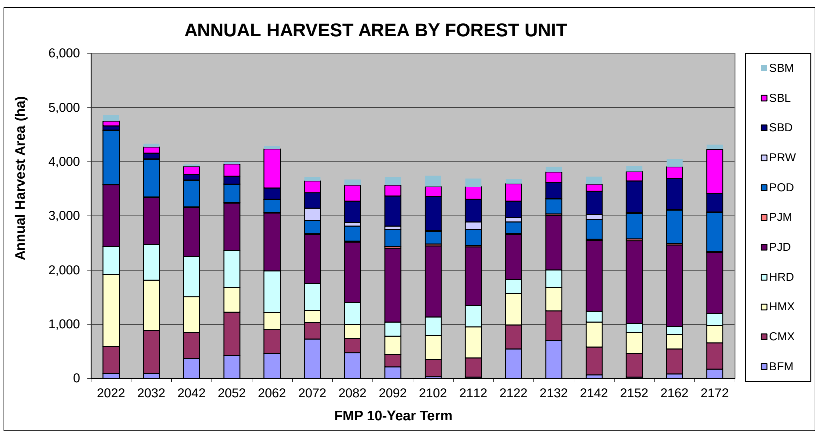
* See AU breakdown of treated area below.

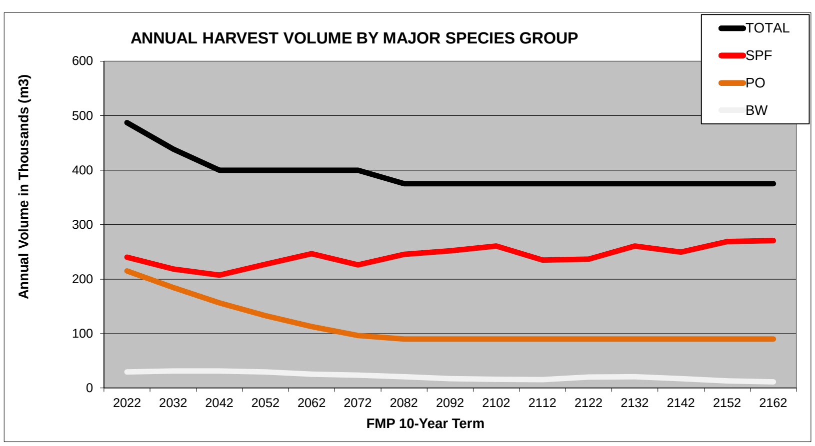
Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	(6d) Prop. By Size Small	Large
T1 (6c)	487.2	240.0	214.8	29.6	2.0	0.95	0.05
T2	438.5	218.7	184.2	31.5	2.0	0.93	0.07
T3	400.0	207.4	156.6	31.2	2.0	0.91	0.09
T4	400.0	227.4	133.1	29.8	2.0	0.93	0.07
T5	400.0	246.8	113.1	25.6	2.0	0.93	0.07
T6	400.0	226.3	96.2	23.5	51.7	0.87	0.13
T7	375.0	245.5	90.0	20.6	15.9	0.91	0.09
T8	375.0	251.9	90.0	17.1	14.6	0.90	0.10
T9	375.0	260.8	90.0	15.8	7.0	0.95	0.05
T10	375.0	234.7	90.0	15.6	32.4	0.93	0.07
T11 (6c)	375.0	236.9	90.0	20.3	23.7	0.92	0.08
T12	375.0	260.6	90.0	21.0	2.3	0.96	0.04
T13	375.0	249.5	90.0	17.2	17.8	0.90	0.10
T14	375.0	268.9	90.0	13.0	2.0	0.96	0.04
T15	375.0	270.5	90.0	11.1	2.0	0.96	0.04
T16	375.0	245.1	103.5	13.8	2.0	0.96	0.04
Average	392.2	243.2	113.2	21.0	11.3		

Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal ha	Natural ha	Plant ha	Seed ha
T1	1,716	1,716	0	4,810	3,031	615	1,164
T2	1,562	1,562	0	4,293	2,683	589	1,021
T3	1,469	1,469	0	3,913	2,169	370	1,375
T4	1,578	1,578	0	3,959	1,967	292	1,700
T5	1,698	1,698	0	4,280	2,256	359	1,665
T6	1,932	1,932	0	3,721	1,420	464	1,838
T7	1,737	1,737	0	3,668	1,553	314	1,801
T8	1,754	1,754	0	3,704	1,592	278	1,834
T9	1,741	1,741	0	3,741	1,650	305	1,786
T10	1,804	1,804	0	3,692	1,634	481	1,577
T11	1,757	1,757	0	3,686	1,538	386	1,762
T12	1,704	1,704	0	3,910	1,677	196	2,038
T13	1,762	1,762	0	3,725	1,834	447	1,443
T14	1,743	1,743	0	3,921	1,955	301	1,665
T15	1,752	1,752	0	4,049	2,115	277	1,656
T16	1,656	1,656	0	4,318	2,796	487	1,034





TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
A1				
A2				
B1	153	206		
B2	169	271		
C			104	158
D				
DEA1	235	154	21	148
E				
ELK	236	105	272	187
MEA1	201	425	398	511
MEA2	382	198	285	208
MEA3	128	71	40	10
MEA4	93	55	49	53
Z01				
Z02	48	119	111	383
Z03	12	44	25	33
Z04	265	187	293	387
Z05	115	255	176	175
Z06	154	114	223	150
Z07	265	312	582	326
Z08	283	133	308	147
Z09	198	146	124	123
Z10	338	179	348	396
Z11	546	257	121	251
Z12	717	494	243	139
Z13	141	92	24	46
Z14		444	156	109
Z15	179	75	50	61
TOTAL	4,859	4,337	3,953	3,999

Z01 now turned OFF all terms (islands)
Harvest area good for T1-T4 for MEA1 and Z12

KENORA FOREST 2022 FMP		SUMMARY of SFMM INVESTIGATION		
Case Name:	**LTMD-07**		**Date:**	April 3, 2020.

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				171													
A65				366			167				24						
A75		133		111							193						
A85		333		413							291						
A95	36			271			338	642	228	4	405						
A105								161	22		67						
A115	13	15						25			11			22	13		37
A125	28	6						45						26	14		48
A135	4	10						21					3	27	43		26
A145	8	1			2								4	2	11		
A155	0	3			1								6		2		
A165	0				1								0		2		
A175		0			0								0				
A185																	
A195																	
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	91	501	0	1.332	5	0	504	894	250	4	991	0	14	77	86	0	111
																Total:	**4.859**

Renewal Area by Treatment Type

	Total	Natural	Plant	Seed
BFM_	90	-	-	90
CMX_	496	198	149	149
CMXC	-	-	-	-
HMX_	1,319	989	330	-
HRDA	5	4	1	-
HRDB	-	-	-	-
HRD_	499	375	125	-
PJDD	885	265	-	619
PJDS	248	74	-	173
PJM_	4	1	-	3
POD_	981	981	-	-
PRWR	-	-	-	-
PRWW	14	3	10	-
SBD_	76	23	-	53
SBL_	85	85	-	-
SBLC	-	-	-	-
SBM	110	33	-	77
	4,810	**3,031**	**615**	**1,164**

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	91	501		1,332	5		504	894	250	4	991		14	77	86		111
T2	94	651	135	933	61		595	626	250	5	693		8	108	111		67
T3	369	475	9	653	92	1	655	656	250	7	485		13	103	145		40
T4	428	617	179	457	194	25	459	631	250	9	340		1	144	183	45	38
T5	465	432		320	265	68	437	820	250	12	238	6		201	237	485	53
T6	729	303		224		20	471	660	250	15	248	224		282	221		74
T7	477	259	6	261	26	51	330	858	250	20	274	70		395	288	3	103
T8	216	223	6	339			259	1,115	250	26	318	61		552	201		144
T9	30	290	30	441		10	337	1,060	250	34	229	21		633	178		202
T10	28	326	23	574	94	27	275	833	250	24	297	141		416	232	0	153
T11	547	424	15	582	29	31	200	583	250	17	216	83		300	267	52	92
T12	708	526	14	435	40	23	260	758	250	22	280	8		301	187		99
T13	68	513		460	18	1	182	985	317	28	364	97		421	131		138
T14	26	436	0	387	33	1	128	1,281	250	36	474	7		589	170		102
T15	86	461	1	271	32		112	1,254	250	26	616	8		571	221	1	140
T16	173	482	3	321	77	5	133	878	250	18	729	7		342	287	529	84

KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: ScopeMEA1-off-ALL

Date: April 7, 2020.

Purpose:

After preliminary LTMD - to scope impact of NO HARVEST on Aulneau Peninsula (risk analysis)

Specific Inputs:

LTMD-07 with MEA1 (Aulneau Peninsula) OFF all terms. Harvest volumes reduced slightly due to smaller eligible land base, most BLG same, long-term PurCn and Oghmx reduced to equal lower IQR. Lower PRW.

		Group:	Mm3/yr		Vol. Flow
		PWR	2.0		
		SPF	220.0	T1	+/- 10%
T6 on	90	PO	150.0	T1	+/- 15%
T7 on	370	TOTAL	420.0	T1	+/- 10%
				Binding.	

BLG Targets and Achievement:
PRW 16,000 ha T17 (reduced harvest, is a loss of PRW area through time)
MooseBrowse T17 target deleted (no young forest created)

Budget: Balanced to revenues

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 -

Overall very good BLG indicator achievement. PRW all ages decreases with current other constraints and reduced managed, land base in SFMM (less Z01 SU and MEA1). Some indicators hung to lower IQR, rather than slightly improved long-term achievement in LTMD-07.
No moose browse in MEA1 after T3 as no young forest being created.

(2a) Area by Landscape Class (Productive ha)

Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	40,952	136,142	68,484	18,070	208,260	141,825	38,522
T2	68,839	127,974	62,335	20,083	202,754	130,032	38,047
T3	79,549	124,376	66,041	23,794	191,656	125,496	37,246
T4	83,958	110,948	61,275	28,499	196,390	128,960	36,335
T5	83,347	63,456	64,465	31,130	238,857	125,015	38,035
T6	88,959	77,754	66,084	29,629	224,796	121,676	33,369
T7	94,283	93,139	68,150	30,371	209,944	116,284	29,358
T8	95,925	102,961	58,621	35,275	204,662	117,403	26,040
T9	93,247	106,891	51,604	43,508	210,661	109,731	24,288
T10	93,714	111,900	47,446	48,306	213,750	100,315	23,627
T11	92,712	116,962	44,550	51,726	214,521	93,176	23,774
T12	91,363	119,161	45,553	52,553	218,374	83,068	25,336
T13	91,623	117,417	46,293	53,989	220,169	76,102	29,463
T14	93,395	114,127	48,103	55,791	219,486	70,351	33,197
T15	95,481	112,072	49,920	56,842	215,819	66,597	37,551
T16	97,486	109,075	51,342	55,866	217,960	63,215	39,126
T17	97,352	112,471	53,005	55,589	216,420	60,000	38,407
BLG Upper	181,443	52,727	145,430	17,982	224,820	65,215	28,328
BLG Lower	101,058	29,333	81,015	12,782	152,976	43,706	23,354

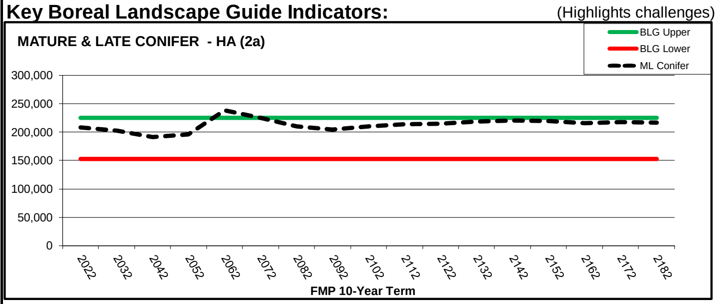
(2b) Old Growth by Grouping (Prod. ha); (2d); (2e); (6a)

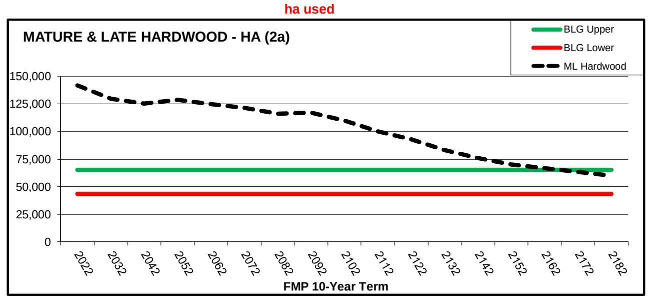
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs	(6a) Available Forest: Term	
T1	30,442	4,217	25,043	1,953	241,172	104,723	T1	503,772
T2	66,393	7,395	64,832	3,327	246,791	95,087	T2	501,583
T3	103,445	11,066	106,444	6,085	255,059	118,460	T3	499,733
T4	106,815	15,550	119,948	8,606	265,188	133,283	T4	498,078
T5	106,575	15,973	113,282	9,084	272,312	135,728	T5	496,317
T6	105,144	17,362	106,106	9,688	279,807	133,844	T6	494,765
T7	108,447	17,728	84,615	9,006	287,314	134,916	T7	494,764
T8	134,447	16,436	69,986	9,274	290,712	134,641	T8	494,679
T9	104,429	16,278	56,374	9,318	290,901	131,894	T9	494,345
T10	84,246	16,183	55,837	9,366	290,726	130,285	T10	494,207
T11	69,560	16,247	55,649	9,434	290,712	129,712	T11	494,165
T12	53,462	16,311	55,649	9,446	290,712	130,014	T12	494,165
T13	47,362	16,531	55,649	9,451	290,712	131,637	T13	494,165
T14	47,362	18,604	55,649	9,458	290,712	132,792	T14	494,165
T15	47,362	18,614	55,649	9,462	290,712	135,477	T15	494,165
T16	47,362	18,411	55,649	9,493	290,712	138,480	T16	494,165
T17	47,362	18,936	55,649	9,499	290,712	139,553	T17	494,165
BLG Upper	79,383	17,281	78,344	99,999	343,729	227,291		
BLG Lower	47,362	12,236	55,649	1,969	290,514	129,712		

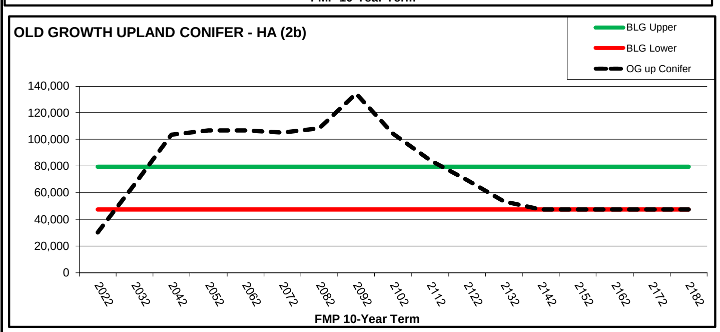
5,000
ha used

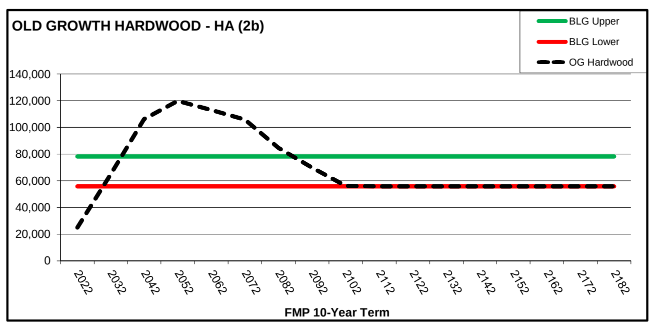
Key Boreal Landscape Guide Indicators:

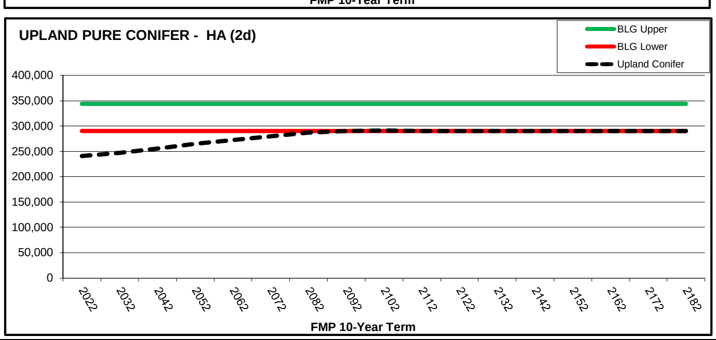
(Highlights challenges)

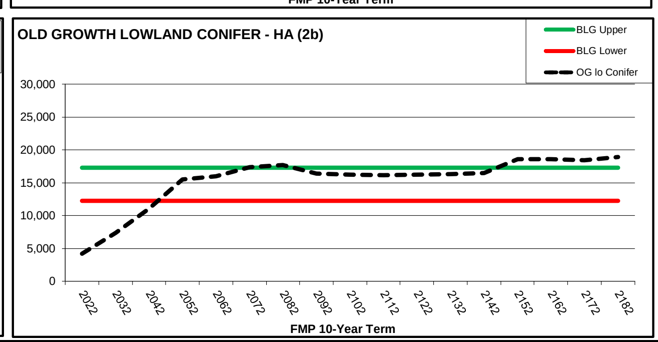












KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: FinalTest5 for Final Plan **Date:** Oct. 14, 2021.

Purpose: To confirm planned harvest in the Final Plan is consistent with objective achievement projected for LTMD-07. The initial land base was revised to include major wildfires in 2021 (incl. KEN51 in caribou zone) which highlights impacts of 2021 fires. Forecast depletions and reserves updated also.

Specific Inputs: LTMD-07 with planned harvest areas Term 1 (all successfully imported 38,110 ha planned versus 38,109 ha FMP-12).
Deleted T1 volume targets, added T2 min. vol. targets to approx. LTMD-07 T2 results. SPF reduced to 210, TOT reduced to 425 to allow for same flow constraints.

Group:	T2 Mm3/yr		Vol. Flow
PWR	2.0		
SPF	210.0	T1	+/- 10%
PO	184.0	T1	+/- 15%
BW		T1	
TOTAL	425.0	Binding.	+/- 10%

BLG Targets and Achievement:
PRW 19,000 ha T17 (reduced as harvest / conversion reduced, trage-off with OGhwd)
DCHS harvest off T1 and T2. Stability of Harvest: max increased to SBD, SBL and SBM = 60%
Young increased T1-T3, as it now achieves IQR all terms. **Budget:** Balanced to revenues
Car zone habitat del T1-T4, as yung forest needs time to age into suitable habitat.
UpCon target reduced T10-T17 to min IQR. OGhwd target reduced to min IQR T17.

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 - Overall very good BLG indicator achievement. PRW all ages is maintained, but cannot go above 19,000 ha T17 with current T1 harvest. Operational Pr planting likely to exceed FinalTest projections.
Except for Caribou Habitat (burns nned 40 years to age into suitable habitat), BLG achievement comparable to LTMD-07.
Available Forest reduced in FinalTest due to actual reserve area included (more reserve areas than LTMD).

(2a) Area by Landscape Class (Productive ha)

Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	148,288	76,997	61,777	14,574	180,569	138,026	32,020
T2	152,658	75,600	67,094	18,465	175,907	128,763	31,966
T3	168,105	73,234	69,154	21,382	163,592	121,219	31,760
T4	80,554	155,131	70,272	23,237	169,202	116,783	31,347
T5	82,824	154,962	76,777	24,802	169,943	106,595	28,494
T6	84,701	169,703	80,540	24,956	158,977	97,559	26,067
T7	88,754	172,746	77,144	28,749	152,976	98,015	23,354
T8	92,299	96,101	69,475	35,428	220,370	97,849	29,658
T9	94,581	100,419	61,960	41,896	220,249	93,504	27,668
T10	97,027	104,640	56,351	46,413	219,852	88,640	26,550
T11	97,033	111,033	52,387	50,036	217,586	83,582	26,188
T12	99,016	114,802	51,790	51,864	213,115	78,117	27,370
T13	104,988	118,527	50,454	53,351	204,960	74,957	28,444
T14	108,972	119,244	50,634	53,696	200,148	72,226	30,195
T15	108,059	120,950	51,184	53,630	196,447	69,333	35,108
T16	102,401	127,093	51,963	51,734	196,717	68,241	36,338
T17	97,919	130,738	52,782	55,651	199,814	64,181	33,182
BLG Upper	181,443	52,727	145,430	17,982	224,820	65,215	28,328
BLG Lower	101,058	29,333	81,015	12,782	152,976	43,706	23,354

(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	23,416	3,980	21,178	1,928	241,172	183,262
T2	58,200	7,046	61,008	3,389	244,895	194,506
T3	84,239	10,128	94,715	6,075	252,184	220,139
T4	86,316	13,960	100,281	8,356	262,422	182,884
T5	88,154	12,816	97,964	9,295	270,429	135,784
T6	87,803	15,183	92,724	9,689	277,971	135,214
T7	90,513	16,132	74,821	8,891	285,841	135,307
T8	85,542	13,678	58,827	8,676	290,712	136,171
T9	68,267	12,977	56,299	8,498	291,523	136,201
T10	52,121	12,236	55,649	8,568	291,000	137,083
T11	75,164	12,236	55,649	8,617	290,712	137,391
T12	63,237	12,236	55,649	8,684	290,712	139,256
T13	53,106	12,236	55,649	8,802	290,810	145,304
T14	51,472	12,236	55,649	9,235	290,712	149,568
T15	50,875	12,236	55,649	10,098	290,712	150,226
T16	51,129	12,266	55,649	10,339	290,712	147,243
T17	53,780	18,743	55,649	10,662	290,712	143,400
BLG Upper	79,383	17,281	78,344	99,999	343,729	227,291
BLG Lower	47,362	12,236	55,649	1,969	290,514	129,712

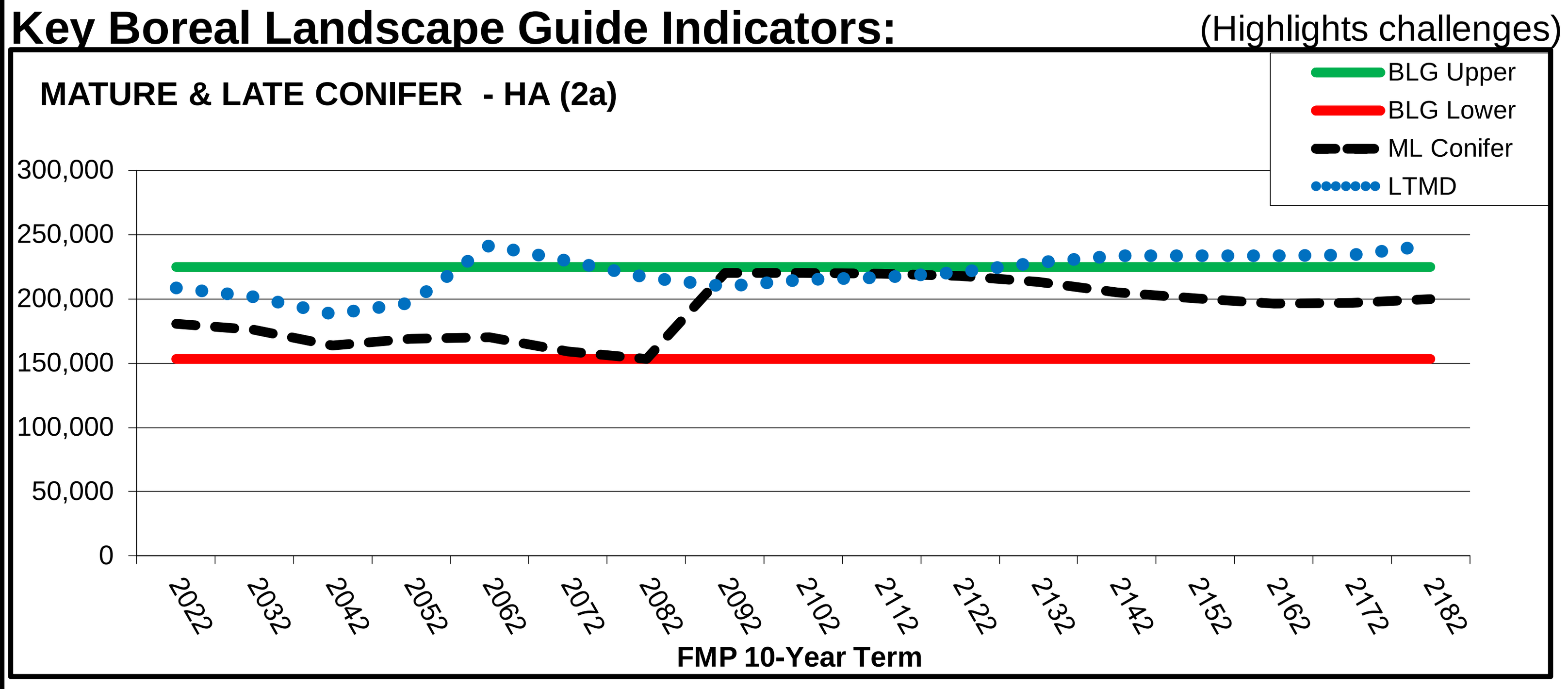
5,000 ha used

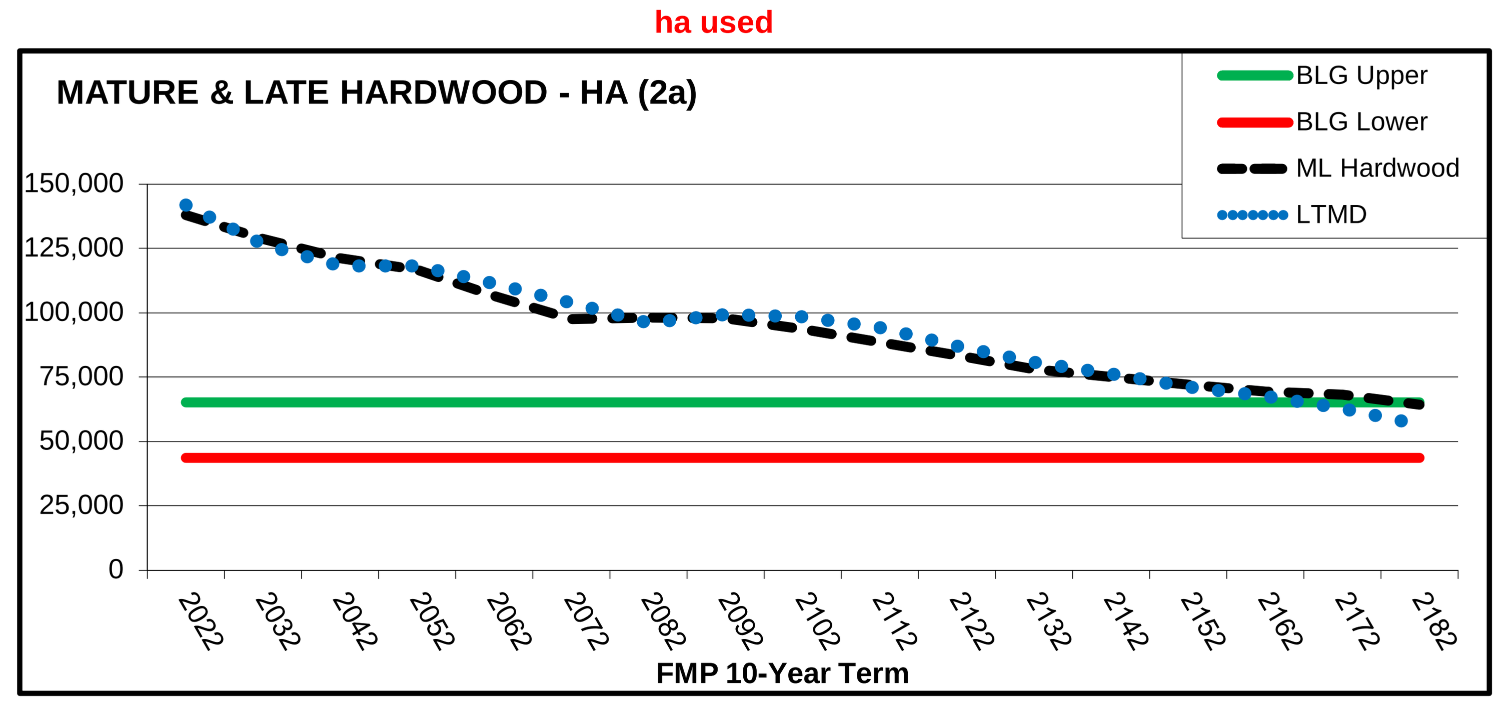
(6a) Available Forest:

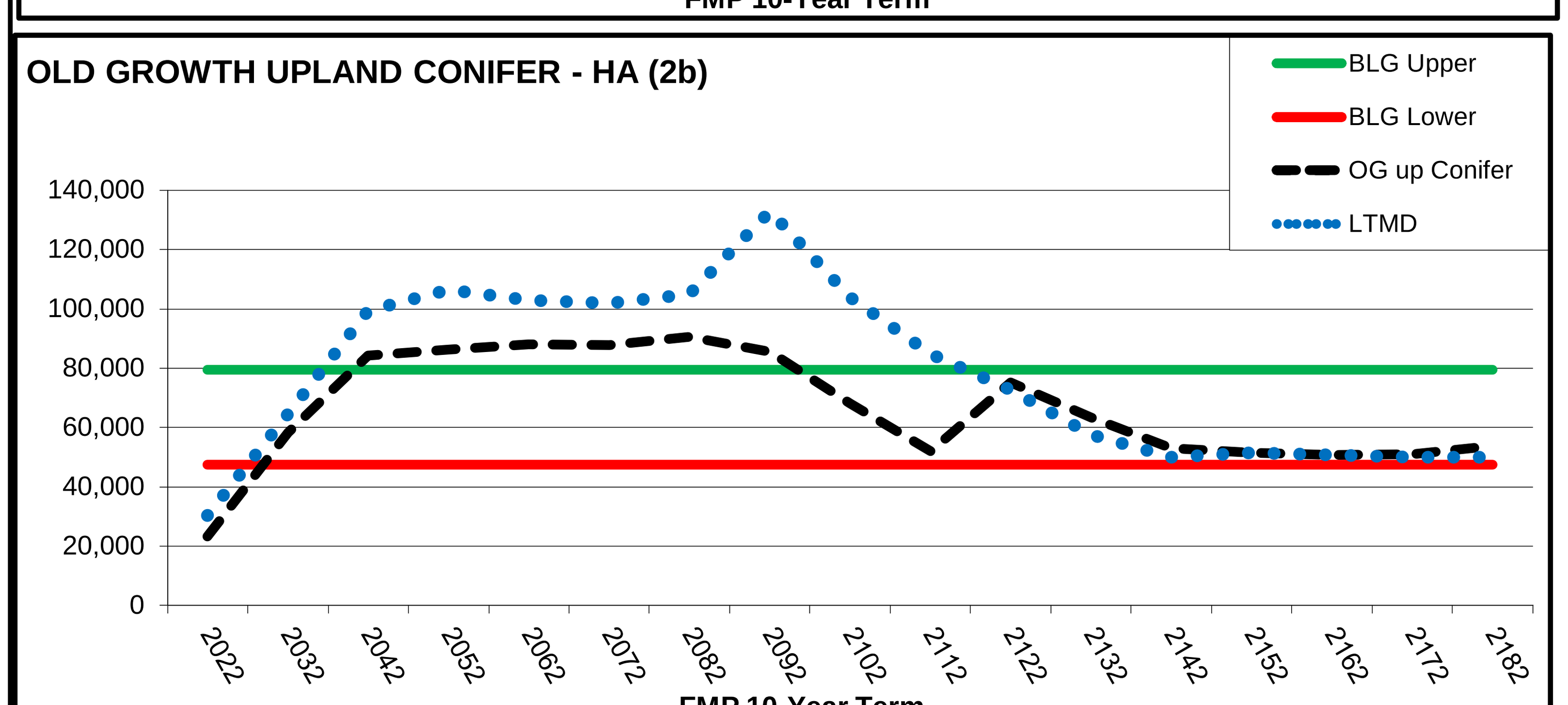
Term	
T1	469,447
T2	467,649
T3	465,702
T4	463,908
T5	462,063
T6	460,627
T7	460,493
T8	460,464
T9	460,157
T10	460,031
T11	459,869
T12	459,869
T13	459,869
T14	459,869
T15	459,869
T16	459,869
T17	459,869

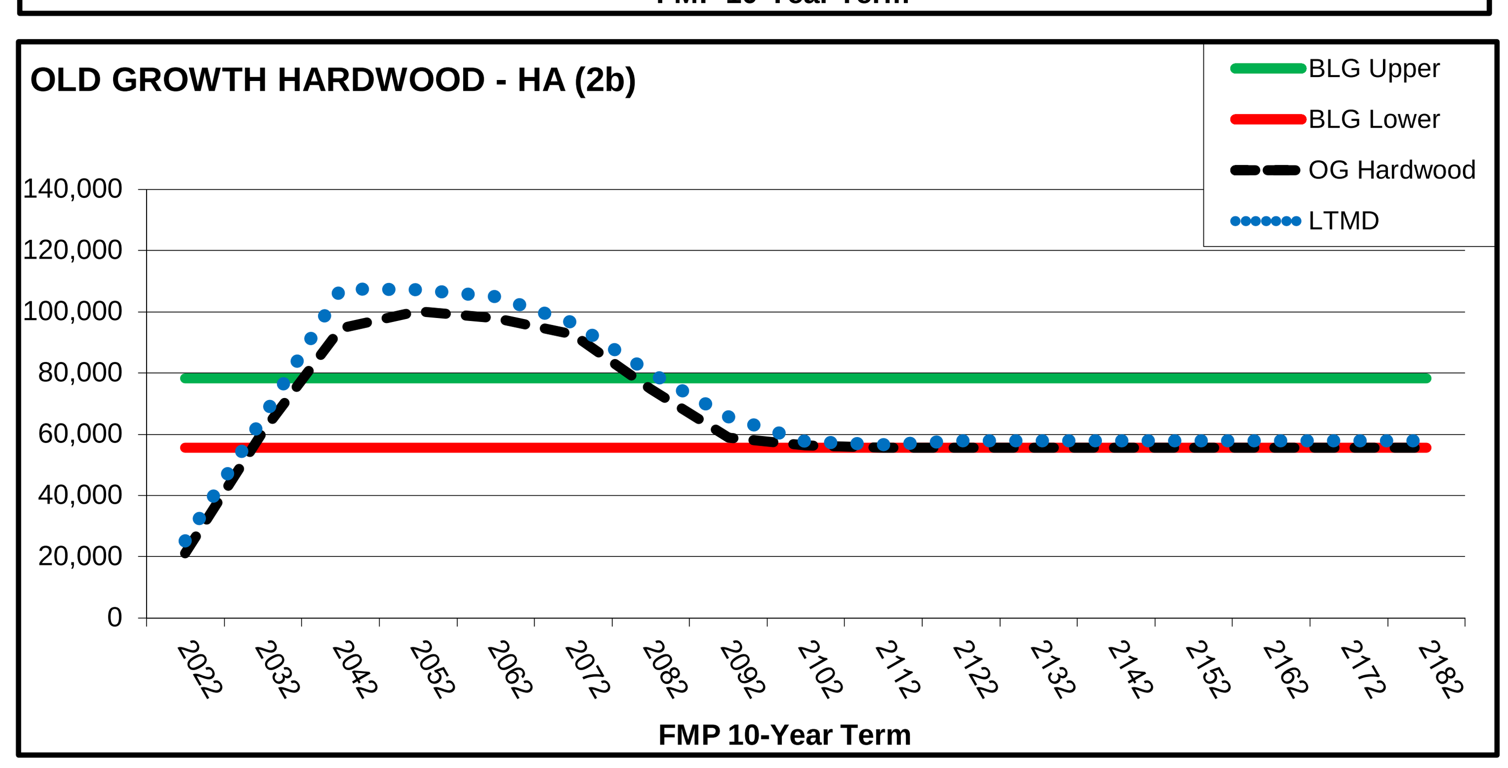
Key Boreal Landscape Guide Indicators:

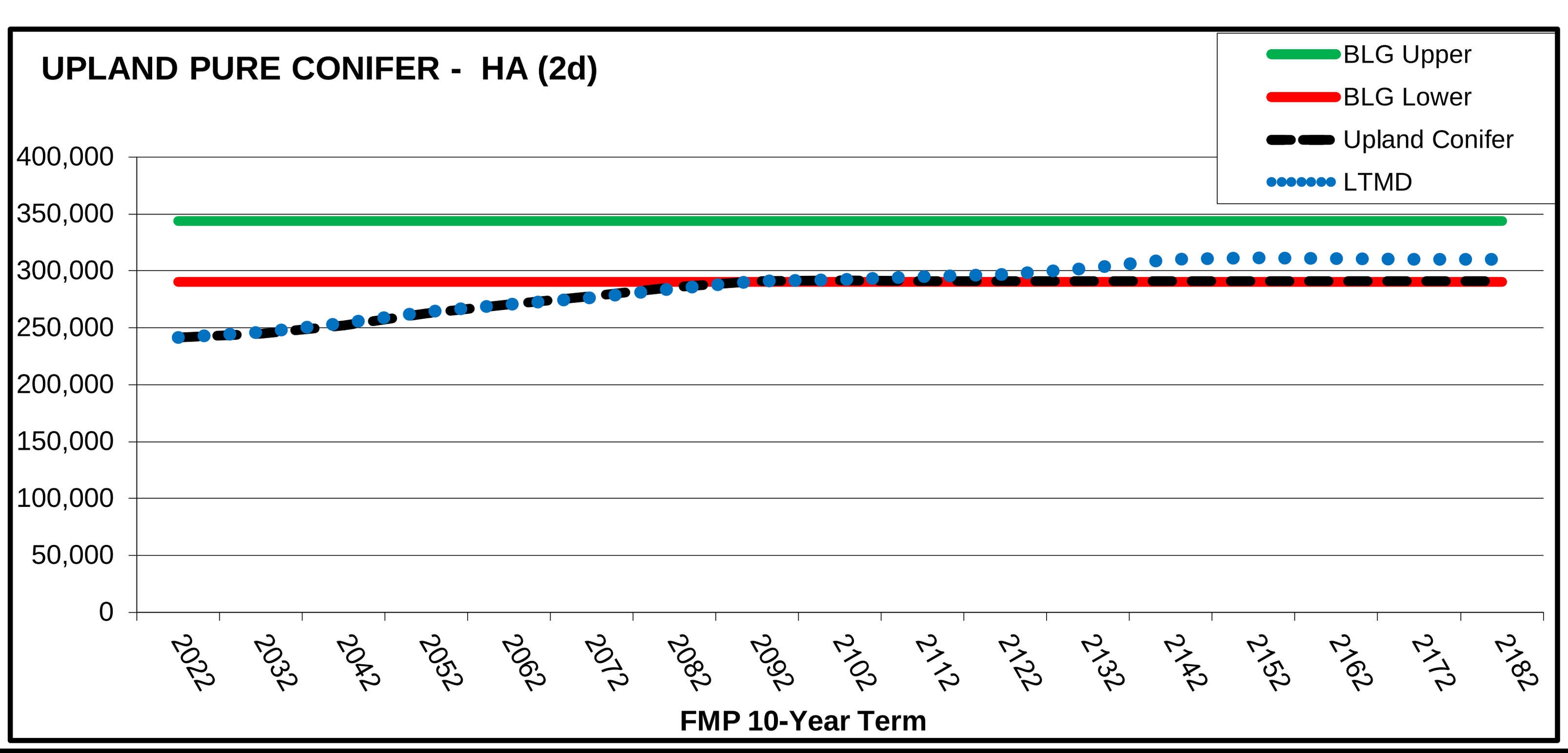
(Highlights challenges)

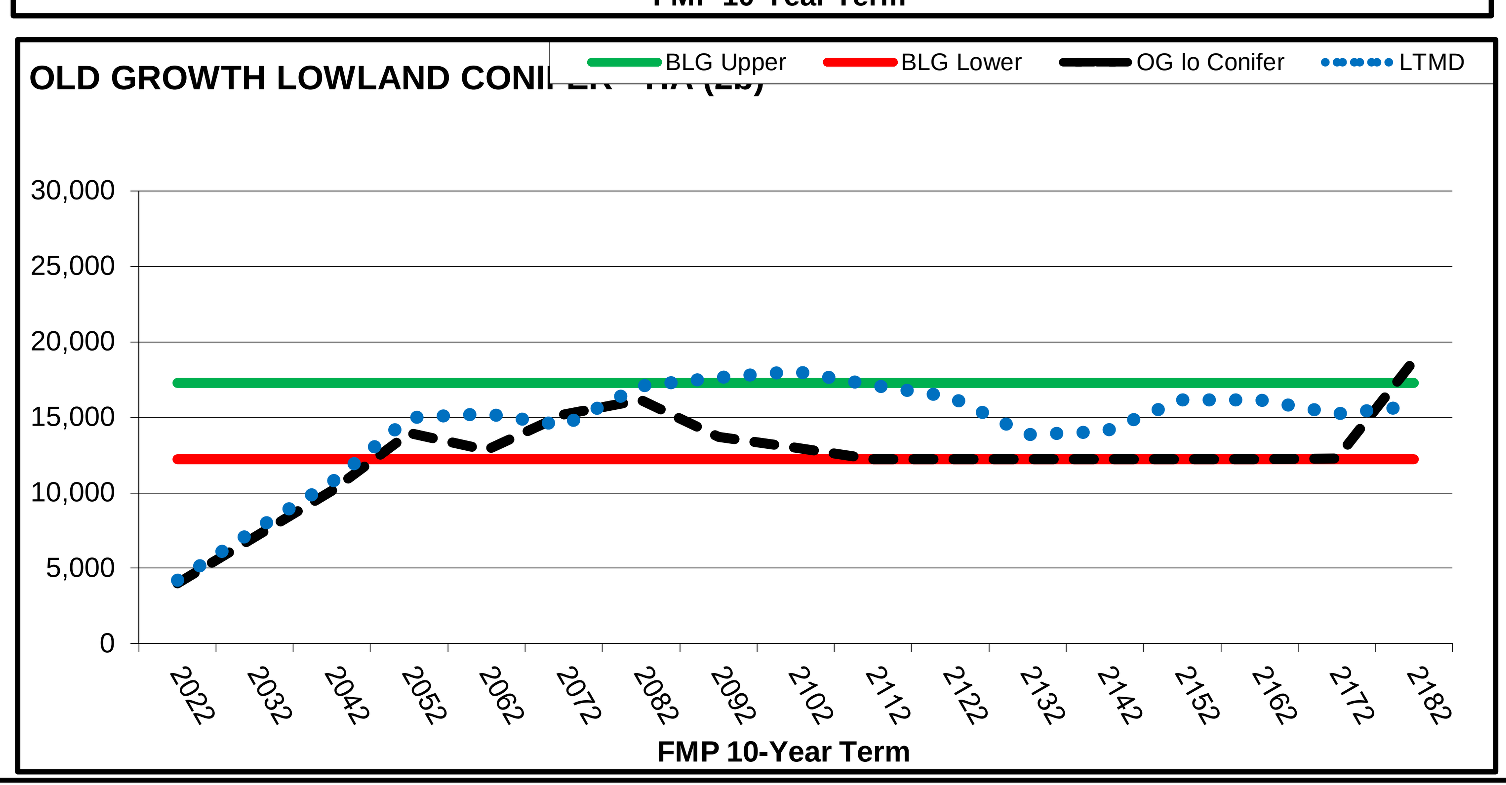












KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

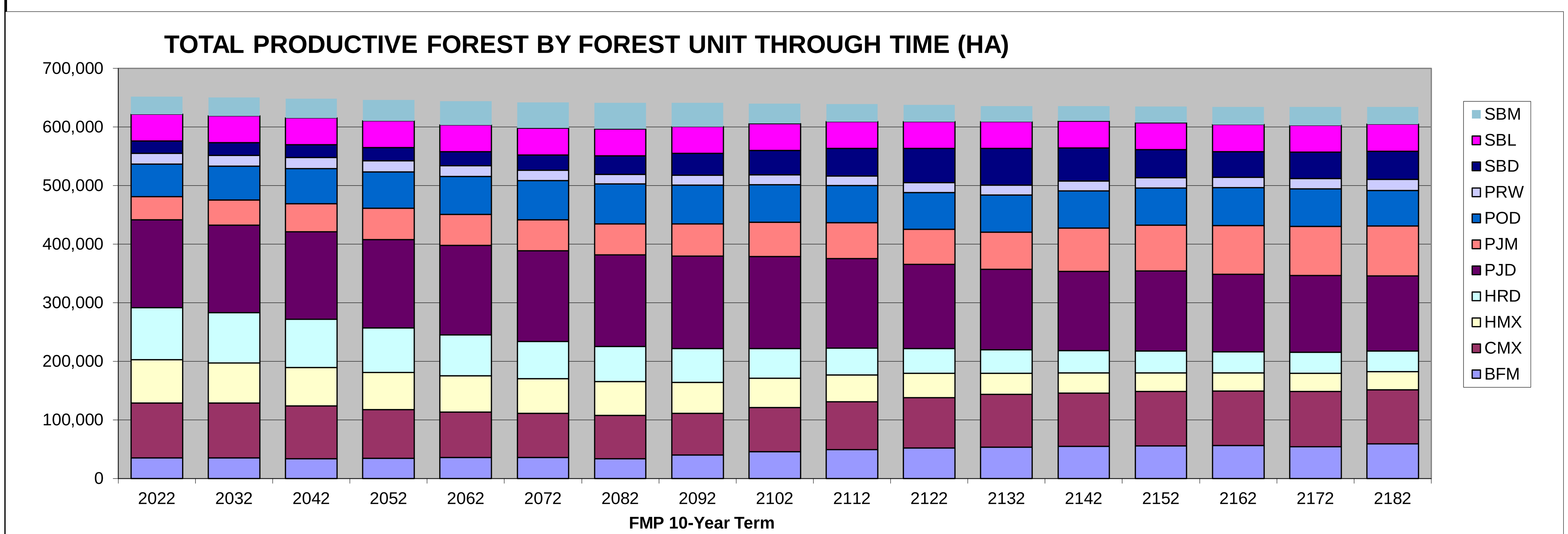
Case Name: **FinalTest5 for Final Plan**

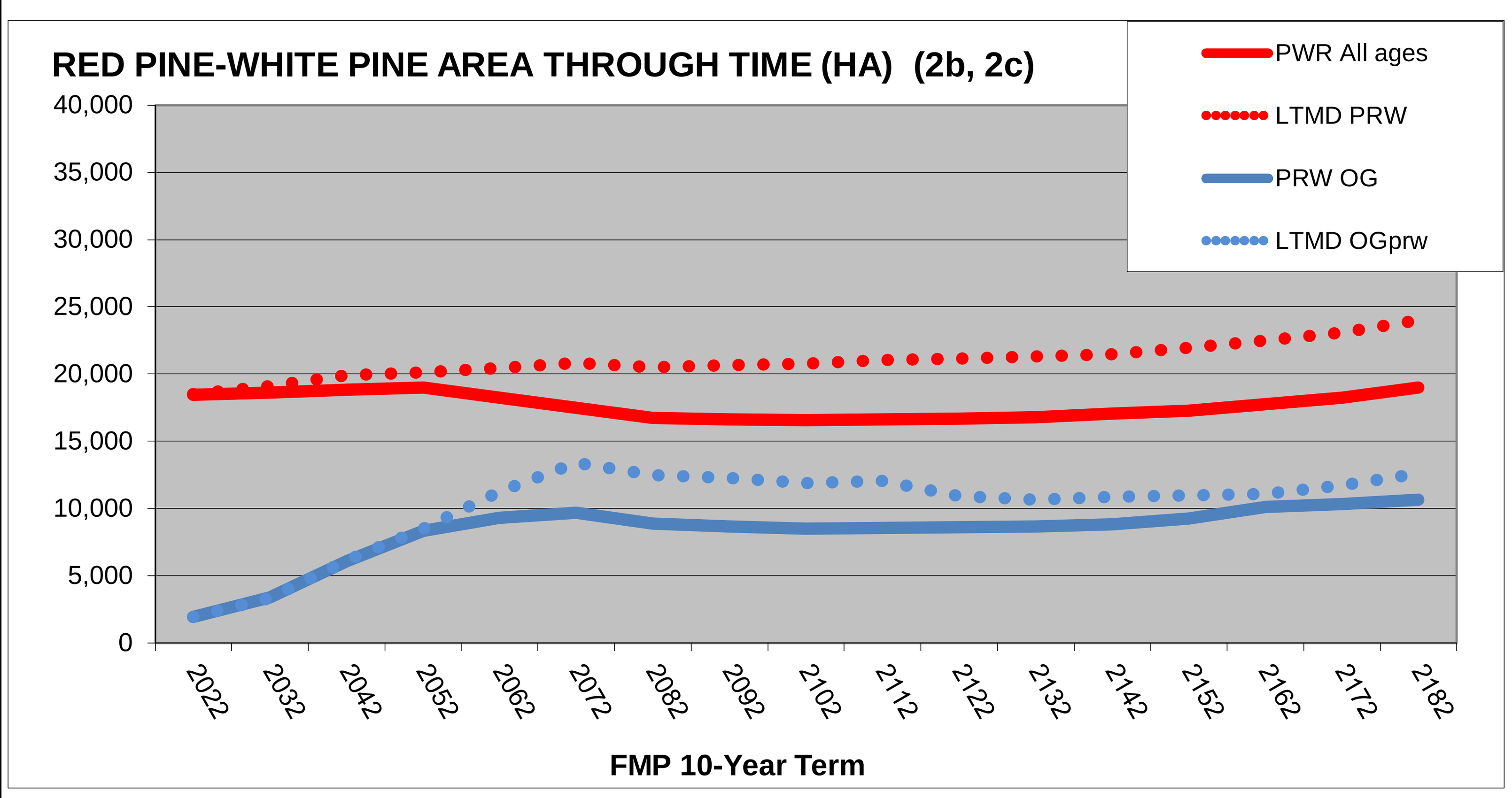
Date: Oct. 14, 2021.

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	652,250	34,934	93,666	74,582	88,200	149,977	39,966	55,484	18,487	20,977	45,725	30,253
T2	650,452	35,016	93,581	68,422	86,397	149,061	43,092	57,755	18,639	21,366	45,747	31,375
T3	648,447	33,890	90,318	64,977	82,587	149,548	47,994	59,814	18,859	21,869	45,818	32,773
T4	646,527	34,513	83,056	63,392	75,808	151,016	53,316	62,424	19,024	22,311	45,889	35,779
T5	644,396	35,837	77,563	61,963	69,454	153,175	52,787	65,126	18,236	23,588	45,788	40,880
T6	642,504	35,958	75,275	59,198	63,599	154,660	52,677	67,284	17,481	26,301	45,738	44,333
T7	641,738	33,603	74,282	57,408	59,912	156,883	52,505	68,172	16,761	31,617	45,760	44,836
T8	641,180	39,961	71,136	53,279	57,362	157,911	55,187	66,335	16,621	37,034	45,774	40,581
T9	640,277	45,626	75,822	49,389	51,361	156,607	58,828	64,172	16,596	41,870	45,787	34,218
T10	639,471	49,195	81,706	46,133	45,677	152,627	61,280	63,331	16,634	46,956	45,794	30,137
T11	637,845	52,132	86,152	41,055	42,562	144,003	59,833	62,747	16,688	58,255	45,796	28,621
T12	636,074	53,553	89,945	36,116	39,963	137,499	63,739	63,188	16,785	62,556	45,813	26,919
T13	635,681	55,026	90,926	34,021	38,526	135,403	73,456	63,456	17,068	56,389	45,848	25,561
T14	635,113	55,613	92,825	31,834	37,107	136,666	78,263	63,825	17,300	47,961	45,897	27,822
T15	634,711	55,985	93,080	31,445	35,408	132,700	83,441	64,363	17,754	44,011	45,964	30,560
T16	634,487	54,517	93,788	31,615	35,497	131,459	83,278	64,100	18,238	44,475	46,020	31,500
T17	634,267	58,812	92,327	31,414	35,298	128,066	85,361	60,638	19,000	47,836	46,067	29,449

(1a) Caribou Habitat (Caribou Zone):

Term	Refuge	Winter
T1	52,259	5,348
T2	52,451	7,087
T3	52,484	7,174
T4	52,615	7,126
T5	69,027	55,338
T6	69,131	55,445
T7	72,210	64,400
T8	78,714	64,386
T9	76,751	57,567
T10	75,768	55,217
T11	74,582	52,655
T12	68,960	42,855
T13	69,612	50,055
T14	68,966	49,099
T15	69,727	53,261
T16	73,393	57,637
T17	75,024	58,635
BLG Upper	61,458	45,161
BLG Lower	54,045	18,667





All ages PRW - desirable level "to increase"
Target in SFMM T17 of 19,000 ha
BLG incr towards ~39,000 ha

Old Growth PRW - desirable level "to increase"
used 5,000 ha in SFMM (overachieved)

PRW achieves 19,000 ha over 160 years. Target reduced in Final Test5 due to decreased harvest area T1 (less opportunity for early conversion).

KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: FinalTest5 for Final Plan

Date: Oct. 14, 2021.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply -

Harvest based on Stage 5 Final planned harvest areas. Close to allocation by subunit (more Z02, Z05, less caribou B, DEA1, Z08, Z12).
Planned harvest 1,050 ha less per year (80% of LTMD), causes lower volume T1 (TOTAL 388K (down 22%) and SPF 192K).
However stand-level volume (FMP-13) is only 12% lower than LTMD (difference MIST vol. calc.).

Renewal assumptions and balance of renewal treatments, same as LTMD.

Available Harvest Area by Term Data (hectares harvested annually) by Forest Unit

Final Plan - dropped all planned harvest on CAR zone.

Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM	LTMD TOTAL
T1 (6b)	3,810	56	400	958	456	1,074	3	738	13	26	35	52	4,859
T2	4,125	270	545	713	644	1,013	4	769	14	26	43	83	4,337
T3	3,811	215	679	499	907	784	6	538	21	42	70	50	3,953
T4	3,875	335	571	518	801	624	8	377	168	67	326	79	3,999
T5	3,871	500	542	643	552	736	10	264	189	107	257	72	4,288
T6	3,941	730	448	477	311	882	13	288	220	172	285	116	3,721
T7	3,891	101	598	394	232	1,071	17	374	80	275	565	185	3,670
T8	3,864	43	432	276	147	1,393	22	487	91	440	238	296	3,713
T9	3,995	18	298	247	100	1,710	28	606	4	368	164	453	3,744
T10	3,945	22	413	321	113	1,572	37	563	7	420	115	362	3,692
T11 (6b)	4,060	194	365	410	136	1,179	48	401	8	672	210	438	
T12	4,529	140	276	338	141	1,532	62	522	5	929	153	431	
T13	4,395	236	359	439	203	1,151	81	387	8	1,160	112	259	
T14	4,068	172	468	307	235	1,404	105	444	7	696	75	155	
T15	3,996	291	399	273	159	1,507	136	522	8	418	116	169	
T16	4,078	91	393	355	126	1,454	177	475	7	251	480	270	

	Natural	Plant	Seed
T1	58%	10%	33%
T2	56%	8%	35%
T3	55%	10%	35%
T4	51%	12%	37%

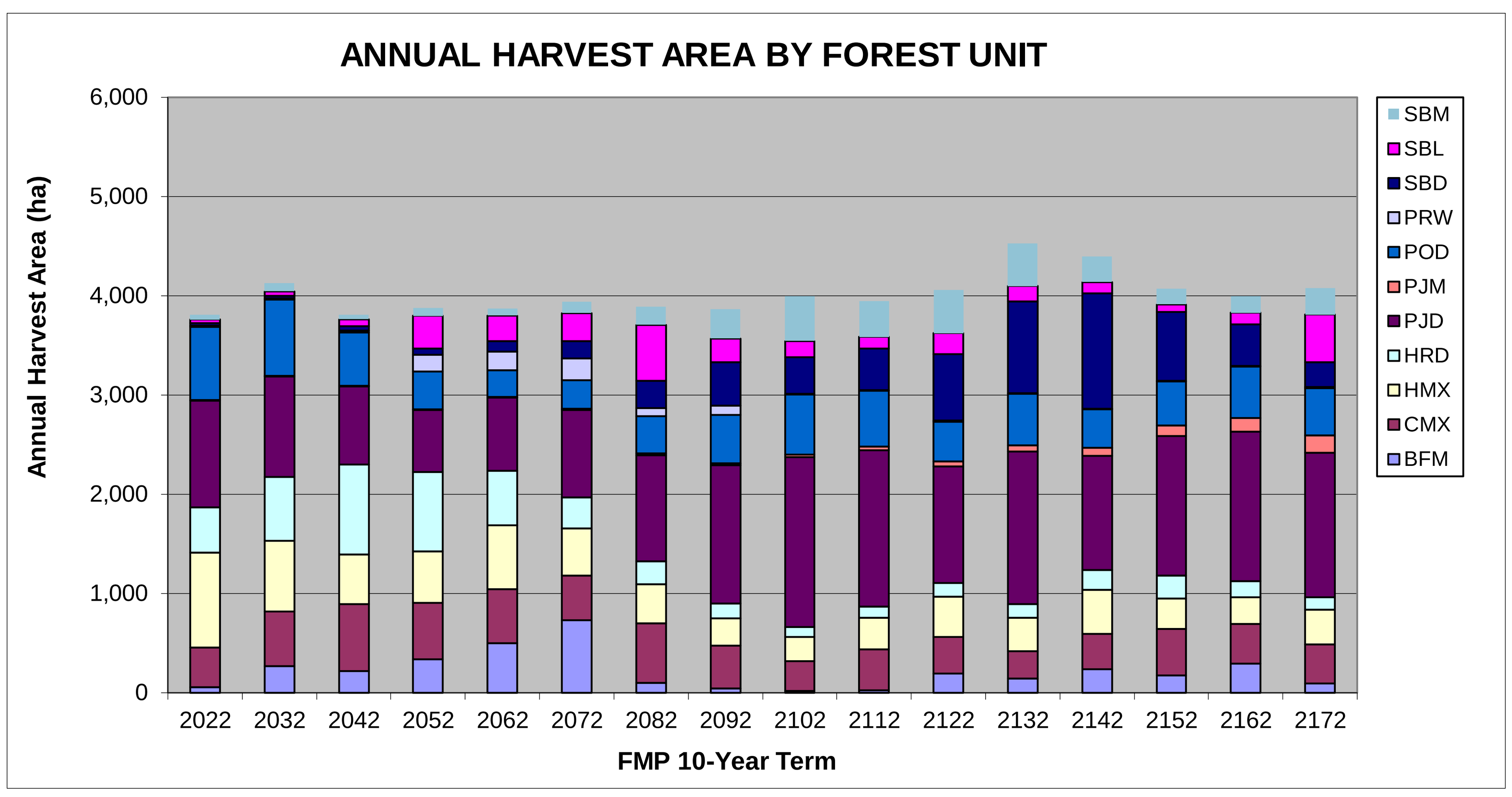
* See AU breakdown of treated area below.

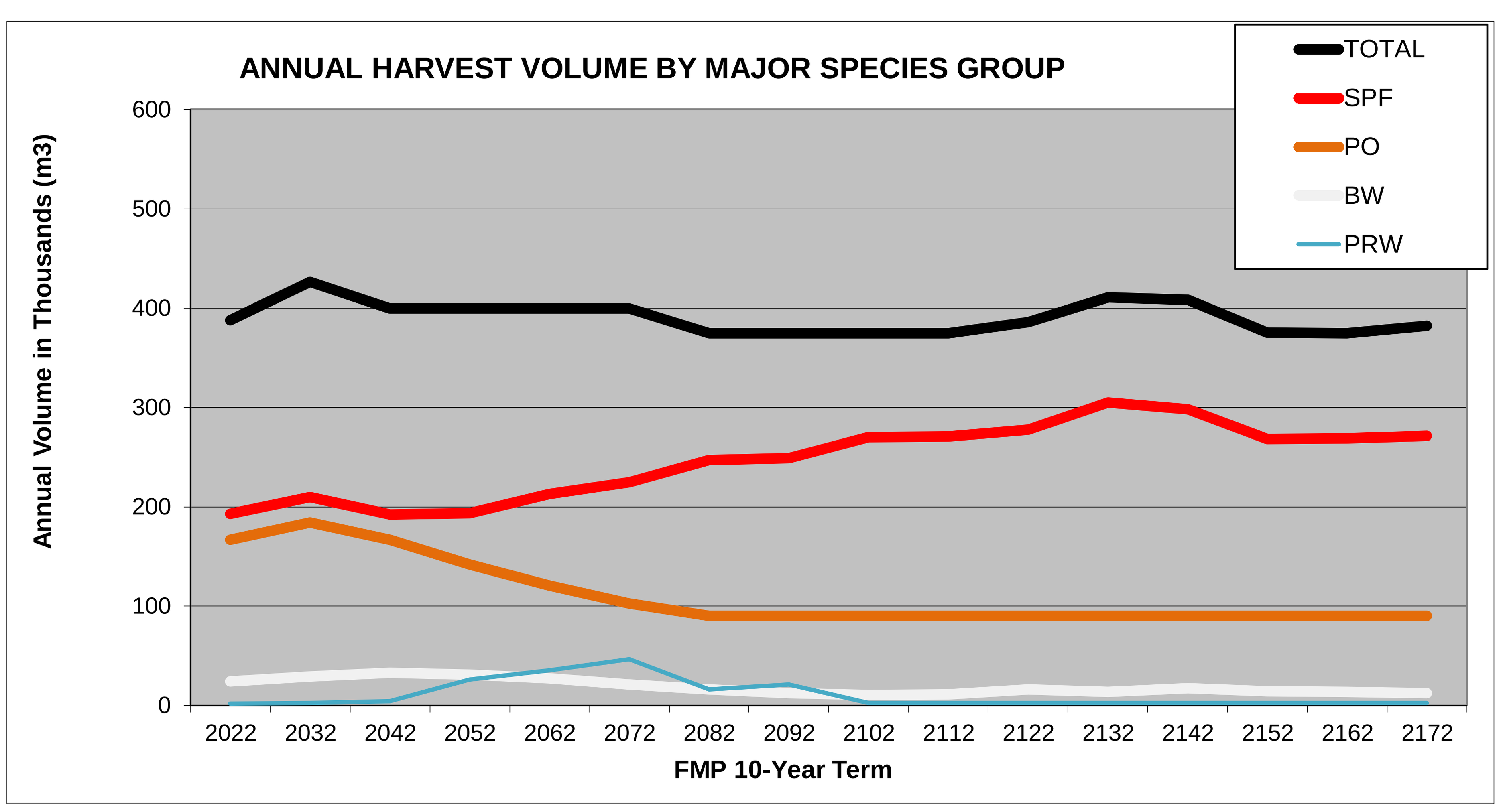
Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	(6d) Prop. By Size Small	Large	LTMD TOTAL
T1 (6c)	387.6	193.2	166.6	23.8	1.9	0.96	0.04	487.2
T2	426.3	210.0	184.0	29.2	2.0	0.92	0.08	438.5
T3	400.0	192.1	166.6	33.1	4.5	0.90	0.10	400.0
T4	400.0	193.5	141.6	30.7	26.3	0.94	0.06	400.0
T5	400.0	212.9	120.4	26.9	35.0	0.94	0.06	400.0
T6	400.0	224.6	102.3	21.3	46.3	0.90	0.10	400.0
T7	375.0	247.0	90.0	16.0	16.3	0.96	0.04	375.0
T8	375.0	249.1	90.0	12.3	21.1	0.96	0.04	375.0
T9	375.0	270.1	90.0	10.6	2.0	0.98	0.02	375.0
T10	375.0	270.8	90.0	10.8	2.0	1.00	0.00	375.0
T11 (6c)	386.2	277.3	90.0	16.0	2.0	0.94	0.06	375.0
T12	410.9	305.0	90.0	13.3	2.0	0.94	0.06	375.0
T13	408.2	298.2	90.0	17.1	2.0	0.96	0.04	375.0
T14	375.3	268.4	90.0	14.3	2.0	0.97	0.03	375.0
T15	375.0	269.1	90.0	13.4	2.0	0.98	0.02	375.0
T16	382.2	271.3	90.0	12.5	2.0	0.99	0.01	375.0
Average	390.7	247.1	111.4	18.8	10.6			

Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal ha	Natural ha	Plant ha	Seed ha
T1	1,381	1,381	0	3,772	2,178	359	1,235
T2	1,504	1,504	0	4,084	2,293	347	1,445
T3	1,413	1,413	0	3,772	2,077	364	1,332
T4	1,595	1,595	0	3,836	1,948	452	1,436
T5	1,749	1,749	0	3,871	1,741	440	1,689
T6	1,895	1,895	0	3,938	1,572	362	2,004
T7	1,758	1,758	0	3,891	1,685	263	1,943
T8	1,793	1,793	0	3,857	1,697	240	1,920
T9	1,754	1,754	0	3,992	1,798	90	2,105
T10	1,753	1,753	0	3,945	1,722	114	2,109
T11	1,795	1,795	0	4,060	1,762	144	2,154
T12	1,957	1,957	0	4,529	2,133	106	2,291
T13	1,922	1,922	0	4,395	1,970	157	2,268
T14	1,739	1,739	0	4,068	2,008	147	1,913
T15	1,742	1,742	0	3,996	1,986	196	1,815
T16	1,780	1,780	0	4,078	2,266	395	1,417





TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA	T1 - LTMD
A1					-
A2					-
B1					153
B2					169
C			9	56	-
D					-
DEA1	119	192	121	131	235
E					-
ELK	268	94	242	219	236
MEA1	184	452	398	485	201
MEA2	359	220	296	150	382
MEA3	11	108	36	72	128
MEA4	57	55	25	43	93
Z01					-
Z02	166	130	140	299	48
Z03	16	49	28	25	12
Z04	192	216	300	365	265
Z05	216	118	181	192	115
Z06	71	148	236	203	154
Z07	256	312	383	213	265
Z08	63	229	308	134	283
Z09	173	132	180	103	198
Z10	309	280	368	383	338
Z11	499	319	131	359	546
Z12	679	526	296	208	717
Z13	171	39	33	80	141
Z14		482	97	147	-
Z15		25	2	8	179
TOTAL	3,810	4,125	3,811	3,875	4,859

Z01 turned OFF all terms (islands)

Harvest area good for T1-T4 for MEA1 and Z12

KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: **FinalTest5 for Final Plan**

Date: Oct. 14, 2021.

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				36							18						
A65	9	1		120			67	36			108						
A75	10	43		130	1		79	27	1		83						2
A85	9	135		255			114	296	92		173	1					4
A95	18	121		370	2		182	429	92	3	330	3	6	10			5
A105	7	62	1	43	2		8	29	45		21			8	4		29
A115	2	28		3	1			5	5		5	1		6	5		8
A125	1	7		1				2	8					2	20		4
A135		2						5				3			3		
A145																	
A155															3		
A165																	
A175															1		
A185																	
A195																	
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	56	399	1	958	6	0	450	829	245	3	738	7	6	26	35	0	52

Total: **3,810**

Renewal Area by Treatment Type - Term 1

	Total	Natural	Plant	Seed
BFM_	55	-	-	55
CMX_	395	17	-	379
CMXC	1	-	-	1
HMX_	948	711	237	-
HRDA	6	4	1	-
HRDB	-	-	-	-
HRD_	445	334	111	-
PJDD	821	246	-	574
PJDS	242	73	-	170
PJM_	3	1	-	2
POD_	730	730	-	-
PRWR	7	2	5	-
PRWW	6	1	4	-
SBD_	26	8	-	18
SBL_	35	35	-	-
SBLC	-	-	-	-
SBM_	51	15	-	36
	3,772	**2,178**	**359**	**1,235**

Available Harvest Area by Analysis Unit

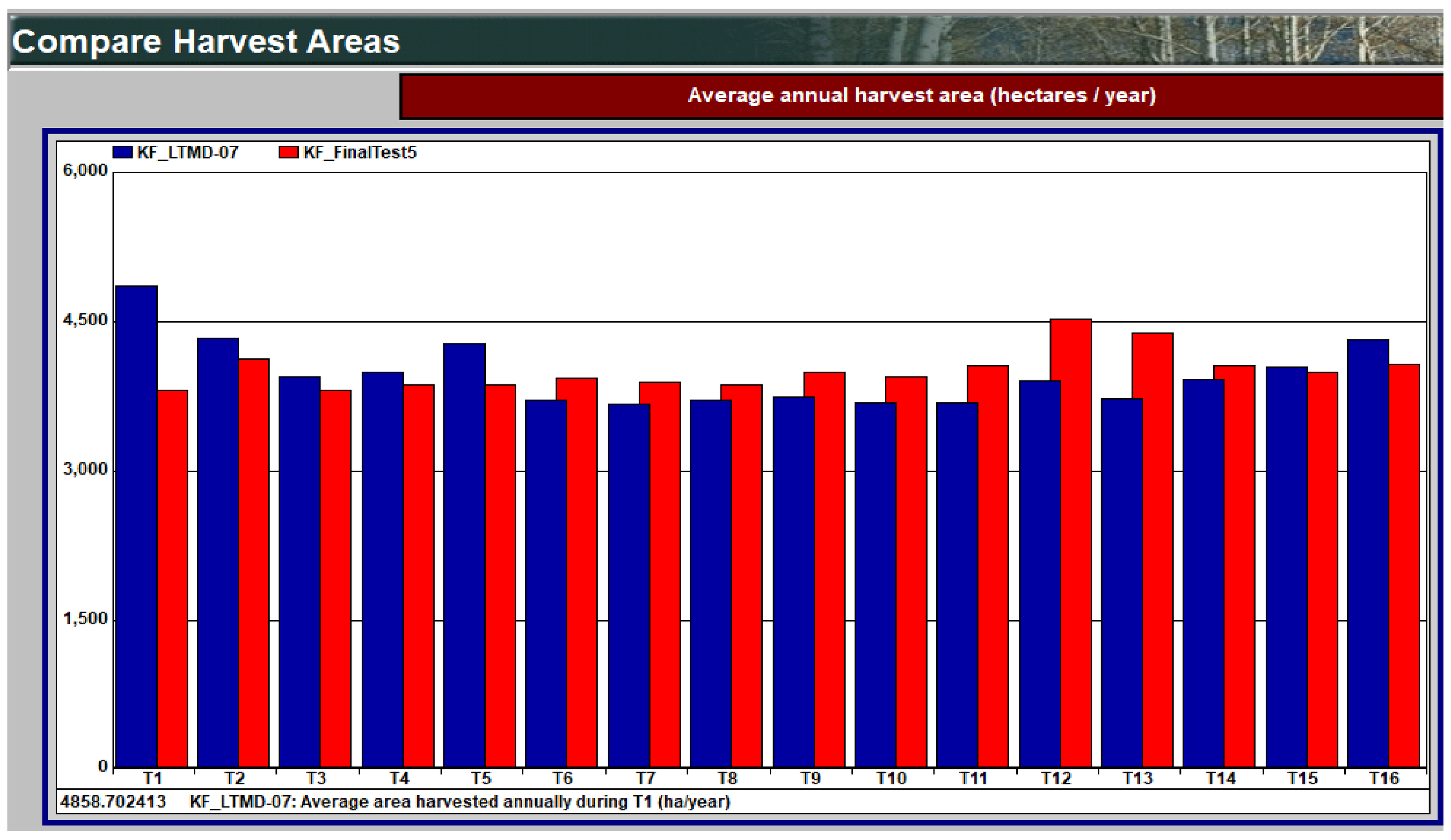
Forest Unit: (Analysis Unit)

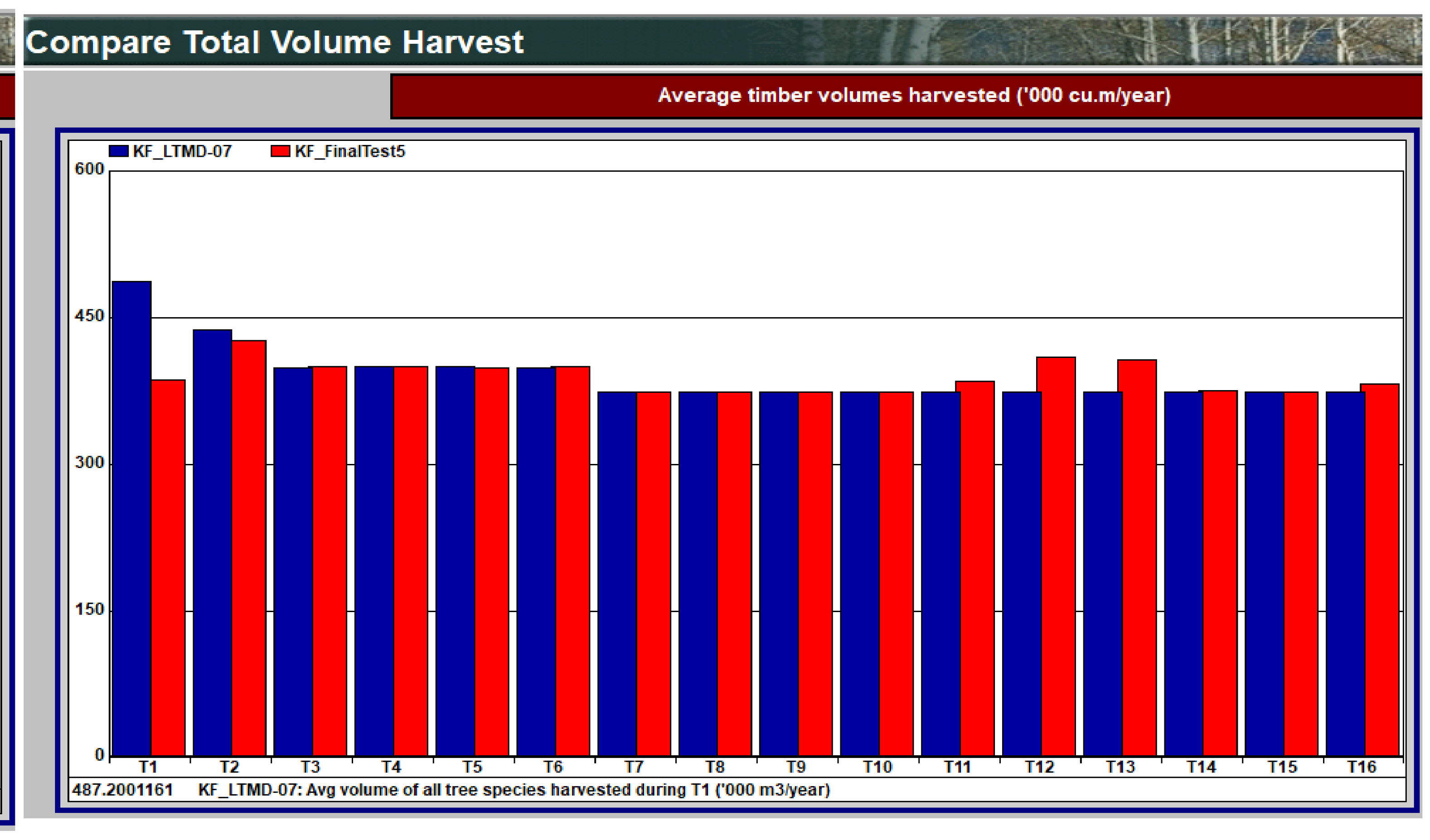
Term	BFM_	CMX_	CMXC	HMX_	HRDA	HRDB	HRD_	PJDD	PJDS	PJM_	POD_	PRWR	PRWW	SBD_	SBL_	SBLC	SBM
T1	56	399	1	958	6		450	829	245	3	738	7	6	26	35		52
T2	270	519	26	713	86	9	549	763	250	4	769		14	26	43		83
T3	215	440	239	499	179	14	714	534	250	6	538		21	42	70		50
T4	335	571		518	162	47	592	374	250	8	377	22	147	67	111	215	79
T5	500	542		643	89	49	415	486	250	10	264	110	79	107	178	78	72
T6	730	448		477		20	290	632	250	13	288	220		172	285		116
T7	101	583	15	394	5	24	203	821	250	17	374	61	19	275	334	231	185
T8	43	426	6	276		5	142	1,068	325	22	487	91		440	234	4	296
T9	18	298	0	247		0	100	1,388	322	28	606	4		368	164		453
T10	22	381	33	321		32	81	1,200	372	37	563	7		420	115		362
T11	194	346	19	410	10	20	105	918	260	48	401	8		672	183	27	438
T12	140	276		338		5	137	1,194	339	62	522	5		929	153		431
T13	236	359		439	25	0	178	901	250	81	387	8		1,160	107	5	259
T14	172	467	1	307	19	0	216	1,154	250	105	444	7		696	75		155
T15	291	398	1	273	8		151	1,257	250	136	522	8		418	116		169
T16	91	392	1	355	20		106	1,204	250	177	475	7		251	186	294	270

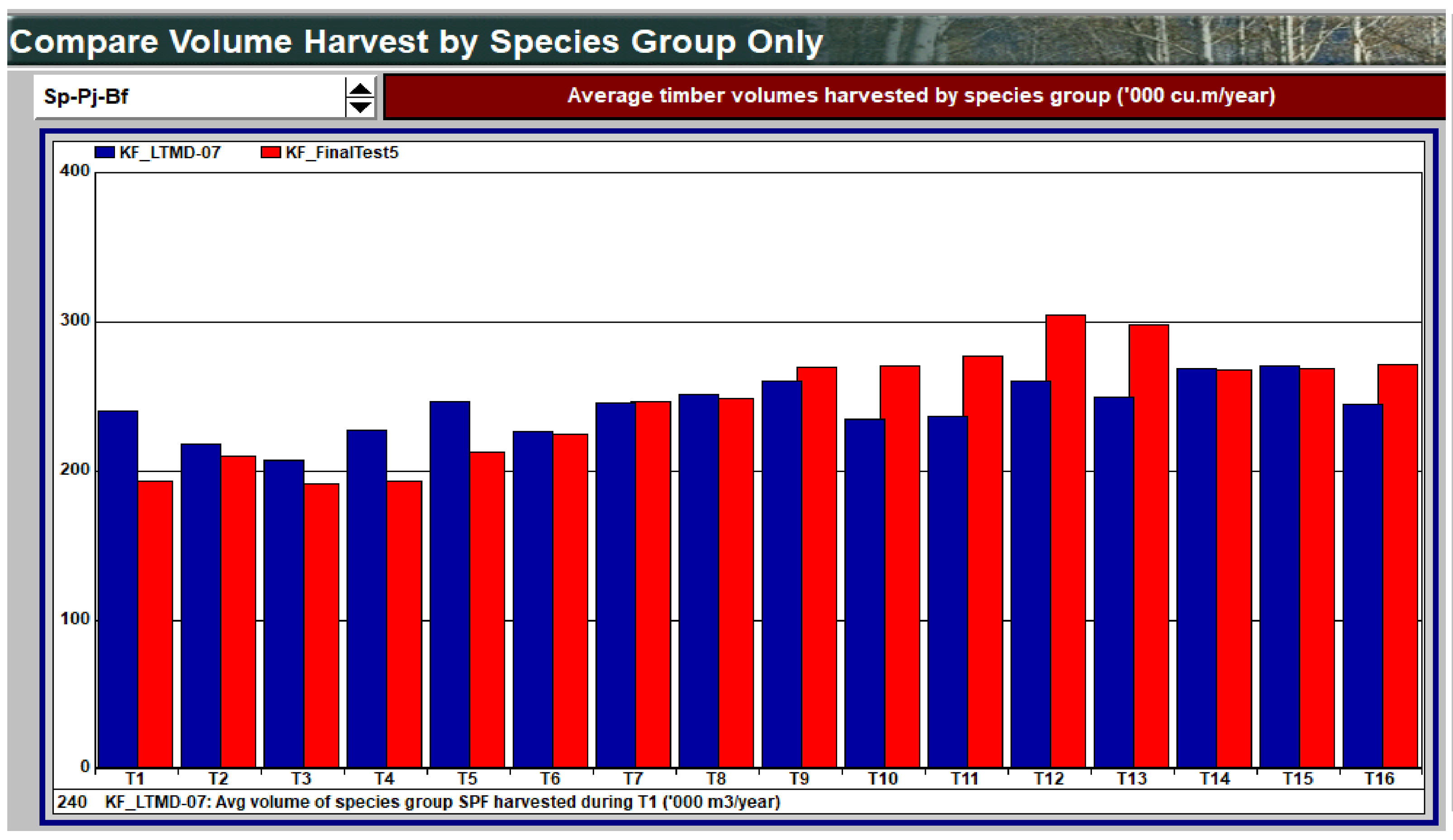
KENORA FOREST 2022 FMP **SUMMARY of SFMM INVESTIGATION**

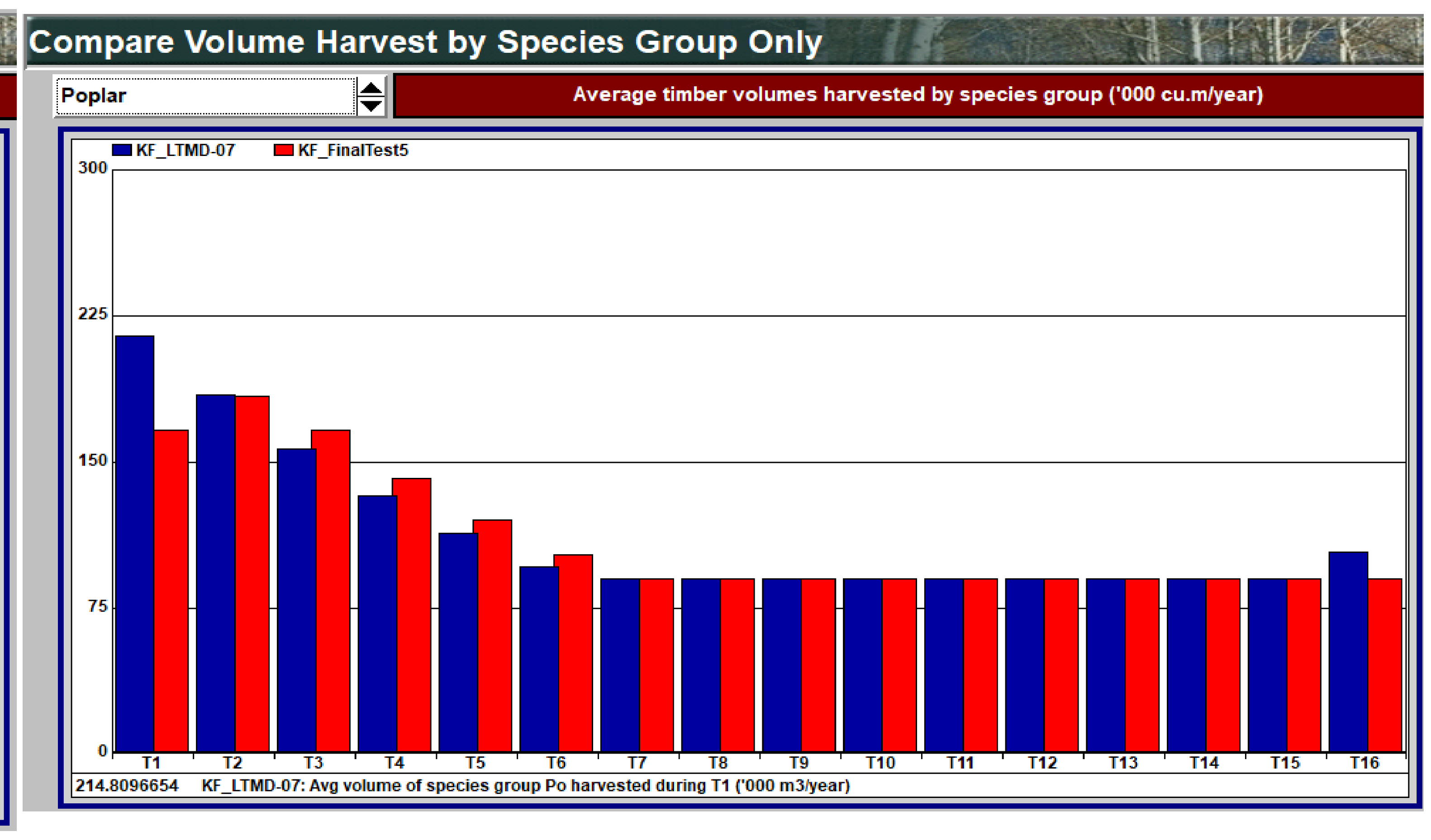
Case Name: **FinalTest5 for Final Plan** **Date:** Oct. 14, 2021.

SFMM Comparison Graphs - LTMD-07 and FinalTest5









KENORA FOREST 2022 FMP **SUMMARY of SFMM INVESTIGATION**

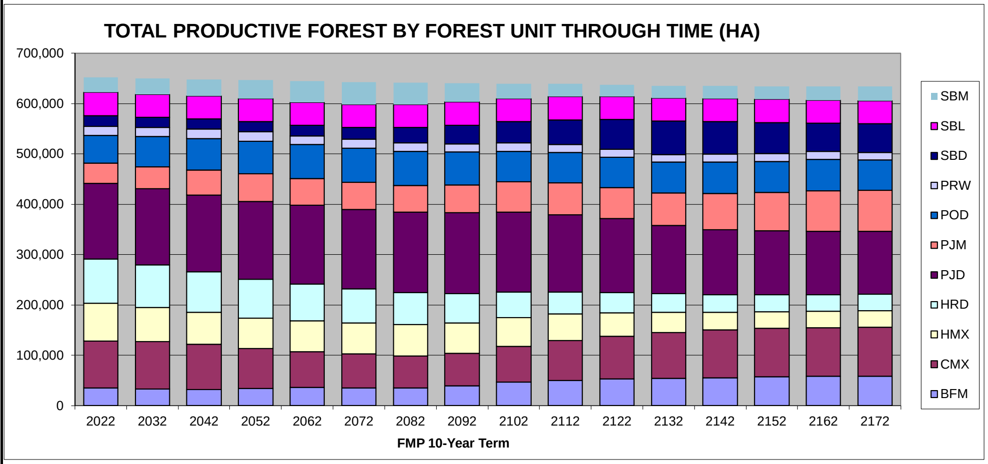
Case Name: **ScopeMEA1-off-ALL** **Date:** April 7, 2020.

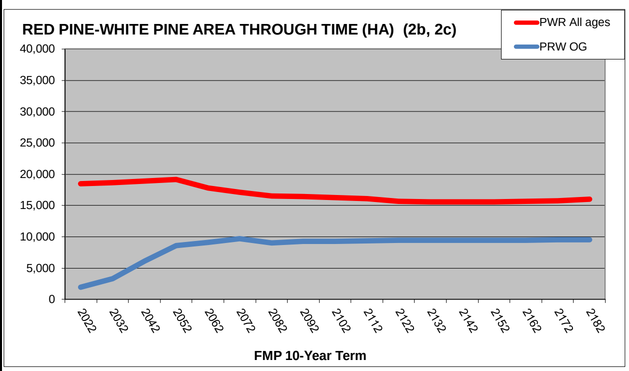
Productive Forest Area Through Time Data (hectares): by Forest Unit

Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW (Indicator (2c))	SBD	SBL	SBM
T1	652,254	34,934	93,667	74,582	88,202	150,031	39,912	55,484	18,488	20,977	45,724	30,253
T2	650,065	32,709	94,394	68,031	84,163	151,440	44,034	59,570	18,639	19,980	45,769	31,337
T3	648,158	31,766	90,307	63,223	80,572	152,801	49,554	62,520	18,890	19,447	45,821	33,257
T4	646,366	34,654	79,073	60,709	76,677	154,120	55,102	65,022	19,182	19,574	45,861	36,392
T5	644,305	36,864	70,929	60,853	72,693	156,378	53,488	67,096	17,776	20,862	45,782	41,583
T6	642,267	35,098	67,454	61,628	67,441	158,531	53,641	68,044	17,156	23,803	45,639	43,831
T7	641,530	35,111	64,023	62,336	62,993	160,015	52,902	67,585	16,507	30,736	45,661	43,661
T8	640,887	39,292	64,694	60,195	58,891	160,556	55,295	65,024	16,426	36,912	45,653	37,949
T9	639,930	46,575	70,835	57,219	51,644	158,084	60,078	60,857	16,264	42,551	45,634	30,188
T10	639,060	50,565	78,785	53,076	43,621	153,636	62,778	60,526	16,121	48,776	45,642	25,536
T11	637,420	53,581	84,082	47,370	40,118	146,700	61,675	60,296	15,628	58,623	45,633	23,713
T12	635,408	54,248	91,152	40,221	36,687	135,903	64,142	61,154	15,588	65,842	45,646	24,826
T13	635,056	55,706	94,625	35,652	34,746	129,327	71,684	62,349	15,600	64,546	45,666	25,156
T14	634,450	57,565	96,282	32,886	33,595	127,319	75,485	62,165	15,563	61,751	45,682	26,158
T15	634,282	58,876	96,508	31,923	32,838	126,277	80,596	62,059	15,647	56,514	45,718	27,325
T16	634,070	58,087	97,773	32,570	33,274	124,248	81,581	60,172	15,726	56,637	45,755	28,246
T17	633,243	57,927	98,025	33,210	32,825	115,544	81,978	58,757	16,000	65,782	45,787	27,408

(1a) Caribou Habitat (Caribou Zone):

Term	Refuge	Winter
T1	71,994	29,678
T2	71,174	61,421
T3	68,430	57,298
T4	68,364	56,581
T5	71,425	56,564
T6	70,579	52,426
T7	73,052	57,523
T8	73,404	58,358
T9	72,348	51,792
T10	73,483	55,105
T11	73,549	53,799
T12	70,251	48,101
T13	71,541	53,217
T14	71,519	54,922
T15	71,893	56,146
T16	74,846	61,077
T17	73,629	59,088
BLG Upper	61,458	45,161
BLG Lower	54,045	18,667





All ages PRW - desirable level "to increase"
Target in SFMM T17 of 16,000 ha
BLG incr towards ~39,000 ha

Old Growth PRW - desirable level "to increase"
used 5,000 ha in SFMM (overachieved)

PRW all ages decreases (not achieved) and Old Growth projections meest desirable levels "to increase".

KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: ScopeMEA1-off-ALL **Date:** April 7, 2020.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - Lower T1 SPF and TOTAL than LTMD-07. Lower sustainable volumes long-term.

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)	4,610	309	458	1,074	743	971	16	669	15	186	80	88
T2	3,935	275	603	836	632	755	21	468	14	147	104	79
T3	3,635	24	972	586	624	803	26	328	2	88	135	47
T4	3,835	291	872	410	540	802	18	229	226	123	258	66
T5	4,050	666	606	287	437	912	24	218	161	173	473	93
T6	3,854	671	425	201	310	957	31	283	189	242	415	130
T7	3,672	299	303	161	302	1,169	41	368	45	338	465	182
T8	3,653	20	214	209	138	1,505	53	475	51	474	260	255
T9	3,790	14	216	272	194	1,464	69	511	50	466	178	356
T10	3,705	18	297	353	160	1,100	89	513	146	508	127	393
T11 (6b)	3,688	202	272	459	216	1,323	116	359	42	359	102	236
T12	3,878	76	174	597	221	1,645	151	368	29	412	63	142
T13	3,861	40	226	477	172	1,577	196	431	36	577	44	85
T14	3,965	120	294	364	127	1,334	255	512	15	807	31	106
T15	4,083	256	363	255	83	1,404	331	642	14	484	103	149
T16	3,977	222	293	178	96	1,153	430	783	22	339	251	208

	Natural	Plant	Seed
T1	59%	6%	35%
T2	56%	10%	34%
T3	52%	8%	39%
T4	42%	9%	49%

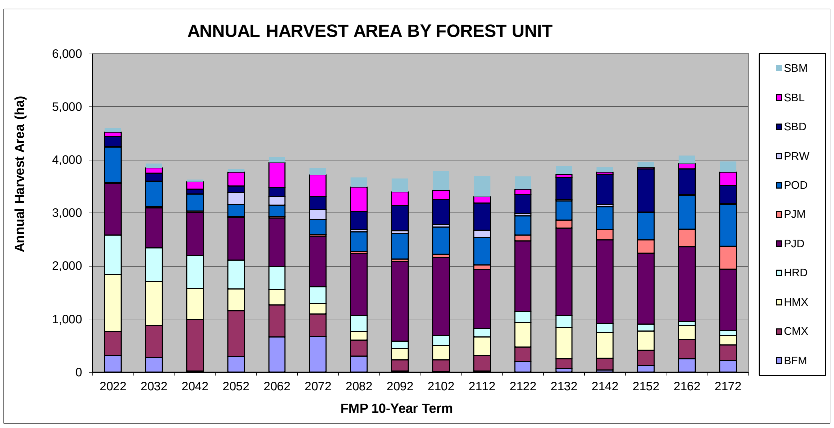
* See AU breakdown of treated area below.

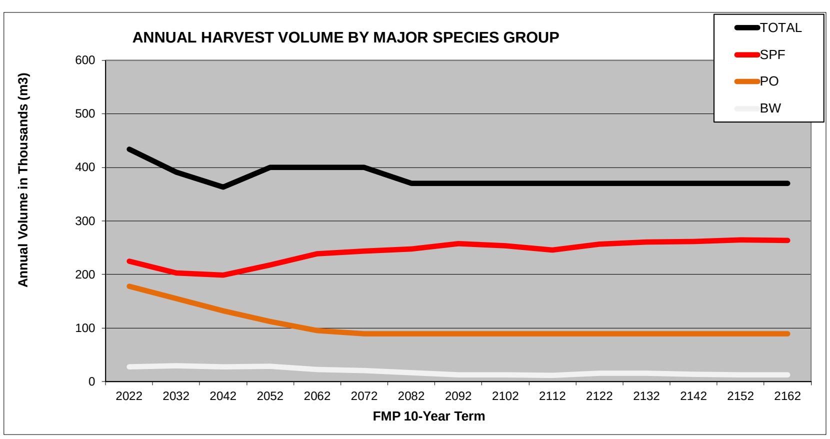
Annual Harvest Volumes by Major Species Groups / **(6d) Prop. By Size**

Term	TOTAL	SPF	PO	BW	PRW	Small	Large
T1 (6c)	434.3	225.0	178.5	27.8	2.0	0.95	0.05
T2	390.8	202.5	155.4	29.6	2.0	0.93	0.07
T3	363.6	198.5	132.1	28.2	2.0	0.90	0.10
T4	400.0	217.6	112.3	28.9	34.0	0.88	0.12
T5	400.0	239.3	95.5	23.0	34.3	0.90	0.10
T6	400.0	243.9	90.0	20.5	40.1	0.89	0.11
T7	370.0	247.3	90.0	16.9	10.0	0.90	0.10
T8	370.0	257.2	90.0	12.6	9.4	0.89	0.11
T9	370.0	254.2	90.0	12.4	12.3	0.97	0.03
T10	370.0	245.7	90.0	12.3	21.0	0.96	0.04
T11 (6c)	370.0	256.8	90.0	16.3	6.0	0.94	0.06
T12	370.0	260.6	90.0	15.5	3.5	0.92	0.08
T13	370.0	261.3	90.0	13.8	4.6	0.93	0.07
T14	370.0	264.7	90.0	12.9	2.0	0.97	0.03
T15	370.0	263.7	90.0	12.6	2.0	0.95	0.05
T16	370.0	248.2	101.7	12.6	3.6	0.95	0.05
Average	380.5	242.9	104.7	18.5	11.8		

Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal ha	Natural ha	Plant ha	Seed ha
T1	1,586	1,586	0	4,564	2,675	278	1,612
T2	1,430	1,430	0	3,895	2,194	374	1,328
T3	1,385	1,385	0	3,598	1,888	300	1,410
T4	1,769	1,769	0	3,797	1,588	358	1,851
T5	1,885	1,885	0	4,041	1,636	298	2,108
T6	1,943	1,943	0	3,854	1,325	269	2,260
T7	1,708	1,708	0	3,670	1,421	149	2,100
T8	1,734	1,734	0	3,644	1,426	125	2,093
T9	1,742	1,742	0	3,787	1,611	154	2,022
T10	1,764	1,764	0	3,705	1,536	238	1,930
T11	1,706	1,706	0	3,688	1,534	200	1,953
T12	1,705	1,705	0	3,878	1,796	187	1,895
T13	1,717	1,717	0	3,861	1,742	151	1,968
T14	1,715	1,715	0	3,965	1,807	102	2,056
T15	1,714	1,714	0	4,083	1,913	38	2,132
T16	1,656	1,656	0	3,977	2,006	169	1,801





TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
A1				
A2				
B1	125	262		
B2	299	397		
C			144	160
D				
DEA1	228	131	15	146
E				
ELK	156	140	321	243
MEA1				
MEA2	383	58	270	331
MEA3	128	76	48	28
MEA4	116	56	41	52
Z02	81	87	114	278
Z03	15	9	18	57
Z04	464	175	254	248
Z05	158	193	201	190
Z06	159	137	248	155
Z07	132	259	467	531
Z08	270	176	277	143
Z09	176	89	195	185
Z10	323	181	303	390
Z11	351	432	125	276
Z12	723	418	431	154
Z13	129	82	33	69
Z14		498	83	135
Z15	194	81	49	63
Z01				
TOTAL	4,610	3,935	3,635	3,835

Z01 now turned OFF all terms (islands)

MEA1 turned off all terms.

KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: ScopeMEA1-off-ALL

Date: April 7, 2020.

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																	
A15																	
A25																	
A35																	
A45																	
A55																	
A65																	
A75																	
A85																	
A95																	
A105																	
A115																	
A125																	
A135																	
A145																	
A155																	
A165																	
A175																	
A185																	
A195																	
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total: **0**

Renewal Area by Treatment Type

	Total	Natural	Plant	Seed
BFM	306	-	-	306
CMX	454	22	-	432
CMXC	-	-	-	-
HMX	1,064	798	266	-
HRDA	4	3	1	-
HRDB	-	-	-	-
HRD	732	732	-	-
PJDD	714	214	-	500
PJDS	248	74	-	173
PJM	16	5	-	11
POD	662	662	-	-
PRWR	-	-	-	-
PRWW	15	4	11	-
SBD	184	55	-	129
SBL	79	79	-	-
SBLC	-	-	-	-
SBM	87	26	-	61
	4,564	**2,675**	**278**	**1,612**

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	309	458		1,074	4		739	721	250	16	669		15	186	80		88
T2	275	596	7	836	44		588	505	250	21	468		14	147	104		79
T3	24	666	306	586	210	2	412	553	250	26	328		2	88	135		47
T4	291	866	6	410	147	64	329	552	250	18	229	18	209	123	176	82	66
T5	666	606		287	61	15	360	662	250	24	218	139	23	173	229	244	93
T6	671	424	0	201	28	1	281	707	250	31	283	189		242	297	118	130
T7	299	297	6	161	54	51	197	919	250	41	368	45		338	363	102	182
T8	20	208	6	209			138	1,195	310	53	475	40	11	474	254	6	255
T9	14	209	7	272		15	179	1,214	250	69	511	35	15	466	178		356
T10	18	271	25	353		30	130	850	250	89	513	134	12	508	125	2	393
T11	202	248	25	459	4	43	169	1,073	250	116	359	40	2	359	87	15	236
T12	76	173	0	597		5	216	1,395	250	151	368	29		412	63		142
T13	40	225	0	477	17	4	151	1,327	250	196	431	36		577	44		85
T14	120	293	0	364	18	3	106	1,084	250	255	512	15		807	31		106
T15	256	362	1	255	8		74	1,154	250	331	642	14		484	22	81	149
T16	222	292	1	178	44		52	903	250	430	783	22		339	15	236	208

KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: ScopeMEA1-off-T1-10 **Date:** April 7, 2020.

Purpose:

After preliminary LTMD - to scope impact of NO HARVEST on Aulneau Peninsula (risk analysis)

Specific Inputs:

LTMD-07 with MEA1 (Aulneau Peninsula) OFF T1-10 (100 years). Harvest volumes reduced slightly due to smaller eligible land base, most BLG same, long-term PurCn and OGhmx reduced to equal lower IQR. Lower PRW.

		Group:	Mm3/yr		Vol. Flow
		PWR	2.0		
		SPF	240.0	T1	+/- 10%
T6 on	90	PO	150.0	T1	+/- 15%
T7 on	390	TOTAL	450.0	T1	+/- 10%
				Binding.	

BLG Targets and Achievement:
PRW 19,000 ha T17 (reduced harvest, just maintain PRW area through time)
MooseBrowse T17 target deleted (no young forest created)

Budget: Balanced to revenues

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 -

Overall very good BLG indicator achievement. PRW all ages maintained but does not increase. Some indicators hung to lower IQR, rather than slightly improved long-term achievement in LTMD-07.

No moose browse in MEA1 after T3 as no young forest being created.

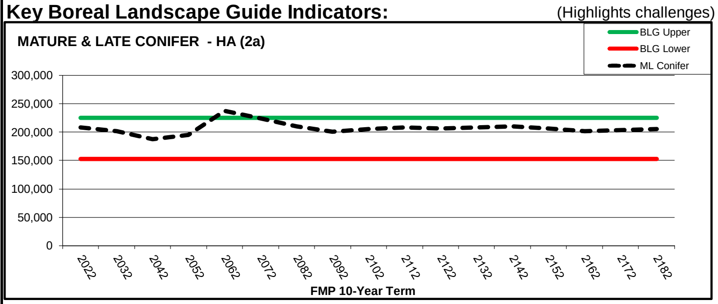
(2a) Area by Landscape Class (Productive ha)

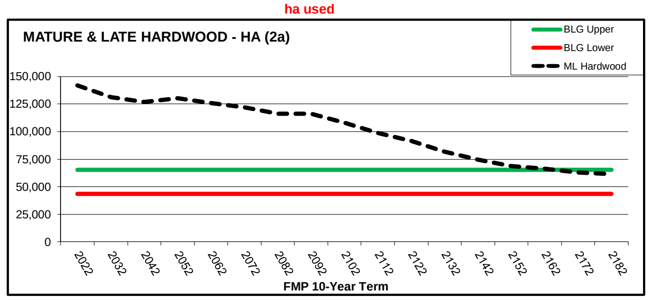
Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	40,952	136,142	68,484	18,070	208,260	141,825	38,522
T2	69,039	127,974	62,335	19,777	201,918	131,144	37,878
T3	82,555	124,557	64,721	25,311	187,217	126,895	36,857
T4	87,759	111,241	59,886	26,551	195,006	130,393	35,411
T5	86,896	65,120	63,125	28,177	237,887	125,934	36,987
T6	91,477	81,210	65,006	27,860	224,097	121,875	30,531
T7	98,600	96,861	67,125	25,889	210,107	116,355	26,362
T8	98,376	107,509	59,416	33,932	200,610	116,196	24,621
T9	97,387	110,815	52,099	42,027	205,624	108,103	23,642
T10	95,517	117,431	48,147	47,017	208,208	98,904	23,573
T11	97,737	120,508	45,478	50,484	206,725	91,730	24,521
T12	100,739	123,187	46,813	48,076	208,284	81,690	26,383
T13	103,466	117,546	49,538	47,188	210,489	74,319	32,274
T14	105,672	118,497	53,984	45,071	206,546	68,603	35,841
T15	103,603	122,922	56,925	45,020	201,531	66,121	37,923
T16	101,661	124,171	58,685	44,429	203,609	62,980	38,298
T17	100,697	126,384	60,531	45,012	205,507	61,287	33,588
BLG Upper	181,443	52,727	145,430	17,982	224,820	65,215	28,328
BLG Lower	101,058	29,333	81,015	12,782	152,976	43,706	23,354

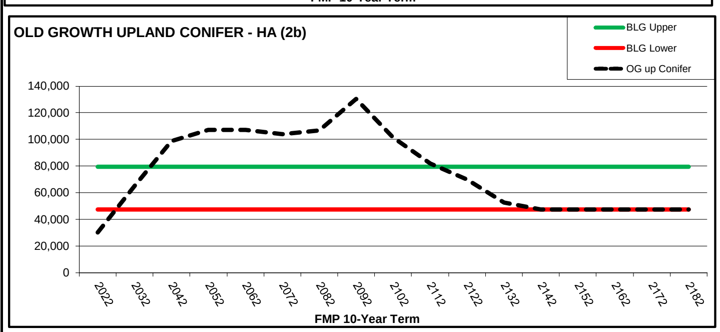
(2b) Old Growth by Grouping (Prod. ha) Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs
T1	30,442	4,217	25,043	1,953	241,172	104,723
T2	65,001	7,335	64,295	3,336	247,567	95,288
T3	98,783	11,029	107,066	6,195	256,374	120,327
T4	107,363	15,377	111,212	8,597	267,502	135,986
T5	107,277	15,265	106,814	9,261	275,707	139,500
T6	103,781	14,555	103,147	10,076	282,724	137,706
T7	106,935	14,731	82,219	10,328	290,322	139,644
T8	130,537	15,020	69,132	9,274	291,158	137,761
T9	101,610	15,936	55,878	9,318	291,154	136,147
T10	81,829	16,183	55,734	9,375	290,712	134,572
T11	69,897	16,247	55,649	9,443	290,712	135,491
T12	52,528	16,311	55,649	9,498	290,712	141,380
T13	47,362	16,531	55,649	9,605	290,712	147,053
T14	47,362	18,038	55,649	9,765	291,785	151,215
T15	47,362	17,086	55,649	9,701	290,712	151,492
T16	47,362	15,907	55,649	9,169	290,712	148,486
T17	47,362	15,746	55,649	9,211	291,938	147,305
BLG Upper	79,383	17,281	78,344	99,999	343,729	227,291
BLG Lower	47,362	12,236	55,649	1,969	290,514	129,712
				5,000 ha used		

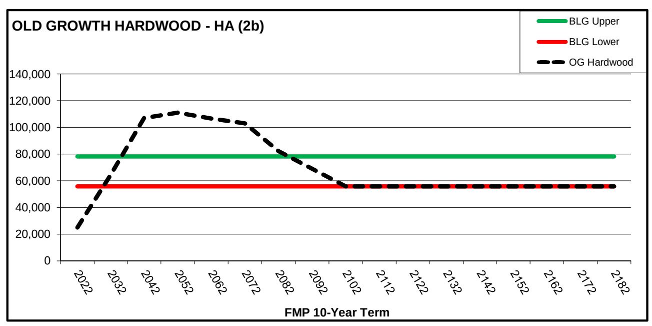
(6a) Available Forest: Term	
T1	503,772
T2	501,583
T3	499,687
T4	497,958
T5	496,139
T6	494,556
T7	494,532
T8	494,452
T9	494,113
T10	493,944
T11	493,928
T12	493,928
T13	493,928
T14	493,928
T15	493,928
T16	493,928
T17	493,928

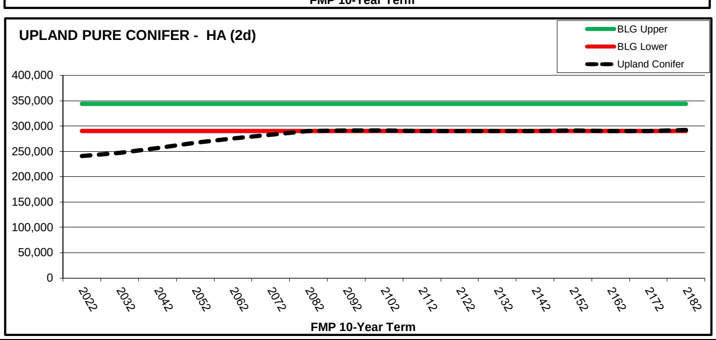
Key Boreal Landscape Guide Indicators: (Highlights challenges)

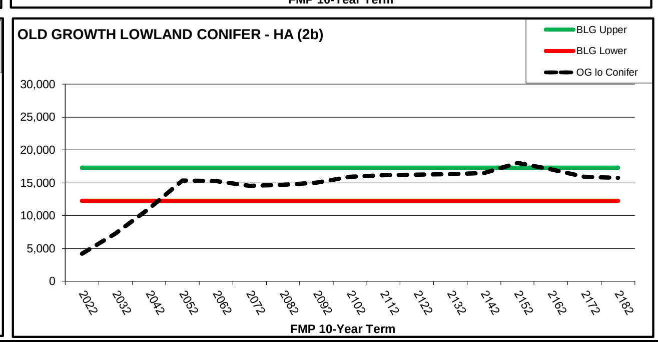












KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: ScopeMEA1-off-T1-10

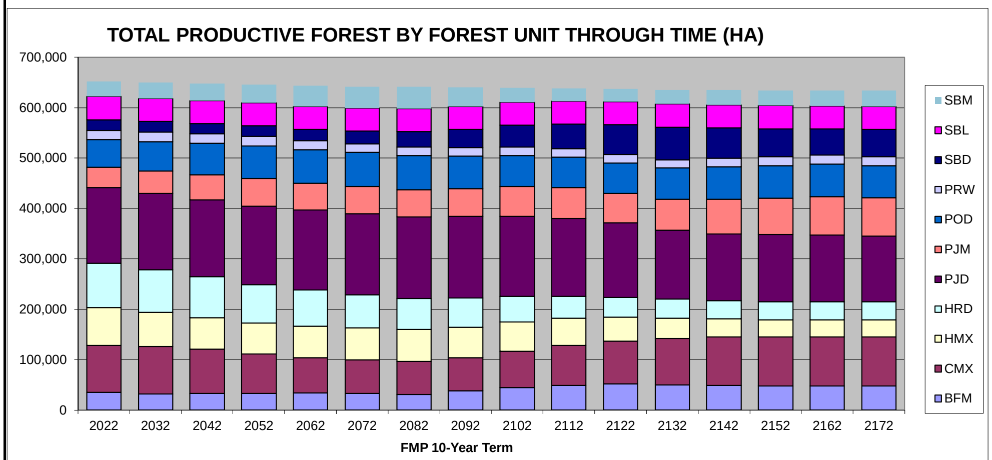
Date: April 7, 2020.

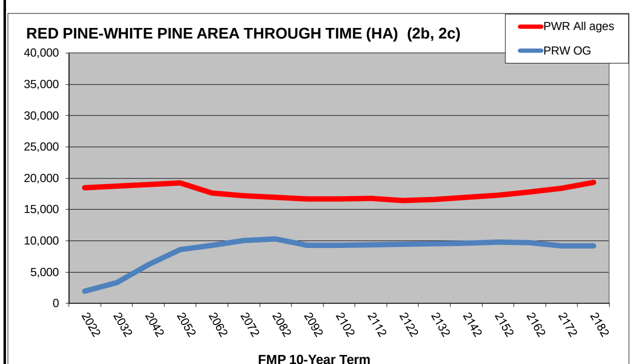
Productive Forest Area Through Time Data (hectares): by Forest Unit

Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW (Indicator (2c))	SBD	SBL	SBM
T1	652,254	34,934	93,667	74,582	88,202	150,031	39,912	55,484	18,488	20,977	45,724	30,253
T2	650,065	32,584	93,864	67,457	85,182	151,074	43,948	58,917	18,724	20,840	45,771	31,705
T3	648,112	33,515	87,060	63,260	81,112	152,731	49,626	61,952	19,017	20,453	45,822	33,564
T4	646,246	33,073	78,089	61,344	76,588	155,110	55,148	64,569	19,227	20,708	45,854	36,536
T5	644,127	34,311	70,240	61,925	71,717	158,435	53,689	66,841	17,605	22,164	45,781	41,418
T6	642,057	33,727	66,502	62,617	65,780	160,880	53,700	67,891	17,245	25,223	45,572	42,921
T7	641,298	30,994	65,242	63,686	61,122	162,644	53,951	67,407	16,931	30,740	45,594	42,987
T8	640,660	38,188	65,469	61,003	57,774	161,541	55,493	64,753	16,730	36,227	45,584	37,897
T9	639,698	45,325	71,936	57,755	50,463	159,484	59,168	60,780	16,719	43,419	45,565	29,083
T10	638,798	49,349	79,452	53,197	43,377	155,214	60,724	60,340	16,816	48,909	45,555	25,865
T11	637,183	52,388	84,466	47,160	40,076	147,683	58,557	60,367	16,460	58,998	45,554	25,474
T12	635,171	50,080	91,921	40,657	37,834	136,938	61,120	61,739	16,624	64,742	45,605	27,912
T13	634,819	49,569	95,424	35,884	36,169	131,988	69,260	64,453	16,944	60,346	45,664	29,118
T14	634,213	47,772	97,203	34,025	35,757	133,387	72,644	64,631	17,319	55,630	45,722	30,124
T15	634,045	48,086	97,658	33,866	35,316	132,722	75,489	64,813	17,823	51,960	45,773	30,541
T16	633,833	47,991	97,253	34,333	35,638	130,369	75,436	63,672	18,400	53,967	45,835	30,940
T17	633,007	49,150	93,379	34,136	35,863	121,839	75,400	63,279	19,352	64,741	45,910	29,958

(1a) Caribou Habitat (Caribou Zone):

Term	Refuge	Winter
T1	71,994	29,678
T2	71,326	61,877
T3	68,986	57,835
T4	69,207	57,517
T5	71,861	57,025
T6	70,626	53,452
T7	72,747	57,413
T8	72,863	57,727
T9	72,549	51,423
T10	73,496	53,533
T11	73,731	53,399
T12	70,313	47,400
T13	71,607	53,273
T14	71,855	56,580
T15	72,114	57,201
T16	75,000	60,796
T17	74,982	61,333
BLG Upper	61,458	45,161
BLG Lower	54,045	18,667





All ages PRW - desirable level "to increase"
Target in SFMM T17 of 16,000 ha
BLG incr towards ~39,000 ha

Old Growth PRW - desirable level "to increase"
used 5,000 ha in SFMM (overachieved)

PRW all ages decreases (not achieved) and Old Growth projections meest desirable levels "to increase".

KENORA FOREST 2022 FMP | **SUMMARY of SFMM INVESTIGATION**

Case Name: ScopeMEA1-off-T1-10 | **Date:** April 7, 2020.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - Meets T1 SPF and TOTAL as per LTMD-07. Lower sustainable volumes long-term.

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)	4,631	338	534	1,123	635	1,048	52	621	13	96	96	74
T2	4,103	100	890	786	688	809	36	435	6	134	125	93
T3	3,719	357	794	550	678	663	25	304	13	81	187	67
T4	3,953	396	904	385	611	721	33	213	213	113	270	94
T5	4,152	557	639	270	507	862	43	223	118	158	645	131
T6	4,066	774	443	189	328	1,046	56	289	105	221	431	183
T7	3,612	22	316	197	229	1,360	72	376	165	310	307	257
T8	3,876	32	226	256	154	1,596	94	466	58	434	200	359
T9	3,951	7	303	333	107	1,560	122	536	41	399	140	403
T10	3,930	13	378	433	153	1,499	159	461	121	369	100	242
T11 (6b)	4,327	520	252	563	178	1,461	207	392	7	517	85	145
T12	4,475	319	255	672	297	1,481	269	301	10	724	59	87
T13	4,355	435	329	470	190	1,158	349	392	5	827	77	122
T14	4,156	131	429	329	127	1,353	454	485	7	612	100	128
T15	4,100	153	556	298	128	1,086	486	586	82	383	163	179
T16	4,296	142	725	388	123	835	524	457	29	230	611	232

	Natural	Plant	Seed
T1	57%	9%	34%
T2	55%	9%	36%
T3	53%	8%	39%
T4	42%	8%	50%

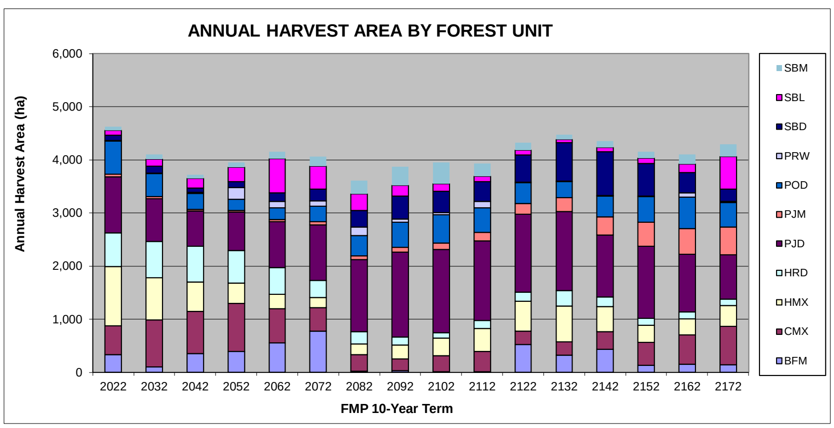
* See AU breakdown of treated area below.

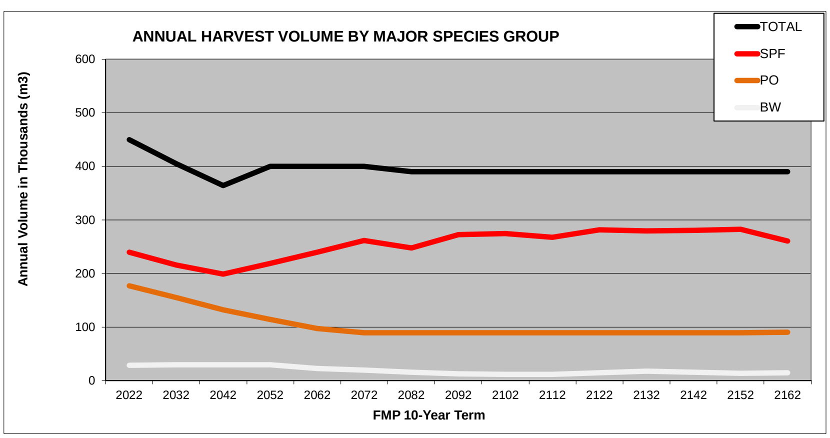
Annual Harvest Volumes by Major Species Groups / **(6d) Prop. By Size**

Term	TOTAL	SPF	PO	BW	PRW	Small	Large
T1 (6c)	450.0	240.0	177.4	29.3	2.0	0.95	0.05
T2	405.0	216.0	155.1	30.0	2.0	0.93	0.07
T3	364.5	198.6	131.8	29.8	2.0	0.90	0.10
T4	400.0	218.4	114.5	29.5	30.5	0.89	0.11
T5	400.0	240.3	97.3	23.0	27.6	0.90	0.10
T6	400.0	261.4	90.0	20.2	23.7	0.92	0.08
T7	390.0	247.7	90.0	15.9	34.2	0.87	0.13
T8	390.0	272.5	90.0	12.8	13.3	0.90	0.10
T9	390.0	274.5	90.0	11.8	13.0	0.96	0.04
T10	390.0	268.1	90.0	12.1	18.8	0.97	0.03
T11 (6c)	390.0	281.7	90.0	15.3	2.0	0.91	0.09
T12	390.0	279.3	90.0	18.2	2.0	0.91	0.09
T13	390.0	280.3	90.0	16.2	2.0	0.94	0.06
T14	390.0	282.1	90.0	13.9	2.0	0.96	0.04
T15	390.0	260.8	90.1	15.0	22.5	0.87	0.13
T16	390.0	266.1	90.0	16.8	8.1	0.91	0.09
Average	395.0	255.5	104.1	19.4	12.8		

Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal ha	Natural ha	Plant ha	Seed ha
T1	1,678	1,678	0	4,584	2,603	435	1,546
T2	1,513	1,513	0	4,062	2,230	365	1,467
T3	1,386	1,386	0	3,682	1,960	304	1,418
T4	1,746	1,746	0	3,914	1,651	311	1,953
T5	1,852	1,852	0	4,144	1,767	283	2,094
T6	1,906	1,906	0	4,066	1,580	208	2,278
T7	1,898	1,898	0	3,610	1,339	349	1,922
T8	1,862	1,862	0	3,867	1,583	211	2,073
T9	1,867	1,867	0	3,947	1,684	223	2,040
T10	1,879	1,879	0	3,930	1,615	238	2,077
T11	1,821	1,821	0	4,327	2,042	138	2,147
T12	1,808	1,808	0	4,475	2,297	86	2,092
T13	1,817	1,817	0	4,355	2,127	106	2,122
T14	1,828	1,828	0	4,156	2,016	186	1,954
T15	1,873	1,873	0	4,100	2,084	381	1,635
T16	1,816	1,816	0	4,296	2,460	462	1,375





TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
A1				
A2				
B1	156	217		
B2	300	358		
C			100	219
D				
DEA1	137	149	82	122
E				
ELK	262	171	199	222
MEA1				
MEA2	424	75	423	199
MEA3	104	89	61	31
MEA4	60	75	69	54
Z02	40	109	175	323
Z03	11	18	48	49
Z04	394	162	277	221
Z05	213	134	160	276
Z06	177	254	72	207
Z07	302	304	536	264
Z08	324	136	232	143
Z09	162	120	177	132
Z10	383	172	358	354
Z11	358	448	181	263
Z12	608	343	308	533
Z13	85	131	61	78
Z14		517	102	208
Z15	131	122	98	56
Z01				
TOTAL	4,631	4,103	3,719	3,953

Z01 now turned OFF all terms (islands)

MEA1 turned off Terms 1-100.

KENORA FOREST 2022 FMP		SUMMARY of SFMM INVESTIGATION	
Case Name:	**ScopeMEA1-off-T1-10**	**Date:**	April 7, 2020.

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																	
A15																	
A25																	
A35																	
A45																	
A55																	
A65																	
A75																	
A85																	
A95																	
A105																	
A115																	
A125																	
A135																	
A145																	
A155																	
A165																	
A175																	
A185																	
A195																	
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
																Total:	**0**

Renewal Area by Treatment Type

	Total	Natural	Plant	Seed
BFM	335	-	-	335
CMX	493	197	-	296
CMXC	36	-	-	36
HMX	1,112	834	278	-
HRDA	15	11	4	-
HRDB	-	-	-	-
HRD	614	461	154	-
PJDD	790	237	-	553
PJDS	248	74	-	173
PJM	51	15	-	36
POD	615	615	-	-
PRWR	-	-	-	-
PRWW	13	13	-	-
SBD	95	29	-	67
SBL	95	95	-	-
SBLC	-	-	-	-
SBM	73	22	-	51
	4,584	**2,603**	**435**	**1,546**

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	338	498	36	1,123	15		621	798	250	52	621		13	96	96		74
T2	100	647	243	786	34		655	559	250	36	435		6	134	125		93
T3	357	760	34	550	217	2	458	413	250	25	304		13	81	163	24	67
T4	396	904		385	242	26	343	471	250	33	213	1	213	113	212	58	94
T5	557	633	6	270	18	67	421	612	250	43	223	118		158	275	370	131
T6	774	443	0	189	12	21	295	796	250	56	289	105		221	358	73	183
T7	22	310	6	197	8	15	206	1,035	325	72	376	146	19	310	285	22	257
T8	32	217	9	256		10	145	1,346	250	94	466	58	0	434	200		359
T9	7	274	29	333		5	101	1,310	250	122	536	41		399	140		403
T10	13	356	22	433		36	117	1,249	250	159	461	121		369	98	2	242
T11	520	249	3	563		25	153	1,211	250	207	392	7		517	70	15	145
T12	319	253	2	672	93	5	198	1,231	250	269	301	10		724	59		87
T13	435	329	0	470	23	7	160	908	250	349	392	5		827	77		122
T14	131	427	2	329	15	0	112	1,103	250	454	485	7		612	100		128
T15	153	555	1	298	16		112	836	250	486	586	82		383	130	33	179
T16	142	722	3	388	44		78	585	250	524	457	29		230	169	442	232

KENORA FOREST 2022 FMP	SUMMARY of SFMM INVESTIGATION

Case Name: ScopeMEA1-off-T1-4 **Date:** April 7, 2020.

Purpose: After preliminary LTMD - to scope impact of NO HARVEST on Aulneau Peninsula (risk analysis)

Specific Inputs: LTMD-07 with MEA1 (Aulneau Peninsula) OFF T1-4 (40 years). Harvest volumes reduced, most BLG same. Lower PRW. Delayed Moose Browse achievement for Aulneau MEA1.

		Group:	Mm3/yr		Vol. Flow
		PWR	2.0		
		SPF	240.0	T1	+/- 10%
T6 on	90	PO	150.0	T1	+/- 15%
T7 on	375	TOTAL	450.0	T1	+/- 10%
				Binding.	

BLG Targets and Achievement:
PRW 22,000 ha T17 (increase PRW area through time, not as much as LTMD-07) **Budget:** Balanced to revenues

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 - Overall very good BLG indicator achievement. Similar achievement to LTMD-07 for most indicators.

(2a) Area by Landscape Class (Productive ha)

Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	40,952	136,142	68,484	18,070	208,260	141,825	38,522
T2	71,072	127,974	62,335	21,540	201,717	127,358	37,963
T3	83,194	124,625	67,404	27,186	188,518	119,925	37,067
T4	88,146	111,764	64,276	29,220	195,382	121,132	36,033
T5	86,799	64,940	69,027	30,036	239,729	114,786	38,495
T6	92,141	81,087	71,442	30,793	227,165	108,030	31,010
T7	95,557	97,030	74,795	31,905	211,495	101,772	28,376
T8	96,857	106,753	64,705	35,038	206,447	103,347	27,144
T9	93,227	111,891	55,903	41,596	211,355	99,073	26,288
T10	92,528	115,273	50,409	44,296	215,954	94,227	25,782
T11	92,616	118,780	45,793	48,180	218,759	87,660	25,028
T12	91,255	120,543	44,784	47,426	225,580	81,721	23,498
T13	91,882	117,661	45,524	42,451	231,317	76,524	29,094
T14	92,225	115,912	46,731	44,101	232,536	71,757	30,585
T15	94,475	114,038	47,739	45,344	231,783	68,821	31,480
T16	95,668	115,619	49,156	45,235	232,323	64,387	31,079
T17	99,732	113,886	50,610	45,860	237,771	59,841	24,940
BLG Upper	181,443	52,727	145,430	17,982	224,820	65,215	28,328
BLG Lower	101,058	29,333	81,015	12,782	152,976	43,706	23,354

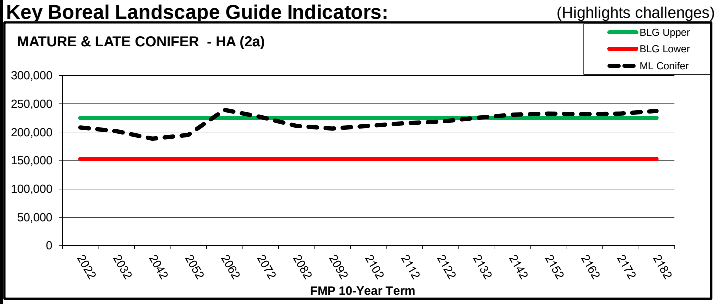
(2b) Old Growth by Grouping (Prod. ha) / (2d) / (2e) / (6a)

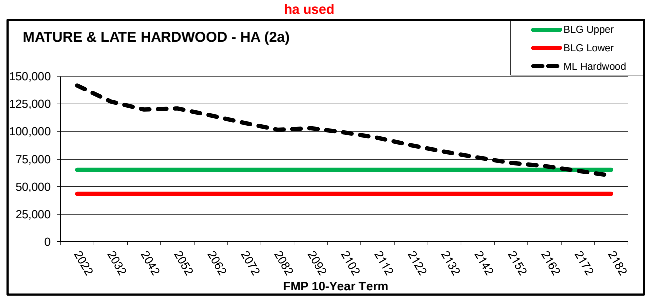
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs	(6a) Available Forest: Term	
T1	30,442	4,217	25,043	1,953	241,172	104,723	T1	503,772
T2	64,523	7,543	63,218	3,332	246,146	97,321	T2	501,478
T3	99,533	10,631	106,081	6,100	253,340	123,716	T3	499,494
T4	105,473	14,913	109,605	7,809	264,527	141,288	T4	497,666
T5	104,534	15,621	106,940	9,571	271,709	144,108	T5	495,823
T6	103,265	14,616	102,646	10,975	278,095	141,972	T6	494,168
T7	106,258	16,646	82,340	10,510	285,139	140,095	T7	494,166
T8	132,660	17,540	68,098	10,270	290,712	137,772	T8	494,082
T9	103,920	18,186	59,262	9,834	292,176	133,964	T9	493,747
T10	85,246	17,325	56,864	10,004	295,597	130,225	T10	493,616
T11	69,220	16,027	58,000	9,212	297,784	129,712	T11	493,561
T12	56,126	13,860	58,000	8,615	303,101	129,712	T12	493,561
T13	50,000	14,054	58,000	8,721	310,000	131,682	T13	493,561
T14	51,116	16,127	58,000	8,934	310,692	132,096	T14	493,561
T15	50,664	16,137	58,000	8,999	310,010	134,227	T15	493,561
T16	50,000	15,222	58,000	9,641	310,000	137,274	T16	493,561
T17	50,000	15,734	58,000	10,449	310,000	141,107	T17	493,561
BLG Upper	79,383	17,281	78,344	99,999	343,729	227,291		
BLG Lower	47,362	12,236	55,649	1,969	290,514	129,712		

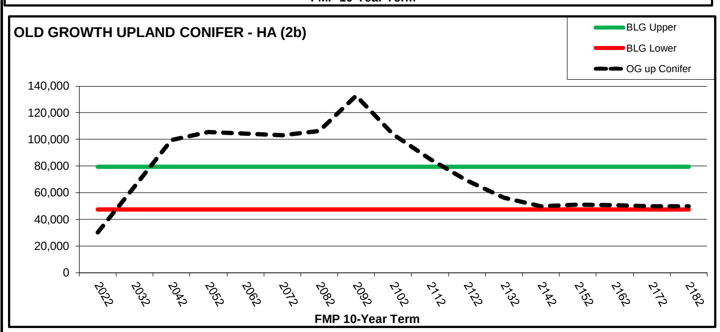
5,000
ha used

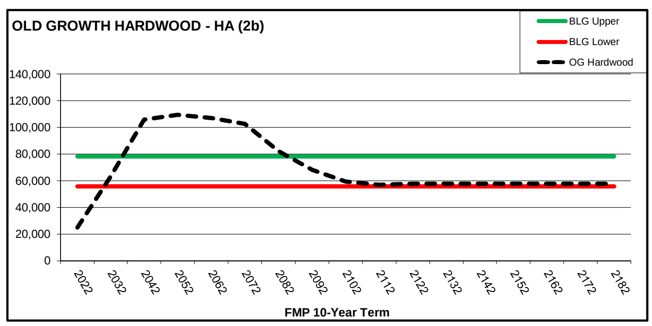
Key Boreal Landscape Guide Indicators:

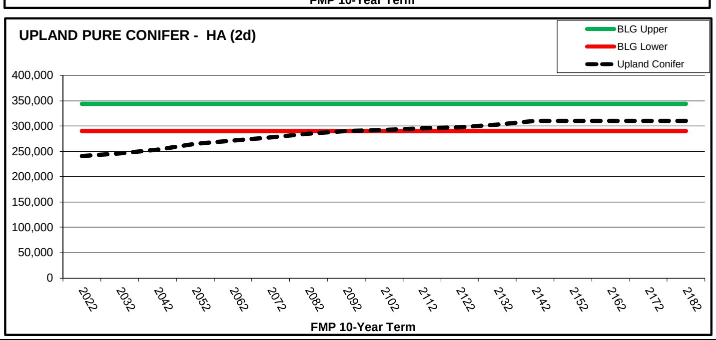
(Highlights challenges)

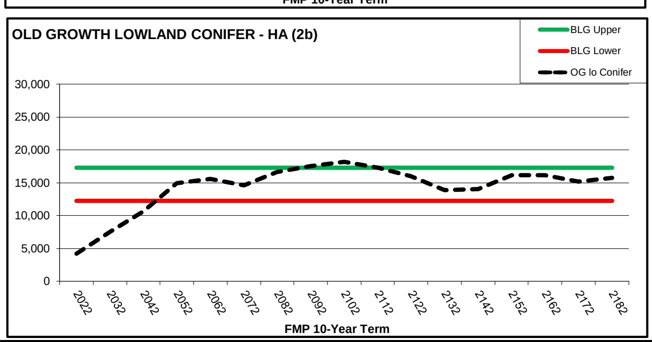












KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

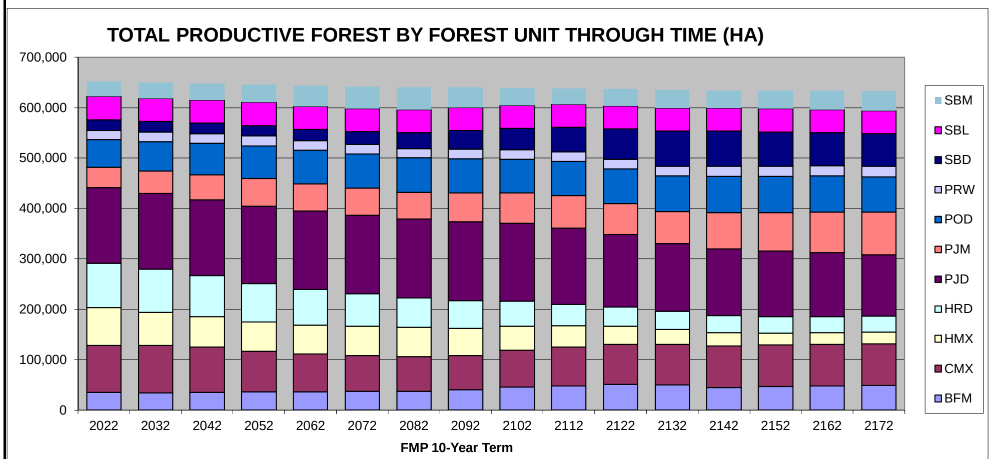
Case Name: ScopeMEA1-off-T1-4 **Date:** April 7, 2020.

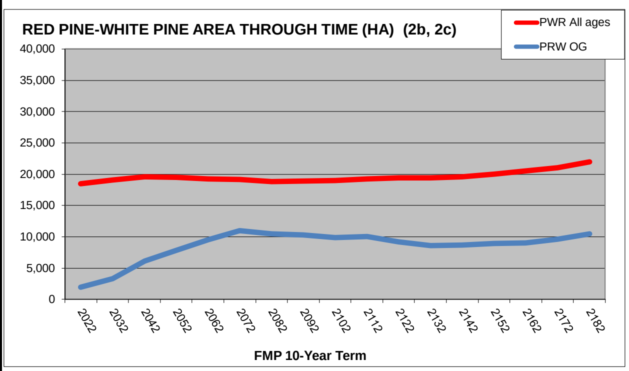
Productive Forest Area Through Time Data (hectares): by Forest Unit — Indicator (2c)

Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	PRW	SBD	SBL	SBM
T1	652,254	34,934	93,667	74,582	88,202	150,031	39,912	55,484	18,488	20,977	45,724	30,253
T2	649,960	34,415	94,115	65,983	85,509	149,880	44,062	58,960	19,055	20,835	45,777	31,369
T3	647,919	35,577	89,794	60,660	81,047	150,345	49,822	62,038	19,626	20,369	45,838	32,804
T4	645,954	35,934	80,972	58,182	76,250	152,795	55,695	64,710	19,501	20,480	45,878	35,558
T5	643,811	36,877	74,284	57,762	71,075	155,151	53,709	66,934	19,259	21,630	45,911	41,219
T6	641,670	37,487	71,121	57,857	64,129	155,921	53,948	68,127	19,187	24,572	45,668	43,653
T7	640,931	37,980	67,941	58,283	58,506	156,033	53,186	68,522	18,863	31,540	45,697	44,380
T8	640,291	40,242	68,419	54,046	54,585	156,715	56,836	67,728	18,866	37,150	45,694	40,012
T9	639,332	45,788	72,981	47,792	49,160	154,501	60,763	66,780	18,975	42,380	45,680	34,532
T10	638,469	47,656	77,194	42,450	43,022	151,268	63,977	67,645	19,210	48,240	45,695	32,112
T11	636,817	50,751	79,904	35,427	38,947	143,000	61,372	68,909	19,402	60,573	45,693	32,839
T12	634,805	49,848	80,914	29,915	35,345	134,498	63,870	70,538	19,433	69,611	45,711	35,122
T13	634,453	45,065	82,048	26,807	33,302	132,473	72,606	71,853	19,612	69,434	45,765	35,487
T14	633,847	47,044	82,080	23,793	32,334	130,237	76,452	72,063	20,022	68,097	45,820	35,906
T15	633,679	48,555	82,397	22,835	31,539	126,704	80,810	71,963	20,511	64,904	45,869	37,592
T16	633,466	48,702	83,153	22,835	31,801	121,819	84,158	70,027	21,022	64,457	45,926	39,566
T17	632,640	49,561	83,080	21,977	30,907	109,712	84,626	69,124	22,000	75,042	45,991	40,621

(1a) Caribou Habitat (Caribou Zone):

Term	Refuge	Winter
T1	71,994	29,678
T2	71,562	61,404
T3	68,170	57,231
T4	68,416	56,821
T5	71,653	56,664
T6	70,540	52,812
T7	73,633	57,299
T8	73,833	58,167
T9	73,021	52,342
T10	74,367	55,697
T11	74,266	53,876
T12	72,486	49,224
T13	73,605	54,810
T14	73,670	56,612
T15	74,119	57,821
T16	75,680	62,000
T17	73,484	57,339
BLG Upper	61,458	45,161
BLG Lower	54,045	18,667





All ages PRW - desirable level "to increase"
Target in SFMM T17 of 22,000 ha
BLG incr towards ~39,000 ha

Old Growth PRW - desirable level "to increase"
used 5,000 ha in SFMM (overachieved)

PRW all ages decreases (not achieved) and Old Growth projections meest desirable levels "to increase".

KENORA FOREST 2022 FMP **SUMMARY of SFMM INVESTIGATION**

Case Name: **ScopeMEA1-off-T1-4** **Date:** April 7, 2020.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - Meets T1 SPF and TOTAL as per LTMD-07. Similar sustainable volumes long-term.
Minor shifts in AHA from analysis units, and minor Subunit shifts.

Overall - indicates that no harvesting in MEA1 Aulneau for 4 terms would result in similar forest condition as LTMD-07.

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)	4,836	169	465	1,245	639	1,090	9	859	13	119	88	139
T2	4,240	89	617	871	742	838	12	601	12	167	113	177
T3	3,912	282	768	610	722	662	16	421	79	100	147	106
T4	3,986	465	850	427	688	759	20	295	94	140	185	64
T5	4,287	450	535	299	618	912	26	340	77	196	744	89
T6	3,848	634	375	209	437	1,079	34	281	177	275	278	68
T7	3,679	513	272	267	337	1,137	44	300	72	385	257	96
T8	3,740	163	246	347	211	1,403	58	391	68	539	180	134
T9	3,693	217	312	451	265	1,160	40	273	43	570	173	188
T10	3,711	33	437	587	299	1,132	28	314	114	352	229	187
T11 (6b)	3,705	481	496	575	265	867	20	220	96	226	347	112
T12	3,908	704	434	515	272	1,052	14	286	7	316	188	119
T13	3,742	30	431	492	199	1,368	18	372	91	443	132	166
T14	3,921	25	396	345	170	1,582	23	484	7	620	169	100
T15	4,111	115	517	281	128	1,474	16	629	8	618	221	103
T16	4,208	189	460	365	228	1,107	11	544	7	371	789	137

	Natural	Plant	Seed
T1	62%	12%	26%
T2	60%	13%	27%
T3	53%	11%	36%
T4	49%	9%	43%

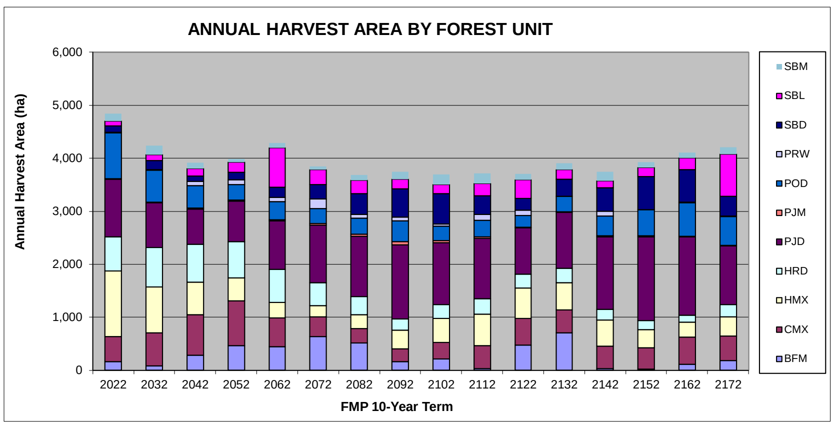
* See AU breakdown of treated area below.

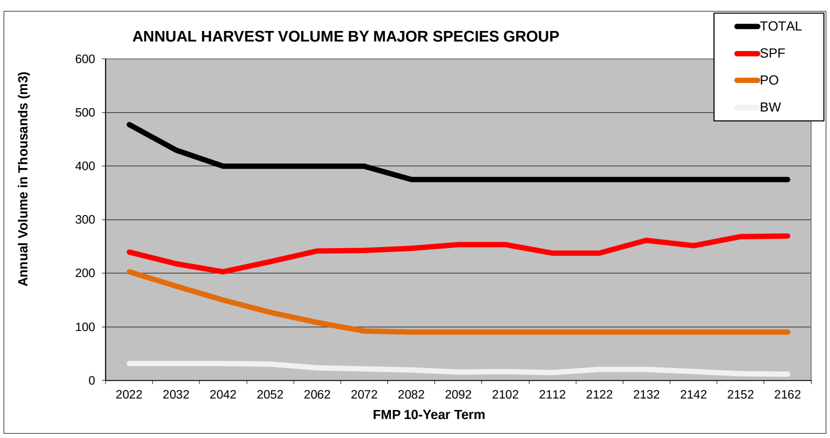
Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	(6d) Prop. By Size Small	Large
T1 (6c)	477.3	240.0	203.1	31.4	2.0	0.97	0.03
T2	429.6	218.0	176.1	31.7	2.0	0.93	0.07
T3	400.0	202.5	149.7	31.6	12.4	0.92	0.08
T4	400.0	221.7	127.2	30.2	14.3	0.95	0.05
T5	400.0	241.2	108.2	23.4	15.0	0.93	0.07
T6	400.0	242.2	91.9	22.1	40.7	0.88	0.12
T7	375.0	246.7	90.0	19.8	16.3	0.91	0.09
T8	375.0	253.1	90.0	15.3	15.6	0.89	0.11
T9	375.0	253.4	90.0	16.7	13.1	0.94	0.06
T10	375.0	238.0	90.0	14.9	29.1	0.94	0.06
T11 (6c)	375.0	237.4	90.0	20.6	23.2	0.92	0.08
T12	375.0	261.1	90.0	21.0	2.0	0.96	0.04
T13	375.0	251.5	90.0	16.6	16.4	0.90	0.10
T14	375.0	269.0	90.0	13.0	2.0	0.96	0.04
T15	375.0	269.9	90.0	11.6	2.0	0.97	0.03
T16	375.0	253.0	95.4	14.5	2.0	0.96	0.04
Average	391.1	243.7	110.1	20.9	13.0		

Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal ha	Natural ha	Plant ha	Seed ha
T1	1,706	1,706	0	4,788	2,977	552	1,258
T2	1,549	1,549	0	4,198	2,528	531	1,139
T3	1,524	1,524	0	3,873	2,066	411	1,396
T4	1,638	1,638	0	3,946	1,920	349	1,677
T5	1,767	1,767	0	4,279	2,156	363	1,760
T6	1,931	1,931	0	3,848	1,525	407	1,916
T7	1,743	1,743	0	3,677	1,526	283	1,868
T8	1,766	1,766	0	3,732	1,622	280	1,830
T9	1,752	1,752	0	3,689	1,570	315	1,804
T10	1,799	1,799	0	3,711	1,653	456	1,602
T11	1,754	1,754	0	3,705	1,588	404	1,713
T12	1,703	1,703	0	3,908	1,687	202	2,018
T13	1,762	1,762	0	3,742	1,843	433	1,466
T14	1,743	1,743	0	3,921	1,944	278	1,699
T15	1,749	1,749	0	4,111	2,102	240	1,769
T16	1,694	1,694	0	4,208	2,654	524	1,030





TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
A1				
A2				
B1	187	213		
B2	251	438		
C			116	166
D				
DEA1	257	136	43	164
E				
ELK	243	177	242	159
MEA1				
MEA2	388	283	267	175
MEA3	106	71	50	47
MEA4	93	58	45	59
Z02	99	122	221	360
Z03	10	69	16	38
Z04	321	172	322	390
Z05	128	210	247	205
Z06	187	160	214	144
Z07	332	210	651	204
Z08	277	170	317	124
Z09	144	200	148	145
Z10	306	188	417	420
Z11	515	284	143	371
Z12	682	463	219	476
Z13	132	96	32	81
Z14		441	116	197
Z15	176	81	88	61
Z01				
TOTAL	4,836	4,240	3,912	3,986

Z01 now turned OFF all terms (islands)

MEA1 turned off Terms 1-4.

KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: ScopeMEA1-off-T1-4

Date: April 7, 2020.

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																	
A15																	
A25																	
A35																	
A45																	
A55																	
A65																	
A75																	
A85																	
A95																	
A105																	
A115																	
A125																	
A135																	
A145																	
A155																	
A165																	
A175																	
A185																	
A195																	
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total: 0

Renewal Area by Treatment Type

	Total	Natural	Plant	Seed
BFM	167	-	-	167
CMX	443	177	133	133
CMXC	18	-	-	18
HMX	1,232	924	308	-
HRDA	4	3	1	-
HRDB	-	-	-	-
HRD	629	528	100	-
PJDD	831	249	-	582
PJDS	247	74	-	173
PJM	9	3	-	6
POD	851	851	-	-
PRWR	-	-	-	-
PRWW	13	3	10	-
SBD	118	35	-	83
SBL	87	87	-	-
SBLC	-	-	-	-
SBM	138	41	-	96
	4,788	**2,977**	**552**	**1,258**

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	169	447	18	1,245	4		635	840	250	9	859		13	119	88		139
T2	89	581	35	871	208	12	522	588	250	12	601		12	167	113		177
T3	282	588	180	610	252		469	412	250	16	421		79	100	147		106
T4	465	764	85	427	44	34	610	509	250	20	295		94	140	185		64
T5	450	535		299	75	47	497	662	250	26	340	42	35	196	240	504	89
T6	634	375	0	209	8	32	398	829	250	34	281	177		275	278		68
T7	513	262	9	267	24	35	278	887	250	44	300	72		385	257		96
T8	163	239	7	347	13	4	195	1,153	250	58	391	68		539	180		134
T9	217	311	1	451		12	253	910	250	40	273	43		570	173		188
T10	33	404	33	587	70	51	177	882	250	28	314	114		352	225	4	187
T11	481	475	21	575	42	22	201	617	250	20	220	96		226	269	78	112
T12	704	428	7	515	6	4	261	802	250	14	286	7		316	188		119
T13	30	431	0	492	15	2	183	1,043	325	18	372	91		443	132		166
T14	25	396	0	345	30	2	137	1,332	250	23	484	7		620	169		100
T15	115	515	2	281	15	1	113	1,224	250	16	629	8		618	219	1	103
T16	189	459	1	365	78	4	147	857	250	11	544	7		371	285	504	137

Appendix 8

Summary of Long-term Management Direction Results

KENORA FOREST 2022 FMP **SUMMARY of SFMM INVESTIGATION**

Case Name: LTMD-07 **Date:** April 3, 2020.

Purpose: LTMD-06 with Z01 subunit OFF all terms (islands) and corrected YIELD, other inputs the same (volumes revised as slightly underachieved versus LTMD-06 due to smaller eligible land base).

Specific Inputs: Built on LTMD-06. Avail land base revised (had previously mis-classified NAT as managed where BMI had NULL field (error was introduced after yield curve development, so only a later model issue after depletions added. Does not affect counting of BLG area at all, only harvest volumes / area). TOTAL volume target reduced.

		Group:	Mm3/yr		Vol. Flow
		PWR	2.0		
		SPF	240.0	T1	+/- 10%
T6 on	90	PO	150.0	T1	+/- 15%
T7 on	375+	TOTAL	475.0	T1	+/- 10%
				Binding.	

BLG Targets and Achievement:
PRW 24,000 ha T17 (reduced as harvest / conversion reduced)

Budget: Balanced to revenues

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 - Overall very good BLG indicator achievement. PRW all ages steady increase, but cannot go above 24,000 ha T17 with current other constraints and reduced managed, land base in SFMM (less Z01 SU).

(2a) Area by Landscape Class (Productive ha)

Ha	PreSap +Sap	Imm Conifer	Imm Hwd	Mature and Late Successional: Balsam	Conifer	Hardwood	Lowland
T1	40,952	136,142	68,484	18,070	208,260	141,825	38,522
T2	71,296	127,974	62,335	22,356	201,568	126,430	37,991
T3	83,480	124,584	68,340	27,940	188,104	118,297	37,116
T4	87,465	111,983	66,320	29,060	196,817	118,109	36,109
T5	86,422	64,500	71,548	30,212	241,764	111,148	38,122
T6	92,801	79,599	73,985	30,805	229,619	103,904	30,863
T7	95,458	95,688	76,685	31,579	216,531	96,103	28,795
T8	96,357	105,916	65,775	35,663	209,839	99,432	27,224
T9	91,399	112,787	55,748	40,052	214,809	98,332	26,112
T10	93,250	115,342	48,773	44,492	216,797	94,169	25,553
T11	93,562	118,394	43,889	48,155	220,884	87,103	24,737
T12	91,813	119,822	43,403	46,890	228,113	80,773	23,899
T13	91,525	117,655	43,794	42,291	233,647	76,129	29,319
T14	92,046	117,454	45,549	43,598	233,746	71,101	30,260
T15	94,174	115,300	47,154	44,702	233,323	67,447	31,486
T16	94,456	116,467	49,031	45,098	234,358	62,673	31,290
T17	100,015	113,384	50,528	45,379	241,715	56,588	24,937
BLG Upper	181,443	52,727	145,430	17,982	224,820	65,215	28,328
BLG Lower	101,058	29,333	81,015	12,782	152,976	43,706	23,354

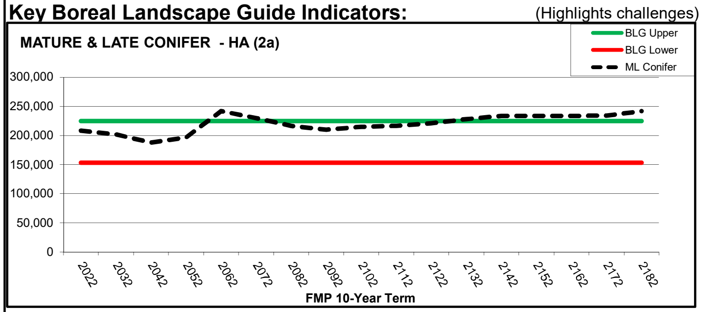
(2b) Old Growth by Grouping (Prod. ha) / **(2d)** / **(2e)** / **(6a) Available Forest:**

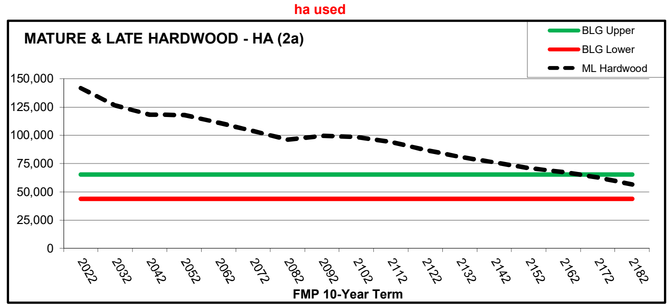
Term:	Lower Old Growth Age (Years): OGupC	OGloC	OGhmx	OGprw	(2d) Upland Conifer	(2e) Young <36 yrs	Term	(6a) Available Forest
T1	30,442	4,217	25,043	1,953	241,172	104,723	T1	503,772
T2	64,587	7,543	65,495	3,325	245,886	97,545	T2	501,468
T3	99,305	10,703	107,532	6,136	253,738	124,897	T3	499,437
T4	106,354	14,954	107,129	8,532	263,799	142,869	T4	497,575
T5	102,941	15,215	104,869	11,261	270,650	145,702	T5	495,730
T6	102,002	14,463	96,365	13,404	276,657	142,984	T6	494,075
T7	104,980	17,058	80,042	12,471	284,625	139,162	T7	494,073
T8	132,777	17,614	65,720	12,248	290,712	136,484	T8	493,997
T9	103,877	18,042	57,640	11,889	292,502	132,333	T9	493,654
T10	84,770	17,135	56,724	12,058	294,820	129,740	T10	493,522
T11	72,559	16,333	58,000	10,931	296,969	129,712	T11	493,468
T12	57,511	13,841	58,000	10,671	302,308	129,712	T12	493,468
T13	50,000	14,060	58,000	10,847	310,000	131,584	T13	493,468
T14	51,423	16,127	58,000	10,990	311,188	131,666	T14	493,468
T15	50,752	16,137	58,000	11,075	310,772	133,985	T15	493,468
T16	50,000	15,222	58,000	11,734	310,000	136,493	T16	493,468
T17	50,000	15,734	58,000	12,585	310,000	141,496	T17	493,468
BLG Upper	79,383	17,281	78,344	99,999	343,729	227,291		
BLG Lower	47,362	12,236	55,649	1,969	290,514	129,712		

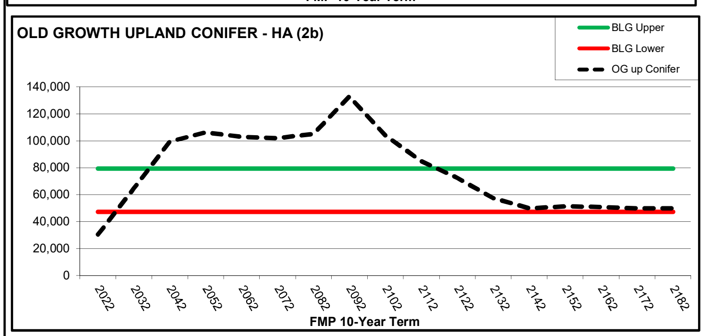
5,000
ha used

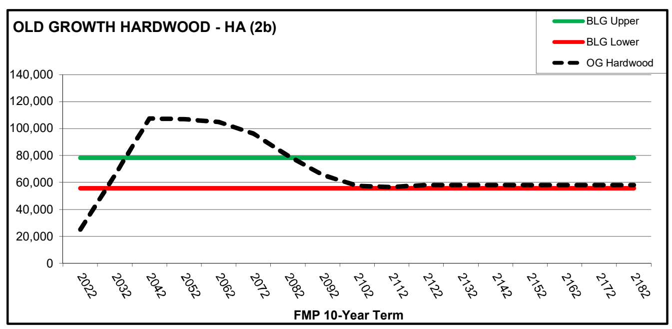
Key Boreal Landscape Guide Indicators:

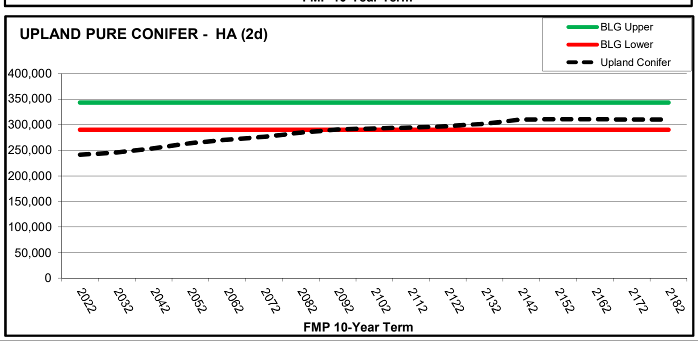
(Highlights challenges)

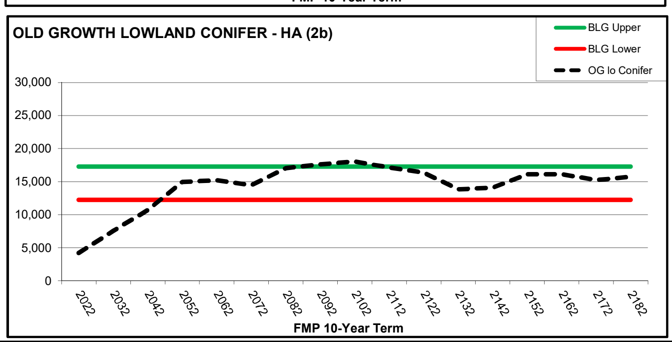












KENORA FOREST 2022 FMP **SUMMARY of SFMM INVESTIGATION**

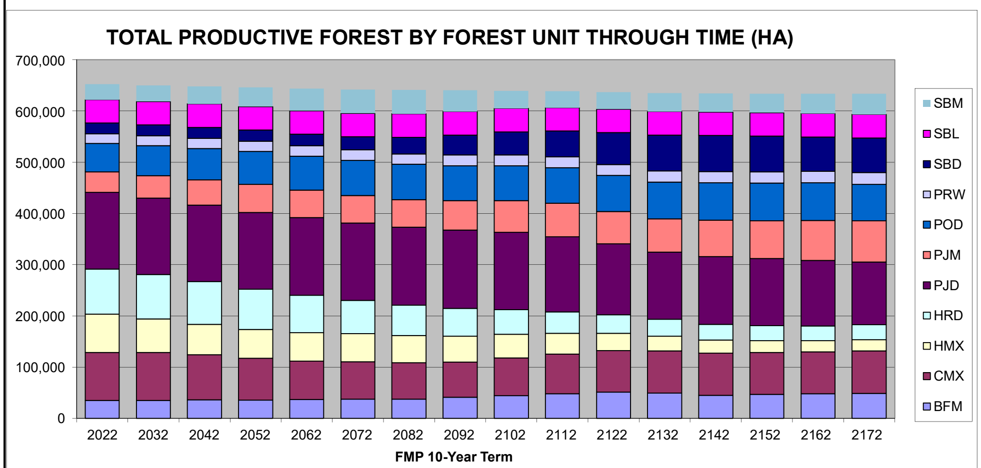
Case Name: **LTMD-07** **Date:** April 3, 2020.

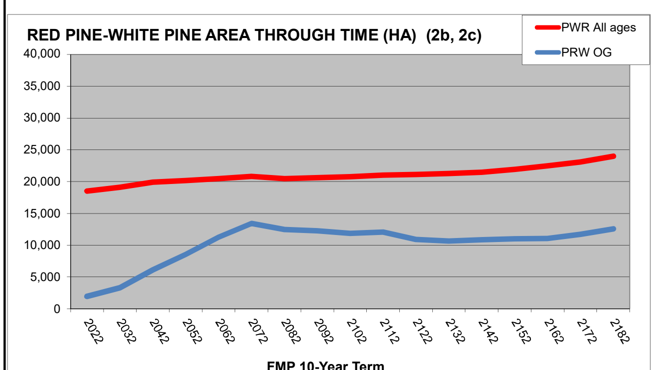
Productive Forest Area Through Time Data (hectares): by Forest Unit

Term	TOTAL	BFM	CMX	HMX	HRD	PJD	PJM	POD	Indicator (2c) PRW	SBD	SBL	SBM
T1	652,254	34,934	93,667	74,582	88,202	150,031	39,912	55,484	18,488	20,977	45,724	30,253
T2	649,950	35,189	93,547	65,138	86,924	149,107	43,872	58,398	19,101	21,253	45,767	31,653
T3	647,861	36,497	87,715	59,326	83,600	148,996	49,244	61,235	19,901	21,400	45,848	34,100
T4	645,863	35,820	81,572	56,234	78,457	149,732	55,140	63,949	20,150	21,429	45,882	37,498
T5	643,717	36,908	75,136	55,144	73,340	151,621	53,142	66,192	20,465	22,498	45,882	43,389
T6	641,576	37,551	72,971	54,682	64,944	151,198	53,732	68,250	20,849	25,410	45,673	46,316
T7	640,838	37,751	70,884	53,332	58,860	152,515	53,273	69,184	20,495	32,344	45,707	46,493
T8	640,205	41,035	68,756	50,384	54,394	152,749	57,311	68,571	20,646	39,247	45,707	41,405
T9	639,239	44,231	73,805	45,927	48,473	150,819	61,956	67,841	20,761	45,361	45,698	34,365
T10	638,375	48,005	77,688	40,576	41,555	146,733	65,664	68,978	21,035	50,416	45,718	32,006
T11	636,724	51,142	80,989	33,734	36,546	138,446	62,798	70,492	21,125	62,574	45,726	33,151
T12	634,712	49,501	82,550	28,107	33,104	130,943	65,073	72,096	21,303	70,393	45,743	35,899
T13	634,360	45,126	82,139	25,892	30,551	132,338	70,539	73,345	21,500	70,754	45,808	36,368
T14	633,754	46,800	81,564	23,283	29,622	130,491	73,876	73,473	21,953	69,815	45,871	37,006
T15	633,586	48,188	81,668	21,851	29,010	127,263	78,056	73,690	22,483	66,830	45,922	38,622
T16	633,373	48,753	82,772	22,290	29,140	121,974	80,737	71,374	23,068	67,132	45,976	40,157
T17	632,547	49,188	83,189	21,536	28,278	109,790	81,081	70,314	24,000	77,798	46,041	41,331

(1a) Caribou Habitat (Caribou Zone):

Term	Refuge	Winter
T1	71,994	29,678
T2	72,246	62,576
T3	70,061	60,218
T4	70,379	59,854
T5	73,525	59,823
T6	72,140	55,137
T7	74,354	58,541
T8	74,544	59,066
T9	73,705	52,656
T10	74,841	56,290
T11	74,732	54,570
T12	71,550	49,338
T13	72,324	54,457
T14	72,500	56,434
T15	72,900	57,599
T16	75,748	61,694
T17	73,832	57,543
BLG Upper	61,458	45,161
BLG Lower	54,045	18,667





All ages PRW - desirable level "to increase"
Target in SFMM T17 of 24,000 ha
BLG incr towards ~39,000 ha

Old Growth PRW - desirable level "to increase"
used 5,000 ha in SFMM (overachieved)

PRW all ages and Old Growth projections meet desirable levels "to increase". More PRW is expected to be produced operationally, than is projected in SFMM transitions.

KENORA FOREST 2022 FMP — SUMMARY of SFMM INVESTIGATION

Case Name: LTMD-07 **Date:** April 3, 2020.

HARVEST AREA and VOLUME RESULTS:

Implications on Wood Supply - Good distribution of harvest area by forest unit, through time.
Harvest volumes by species groups look good. Good distribution between OMZ subunits. (improved with removal of Z01)
Reduced long-term TOTAL volumes, resulting form removal of Z01, however is still slightly higher than projected in 2012 FMP 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 (6b)	4,859	91	501	1,332	509	1,144	4	991	14	77	86	111
T2	4,337	94	786	933	656	876	5	693	8	108	111	67
T3	3,953	369	484	653	748	906	7	485	13	103	145	40
T4	3,999	428	796	457	678	881	9	340	1	144	228	38
T5	4,288	465	432	320	769	1,070	12	238	6	201	722	53
T6	3,721	729	303	224	492	910	15	248	224	282	221	74
T7	3,670	477	265	261	407	1,108	20	274	70	395	290	103
T8	3,713	216	229	339	259	1,365	26	318	61	552	201	144
T9	3,744	30	320	441	347	1,310	34	229	21	633	178	202
T10	3,692	28	350	574	395	1,083	24	297	141	416	232	153
T11 (6b)	3,686	547	439	582	260	833	17	216	83	300	319	92
T12	3,910	708	540	435	323	1,008	22	280	8	301	187	99
T13	3,725	68	513	460	201	1,302	28	364	97	421	131	138
T14	3,921	26	437	387	162	1,531	36	474	7	589	170	102
T15	4,049	86	462	271	144	1,504	26	616	8	571	222	140
T16	4,318	173	484	321	215	1,128	18	729	7	342	816	84

	Natural	Plant	Seed
T1	63%	13%	24%
T2	62%	14%	24%
T3	55%	9%	35%
T4	50%	7%	43%

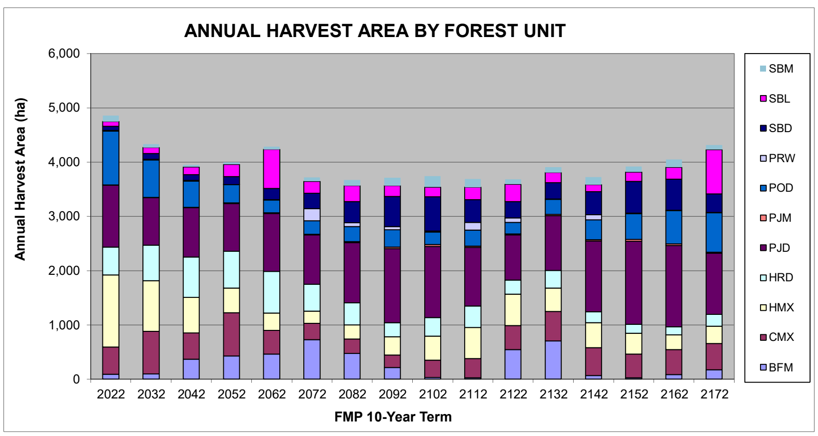
* See AU breakdown of treated area below.

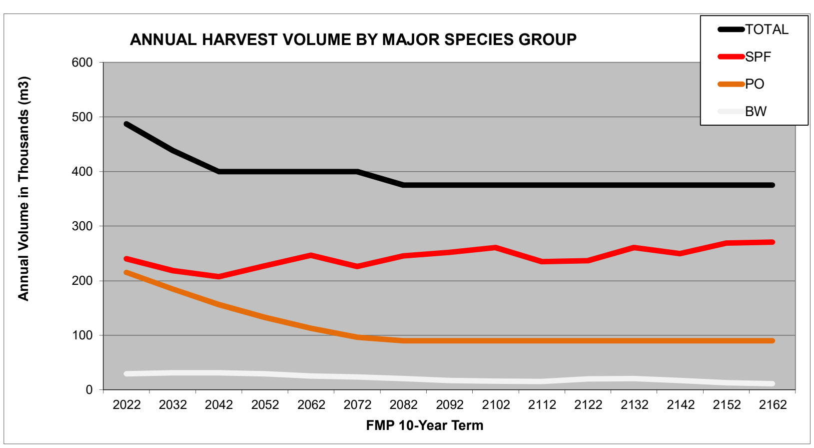
Annual Harvest Volumes by Major Species Groups

Term	TOTAL	SPF	PO	BW	PRW	(6d) Prop. By Size Small	Large
T1 (6c)	487.2	240.0	214.8	29.6	2.0	0.95	0.05
T2	438.5	218.7	184.2	31.5	2.0	0.93	0.07
T3	400.0	207.4	156.6	31.2	2.0	0.91	0.09
T4	400.0	227.4	133.1	29.8	2.0	0.93	0.07
T5	400.0	246.8	113.1	25.6	2.0	0.93	0.07
T6	400.0	226.3	96.2	23.5	51.7	0.87	0.13
T7	375.0	245.5	90.0	20.6	15.9	0.91	0.09
T8	375.0	251.9	90.0	17.1	14.6	0.90	0.10
T9	375.0	260.8	90.0	15.8	7.0	0.95	0.05
T10	375.0	234.7	90.0	15.6	32.4	0.93	0.07
T11 (6c)	375.0	236.9	90.0	20.3	23.7	0.92	0.08
T12	375.0	260.6	90.0	21.0	2.3	0.96	0.04
T13	375.0	249.5	90.0	17.2	17.8	0.90	0.10
T14	375.0	268.9	90.0	13.0	2.0	0.96	0.04
T15	375.0	270.5	90.0	11.1	2.0	0.96	0.04
T16	375.0	245.1	103.5	13.8	2.0	0.96	0.04
Average	392.2	243.2	113.2	21.0	11.3		

Projected Revenues, Expenditures & Renewal Area

Term	Revenue M$	Expend. M$	Unspent M$	Renewal ha	Natural ha	Plant ha	Seed ha
T1	1,716	1,716	0	4,810	3,031	615	1,164
T2	1,562	1,562	0	4,293	2,683	589	1,021
T3	1,469	1,469	0	3,913	2,169	370	1,375
T4	1,578	1,578	0	3,959	1,967	292	1,700
T5	1,698	1,698	0	4,280	2,256	359	1,665
T6	1,932	1,932	0	3,721	1,420	464	1,838
T7	1,737	1,737	0	3,668	1,553	314	1,801
T8	1,754	1,754	0	3,704	1,592	278	1,834
T9	1,741	1,741	0	3,741	1,650	305	1,786
T10	1,804	1,804	0	3,692	1,634	481	1,577
T11	1,757	1,757	0	3,686	1,538	386	1,762
T12	1,704	1,704	0	3,910	1,677	196	2,038
T13	1,762	1,762	0	3,725	1,834	447	1,443
T14	1,743	1,743	0	3,921	1,955	301	1,665
T15	1,752	1,752	0	4,049	2,115	277	1,656
T16	1,656	1,656	0	4,318	2,796	487	1,034





TERM 1 ANNUAL HARVEST AREA by SUBUNIT (ha)

SU	T1 AHA	T2 AHA	T3 AHA	T4 AHA
A1				
A2				
B1	153	206		
B2	169	271		
C			104	158
D				
DEA1	235	154	21	148
E				
ELK	236	105	272	187
MEA1	201	425	398	511
MEA2	382	198	285	208
MEA3	128	71	40	10
MEA4	93	55	49	53
Z01				
Z02	48	119	111	383
Z03	12	44	25	33
Z04	265	187	293	387
Z05	115	255	176	175
Z06	154	114	223	150
Z07	265	312	582	326
Z08	283	133	308	147
Z09	198	146	124	123
Z10	338	179	348	396
Z11	546	257	121	251
Z12	717	494	243	139
Z13	141	92	24	46
Z14		444	156	109
Z15	179	75	50	61
TOTAL	4,859	4,337	3,953	3,999

Z01 now turned OFF all terms (islands)
Harvest area good for T1-T4 for MEA1 and Z12

KENORA FOREST 2022 FMP	SUMMARY of SFMM INVESTIGATION
Case Name: LTMD-07	Date: April 3, 2020.

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				171													
A65				366			167				24						
A75		133		111							193						
A85		333		413							291						
A95	36			271			338	642	228	4	405						
A105								161	22		67						
A115	13	15						25			11			22	13		37
A125	28	6						45						26	14		48
A135	4	10						21					3	27	43		26
A145	8	1			2								4	2	11		
A155	0	3			1								6		2		
A165	0				1								0		2		
A175		0			0								0				
A185																	
A195																	
A205																	
A215																	
A225																	
A235																	
A245																	
A255																	
	91	501	0	1.332	5	0	504	894	250	4	991	0	14	77	86	0	111
																Total:	**4.859**

Renewal Area by Treatment Type

	Total	Natural	Plant	Seed
BFM_	90	-	-	90
CMX_	496	198	149	149
CMXC	-	-	-	-
HMX_	1,319	989	330	-
HRDA	5	4	1	-
HRDB	-	-	-	-
HRD_	499	375	125	-
PJDD	885	265	-	619
PJDS	248	74	-	173
PJM_	4	1	-	3
POD_	981	981	-	-
PRWR	-	-	-	-
PRWW	14	3	10	-
SBD_	76	23	-	53
SBL_	85	85	-	-
SBLC	-	-	-	-
SBM_	110	33	-	77
	4,810	**3,031**	**615**	**1,164**

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	91	501		1,332	5		504	894	250	4	991		14	77	86		111
T2	94	651	135	933	61		595	626	250	5	693		8	108	111		67
T3	369	475	9	653	92	1	655	656	250	7	485		13	103	145		40
T4	428	617	179	457	194	25	459	631	250	9	340		1	144	183	45	38
T5	465	432		320	265	68	437	820	250	12	238	6		201	237	485	53
T6	729	303		224		20	471	660	250	15	248	224		282	221		74
T7	477	259	6	261	26	51	330	858	250	20	274	70		395	288	3	103
T8	216	223	6	339			259	1,115	250	26	318	61		552	201		144
T9	30	290	30	441		10	337	1,060	250	34	229	21		633	178		202
T10	28	326	23	574	94	27	275	833	250	24	297	141		416	232	0	153
T11	547	424	15	582	29	31	200	583	250	17	216	83		300	267	52	92
T12	708	526	14	435	40	23	260	758	250	22	280	8		301	187		99
T13	68	513		460	18	1	182	985	317	28	364	97		421	131		138
T14	26	436	0	387	33	1	128	1,281	250	36	474	7		589	170		102
T15	86	461	1	271	32		112	1,254	250	26	616	8		571	221	1	140
T16	173	482	3	321	77	5	133	878	250	18	729	7		342	287	529	84