
20-Year Forest Management Plan for Forest Management Licence #2

TERMS OF REFERENCE

(Manitoba 20-Year Forest Management Plan Guideline – Section 3.0)

Proponent: Nisokapawino Forestry Management Corporation (NFMC)
And
Canadian Kraft Paper Industries Ltd. (CKP)

Term of FMP: January 1, 2027 – December 31, 2046

CURRENT STATUS

The current Forest Management Licence Agreement (FMLA) for FML 2 had an expiry date of December 31, 2024. A 2-year extension to the FMLA was applied for by NFMC and approved by the Manitoba government prior to December 31, 2024, extending the expiry date to December 31, 2026.

The current Environment Act Licence (EAL) No. 2302 ER had an expiry date of December 31, 2024. The EAL was extended to December 31, 2026.

The current Forest Management Licence Agreement (FMLA) for Forest Management Licence (FML) #2 is held jointly by Canadian Kraft Paper Industries Ltd (CKP) and Nisokapawino Forestry Management Corporation (NFMC).

NFMC performs the forestry management services associated with the operation of FML 2 and will be the lead proponent for the new 20-Year Forest Management Plan for FML 2. NFMC is equally owned by Canadian Kraft Paper Industries Ltd. and Nekoté Limited Partnership. Canadian Kraft Paper owns and operates a kraft pulp and paper mill operation in The Pas, MB and the Nekoté LP is owned and represents the interests of 7 First Nations upon whose traditional lands the FML 2 is located. NFMC works to ensure the objectives of both Partners are being met with respect to forest management decisions, local opportunities for employment, education, and training, and access to fibre. Other tenures that are volume based exist within FML 2 and are referred to as Quota holders. NFMC provides planning services for their tenure at the direction of the FML Agreement and the Manitoba Government.

GENERAL INFORMATION

Development of the Forest Management Plan (FMP) will follow the framework of the Manitoba's 2021 Twenty Year Forest Management Plan Guideline. As such, the first step in the FMP is to define the Terms of Reference as per the Guideline. The primary representative in the FMP process for NFMC is the General Manager, and the primary representative for Manitoba Natural Resources and Northern Development (NRND) is the Director of Forestry and Peatlands. The 20 Year FMP development will follow a collaborative, integrated development process. A planning team composed of Manitoba Government representatives, Nisokapawino Forestry Management Corporation Representatives (including Nekoté Community Representatives), and Canadian Kraft Paper Representatives are

responsible for the development of these Terms of Reference, and the creation of the FMP. Scientists and/or consultants will form a part of this team as invited.

Section 3.0 of Manitoba’s Twenty Year Forest Management Plan Guideline outlines the requirements to be included in the Terms of Reference (ToR) used to develop this document. Beyond the scope of the ToR, the proponent will develop the FMP in full accordance with the guideline. This includes the development of Values, Objectives, Indicators and Targets (VOIT’s) as based on the Canadian Council of Forest Ministers criteria and indicators. This will include the development of indicators to address socio-economic conditions, environmental protection, and other identified values that cannot be modelled as it relates to the FMP.

PRE-PLANNING REQUIREMENTS: TERMS OF REFERENCE

The Terms of Reference for the FML 2 2027 FMP (reported here) provides the overall guidance for the planning process by identifying and defining:

- Known issues/risks/knowledge gaps within the FML
- Planning team members and their roles and responsibilities
- Communication strategies for Planning Team members
- Engagement plans with First Nation communities, and stakeholders
- Modelling methods and modelling input data
- Indicator species and wildlife habitat assessment methods
- Scope of FMP assessments for climate change and cumulative effects; and,
- Process and timelines

The Terms of Reference is a living document. It is used by both the Manitoba Government (the Regulator) and NFMC and CKP (The Proponents) as a planning aid. This is a public document that provides the roles and responsibilities of Planning Team members, information requirements for the plan development, as well as internal and external communication plans. During the development of the FMP changes to what would be included in the FMP or how components of the FMP would be developed were discussed and agreed to by the Proponent and Regulator. Updates to the Terms of Reference have been made as part of those discussions and revisions are captured in the table below.

Revision	Date	Description
1.0	December 2019	Initial draft Terms of Reference
2.0	December 2020	Additional information added around inventory and model. Indicator species reviewed and updated. Communication plan expanded to include internal and public plans. Issues and milestone schedule updated. Reviewed by FMP Planning Team and Sub-Committees.
3.0	February 2022	Additional information added to address changes to the 20-Year Forest Management Plan Guideline from MB NRND in December 2021. Includes scoping information for Climate Change and Cumulative Effects assessments. Revisions to timelines.
4.0	May 2022	Updated to address comments received from TAC and public from registry posting of the ToR version 3.0.

Revision	Date	Description
5.0	December 2024	Updated to include changes to the duration of the FMP upon receiving approval of 2-year extension to the FMLA (updated to state 2027 FMP with associated duration and milestones). Updated to include Wildlife Habitat Elements and Habitat Assessment models that were updated and available for use with regional data. Updates to the habitat elements were a result of adjusting approach after receiving feedback during engagement with rightsholders and stakeholders.

Table 1. FML 2 FMP Planning Team members (as of Revision 5.0, December 2024).

Organization	Name	Title	Role
NFMC	Andrew Forward	General Manager	Plan Author, Chair
Manitoba NRIF	Brad Epp	Director of Forestry and Peatlands Branch	Member
Canadian Kraft Paper Ltd		Woodlands Manager	Member
Nekoté LP		Nekoté Liaison	Member
Chemawawin Cree Nation		Representative	Member (Nekoté)
Mathias Colomb Cree Nation		Councilor	Member (Nekoté)
Misipawistik Cree Nation		Councilor	Member (Nekoté)
Mosakihiken Cree Nation		Representative	Member (Nekoté)
Opaskwayak Cree Nation		Representative	Member (Nekoté)
Sapotaweyak Cree Nation		Councilor	Member (Nekoté)
Wuskwi Sipihk First Nation		Representative	Member (Nekoté)
NFMC		Silviculture Forester	Member
NFMC		Forest Technician	Member
Manitoba NRIF	Jane Epp	Planning and Practices Forester	FMP Coordinator
Manitoba NRIF	Evan Finkler	Indigenous Relations Forester	FMP Consultation Lead
Manitoba NRIF	Sima Feuer	Manager, Planning and Development	Member
Manitoba NRIF	Jianwei Liu	Wood Supply Forester	Member
Manitoba NRIF	James Boyd	Manager, Inventory and Analysis	Member
Manitoba NRIF	Joel Kayer	Northwest Regional Forester	Member
Manitoba NRIF	Graydon McKee	Habitat Mitigation Biologist	Member
Manitoba NRIF	Lindsey Bylo	Lead Wildlife Biologist – NW Region	Member
Manitoba NRIF	Maria Arlt	Director of Wildlife	Member
Manitoba ECC	Bryce Wood	Environmental Officer	Member
Manitoba ECC	Jenny Harms	Protected Areas Specialist	Member

Important milestones and timelines for the development of the FMP are included at the end of this document. The Planning Team has the responsibility to continually review the schedule of milestones and agree on necessary adjustments accordingly. Manitoba's NRND has provided the FMP Submission Date, Review process, and approval date within Table 2.

The remaining requirements of the Terms of Reference have been organized into the following sections:

1. Topics of potential impact or influence on the FMLA
2. Land base and Modeling Information for FMP development

3. Wildlife habitat and Indicator Species
4. FMP Assessments for Cumulative Effects and Climate Change Adaptation
5. Communication Plan
6. Process and Timelines

Table 2. Manitoba NRIF Review and Approval Schedule of completed FMP.

Key Manitoba NRIF Review and Approval Milestones	Estimated Dates
FMP Draft Submission	June 2025
Public and government review	June 2025 - September 2025
Manitoba Consultation of Completed FMP Submission	October 2025 – June 2026
Final FMP Approval	July 2026 – December 2026

TOPICS OF POTENTIAL IMPACT OR INFLUENCE ON THE FML

The topics in this section are elements that could be considered as inputs to the FMP but are yet to be developed. They may be broad or complex in nature and not easily incorporated into an FMP, but are important both socially and environmentally within the FML and may need to be spoken to during the development of the FMP.

Woodland Caribou Recovery Strategies and Action Plans

Boreal woodland caribou are listed as “threatened” under both the federal Species at Risk Act and Manitoba’s Endangered Species and Ecosystems Act. The Province of Manitoba continues to develop Woodland Caribou Recovery Strategies and Action Plans. In the event these Strategies and Plans are not available to contribute to the Forest Management Plan, the regulator and the proponent will determine a mutually agreeable process for integration into the FMP at some future point.

Ecosystem-Based Management

Ecosystem-based management (EBM) is an approach to management that is guided by natural patterns and processes. The goal is to reduce the differences between natural and managed landscapes in order to keep habitat conditions within a natural range of variation. In Manitoba’s boreal forest, wildfire is a dominant natural disturbance agent. The size and pattern of wildfire disturbance is variable and some large disturbance events are very likely. As a result, the transition to EBM will result in more spatially concentrated harvest relative to historical practice. A shift towards larger harvest blocks may impact other resource users and stakeholders and may cause public concern if the background and objectives of EBM are not clearly communicated. Although other jurisdictions across Canada have adopted EBM into forest management planning as a best practice, this policy direction is currently not available in Manitoba. Manitoba may explore EBM policy direction during the development of this FMP. This new direction could have an influence on the FMP.

Maintenance of moose habitat

Moose are a culturally and socially important species in the forest management licence area and forestry activities affect their habitat. Due to a variety of factors, moose have experienced a population decline in several regions in Manitoba which has led to conservation closures for moose hunting in areas of the province, although not within FML #2. While habitat is not likely the driving factor affecting moose population declines in the Province, habitat availability and potential impacts related to forestry activities such as increased pressure on populations through predation or hunting should be considered.

Forest health

Forest insect and disease are important natural disturbance agents in Manitoba's boreal forest. In the past, both jack pine and spruce budworm outbreaks have occurred within the FML at variable intensities and extents. Currently, there is an outbreak of jack pine budworm occurring within the FML. Such outbreaks can threaten the sustainability of the forest industry and the communities that depend on them. The Province and CKPI must continue to collaborate on the management of insect and disease outbreaks.

LAND BASE BACKGROUND INFORMATION FOR FMP

The following section provides information on FML 2 land base, required inventory updates and agreed upon processes and summarizes the status of each FMU within the FML for use in the FMP.

Boundaries and Land base Extent of FML 2

Figure 1 outlines the area of Forest Management License 2 (FML 2) in northwestern Manitoba. The license area covers over 8.77 million ha north and west of Lake Winnipeg, and encompasses the major population centres of The Pas, Flin Flon and Thompson, in addition to numerous additional smaller indigenous and non-indigenous communities.

FML 2 contains portions of three Forest Sections (see Figure 2), the Saskatchewan River, Highrock and the Nelson River Forest sections. Each forest section is comprised of several Forest Management Units (FMU), each of which functions as an independent sustained yield unit for the purpose of timber harvesting and annual allowable cut determinations (see Figure 3).

- FMUs of the Saskatchewan River Forest Section which form part of FML 2 - 50, 53, 58 and 59
- FMUs of the Highrock Forest Section which form part of FML 2 - 67, 68 and 69
- FMUs of the Nelson River Forest Section which form part of FML 2 – 801, 802, 803 (Formerly FMUs 83, 84, 85, 87, and 89)

Portions of the Nelson River Forest Section have been recently completed with a new photo-interpreted Forest Lands Inventory (FLI). Manitoba, in response to a request from industry, has determined that it would be more efficient to align FMUs in Nelson River to the inventories being completed, and to better align with the realities of the challenging geography and distances in Nelson River. For the 2027 FMP, Nelson River Forest Section will be arranged into three FMUs (see Figure 3). FMU 801 corresponds to the recently completed FLI, and is on the accessible western side of the Nelson River. FMU 800 is currently inaccessible on the eastern side of the Nelson River and FMU 802 is on the top of FMU 801 in the Nelson River Forest Section. Both FMU 800 and 802 will use Forest Resource Inventory (FRI).

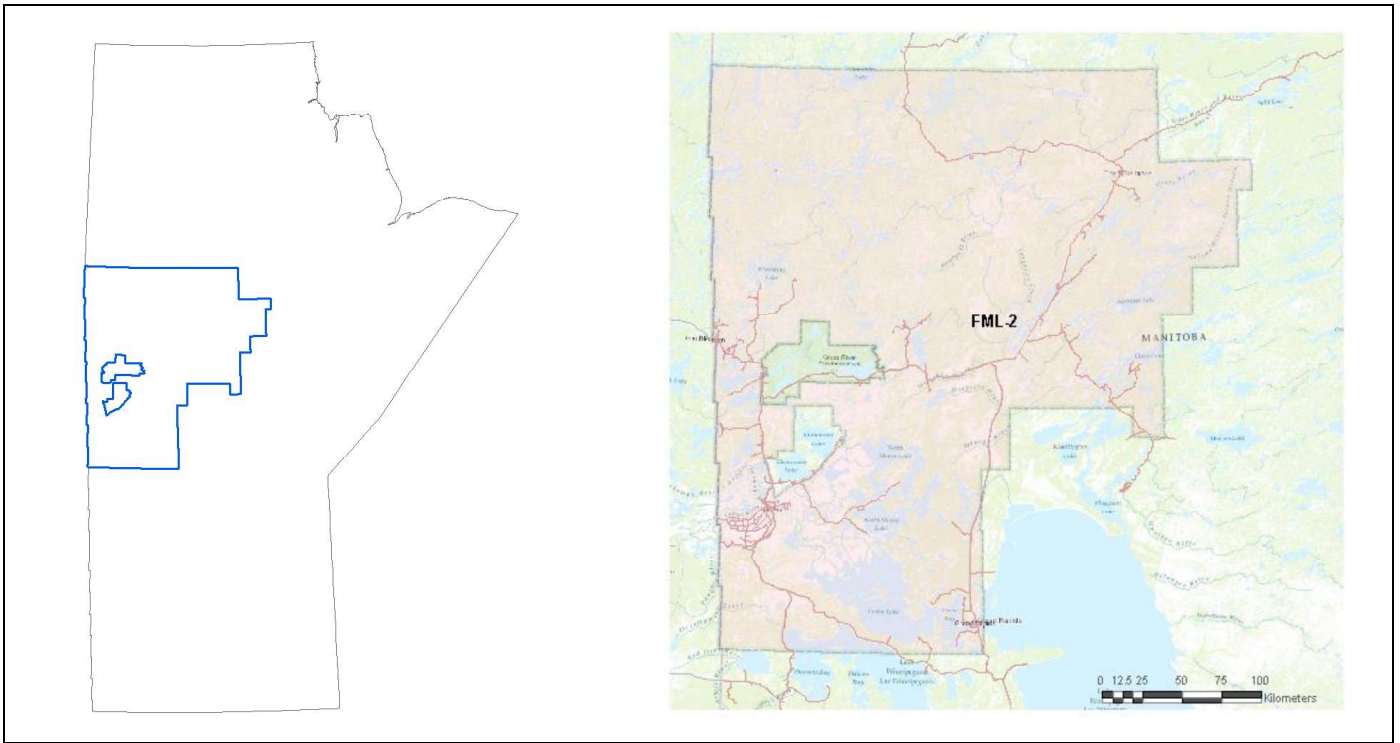


Figure 1 Forest Management Licence 2 in northwestern Manitoba

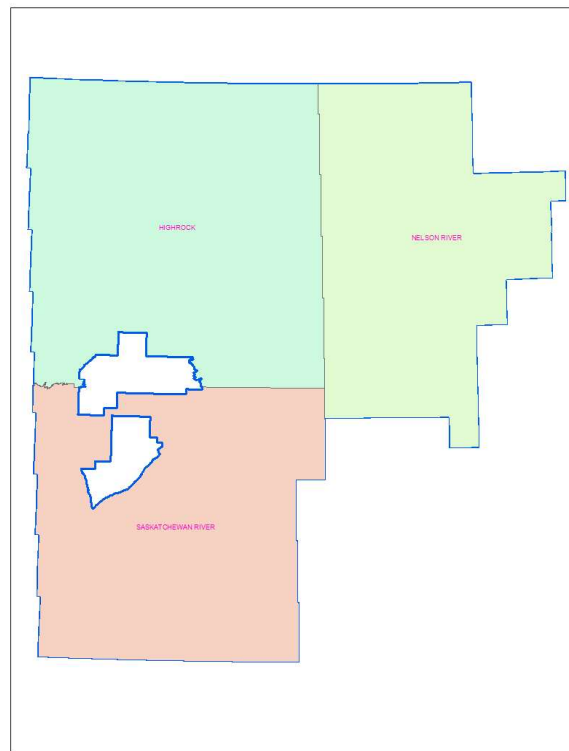


Figure 2 Forest Sections of Forest Management Licence 2 in northwestern Manitoba. FML 2 encompasses portions of the Saskatchewan River and Nelson River Forest Sections and all of the Highrock Forest Section

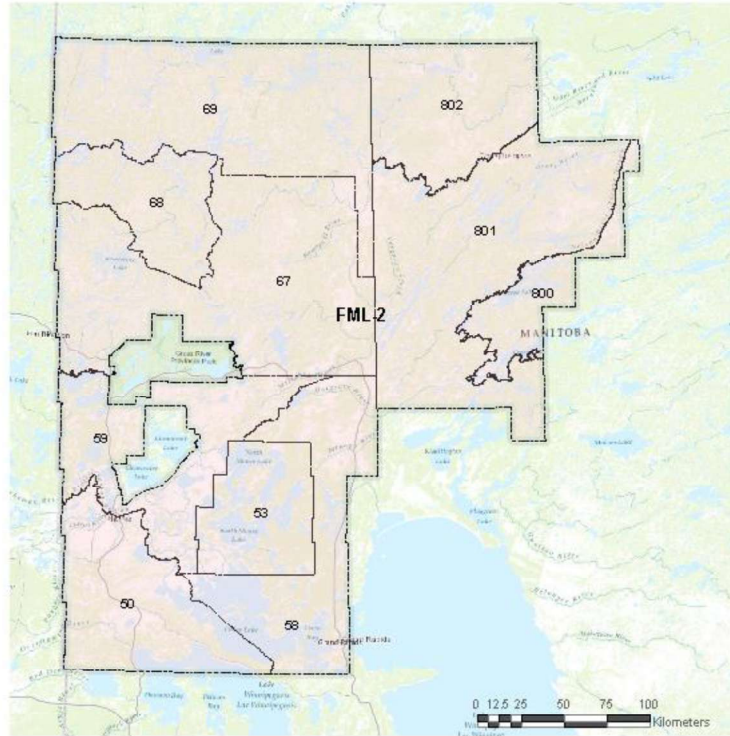


Figure 3 New Forest Management Units for use in the 2027 FML 2 Forest Management Plan. The Nelson River Forest Section has been delineated so that FMU 801 corresponds to the area of completed FLI, and FMUs 802 and 800 correspond to the FRI.

Forest Inventory in Provincial Parks and Protected and Conserved Areas

The 2027 FML 2 Forest Management Plan will consider broad objectives for ecosystems, wildlife, habitat, and timber supply over the vast land base of the FML in northwestern Manitoba. The forest inventory is the key input into the FMP that will allow the Planning Team to evaluate and measure the values on the land base to meet all of the plan objectives. Provincial parks and protected and conserved areas are a critical element in evaluating the quantity, quality and connectivity of habitats across the entire FML. The inclusion of parks and protected areas in the assessment of habitats within the FML does not influence the management and development decisions of Parks Branch.

Including forest inventories from provincial parks, and protected and conserved areas in the forest inventory planning for FML 2 may help the team to develop and meet the broad strategic ecological objectives of the entire forest. Species that have a large home range, such as woodland caribou, will make use of habitat across very large areas and cross many borders. The FMP Planning Team will request inputs from the land managers for these areas and seek their advice on incorporating available forest inventories into the FMP process.

In the case of Grass River Provincial Park and Clearwater Lake Provincial Park, these areas are physically outside the FML; however Parks Branch will be contacted to explore opportunities for including the forest inventories within the parks in the planning inventory to assist the Planning Team in evaluating plan objectives for wildlife and habitat only. Harvest operations will not be a consideration within the provincial park areas in this Forest Management Plan (FMP), nor will any decisions in the FML impact the ability for unprotected provincial parks to be developed in accordance with their respective park management plans and/or land use categories.

Re-Inventory

Portions of FML 2 currently have very old forest inventories that require a re-inventory that meets new forest inventory standards. The previous FRI standard, in use until 2000, provided limited timber attributes and did not include key attributes like canopy heights or age, key elements in the determination of volume.

Areas of Special Interest

There are several large areas of special interest (ASIs) in the High Rock and Nelson River Forest sections (FMUs 69, 800, 801, and 802) which may have implications on the management of FML 2.

Areas of special interest are designed based on enduring features found within an ecoregion that still need to be captured in Manitoba's network of protected and conserved areas to adequately represent the ecological biodiversity found in the province. These study areas are not formally protected, and may be considered as candidate protected areas in the future through the Protected Areas Initiative.

The FMP Planning Team will request a status update for ASIs within the High Rock and Nelson River Forest Sections from Manitoba Environment, Climate and Parks. The inclusion of this information within the planning inventory will provide a complete overview of the land base for wildlife and habitat connectivity assessment, and provide guidance in developing management objectives for the FML that align with the intent and objectives of the ASIs.

Relevant Landbase Management Plans

Government Management Plans:

The FMP Planning Team will use existing land-base management plans for Crown land designations and other planning areas within the FML and for Grass River and Clearwater Lake Provincial Parks in FMUs 57 and 60 as guidance when developing management objectives for FML 2 that align with the intent and objectives of these areas. The Planning Team will clarify language in the Grass River and Clearwater Lake Provincial Park Management Plans with the Provincial Park Planner.

- All provincial park management plans
<https://www.gov.mb.ca/sd/parks/park-facilities-and-services/park-system-plan/>
- Carrot-Saskatchewan River Integrated Watershed Management Plan
http://www.manitoba.ca/water/watershed/iwmp/carrot_saskatchewan/index.html

Other User Management Plans

The proponent will engage with Communities within FML 2 to review available plans or plans in development to seek guidance in developing management objectives and VOITs for the FMP. The following examples provide a potential list of available information.

- Community land use plans
- Tradition Use plans
- Traditional Knowledge Practices/Guidelines
- Spatial information of travel corridors, traditional use areas, sites currently being gathered for community plan development

Inventory Update Process for Planning

Manitoba NRND will update all inventories in the FML to an effective date of December 31, 2020, to capture all recent disturbances and silvicultural treatment data. The final Landbase will be provided to the proponent for use

in the FMP. All analyses by the Province of Manitoba and NFMC would utilize the same spatial landbase data for modelling.

The process will involve an amalgamation of the two inventory types (FRI and FLI) for the FML. Ages, disturbances and past silviculture, where available, will be used to update the planning inventory. Forest inventory information within provincial parks will be included in the planning inventory in order to facilitate habitat and wildlife assessments for the entire landbase.

While high resolution (30 cm) imagery has been acquired for most of the Saskatchewan River Forest Section, the development of a new Forest inventory for that section will not be completed in time to be included in the development of this FMP.

Detailed information about each FMU, the current status and updates required is contained in Table 3.

Additional Spatial Information for FMP Modeling and Analysis

a. Roads

Roads are important as land base netdowns (for buffers) and as a modelling tool to model timber access, economics and even habitat indicators. NFMC will provide forest level roads for FMP modelling, and to Manitoba as well to ensure continuity in the development of the modelling landbase.

b. Streams/Rivers

Streams and rivers provide critical habitat and buffers around these features are necessary for protection of these features. The best available information will be used to identify water features; either from within the forest inventory or other sources of GIS data, such as the National Hydrographic Network will also be investigated for use as a spatial netdown of riparian reserves.

Note: additional spatial information will be incorporated when available (see section Other User Management Plans)

Table 3 Summary of Inventory and Land Base Elements by FMU

Forest Section		High Rock Forest Section			Nelson River Forest Section			Saskatchewan River Forest Section				Grass River Provincial Park (PP)	Clearwater Lake PP, Cormorant Provincial Forest
Category	Description	FMU69	FMU68	FMU67	FMU802	FMU801	FMU800	FMU59	FMU58	FMU53	FMU50	FMU60	FMU57
Inventory	Inventory Standard	FRI	FLI	FLI	FRI	FLI	FRI	FRI	FRI	FRI	FRI	FLI	FRI
	Inventory Current update (for depletions and silviculture data)	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020
Status of Base Case	Yield Curves	STRATA	STRATA	STRATA	STRATA	STRATA	STRATA	STRATA	STRATA	STRATA	STRATA	NA	NA
	Model Inputs	Silviculture Transitions, Management Options, Species Succession			Silviculture Transitions, Management Options, Species Succession	Silviculture Transitions, Management Options, Species Succession	Silviculture Transitions, Management Options, Species Succession					NA	NA
	Forest Estate Model	Woodstock	Woodstock	Woodstock	Woodstock	Woodstock	Woodstock	Woodstock	Woodstock	Woodstock	Woodstock	Woodstock	NA
AAC	Year	2020	2014	2014	2020	2020	2020	2014	2014	2014	2014	NA	NA
FMP Modeling	FMP Landbase (includes disturbances and forecasted depletions to the end of plan current plan)	2024	2024	2024	2024	2024	2024	2024	2024	2024	2024	2024	2024
	Ownership/Status	Current	Current (TLE lands within this area – no inventory provided)	Current	Current	Current	Current	Current	Current	Current	Current	Current	Current
	Provincial Land Designations (provincial parks, ecological reserves, wildlife management areas, community pastures, etc)	Current	Current	Current	Current	Current	Current	Current	Current	Current	Current	Current	Current
	Areas of Special Interest	Current	Current	Current	Current	Current	Current	Current	Current	Current	Current	Current	Current
	Yield Curves	STRATA	STRATA	STRATA	STRATA	STRATA	STRATA	STRATA	STRATA	STRATA	STRATA	STRATA	STRATA
Forest Estate Model	Patchworks	Patchworks	Patchworks	Patchworks	Patchworks	Patchworks	Patchworks	Patchworks	Patchworks	Patchworks	Patchworks	Patchworks	Patchworks

FMP MODELLING

Wood supply modelling uses computer simulation tools to forecast future forest conditions as a result of management strategies and constraints being considered. The use of wood supply models helps to explore and understand impacts and trade-offs of management decisions within a large geographical area over long time horizons. The information derived from modelling provides decision support to the FMP Planning Team as they develop and select the Preferred Management Scenario.

Manitoba NRND will complete the required Base Case modelling for FMUs (FMU69; FMU800; FMU801; FMU802) that do not currently have an updated Base Case. The Base Case modelling is important to provide a benchmark understanding of the wood supply within the FML and the interactions of various model inputs and generally sets the upper limits of annual harvest. The Base Case does not usually account for operational constraints and requirements like roads, haul distances and seasonal harvest block layout. The harvest levels derived from Manitoba NRND will inform the development of the FMP model and management objectives. Manitoba NRND will provide the results of the Base Case to the proponent as well as any relevant inputs as this information becomes available.

NFMC has chosen to use the Patchworks forest estate model for FMP scenario planning. The Patchworks model is a spatially explicit planning tool that maintains forest area information and relationships to the managed land base throughout the strategic planning exercise. This will provide a more realistic forecast of management alternatives that will consider spatial factors such as accessibility, roads, harvest blocks as well as landscape level habitat relationships for species with large home ranges like Woodland Caribou. Considering location of management activities within the FML at the strategic level will provide better connectivity to operations and implementation of the plan. This landscape level strategic approach will consider objectives at the FML level, as well as at the FMU level where required.

Due to the use of different models and management objectives being considered between the Base Case and FMP Modeling, the Planning Team anticipates some differences in results.

Model Input - Yield Curves

STRATA based yield curves exist and will be provided by NRND Forestry and Peatlands for the FMUs. Strata based yields have been used in all existing Base Cases (Sask River and FMU 67 and 68). For the FMP model, NFMC will use the latest information available where the required input information exists. Utilization standards also have an impact on the determination of sustainable harvest levels.

Model Input - Post-Harvest Transitions

Manitoba NRND and NFMC will work closely together to create post-harvest transitions from collected silviculture data, for use in Base Case and FMP models (developed by Forest Section). Post-harvest transitions are an important model input that provide a future forest condition based on the management activity scheduled. Historical records, current practices and local operational knowledge will be used by the Land-base and Modeling Sub-Committee.

Modeling Scenarios – Scenario Planning

Working towards a scenario that will consider numerous management objectives – both ecological and economic – and that reflect objectives expressed by communities. The following scenarios will be developed and influenced by Indigenous communities and stakeholders input to be included in the Preferred Management Approach Selection Process along with the Base Case.

- Baseline Scenario

- Current policy and management objectives
- Sustainable wood supply – for FML and FMUs
- Accessibility and arrangement of harvest blocks
- Transportation considerations and economics
- Habitat Scenario
 - Baseline scenario objectives
 - Explore management alternatives to enhance the amount and arrangement of habitat for selected indicator species within the FML over time.

Spatial Harvest Schedule and the Base Case

The Manitoba government Base Case spatial component is not intended to generate an operational spatial harvest schedule and this will come from the Preferred Forest Management Scenario (PFMS) after analysis and engagement with rightsholders and stakeholders. The FMP model, developed in Patchworks as a fully spatial model, will allow the team to explore and visualize the FMP objectives in very interactive ways. The FMP model may consider objectives that are not present in the base case such as roads, economics, caribou strategy, moose strategy, current conditions of ecological features. All of these have the potential to deviate from the Base Case results and will be fully discussed and developed as a team to ensure the objectives of the FMP are met.

PRELIMINARY IDENTIFICATION OF REGIONALLY IMPORTANT SPECIES

Revision 5.0: At the time the original Terms of Reference was developed, a selection of indicator species was chosen based on available HSI models. Based on feedback heard during engagement and discussions with the Planning Team, it was decided that the HSI models historically available and initially selected for use (caribou, hairy woodpecker, marten, great grey owl, moose, common yellowthroat, red-breasted nuthatch, ruffed grouse, and black-and-white warbler) were potentially not representative of conditions in FML 2.

The Planning Team concluded that based on this feedback, a new approach was necessary. The boreal songbird section has been added to this Terms of Reference to document the framework and direction taken to consider, include, and apply boreal songbird models in the forest management plan development process in place of the previously identified HSI models for indicator species. When considered alongside boreal woodland caribou habitat elements at the landscape scale, moose habitat elements at the more local scale, and songbird habitat elements to capture a diverse range of habitat needs, the Planning Team agreed to update the following section to represent regionally important and focal species on the FML.

Indicator species are defined as an animal or plant species that can be used to infer conditions in a particular habitat. In terms of the development of the FMP for FML 2, the preliminary indicator species identified in the plan were selected due to the variety of habitat types and forest conditions utilized, as well as habitat suitability models that were available for use in a forest modelling context. During the initial development stages of the FMP, it was determined that many of the available Habitat Suitability Index (HSI) models available for use in Manitoba were derived with references and observations from southern ecoregions based on the knowledge and data available at the time. Many of these models had not been validated with observation data within the northern boreal regions

where they would need to be apply (with the exception of the Marten model). For those that have been, there was little preference or alignment with higher HSI values¹. For these reasons, as well as based on feedback heard from rightsholders and the public, NFMC will be looking to implement a new approach for habitat assessments in the FML 2 Forest Management Plan. The approach proposed will use habitat elements at the coarse landscape scale and focus on habitat assessment models derived with known location data from the region, where available.

The approach to forest management planning in Manitoba is open and collaborative with opportunities for ongoing public involvement. Additional species of social, economic, or community importance may be brought forward during public engagement opportunities that are not listed in the Terms of Reference. Additional species of community importance will be recorded during collection of Concerns and Values through engagement. Additional species will be reviewed to understand how the species habitat requirements would be covered by the habitat matrix (Table 4) at a broad scale or how fine-scale requirements could be addressed operationally with Section 9.1 of Implementation Strategies of the FMP guideline.

In some cases, indicator species may be identified as important for communities or of concern/risk, however there are no habitat models available. There are opportunities to quantify broad landscape level forest types and seral stages over time within the FMP that may inform habitat requirements of these species in the future. Other opportunities exist at a finer scale during operational planning and implementation to address site-specific habitat concerns.

The approach proposed for the development of the FMP is to:

1. Represent habitat elements for wildlife species at the coarse strategic scale within the forest model;
2. Assess specific habitat preferences for selected species using available, updated wildlife models;
3. Consider fine-scale habitat element arrangements and requirements during operational planning for selected species; and,
4. Develop research plans to increase available data in FML 2 to refine Manitoba habitat models in future plans.

The species included in the Terms of Reference to be considered in the FMP Matrix of Habitat Elements have been listed based on:

- Distribution within FML 2;
- Availability of quantifiable habitat models and metrics for Manitoba;
- Ability to influence habitat types through forest management;
- Federal or provincial classification of a species of concern or species at risk;
- Importance to stakeholders and rightsholders within or adjacent to FML 2; and,
- Representation of a broad spectrum of forested habitat types.

[Matrix of Habitat Elements for Wildlife Species](#)

A matrix of habitat elements defined using broad forest cover types and seral stages was proposed to categorize habitat elements distributed across FML 2. These habitat elements can be represented directly in the forest model and can be tracked over time as the forest ages and regenerates from disturbances. The matrix of habitat elements covers many representative species found within the region. The forest model can measure and report on the abundance of these general habitat elements within the FML and demonstrate relative changes as a result of the strategic direction identified in the Preferred Forest Management Scenario. The dimensions of the matrix (box) represent general but unique habitat types that occur around the FML and maintaining the dimensions of the box

¹ Berger, R. and J. Ehnes. 1997. Bird habitat suitability index (HSI) validation study.

Final Report. Manitoba Model Forest. 150 pp.

is a way to model landscape level habitat elements (coarse filter/strategic) over time in a forest model. Table 4 below has been populated with examples of species that would occupy or potentially use the habitat element represented by each broad forest habitat type.

The habitat elements (combinations of seral stages and forest cover types) will be defined and used during the development of the PFMS in the forest model.

In addition to the general habitat elements, additional habitat types will be defined in the forest model for important wildlife species identified:

1. Boreal Woodland Caribou
 - a. Preferred, Useable, and Refuge general forested habitat types.
2. Moose
 - a. Thermal cover, general cover, and browse/forage general forested habitat types.

Table 4. Habitat elements matrix table describing the broad habitat types represented within FML 2 using seral stages and cover types.

Seral Stages	Softwood	Softwood-leading Mixedwood	Hardwood-leading Mixedwood & Hardwood	Non-Productive Forest
Young	Great grey owl Lynx Marten Red breasted nuthatch White-throated sparrow	Common yellowthroat Great grey owl Lynx Marten Moose (browse) Red-breasted nuthatch White-throated sparrow	Black and white warbler Common yellowthroat Great grey owl Lynx Moose (browse) Ruffed grouse	Beaver Caribou Common yellowthroat Greater yellowlegs Moose
Immature	Marten Red breasted nuthatch Great grey owl	Marten Moose (cover) Red breasted nuthatch Great grey owl	Black and white warbler Moose (cover) Great grey owl Ruffed grouse	
Mature, Old, & Very Old	Caribou Marten Olive-sided flycatcher Red breasted nuthatch Great grey owl	Marten Olive-sided flycatcher Red breasted nuthatch Hairy woodpecker Great grey owl	Black and white warbler Hairy woodpecker Great grey owl Ruffed grouse	

Habitat Assessment Models

Boreal Caribou

The provincial 20-year Forest Management Plan Guideline (Manitoba Agriculture and Resource Development, 2021) directs that:

Within Boreal Caribou ranges proponents would be expected to implement a management strategy using the best available information to mitigate effects of forest management activities on caribou habitat. This includes a Caribou Habitat Protection Plan to be incorporated into the FMP to provide guidance to the management plan. Manitoba will provide further details as the provincial caribou action plan for range plan development is finalized.

It is recognized that Woodland Caribou habitat management is a priority management objective for FML 2 and will provide the strategic landscape direction of the preferred management strategy.

Revision 5.0: At the time of FMP development and revisions to the Terms of Reference a finalized Habitat Protection Plan or Provincial Action Plan were not available. However, information regarding habitat elements, assessments, and direction were available to include in the FMP development that would be consistent with direction for caribou habitat protection.

Woodland Caribou conservation, planning and management requires a larger landscape level approach and considers both the relative abundance of habitat and the arrangement at large scales. Due to the large landscape levels and spatial arrangements that will need to be considered and that will be directly influenced by forestry and access, Woodland Caribou will be addressed directly within the management objectives and within the wood supply model. Woodland Caribou has also been included as an indicator species and the resulting amount and arrangement of habitat will be assessed and reported using the updated annual HSI model that includes current disturbances on the landscape. Current buffered anthropogenic disturbances (not including forest harvesting) used in the development and validation of the Caribou HSI (Arsenault & Hazell, 2021)² will remain static from Plan Start to Plan End for the spatial assessment and be consistent with information available from Environment Canada, updated to include additional known disturbances such as linear features and recent harvest/fire. Future harvest disturbance and road development from management scenarios will be an input into the HSI model.

The post-processing boreal caribou habitat suitability index model:

1. Includes assessment of vegetation types, stand ages, anthropogenic and natural disturbances
2. Assessed for Plan Start (Time 0), Plan End (Year 20), additional projected plan (Year 40)
3. Provides an assessment of habitat quality that considers arrangement of habitat elements

Boreal Songbirds

As discussed previously, many of the available Habitat Suitability Index (HSI) models available for use in Manitoba were derived with references and observations from southern ecoregions based on the knowledge and data available at the time. Many of these models have not been validated with observation data within the northern boreal regions where they would need to be applied for use within this forest management plan. For these reasons, as well as feedback from rightsholders and the public, NFMC proposed a new approach to wildlife habitat assessment using boreal songbird habitat models to assess relative habitat measures in the FMP and for alternative management strategies.

The approach will utilize data driven boreal songbird models from a neighbouring jurisdiction with a similar ecoregion and begins to add local Manitoba observation data to validate model performance for use in this area. NFMC has identified a need to collect additional songbird species data to continually improve models that represent habitat needs and conditions within the FML. On-going research and data collection plans will be included in Part 3 Research sections to assist in developing a rigorous monitoring program to validate and continuously refine the modelling approach.

² Arsenault, A & Hazell, M., 2021. *Technical Memo – Manitoba Government – Woodland Caribou Habitat State Analyses*. Wood Environment and Infrastructure Solutions, a Division of Wood Canada Limited.

The following approach was proposed to and accepted by the Planning Team in 2023. The development of the approach, adjustments to Ontario model using available Manitoba observations, results and continued research will be document in the FMP.

The province of Ontario has developed Boreal Songbird Models as part of the coarse filter application of the Forest Management Guide for Boreal Landscapes³. The Boreal Songbird models within the guidelines available to forest managers were developed by Rob Rempel of the Centre of Northern Forest Ecosystem Research: Forest policy scenario analysis – Evaluating the effectiveness of coarse-filter policy options on conserving songbird communities (Rempel et al. 2007)⁴. These data-driven models were developed based on the boreal shield, a similar northern boreal forest ecoregion (Figure 4).

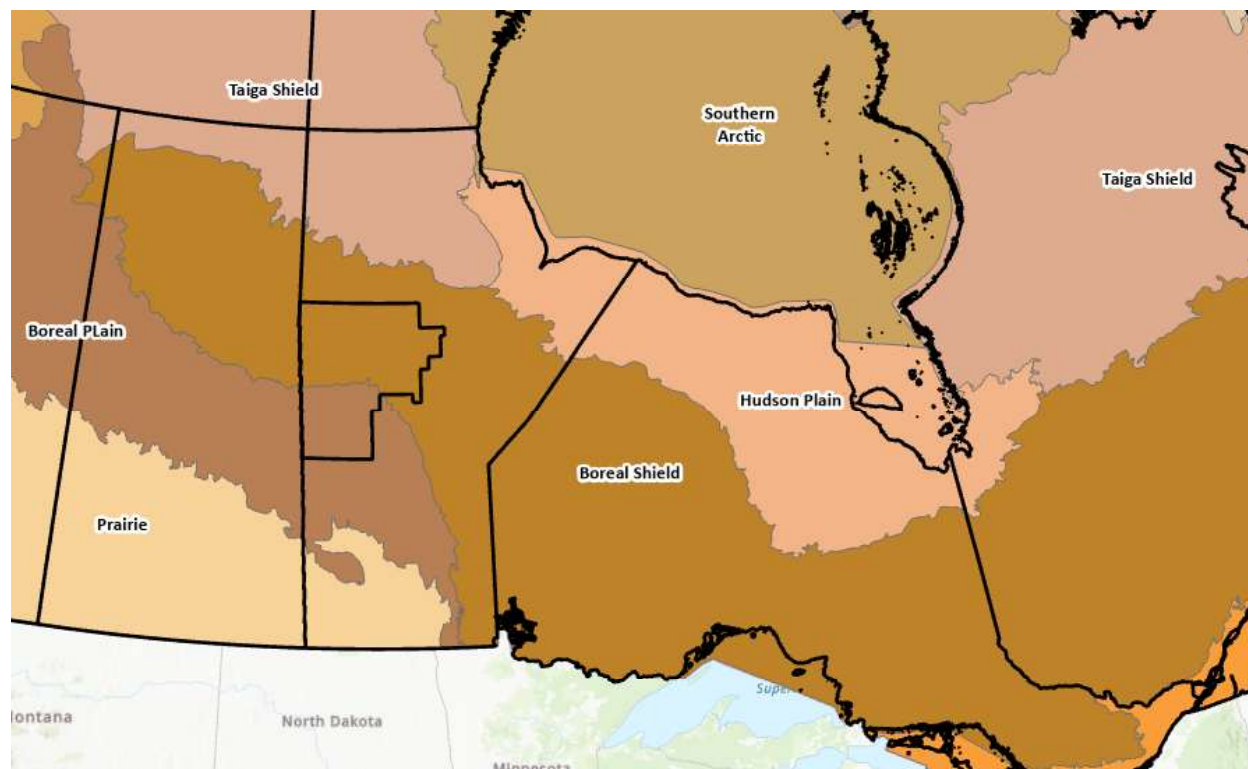


Figure 4. Ecoregions of Manitoba and surrounding provinces. FML 2 boundaries are outlined in black within the province.

Forest model habitat elements will be defined and exported from the Patchworks forest model for assessment in boreal songbird habitat models:

1. Forest model parameters
 - a. Crown closure, distance, height, age, percent hardwood, age density, percent mature, percent young (at local and region scale).
 - b. Exported for Plan Start (Time 0), Plan End (Year 20), additional projected plan (Year 40).

³ Ontario Ministry of Natural Resources, 2014. *Forest Management Guide for Boreal Landscapes*. Toronto: Queen's Printer for Ontario.

⁴ Rempel, R. S., J. Baker, P. C. Elkie, M. J. Gluck, J. Jackson, R. S. Kushneriuk, T. Moore, and A. H. Perera. 2007. Forest policy scenario analysis: sensitivity of songbird community to changes in forest cover amount and configuration. *Avian Conservation and Ecology - Écologie et conservation des oiseaux* 2(1): 5. [online] URL: <http://www.ace-eco.org/vol2/iss1/art5/>

Songbird models will be run initially using Ontario coefficients and occupancy thresholds. Results will be validated using available known songbird location observation data from The Atlas of the Breeding Birds of Manitoba (birdatlas.mb.ca and naturecounts.ca). Using this available data the models will be validated for performance.

The following steps have been proposed for the development of the plan and will be documented once completed in the FMP:

1. Assessment of performance of Ontario models
2. Documentation of initial performance
3. Development of any new Manitoba Bird Models using available data
4. Assessment of performance of Manitoba Bird Models
5. Documentation of validation and results from PFMS for Percent Area Occupied (POA)
6. Recommendations and proposed research program during implementation of FMP for additional regional data collection to further refine initial Manitoba Bird Models.

Moose

Planning for moose habitat is a great example of a species that can be represented at both the strategic, coarse-filter level while also benefitting from more detailed, fine-filter operational planning. In the forest model, general habitat elements will be defined to identify preferred forest types in the region over time (see above for forest model habitat elements for moose – thermal cover, general cover and browse). However, how these habitat elements need to be arranged at the local level to provide fine-scale habitat needs are a key component to moose habitat planning. This level of in-block detail is planned for and implemented at the operational scale, not within the strategic landscape level forest model. Because of these requirements and the cultural and social importance of this species information about moose and moose habitat planning will be addressed at both levels of development.

1. Strategic modelling and scenario analysis for the selection of the PFMS.
 - a. Thermal cover, general cover and browse/forage general forested habitat types.
2. Moose-specific operational considerations for planning during implementation of the FMP.

There is currently no habitat assessment model for moose available for the FML 2 region of Manitoba. The FMP will focus on strategic, landscape scale habitat elements, fine-filter operational planning considerations of specific habitat elements/features, and the management of access (e.g., road decommissioning and minimizing fragmentation).

Other Regionally Important Species

During pre-planning and the development of the Terms of Reference to determine preliminary Indicator Species and review available models for wildlife habitat type modelling it was discussed that no Manitoba Habitat Suitability Index (HSI) currently existed for the Lynx. This is an important fur-bearing species in the region and within FML 2 that utilizes younger habitat types and openings for hunting snowshoe hare. Preliminary research revealed models exist for neighbouring Northwestern Ontario and could potentially be adapted for use in Manitoba. The development and adaptation of a HSI model for Lynx that could be used in this FMP would be contingent on joint participation from both the proponent and the Manitoba Fish and Wildlife and Forestry and Peatlands Branches and an expression of interest from Indigenous Communities during the engagement process. If testing and validation of the HSI model is able to be completed by Manitoba outside of the FMP process the Lynx habitat assessment could potentially be included with the other indicator species. Feasibility of the joint development of the Lynx HSI would be determined through discussions of timing, cost, available data and validation timing.

Revision 5.0: While the development of a Lynx HSI was considered at the pre-planning stage, during the initial stages of plan development it was decided on by the Planning Team that the Lynx HSI model would not be pursued, and NFMC would instead focus on songbird model development as songbird initial data existed and collection of additional data would be more practical and economical.

FMP ASSESSMENTS

Cumulative Effects Assessment

Cumulative effects are defined as: “Changes to environmental, social and economic values caused by the combined effect of past, present and potential future human activities and natural processes.”⁵ The purpose of the Cumulative Effects Assessment (CEA) in this FMP will be to determine how the proposed forest management activities will affect and relate to sensitive values⁶. This will be achieved by consolidating all the different analyses already being completed for the purpose of achieving sustainable forest management.

Scope

The Proponent will identify and assess potential threats from proposed forest management activities to sensitive values. The bow-tie risk assessment tool will be used to help identify policies and procedures to help reduce or mitigate these threats. The following are 5 key sensitive values that will be addressed in the CEA:

1. Watersheds and Aquatic Ecosystems,
2. Carbon Balance, and
3. Biodiversity.
4. Moose
5. Caribou

No additional data will be collected specifically for the CEA, although some additional modelling and analysis of existing information from the FMP development may be conducted. The following information and data layers will be used:

- Productive and Non-Productive Landbase on FML 2
- Preferred Forest Management Scenario
- Existing Roads and Linear Features
- Habitat elements and habitat model assessments (Caribou, songbirds)
- Recent Wildfires
- Watersheds
- Available Wetland Carbon Information
- Generated Forest Carbon Curves

⁵ Government of British Columbia (2016). Cumulative Effects Framework Interim Policy for the Natural Resource Sector. Retrieved from: <https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/cumulative-effects-framework>

⁶ Sensitive values are values not directly addressed already by the FMP, but which are sensitive to cumulative effects, important to communities, and affected by proposed forest management activities.

Effects Assessment and Identification of Risk Mitigation Strategies;

The assessment of effects will be completed using the bow-tie analysis method with guidance from Dr. Rob Rempel.⁷ Based on each value’s hazard and top event, the following will be identified: threats, barriers, controls, consequences, and mitigative controls. The bow-tie analysis identifies possible threats and consequences of the hazard and assesses whether they are addressed by the FMP and associated operations and procedures to limit cumulative effects and reduce the risk of a hazard occurring for each value.

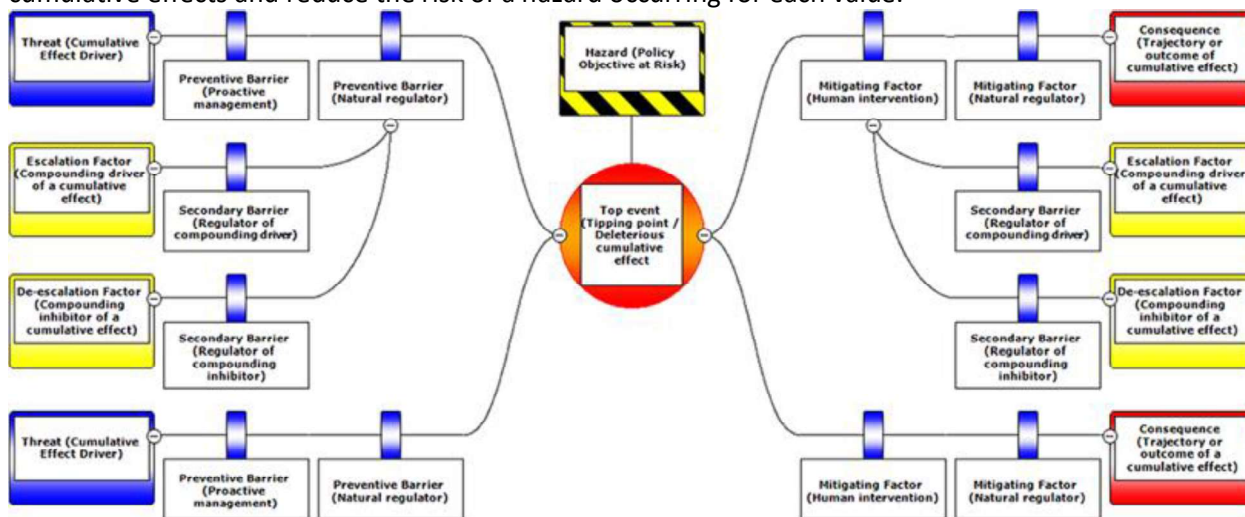


Figure 5. Example bow-tie analysis from FERIT.

Based on the data listed above further analysis will be completed to add understanding to threats within the bow-tie analysis.

1. Watersheds and Aquatic Ecosystems.

A cumulative watershed disturbance analysis will be completed to better understand disturbance effects on the watershed. Thirty percent disturbance is the threshold that is generally set and accepted across Canada, including Manitoba⁸, where disturbance below the threshold will not affect stream flow in spring run-off.^{9,10,11,12,13} Disturbance from harvest (both softwood and hardwood recovery curves) will be included in the FMP wood supply model and provide an estimate of disturbance from management at plan end. Natural disturbance and linear features available at plan start will also be included in the analysis at the watershed level (if available).

⁷ Dr. Rob Rempel is the Principal for FERIT (Forest Ecosystem Research and Information Technologies) and a leader in cumulative effects assessment using the bow-tie methodology.

⁸ D.A. Westworth & Associates Ltd. 1992. An overview of potential forest harvesting impacts on fish and fish habitat in the northern boreal forests of Canada’s prairie provinces. Department of Fisheries and Oceans. Edmonton, Alberta.

⁹ Winkler, R and Boon, S (2017). Equivalent Clearcut Area as an Indicator of Hydrologic Change in Snow-dominated Watersheds of Southern British Columbia. Extension Note 118. Retrieved from: <https://www.for.gov.bc.ca/hfd/pubs/docs/en/EN118.pdf>

¹⁰ The Community Watershed Guidebook for British Columbia uses 30% ECA as the threshold for all watersheds greater than 250ha. Found [here](#).

¹¹ ECA analysis was first published by the US Forest Service in 1974, since then many US watersheds studies in the 1970s and 80s were conducted and found no recognizable changes in stream hydrographs until ECAs approached 30%. Sourced from Haslam Lanf Community Watershed Coastal Watershed Assessment Procedure (CWAP) 2015 Update by Carson Land Resources Management Ltd. From [here](#).

¹² Buttle, J M and Metcalfe, R A (2000) found in their paper “Boreal forest disturbance and streamflow response, northeastern Ontario” that medium to large scale watersheds with ECAs of 5-25% did not show significant streamflow response. Published in *Canadian Journal of Fisheries and Aquatic Sciences*, 57, S2.

¹³ The Government of Saskatchewan sites [here](#) that flow increases are minimized when ECA is limited to 30% in coniferous dominated watersheds, and 20-25% in aspen dominated watersheds.

2. Carbon Balance

Forest ecosystem carbon calculations will be included for the forested area within FML 2 that has been classified into strata and have an associated yield curve. Forest carbon stock estimates by strata will be generated from the Carbon Budget Model of the Canadian Forest Service (CBM-CFS3¹⁴) and included in the FMP wood supply model to track carbon stocks and stock changes in different forest ecosystem carbon pools through time. Estimates of wetland carbon storage obtained through literature review and ongoing research in the area will also inform the cumulative effects on carbon balance within the FML.

3. Biodiversity

Habitat elements for regionally important species will be determined based on the preferred forest management scenario and habitat models available for assessment. Wildlife habitat elements and assessment models have been selected to cover broad habitat types within the forested area based on forest type, age class and rightsholders concerns. Additional analysis for woodland caribou will also inform the spatial arrangement of habitat within the ranges and assess how the Preferred Forest Management Scenario impacts habitat. Existing linear features and natural disturbance events will be considered in caribou HSI assessment. Separate bow-tie assessments will be looked at for Caribou and Moose, to further focus the biodiversity assessments.

Evaluation of Significance; Monitoring and Follow-up

Based on the outcomes of the bow-tie analysis, the mitigation efforts for each value will be summarized and gaps that have been identified will be discussed. The monitoring and reporting timeframe will align with other FMP management requirements. Although the threats assessed in the CEA are part of the FMP process, the CEA will be a separate chapter in the FMP. This will provide an opportunity for review from the FMP Planning Team and Communities before approval.

Climate Change Adaptation

Climate change is a significant change in either the average state of the climate or in its variability, measured over an extended period (usually at least 30 years). Climate change is having an impact on the boreal forest and is expected to continue to do so in the coming decades. The CKP Woodlands and NFMC Staff (herein referred to as Woodlands department) will use a structured and robust forest adaptation¹⁵ framework approach to conduct a Climate Vulnerability Assessment (CVA) to better understand the potential impacts of climate change on the forests, and support actions under increasing uncertainty. The goal of CVA is to identify climate change related risks and potential adaptation measures that will be included in the FMP to reduce forest vulnerability¹⁶, take advantage of any positive opportunities that may be associated with climate change, and increase likelihood that sustainable forest management objectives will be achieved. The CVA framework allows for evidence and science-based decision making to address the complex challenges related to climate change.

¹⁴ Kurz et al. 2009: Kurz, W.A.; Dymond, C.C.; White, T.M.; Stinson, G.; Shaw, C.H.; Rampley, G.J.; Smyth, C.; Simpson, B.N.; Neilson, E.T.; Tyofymow, J.A.; Metsaranta, J.; Apps, M.J. 2009. CBM-CFS3: A model of Carbon-dynamics in forestry and land-use change implementing IPCC standards. *Ecol. Model.*, 220, 480-504.

¹⁵ Adaptation – Actions to manage the risks/reduce negative impacts of climate change, and to increase the magnitude and likelihood of positive impacts. It is the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which in turn moderates harm or exploits beneficial opportunities.

¹⁶ Vulnerability – The degree to which a system is susceptible to, or unable to cope with, the adverse effects of climate change (including variabilities and extremes). It is a function of the character, magnitude and rate of climate change and the variation to which a system is exposed, its sensitivity, and its adaptive capacity.

The process that the CVA will follow is based on the Canadian Council of Forest Ministers' (CCFM) adaptation framework approach, designed for forest managers to use in assessing vulnerability of sustainable forest management system to climate change.¹⁷ The CVA framework is a series of facilitated workshops and discussions that the Woodlands Staff will undertake to complete 5 key steps:

1. Define the scope of assessment;
2. Understand current and future climate conditions;
3. Complete a detailed vulnerability assessment;
4. Identify and prioritize adaptation options; and
5. Implement and monitor adaptation efforts.

Assessment Scoping

The scope of the CVA will be limited to the FML 2 landbase and the Woodlands Staff will be the main group contributing to the analyses. The Woodlands Staff is committed to an extensive communications and engagement plan with Indigenous and general communities. The CVA steps and themed discussions will be incorporated directly into the communication and engagement outlined in the TOR. The goal is to incorporate community feedback, knowledge, and experience as much as possible to inform the decisions made by the Woodlands Staff in the CVA.

The following policies and guidelines have been identified for the Woodlands Staff to consider during the CVA process:

- Made-in-Manitoba Climate and Green Plan;
- Report of the Expert Advisory Council to the Minister of Sustainable Development;
- Canada in a Changing Climate: Regional Perspectives Report (Prairie Provinces);
- Climate Change and Sustainable Forest Management in Canada: A Guidebook for Assessing Vulnerability and Mainstreaming Adaptation into Decision Making;
- Pan-Canadian Framework Third Annual Synthesis Report;
- A Healthy Environment and a Healthy Economy; and
- Adapting to the impacts of Climate Change in Canada: An Update on the National Adaptation Strategy.

The first step that the Woodlands Staff will take in the CVA is to create a problem statement explicit to climate change and specify the challenge and purpose of the assessment.

The second step is to tell the current and future climate story by compiling and analyzing existing historical and future climate data from the Government of Manitoba and/or the Prairie Climate Centre.¹⁸ Climate variables will be chosen based on their availability, ability to describe climate and weather patterns, comparability between historical and future trends, and relationship with forestry operations and management. No new climate data will be created for the CVA. If possible and effective, climate data will be related to the three major ecoregions that exist in FML 2. Current and future forest conditions will be inferred based on the described climate trends, no further modelling or analysis will be completed for the FMP.

To proactively consider a worst-case scenario and better understand the full potential impacts of climate change, the future climate projection used for the CVA will be the Representative Concentration Pathway (RCP) developed by the Intergovernmental Panel on Climate Change (IPCC) of RCP 8.5 (a high carbon emission scenario, representing the upper bound of predicted carbon emission).

¹⁷ J.E. Edwards, et al. (2015). Canadian Council of Forest Ministers' Climate Change and Sustainable Forest Management in Canada: Guidebook for Assessing Vulnerability and Mainstreaming Adaptation into Decision Making. Available online [here](#).

¹⁸ The [Prairie Climate Centre](#) through the University of Winnipeg has developed [The Climate Atlas of Canada](#) where climate data is publicly available to support adaptation and mitigation.

After reviewing the climate data, engagement and a Woodlands Staff workshop will be held to:

- 1) Identify instances of extreme weather events/climate variability that occurred in the past;
- 2) Understand how climate has influenced current management practices;
- 3) List what adaptations already exist; and
- 4) Brainstorm potential positive and negative forest impacts¹⁹ for the future climate scenario.

Vulnerability Assessment

Based on the potential current and future climate change impacts to sustainable forest management, a workshop will be held with the Woodlands Staff facilitating discussions to identify where the NFM forest management system is vulnerable to climate change (adaptation is needed), and where opportunities for positive impacts could occur (enhanced by adaptation).

Each impact will be ranked based on the potential effect (exposure and sensitivity) on the system and whether the system is resilient²⁰ and has the adaptive capacity²¹ to cope with the impact. Uncertainties²² and knowledge gaps are considered vulnerabilities. The vulnerability rankings will be subjective and based on the information and knowledge available (including engagement feedback) to the Woodlands Staff at that time.

Once the climate change impacts have been ranked based on vulnerability, the Woodlands Staff will narrow down which impacts are most vulnerable and require adaptations. The vulnerability assessment allows the Woodlands Staff to focus on impacts where they can influence the most change.

Adaptation Options

The first step will be to brainstorm, through another Woodlands Staff workshop, adaptation options to climate change impacts. Adaptation options will be designed to reduce vulnerability or increase resiliency and capacity to respond to the climate change impact. Adaptation options can be strategic or operational and should address the gaps and weaknesses identified in the vulnerability assessment.

After the adaptation option brainstorming session, the options will be evaluated and ranked based on their importance in achieving sustainable forest management objectives and their feasibility in implementation. Those options considered important will be identified as robust, no-regret, win-win, and must-do options. Adaptations that are not considered important at the time will be considered potential options in future assessments. The outcome of this evaluation will be a prioritized list of adaptation options that can be considered for incorporation into the FMP and other forest systems and procedures.

¹⁹ Impacts – Effects on natural and human systems by physical events, disasters and climate change.

²⁰ Resilience – The ability of a system and its component parts to anticipate, absorb, accommodate, recover or reorganize from disturbances in a timely and efficient manner while retaining the same basic structure and ways of functioning. The capacity for self-organization and the capacity to adapt to stress and change.

²¹ Adaptive Capacity – The ability of a system to adjust to climate change (including variability and extremes) to reduce adverse impacts, moderate potential damages (moderate impacts to reduce vulnerability), take advantage of beneficial opportunities, or cope with the consequences. It includes the strengths, weaknesses, attributes and resources available to prepare and respond.

²² Uncertainty – Degree to which a value or relationship is unknown. Can result from a lack of information or disagreement about what is known or knowable, can originate from many sources (e.g. quantifiable data errors, ambiguously defined terms, uncertain projections of human behaviour), and can be quantitative or qualitative statements.

Implement and Monitor Adaptation

A plan to mainstream²³ and include these climate change adaptations into existing or new systems, and day-to-day decision-making and management will be developed. The monitoring system set up for the FMP and other forest systems and procedures will also address the climate change adaptations with the goal of continuous improvement.

Although climate change will be considered throughout the FMP process, the CVA will be a separate chapter in the FMP. This will provide an opportunity for review from the FMP Planning Team and Communities before approval.

FMP COMMUNICATIONS

Background and Objective for FMP Communication

The Terms of Reference require the creation of a Communication Plan. As the FMP is a complex project, with the development of the FMP spanning from Jan 1, 2020 to Dec 31, 2026, it is necessary to consider processes for both internal and external communication. Vital to the FMP development is ensuring that external groups (Indigenous communities, stakeholders and the public) have a process or processes that allow for engagement and participation, distribution of appropriate information, opportunities for feedback, questions and comments about the FMP process and the FMP itself, and integration of appropriate external information as a result. This Communication Plan should guide internal and external FMP development processes and bring clarity to the proponent, the Government, and the public groups about who is responsible for what elements of communication at what times in the process.

Internal Communication

FMP Planning Team

Regular FMP Planning Team meetings will be scheduled (monthly) to continuously document progress against timelines, deliverables, issues and key next steps. Reported progress or issues from Sub-Committee representatives will provide transparent and collaborative internal communication within the FMP teams. These regular FMP Planning Team meetings will be conducted as appropriate including virtually and in-person. Additional meetings will be scheduled as required during the development of the plan.

Sub-Committees

Sub-committees will meet as required during the development of the plan. Sub-committees are required to report back to the Planning Team on their findings or work in accordance with the timelines agreed upon at the Planning Team level. Sub-committees are expected to return with an agreed upon, single voice/opinion/piece of work at the Planning Team level to avoid lost time of the larger group. Where a sub-committee has differing opinion within the group and is unable to arrive at a unified position, they should engage the Director of Forestry and Peatlands and the General Manager for guidance.

Chapter Approval in Principle

Manitoba Natural Resources and Northern Development (NRND) and NFMC agree to a Chapter Approval in Principle process. Chapters of the FMP, or portions thereof, would be submitted to Forestry and Peatlands Branch for a full Technical Advisory Committee (TAC) review and comments as completed by NFMC. These comments would be forwarded to NFMC for response. Chapters of the FMP, or portions/sections will also be provided to Communities based on Community Engagement Plans for comment prior to submission. A chapter being “Approved in Principle”:

²³ Mainstreaming – Integrating climate change considerations into existing decision-making, planning or operational processes on an ongoing basis (becomes part of ‘business as usual’). This includes all aspects of forest management policies, programs, plans and practices. Mainstreaming supports the ability to account for trade-offs, address uncertainty, and manage adaptively by promoting a continuous process of selecting and implementing options, evaluating and modifying where necessary.

- Is an indication that no significant concern or areas of work remain within the Chapter and that the planning team and TAC support it's content;
- Does not prevent the proponent or the regulator from suggesting or considering change at the FMP final compilation stage; and,
- However, any change should not be significant by virtue of the Chapter having been previously approved in principle.

Once the full plan is submitted, Forestry branch will follow the Manitoba's Twenty-Year Forest Management Plan Guideline, (2021) in coordinating a review.

Dispute Resolution

The Planning Team may encounter an impasse on courses of action. In the event of an impasse, a two-stage process will be used. Stage one mediation consists of a discussion between the NFMC General Manager and the Director of Forestry and Peatlands. Ideally, the impasse would be broken by the General Manager and Director of Forestry and Peatlands agreeing upon a solution. Stage two mediation would be enacted only if stage one mediation fails. Stage two mediation would consist of the General Manager and the Director of Forestry and Peatlands agreeing upon a third-party consultant. Both parties agree that the findings of the third party will be accepted as the appropriate resolution to the impasse. The third-party consultant would provide a solution that would break the impasse, allowing the Forest Management Plan efforts to continue.

External Communication Plan

The Planning Team endeavors to provide FMP development opportunities to the public. The approach to participation and communication is varied depending on each rightsholder and stakeholder. A collaborative approach to development by the proponent, MB Government, rightsholders, and stakeholders is a desirable target.

Indigenous Community Engagement Plans

Indigenous Communities as Rightsholders

NFMC's engagement processes with Indigenous Communities reflect the principals and standards of the United Nations Declaration on the Rights of Indigenous People (UNDRIP). Robust community engagement and listening with Indigenous communities as rightsholders is essential for true collaboration. Inclusion of Indigenous knowledge (IK) and Traditional Land Uses information will be used when available within the FMP. This includes spatial data from land use plans and qualitative data within the development of the VOITs.

The proponent is committed to providing the opportunity for Indigenous Communities to develop engagement plans appropriate to their community. Neko'té communities have representation on the FMP Planning Team as part of the proponent team. The Neko'té liaison and the Neko'té community representatives will assist in facilitating the collaborative development and execution of plans during the FMP process for the Neko'té communities. The proponent will also formally invite non-Neko'té Indigenous Communities to identify a point of contact for the duration of the FMP development.

General Community Engagement Plan

Although each plan may be unique, the following outline provides a general overview of the process. Plans will endeavor to identify groups within the community to contact, as well as outline information and sharing sessions to align with FMP plan development milestones and tasks.

FMP Engagement Milestones

Meetings and events will be determined by proponent and communities as milestones are reached during FMP development and in accordance to the individual engagement plans. As an example, for each of the milestones identified below we envision:

- providing relevant background information on each engagement milestone as it approaches,
 - following-up with communities to hear comments and collect input, and
 - subsequently presenting the updated information prior to moving on to the next engagement milestone
1. Community Information Sessions
 - Pre-planning overview and FMP process information sharing
 2. FMP Objectives
 - Development and review of draft objectives
 3. FMP Modeling Inputs
 - Review and community input
 4. Strategic Timber Supply Analysis to support FMP
 - Review of targets and strategies for analysis
 5. Scenario Results Review and Selection of Preferred Scenario
 - Review and discussion of relative trade-offs
 - Determination of Preferred Forest Management Scenario (PFMS)
 6. Spatial Harvest Schedule and Habitat Assessment
 - Review and discussion of 20 year spatial harvest schedule
 - Habitat assessments for selected species using PFMS
 7. FMP Draft Review
 - Review and comment on draft FMP chapters completed prior to submission

Stakeholder Engagement Plans

Stakeholder Groups

The proponent is committed to providing relevant information on the FMP and receiving feedback from stakeholders. Stakeholder groups on FML 2 will include municipalities and local governments, as well as resource user groups. The proponent will engage with stakeholders at significant milestones for the duration of the FMP development.

General Stakeholder Engagement Plans

1. Seek invitation to address local governments and resource user groups to provide an overview of the FMP process, timeframe for development, and to establish a point of contact.
2. Provide information packages and summary information to local governments and resource user groups through point of contact at significant plan development milestones:
 - FMP objectives
 - Selection of Preferred Forest Management Scenario and 20 year SHS
 - FMP completion and review opportunities
3. Address local governments and resource user groups to provide additional information and collect comments when requested.
4. Maintain a communication log of events, information shared and comments from local governments and resource user groups for documentation in FMP Chapter 4 – Communication.

Public Advisory Group

Sustainable Forest Management Committee/Forest Resource Advisory Committee (SFMC/FRAC)

A Public Advisory Committee exists to serve as an ongoing forum where representatives from across the FMLA can share knowledge, interests, views, values and concerns with respect to forest management activities. This committee includes representatives from a broad cross-section of stakeholders across the FMLA and is currently known as the Sustainable Forest Management Committee (SFMC). Membership is open to Indigenous Peoples, communities, general public and organizations. The proponent commits to providing FMP development updates and information to the SFMC when they are scheduled to meet and hearing comments and concerns related to the development of the 20-year FMP. The proponent will work with the existing point of contact between the SFMC and NFMC, as well as currently existing meeting schedules for the duration of the FMP development.

General Public Advisory Engagement Plan

1. Provide FMP development updates to the SFMC at regularly scheduled meetings (quarterly).
2. Proponent will ensure a representative is in attendance at SFMC meetings to answer questions and collect comments to address.
3. Provide information packages and summary information to SFMC members through point of contact at significant plan development milestones:
 - FMP Objectives
 - Selection of the PFMS and 20-year SHS
 - FMP completion and review opportunities
4. Maintain a communication log of events, information shared and comments from SFMC members for documentation in Communication chapter.

Communication Tools

Formal Letters

Formal letters will be mailed to known point of contacts for communities, local governments and other resource users. These letters will be mailed early in the FMP development process to ensure all rightsholders and stakeholders are aware of the development process, contact information is shared and an invitation to engage further is extended. Formal letters are a communication tool that may be used throughout the process at various times to ensure consistent messaging to all rightsholders and stakeholders or inform of significant milestone achievements.

Information Packages

It is the intent of the proponent, with guidance from the FMP Planning Team, to develop a summary document to outline the FMP Process, phases of development, and opportunities for comment, as well as contact information for additional information and resources. This summary document will be developed by the Planning Team with the objective of simplifying the information contained in the Terms of Reference and Manitoba's 20-Year Forest Management Plan Guideline. The intent is to distribute this summary information to takeholders, stakeholder groups and Indigenous Communities early in the FMP development process to educate and engage at the earliest stage of the FMP. This summary information package is in addition to any formal engagement letters to all Communities on the FML.

Meetings

The Proponent will host FMP development sessions for stakeholders and rightsholders throughout the course of the project. These sessions will be either in person or virtual depending on the state of the pandemic and restrictions at the time. Advertising will take place locally in advance, and local governments will be approached

for approval to conduct the session. Timing and frequency of meetings for stakeholder groups and communities will be determined through the Community Engagement Plans or achievement of engagement milestones.

Social Media/Online Information

The proponent will use social media if deemed appropriate and useful to provide information to the public regarding information, opportunities for participation, and progress of the FMP development. General information regarding the development of the FMP will be available to the public on the NFMC website and will be updated periodically throughout the development of the plan to provide up to date information. Contact information for FMP inquiries will be provided on the website.

Communication History

Information distributed, feedback and comments collected as well as scheduled events and summary meeting notes will be recorded within a communication log and form a component of the FMP focused on Communication. The FMP is a public document and as such information recorded and summarized will be general to protect individual and community privacy.

FMP Development Rightsholders, Stakeholders, and Communities

The following groups were identified in the communication plan development and will be engaged throughout the duration of the FMP development as outlined above based on their willingness to engage.

Group	Members/Communities
Nekoté Limited Partnership Communities	Chemawawin Cree Nation Mathias Colomb Cree Nation Misipawistik Cree Nation Mosakahiken Cree Nation Opaskwayak Cree Nation Sapotaweyak Cree Nation Wuskwi Sipiik First Nation
Other Communities	Cormorant Flin Flon Nisichawayasihk Cree Nation Norway House Cree Nation Pikwitonei Pimicikamak Cree Nation RM of Kelsey (Carrot Valley, Rahl’s Island, Wanless, Cranberry Portage) Sherridon Snow Lake The Pas Thicket Portage Thompson Wabowden
Resource User Groups	Kelsey Conservation District Manitoba Hydro Manitoba Lodge and Outfitters Association Manitoba Metis Federation Manitoba Trappers Association Manitoba Wildlife Federation

Group	Members/Communities
	Mining Association of Manitoba Inc. Quota Holders and Third-Party Operations (Arthur Anderson, Wayne Pokrant, Gary Mosiondz, Spruce Products Ltd.) SNOMAN Inc.
NFMC/CKP Public Advisory Group	Forest Resource Advisory Committee/Sustainable Forest Management Committee (SFMC)
Education/Research	Ducks Unlimited Canada University College of the North

Crown Indigenous Consultation

Manitoba will be undertaking a Crown-Indigenous consultation process with Indigenous communities for the Nisokapawino Forestry Management Corporation (NFMC) 20-Year Forest Management Plan (FMP). This will be a coordinated approach with Manitoba and NFMC to ensure that community's information is considered during development of the FMP. Manitoba will be initiating the consultation process by sending initial information packages to communities in spring/summer 2022.

FMP Contact and Additional Information Requests

The proponent (NFMC and CKP) will be engaging with groups and communities listed above to develop the plan, to solicit feedback on the development of the plan based on the schedule of engagement milestones above, to communicate updates on the planning process and management objectives, and to address comments received from information sessions, letters and informal communication. Efforts will be made to coordinate and integrate timing of proponent engagement activities with the Manitoba government where possible.

For information on the FMP process and opportunities to participate contact:

Andrew Forward
General Manager
NFMC
Andrew.forward@niso.ca
204 623 8510

For information on Section 35 Consultation by the Government of Manitoba Contact:

Evan Finkler
Indigenous Relations Forester
Natural Resources and Indigenous Futures
Evan.Finkler@gov.mb.ca
204 792 4142

For information on Manitoba legislation, policy, regulation, or guidelines contact:

Jane Epp
Planning and Practices Forester
Natural Resources and Indigenous Futures
Jane.Epp@gov.mb.ca
204 794 8545

For more information on the Public Advisory Group/Sustainable Forest Management Committee (SFMC) contact:
 Jeanne Besaw
 Silviculture Forester
 NFMC
Jeanne.besaw@niso.ca
 204 620 8453

MILESTONES AND PLAN DEVELOPMENT TIMELINE

The FMP development schedule is driven by the Engagement Milestones outlined in the Communication Plan to ensure that information shared during engagement can be incorporated at all stages of plan development. Review and approval checks have been included throughout the plan development schedule.

The following items have been identified as important information milestones in the development of the FMP (Table 5). These milestones have been listed in the Terms of Reference to acknowledge that achieving the current approval and review schedule (Table 2) is dependent on the development and delivery of these key items. This information provides background required at Engagement Milestones and decisions points in the process. These dates, along with Engagement progress, will provide the Planning Team with milestones in which adjustments to the schedule and activities can be made where necessary. If the information is not available during the development of the FMP the Planning Team will adjust to best adapt to deliver the FMP when required.

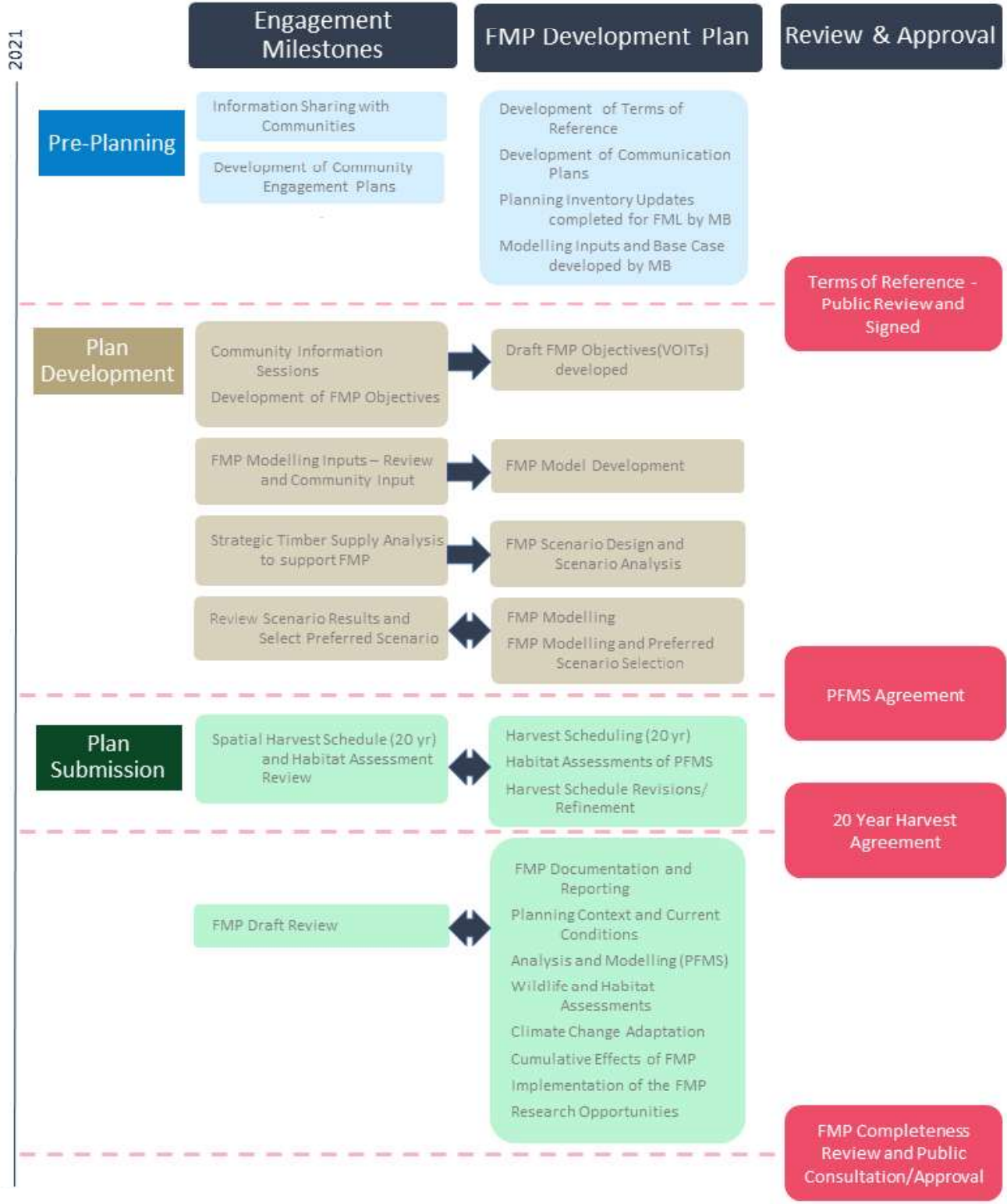
Table 5. Information milestones for FML 2 FMP development schedule.

Information	Description	Source	Date
Data Requirements	FML 2 Planning Inventory including parks	MB NRIF	December 2021
	Model inputs developed for use in Base Case and FMP Model	MB NRIF	December 2021
Policy Direction & Information	Natural Range of Variation (NRV) development complete prior to FMP Model development	MB NRIF	April 2022
	Caribou habitat direction complete prior to FMP Model development	MB NRIF	April 2022
FMP Analysis & Development	Identification of Preferred Management Scenario (PFMS)	NFMC	January 2024
	Submit completed FMP with Final Chapters	NFMC	June 2025

Revision 5.0: At the time of FMP development and revisions to the Terms of Reference a finalized Caribou Habitat Protection Plan or Provincial Action Plan were not available, as well as the Natural Range of Variation (NRV) information. The information and policy direction milestones listed in the table were not available prior to model development. However, information regarding habitat elements, assessments, and landscape direction were included in the FMP development that would be consistent with direction for caribou habitat protection and ecosystem-based management for landscape age classes in the region.

The FMP Analysis and Development milestone dates were updated to include changes to the duration of the FMP upon receiving approval of 2-year extension to the FMLA (updated to state 2027 FMP with associated duration and milestones).

FML2 Forest Management Plan Schedule



GLOSSARY OF TERMS

Annual Allowable Cut (AAC)

The annual allowable cut is the volume of wood per year that may be harvested in the Forest Management Licence area and is expressed in cubic metres.

Base Case

A Base Case Report documents the wood supply in detail for the current forest management practice in the study area, and forms the reference point for further analysis. The Base Case defines the landbase net down, strata, yield curves, succession pathway and its management objectives with non-spatial and spatial constraints. These constraints include harvest volume control and maintenance of ecological values like old forests and wildlife habitat.

Biodiversity

Biodiversity is the variety and variability within and between living organisms from all sources, such as terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are a part.

Forest Land Inventory (FLI)

An ecologically-based forest inventory designed to accurately represent the location and characteristics of the forest resource. An ecosystem field sampling (volume sampling) program was undertaken in conjunction with the development of this updated inventory process to help characterize the forest resource in terms of total and merchantable timber volumes and to help identify ecological characteristics of sites.

Forest Management Plan

Landscape level plan that provides strategic direction for forest resource activities on crownlands, within a license area, over a 20 year period.

Forest Resource Inventory (FRI)

A forest resource inventory is an older forest inventory that represents the location and characteristics of the forest resources. Any forest inventory is the systematic collection of data and forest information for assessment or analysis. Forest resource inventories characterize the forest based on information collected from aerial photography and field sampling information. The inventory information (either FRI or FLI) is the primary information source for forest management and is provided as a spatial data that can be viewed/analyzed in a geographic information system (GIS).

Indicator Species

An animal or plant species that can be used to infer conditions in a particular habitat. Also referred to as regionally important or focal species in this FMP.

Landbase / Netdown (spatial)

Additional spatial information is merged with the forest inventory information (FRI/FLI) to further classify the forest lands within the study area (FML/FMU). This process is referred to as a 'netdown'. Administrative boundaries, riparian areas, parks or deferral areas are not identified in a forest inventory but are essential in forest management planning and decision making for the analysis area. An inventory contains the raw forest information (type, age, location, etc). Additional spatial information is combined with the inventory to identify areas excluded from forestry activities, areas with unique considerations for management or areas available for forest management and harvest activities. The result of the 'netdown' is generally referred to as the Land-base in wood supply analysis and forest management planning. The word landbase is often used to describe the geographical extent of the planning area – in this case the land within the FML 2 boundary may be referred to as the landbase within the Forest management Plan.

Model

A model is an idealized representation of reality developed to describe, analyze or understand the behaviour of some aspect of it. Modeling is a mathematical representation of relationships under study. Modeling involves the quest to find a subset of variables and a function between them that predicts one or more dependent variables.

Natural Range of Variation

Natural range of variation refers to the spectrum of natural conditions possible in ecosystem structure, composition, and function, when considering both temporal and spatial scales. (CBFA, 2016)

Non-Productive Forest

In the context of forest management planning, non-productive forest refers to a forested area that does not contribute significantly to commercial timber production due to factors such as poor growth conditions, low stocking, or non-merchantable species composition (most often, a combination of these and other factors).

Preferred Management Scenario

This is a set of compatible and integrated resource management objectives and strategies that are selected to guide plan implementation.

Proponent

A proponent is a Forest Management Licence (FML) holder, who is required to have a forest management plan as per their FML agreement.

Roads

Primary and secondary roads are defined in Manitoba's Forestry Road Guideline as:

Primary Road: Permanent, all weather, allowing for general access through the forest

Secondary Road: Used for three or more years, all weather, providing access to and within operating areas

Seral Stage

This is the series of plant community conditions that develop during ecological succession from bare ground (or major disturbances) to the climax stage (Dunster, 1996).

Silviculture

Silviculture is the theory and practice of controlling the establishment, composition, structure and growth of forests to achieve specified management objectives.

Strata

Strata - plural, stratum - singular. These are sub-divisions of forest types (*e.g.* aspen-hazel on clay soil stratum; or jack pine-blueberry on sand stratum).

Sustainable Forest Management (SFM)

This describes management that maintains and enhances the long-term health of forest ecosystems for the benefit of all living things while providing environmental, economic, social and cultural opportunities for present and future generations (CCFM 2000).

Technical Advisory Committee (TAC)

The Technical Advisory Committee (TAC) consists of provincial and federal government specialists who provide technical expertise.

Terms of Reference (ToR)

The Terms of Reference is a signed agreement by the proponent and government on the localized, specific details to be included when developing the FMP for a specific area.

VOITs – Values, Objectives, Indicators, and Targets

- The **values** must consider provincial legislation and policies, company policies and commitments, forest certification requirements, and public and cultural values.
- Management **objectives** are to be developed to address the values. Objectives must be measurable, achievable and used for the longer term. These management objectives form the core of the FMP. All other information in the FMP will support these objectives and how they will be achieved.
- **Indicators** must be a measure of the state or condition of the value.
- **Targets** must be the desired future state or condition of the indicator that would meet the objective for the value.

Wood Supply

Wood supply is the quantity of timber available for harvest over time. Wood supply is dynamic, not only because trees naturally grow and die, but also because conditions of the environmental, social and economic factors that affect the availability of trees for harvest change through time.

Wood Supply Analysis

Wood supply analysis is the process of assessing and predicting the current and future timber supply for a geographic area. Therefore, harvest levels from wood supply analysis fully depend on a series of key ecological, economic and social factors, such as:

- biological conservation
- forest development
- technological change
- local communities
- employment opportunities

It is an assessment of future timber supplies over long planning horizons (200 years) that uses wood supply models.

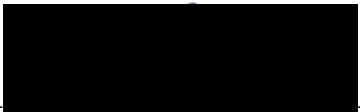
Yield Curves

Yield curves represent forest growth in wood supply models and analysis. A yield curve represents the sum of annual changes in growth over time. Yield curves can be used to determine the amount of net volume (cubic metres) of wood present in the forest at any given time. Yield curves are developed for each STRATA (hardwood types and softwood types will grow differently for example). Yield curves are created based on sample plot information collected within the forests of Manitoba (measuring trees in the same plot location for a number of years to record actual growth and yield). Yield curves are a predicted value and are based on average stand conditions in the forest.

TERMS OF REFERENCE SIGNATURES

If the foregoing accurately reflects your understanding of this Terms of Reference, please confirm your agreement by signing in the space provided below.

Nisokapawino Forestry Management Corporation

Per: 
Andrew Forward
General Manager

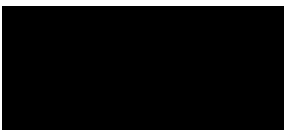
June 27, 2025
Date:

Manitoba Natural Resources and Indigenous Futures Forestry and Peatlands Branch

Per: 
Brad Ep
Director

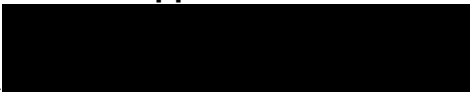
Date:

Canadian Kraft Paper Industries Ltd.

Per: 
Wally Quiring
Woodlands Manager

June 27, 2025
Date:

Manitoba Environment and Climate Change Environmental Approvals Branch

Per: 
Agnes Wittmann
Director

Date: