2027-2046 FML 2 Forest Management Plan

EXECUTIVE SUMMARY

Forest Management Licence No. 2 20-Year Forest Management Plan

2025-06-30

Prepared by:

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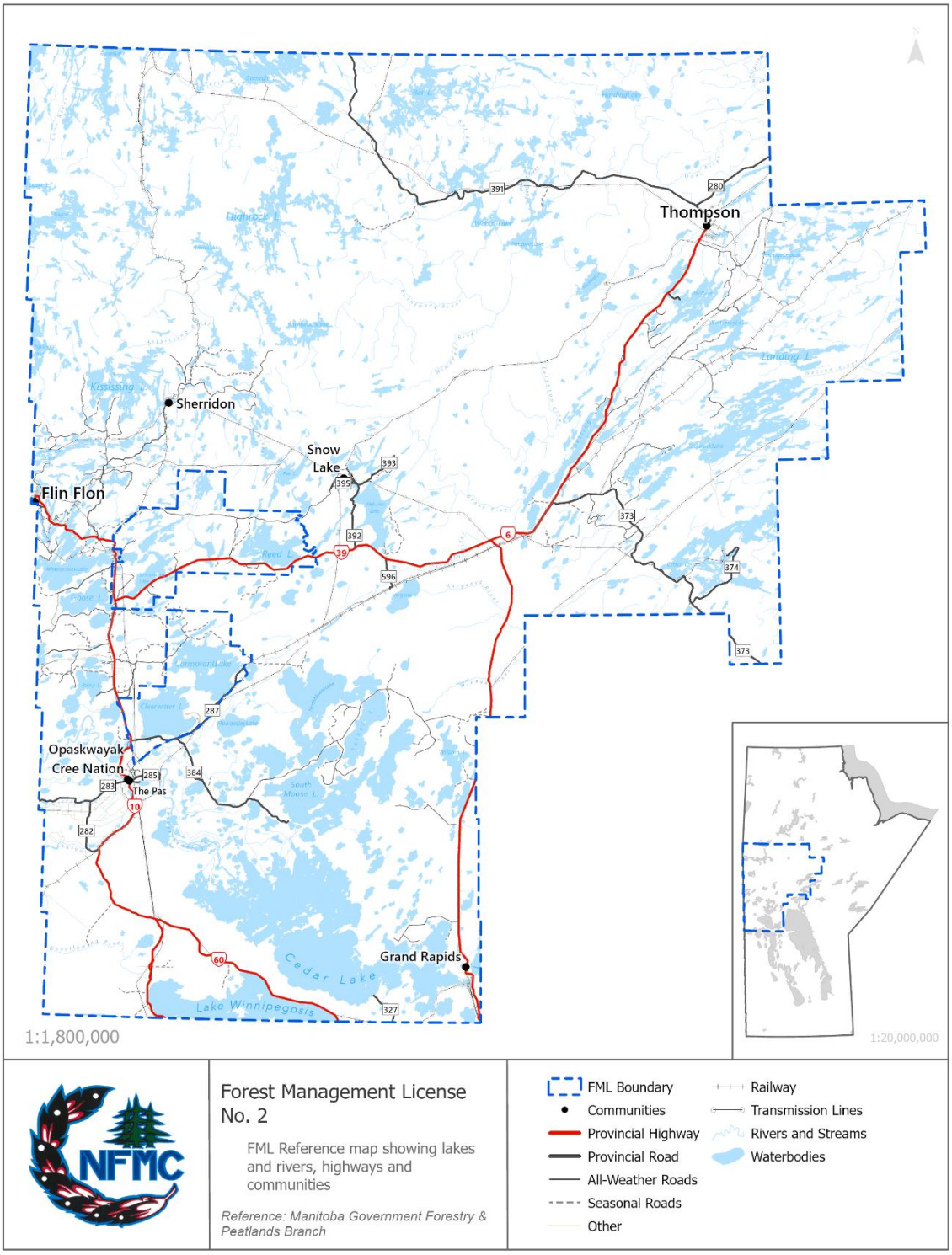
Acknowledgements

Nisokapawino Forestry Management Corporation and its parent partners, Canadian Kraft Paper Industries Ltd and Nekoté LP, acknowledge the activities identified in this strategic plan take place on the Ancestral, Traditional, and Treaty Territories of Treaty 4, 5, and 6 people. We are grateful for the engagement with communities and the opportunity to work with Traditional Knowledge Keepers, Elders, and Leadership in the development of this forest management plan. We hope that our efforts to have this plan guided by recognition and respect of Indigenous Rights and Traditional Forest Knowledge, supported by continuing engagement in operational planning and our ongoing efforts in economic reconciliation, reflects appropriately with the spirit and intent of the Treaties.

Forest Management Licence No. 2



FML 2 reference map showing lakes and rivers, highways, and communities.

Executive Summary

Forest Management Licence No. 2 (FML 2) spans more than 9 million hectares of boreal forest, lakes and lowlands in northwestern Manitoba. It encompasses the Saskatchewan River, Highrock, and Nelson River Forest Sections and includes the population centres of The Pas, Opaskwayak Cree Nation, Flin Flon, Mathias Colomb Cree Nation, Pimicikamak Cree Nation, Nisichawayasihk Cree Nation, and Thompson, as well as smaller Communities.. The licence area overlaps the Traditional Territories of ten First Nations, with many more having cultural and land-based connections to the area. FML 2 contains a diverse mosaic of forest types shaped by natural disturbance—predominantly wildfire—and includes productive softwood stands of black spruce and jack pine, as well as mixedwood and hardwood species. The forest supports a rich range of wildlife including moose, boreal woodland caribou, black bear, lynx, and many of bird species. Aquatic ecosystems, wetlands, and riparian zones add to the ecological complexity and are critical to biodiversity and cultural use. Together, these forests sustain ecological functions, Indigenous livelihoods, recreational values, and commercial activities.

The FML 2 20-year Forest Management Plan, effective from 2027 to 2046, was developed collaboratively by Nisokapawino Forestry Management Corporation (NFMC) on behalf of Canadian Kraft Paper Industries Ltd (CKP) and Nekoté Limited Partnership (LP), in partnership with the Government of Manitoba. NFMC is a unique joint venture in that it is equally owned by CKP and Nekoté LP, and leads forest planning and operations across the licence area. CKP operates a kraft pulp and paper mill in The Pas and is the primary softwood timber user on FML 2, sourcing long-fibre softwood from across the region. The forest industry in the area plays a vital economic role, supporting direct employment in forestry and mill operations, as well as secondary industries such as road construction, silviculture, harvesting, and hauling. In addition to NFMC and CKP's operations, several volume-based tenure holders operate within the FML area under government-issued quotas, adding to the diversity of forest-based economic activity. This forest management plan aims to support these economic contributions while ensuring that ecological integrity and social values are maintained over time.

The development of this forest management plan spanned more than five years. In response to feedback from Indigenous communities and other participants, NFMC and CKP requested and received a two-year extension to the planning timeline. This additional time allowed for deeper and more flexible engagement with rightsholders, stakeholders, and public advisory group representatives. Over this extended period, a broad range of concerns and forest-based values were gathered—reflecting cultural, ecological, and economic priorities across the licence area. These inputs directly informed the development of values, objectives, indicators, and targets (VOITs), which are based on the Canadian Council of Forest Ministers (CCFM) F*ramework of Criteria and Indicators of Sustainable Forest Management in Canada* and serve as the foundation for sustainable forest management within the plan. In addition to guiding the development of VOITs, many of the concerns and priorities shared during engagement were addressed through the climate vulnerability adaptation assessment (CVA), the cumulative effects assessment (CEA), and commitments to ongoing engagement and research, helping integrate broader social and ecological priorities into decision-making.

The VOITs address a wide spectrum of goals, from maintaining biodiversity and wildlife habitat, to supporting cultural values, respecting water and soil resources, enabling research, and providing economic stability. They are reflected throughout the plan—in harvest design, road planning, renewal strategies, access management, ongoing engagement processes, research initiatives, and monitoring commitments (a full list is provided below). A selection of the more quantifiable VOITs also guided the development of long-term wood supply analyses that tested alternative approaches to achieving sustainability and minimizing trade-offs between competing forest values.

Through this modelling and scenario analysis process, a Preferred Forest Management Scenario (PFMS) was selected by the Planning Team. This team included representatives from Nisokapawino Forestry Management Corporation, Canadian Kraft Paper Industries Ltd., Nekoté Limited Partnership, members from Nekoté communities, provincial government staff from Forestry and Peatlands, Fish and Wildlife, and Parks Branches, as well as supporting consultants. The Planning Team evaluated alternative scenarios against a wide range of ecological, social, and economic objectives before ranking and selecting the PFMS. This scenario emphasizes a

spatial harvest and access pattern that improves alignment with wildlife habitat goals and reduces forest fragmentation. The PFMS integrates ecological considerations such as caribou habitat, moose browse quality, and patch size distribution while maintaining the flexibility and operability needed to meet long-term fibre needs.

The PFMS demonstrates that long-term harvest levels meeting sustainability objectives are achievable across all forest management units (FMUs), with harvest levels forecast to remain within or below the provincial annual allowable cut (AAC) thresholds. It maintains or increases operable forest growing stock and achieves strategic VOITs related to habitat, ecosystem diversity, and carbon storage. The PFMS models that the strategic direction of the plan will be able to maintain preferred caribou habitat in many caribou management units and improves the distribution of old and very old forest types; an important habitat element within the region. The strategic projected harvest levels in the PFMS represent what is possible in the FML after considering the balance and achievement of many other forest management plan objectives and targets. Actual harvest utilization over the past two decades has remained significantly below the forecasted levels, indicating a conservative use of forest resources and capacity for flexibility in implementation.

The full AAC projections by FMU under the PFMS are summarized in the accompanying table.

Projected softwood harvest volume by forest management unit (FMU) for the 20-year planning period alongside recent average actual softwood harvest volume and the provincially-determined annual allowable cut as of April 1, 2025. Average actual annual softwood requirements are based on the 2021 to 2023 Forest Management Operating Plan period and as reported in the Forest Management Report 2021-23 for FML 2. All reported volumes are in cubic metres per year (m^3/yr).

FMU	Projected Annual Softwood Harvest Volume (m^3/yr)		Average Actual Annual Softwood Harvest Volume (m^3/yr; 2021-2023)	Provincial Softwood Annual Allowable Cut (m^3/yr; April 1 2025)
	First 10 Years (2027-2036)	Second 10 Years (2037-2046)		
50	23,639	23,702	-	26,809
53	94,975	95,013	71,349	103,990
58	96,470	96,343	77,501	131,910
59	88,014	87,923	95,180	93,488
67	308,392	308,258	14,982	379,371
68	52,199	52,217	-	62,206
69	77,851	78,012	-	222,012
800	12,882	12,889	-	19,712
801	399,157*	399,157*	-	389,422
802	58,287	54,247	-	135,517
Total	*1,211,866*	*1,207,761*	*259,012*	*1,564,436*

**Should NFMC approach reaching strategic-level utilization in FMU 801 during plan implementation, NFMC will not harvest above the provincially-determined AAC (389,422 m^3/yr as of April 1, 2025 – See Appendix V – Provincial Annual Allowable Cut Letter for more information).*

Planning and engagement activities do not stop with the approval of this strategic plan. Implementation will occur through a series of 2-year forest management operating plans (FMOPs) over the next 20 years. This forest management plan includes guidance on how implementation will unfold, including criteria for harvest block selection, site-level mitigation, silvicultural prescriptions, and operational access planning. Implementation is where strategic direction meets practical, on-the-ground decision-making, providing opportunities to integrate local knowledge, address community-specific concerns, and apply adaptive strategies to manage wildlife habitat, riparian areas, and other sensitive values. Research and monitoring will play a key role throughout implementation. Initiatives such as boreal songbird habitat monitoring and forest renewal assessments, along with tracking of forest health, carbon, and VOIT indicators, will help determine whether the plan is on track and whether adjustments are needed to meet long-term goals.

This forest management plan serves as a long-term road map. It sets direction and defines outcomes but remains flexible in how those outcomes are achieved. Through ongoing community engagement, operational planning, and evidence-based updates, the plan supports a shared and adaptable approach to forest stewardship—one that can evolve as conditions, knowledge, and values continue to change over time.

Forest Management Plan Objectives

Biological Diversity

1. To maintain a forest with an age class structure and composition that resembles that of a fire-driven boreal forest ecosystem that is capable of supporting a broad range of species.
2. To maintain a forest landscape condition with valuable ecosystem representation through the retention of all forests within protected areas or any other areas excluded from forest management activity.
3. To maintain a forest landscape condition which has retained existing habitat features.
4. To move towards, over time, a forest with a landscape pattern resembling a fire-driven boreal forest ecosystem that is capable of supporting a broad range of species.
5. To move towards, over time, a forest landscape condition which provides an adequate amount and distribution of boreal woodland caribou habitat.
6. To maintain forested areas that would provide browse and cover for moose on the FML to maintain the distribution of moose habitat on the landbase.
7. To consider the provision of forest area and structures that provide habitat requirements for selected boreal songbird species.

Ecosystem Condition and Productivity

8. To maintain a forest landscape condition that supports ecosystem condition and productivity through the maintenance of a non-declining growing stock on the productive forest landbase.
9. To create a forest landscape condition that supports ecosystem condition and productivity by minimizing landscape fragmentation from access development.
10. To maintain a forest landscape condition that supports ecosystem condition and productivity by adapting to changing climate conditions.

Soil and Water Resources

11. To maintain water resources by minimizing the impact of forestry-related disturbance on a watershed scale.
12. To maintain a forest landscape condition which has retained existing water resource features.
13. To maintain a forest landscape condition which has retained soil quality.

Role in Global Ecological Cycle

14. To support a forest landscape condition that maintains its role in global ecological cycles through forest carbon storage and sequestration.

Economic and Social Benefits

15. To supply industrial and consumer wood needs, while maintaining economic and forest sustainability, to realize a predictable and consistent flow of wood from FML 2.

Society's Responsibility

16. To respect Indigenous Rights and Traditional land use by retaining forests on Indigenous Reserve Land, Treaty Land Entitlements, and lands identified under the Grand Rapids Forebay and Northern Flood Agreements.
17. To respect Indigenous and Treaty Rights through ongoing open and respectful communications with First Nations and Métis communities to foster meaningful engagement.
18. To maintain fair and effective decision making through ongoing open and respectful communications with local forest-based communities to foster meaningful engagement.
19. To maintain fair and effective decision making through ongoing opportunity for the participation of and engagement with the local Sustainable Forest Management Committee (SFMC).
20. To maintain fair and effective decision making through compliance with sustainable forest management third-party certifications.

2027-2046 FML 2 Forest Management Plan

ENGAGEMENT STRATEGY

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Engagement Strategy

What is engagement?

In the context of forest management planning, engagement refers to the intentional and ongoing process of involving rightsholders (Indigenous communities), stakeholders (the public, local groups, industry, resource users, NGOs), and the public advisory group (the Sustainable Forest Management Committee) in the development of the forest management plan by the plan author, also referred to as the proponent. In the case of this forest management plan, the proponent is Nisokapawino Forestry Management Corporation (NFMC). Engagement creates opportunities for individuals and groups to share values, raise concerns, and provide local knowledge or technical input about the forest and land that helps shape how the forests in their region will be managed. Engagement also creates opportunities for information and updates to be shared to individuals and groups so that feedback can be provided to NFMC during the planning process.

Engagement is about listening, learning, and adapting forest management planning to reflect the diverse perspectives and priorities of the people who live locally to, use, or have rights to the forest. It supports transparency and promotes a forest management plan that is not created in isolation but rather reflects a shared vision for the land for the next 20 years.

What is a communication plan?

A communication plan is a "roadmap" for how engagement will happen throughout the forest management planning process. It outlines who will be contacted, when engagement will occur, what kind of information will be shared, and how feedback will be gathered and incorporated. It must be clear, inclusive, and tailored to different audiences—rightsholders, stakeholders, and the public—so that each group has meaningful opportunities to participate.

In Manitoba, a communication plan is a required component of the forest management plan Terms of Reference (see Appendix T – Terms of Reference). A Terms of Reference is a document that outlines the process to be followed for developing the forest management plan. A Terms of Reference is created prior to beginning the development of the plan, is done in collaboration with the Planning Team and is reviewed by the public, government and rightsholders. This gives a clear direction for 'how' the forest management plan will be developed. Including a communication plan in the Terms of Reference is essential as it sets the expectations and approach for how people will be involved *before any planning decisions are made*. The Terms of Reference outlines forest management plan scope, the roles of participants, and the overall development timeline. Embedding a communication plan within the Terms of Reference supports that engagement is not an afterthought, but rather a core part of the planning process from day one.

For FML 2, the Communication Plan was developed early on in the forest management plan development process in collaboration with the Planning Team and was reviewed publicly as part of the Terms of Reference. The Planning Team was composed of a selection of individuals, including representatives from NFMC, Canadian Kraft Paper Industries Ltd, and Nekoté Limited Partnership, as well as representatives from within Nekoté communities, government personnel from the provincial Forestry and Peatlands, Fish and Wildlife, and Parks Branches, and consultants that assisted in the development of this plan. For a full list of the Planning Team, see Table 1 in Appendix T – Terms of Reference. This collaborative development of a communication plan helped support an approach to engagement that was proactive and aligned with key decision points in the plan's development.

Manitoba's *20-Year Forest Management Plan Guideline* (Manitoba Agriculture and Resource Development, 2021) emphasizes that engagement must occur throughout the development process and at defined milestones—not just at the end. The Communication Plan identifies those milestones and details how NFMC planned to share information and seek input before each decision point. This prioritizes transparency, builds trust, and supports the development of a plan that reflects local values, concerns, and priorities.

How is forest management plan engagement different from the Manitoba Government's legal duty to consult?

Forest management plan engagement and Crown consultation are distinct but complementary processes.

- Engagement, as led by the forest management plan proponent (in this case, NFMC), is about sharing information, inviting participation, and seeking input on forest values and concerns. It is inclusive of all interested parties and helps shape the plan's objectives, strategies, and outcomes.
- Consultation, on the other hand, is a legal obligation of the Crown under Section 35 of *The Constitution Act (1982)* to consult Indigenous communities when proposed activities may adversely affect Aboriginal or Treaty Rights. In Manitoba, this process is coordinated by the Forestry and Peatlands Branch. For the FML 2 forest management plan, the Province undertook a separate, parallel consultation process, including the distribution of information packages and direct follow-up with communities.

These two processes are connected. Engagement can inform and complement Crown consultation, but it does not replace or fulfill the Crown's duty to consult. NFMC's communication and engagement efforts are designed to be transparent and respectful, and to support the province's legal consultation process by providing detailed, accessible information and creating space for communities to raise concerns or offer knowledge that can influence the plan.

How much time was there for engagement to occur alongside the development of the forest management plan?

Planning for the forest management plan for Forest Management Licence (FML) No. 2 began several years in advance of its original intended start date of January 1, 2025. The goal was to prepare a 20-year plan for the period 2025–2045, with submission to the Province by December 2023 to allow time for public review and Indigenous consultation during 2024.

However, feedback during the planning process indicated that additional time was needed to support more meaningful engagement. While some communities were actively involved in the planning process, others faced limited capacity or competing priorities, and NFMC was not always able to connect with communities to explore interest or design engagement approaches.

In response, NFMC requested and received a two-year extension to Environment Act Licence (EAL) No. 2302 ER and the Forest Management Licence Agreement (FMLA; for more information, see Part 1 – Planning Context section 6 Forest Administration). This adjustment extended the draft forest management plan submission deadline to June 2025, and shifted the start of the new 20-year plan to January 1, 2027, covering the period 2027–2046. See Figure B for a comparison of timelines before and after the extension. This extension allowed for additional time to be available for the public review, Consultation, and Government of Manitoba review and approval stages as well.

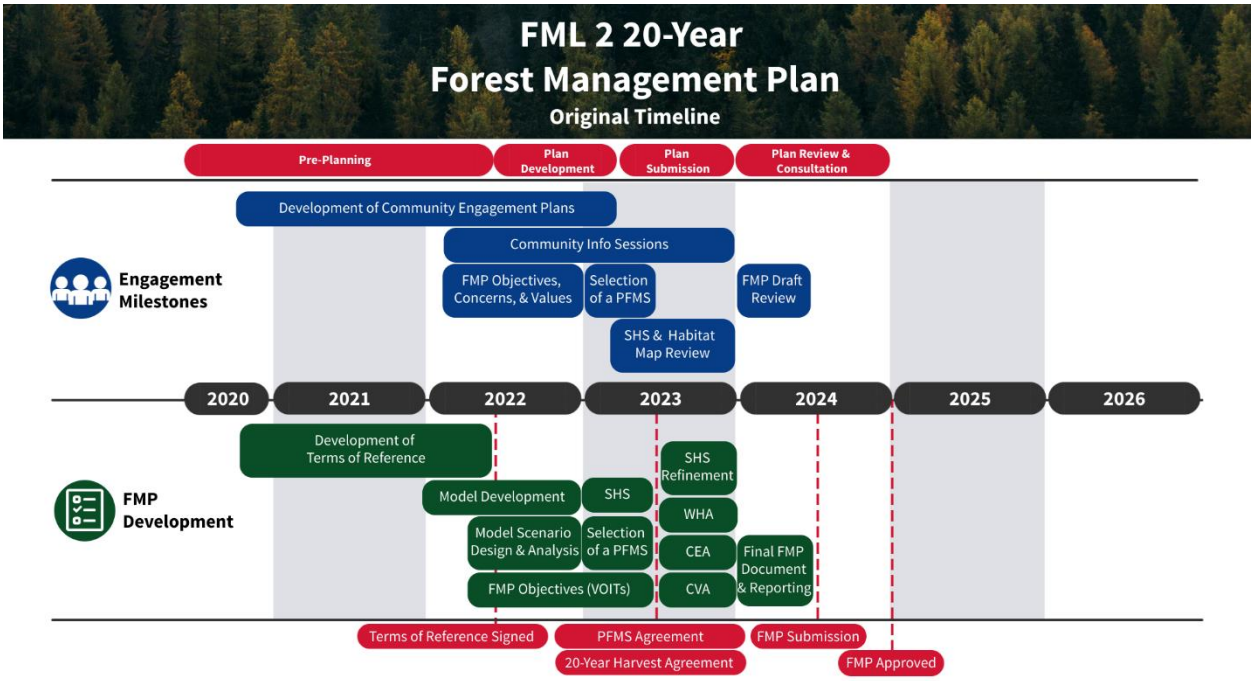
The additional time granted through the two-year extension allowed NFMC to:

- Continue community information sessions and engagement efforts;
- Adapt engagement approaches to reflect local needs and capacity;
- Share and revise draft spatial harvest schedule maps and forest management plan objectives; and,
- Initiate conversations about how engagement would continue throughout the implementation of the forest management plan.

The following section will outline NFMC's communication plan and how the related engagement strategies were implemented during forest management plan development. This chapter will provide summaries of the important values and concerns that were heard from rightsholders, stakeholders, and the Sustainable Forest Management Committee (SFMC) advisory group with regards to forestry and forestry planning activities in the region.

Opportunities to get involved in forest management and planning activities with NFMC does not stop with the completion of the 20-year forest management plan. Creating on-going engagement opportunities during the

implementation of the plan is an important outcome of the work completed and the relationships built within and around FML 2. This chapter provides a summary and contact information on how NFMC intends to continue supporting engagement efforts that will allow individuals and groups to stay informed, get involved, and provide additional values, concerns, and feedback over the next 20 years.



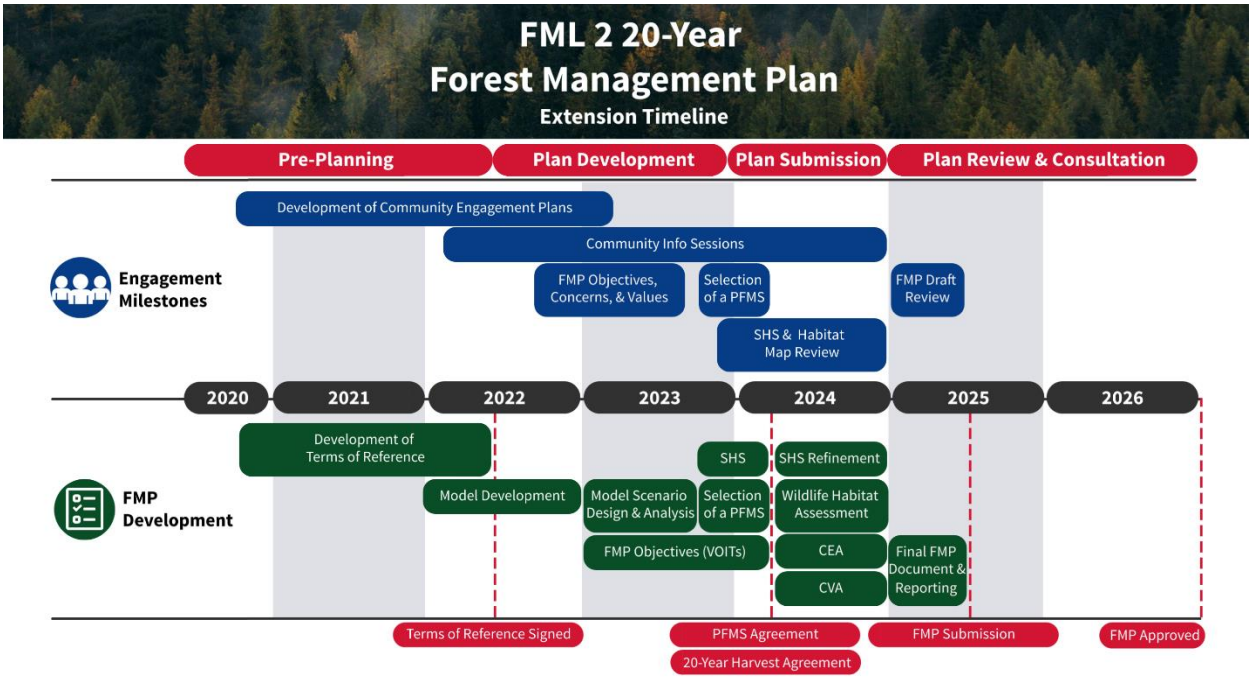


Figure A. A comparison of forest management plan development and engagement milestone timelines between the original timeline (above) and the final, updated timeline (below) put in place following the approval the Environmental Act Licence and Forest Management Licence Agreement extension.

COMMUNICATION PLAN OVERVIEW

The Communication Plan developed for the FML 2 forest management plan was grounded in the principles of collaboration, transparency, and ongoing participation, as outlined in Manitoba's *20-Year Forest Management Plan Guideline* (Manitoba Agriculture and Resource Development, 2021) and formalized in the approved Terms of Reference. It established the framework for how NFMC would share information, solicit feedback, and remain responsive to rightsholders and stakeholders at every stage of plan development. Designed collaboratively with the Planning Team, it identified key decision points and associated engagement milestones to facilitate outreach that was timely and relevant. It specified the tools and approaches to be used with each participant group—including Indigenous rightsholders, public stakeholders, and advisory bodies—and committed to accessible, appropriate communication methods. The plan also emphasized flexibility, enabling NFMC to adapt its approach based on community capacity, interest, and feedback received.

Engagement Milestones

Engagement for the FML 2 forest management plan was structured around a series of defined milestones that aligned with key development steps in the planning process. These milestones are listed below.

1. Pre-Planning;
2. Forest Management Plan Objectives
3. Forest Management Plan Modelling Inputs
4. Strategic Timber Supply Analysis
5. Scenario Results Review and Selection of Preferred Scenario
6. Spatial Harvest Schedule and Habitat Assessment
7. Forest Management Plan Draft Review

Each milestone served as a touchpoint for sharing information, gathering feedback, and refining direction. These milestones were established in the Communication Plan as part of the Terms of Reference, ensuring that engagement remained continuous and meaningful from pre-planning through to plan approval and beyond.

Each milestone planned for a consistent three-step engagement approach:

1. Provide context and background to communities and stakeholders ahead of decisions;
2. Collect feedback through meetings, workshops, and correspondence; and,
3. Present outcomes or revisions prior to moving into the next planning stage.

Figure B illustrates how these milestones were integrated into the forest management plan's overall planning and approval process, supporting that engagement remained a core part of the journey from pre-planning to plan submission.

The following subsections provide additional information related to each milestone, as well as the timeframe in which engagement for these milestones generally occurred. This milestone-based approach supported that engagement was not a one-time event, but an ongoing process that could respond to community interests and feedback, technical inputs, and government direction. Each milestone built on the previous one, supporting transparency, accountability, and inclusiveness throughout the forest management planning process.

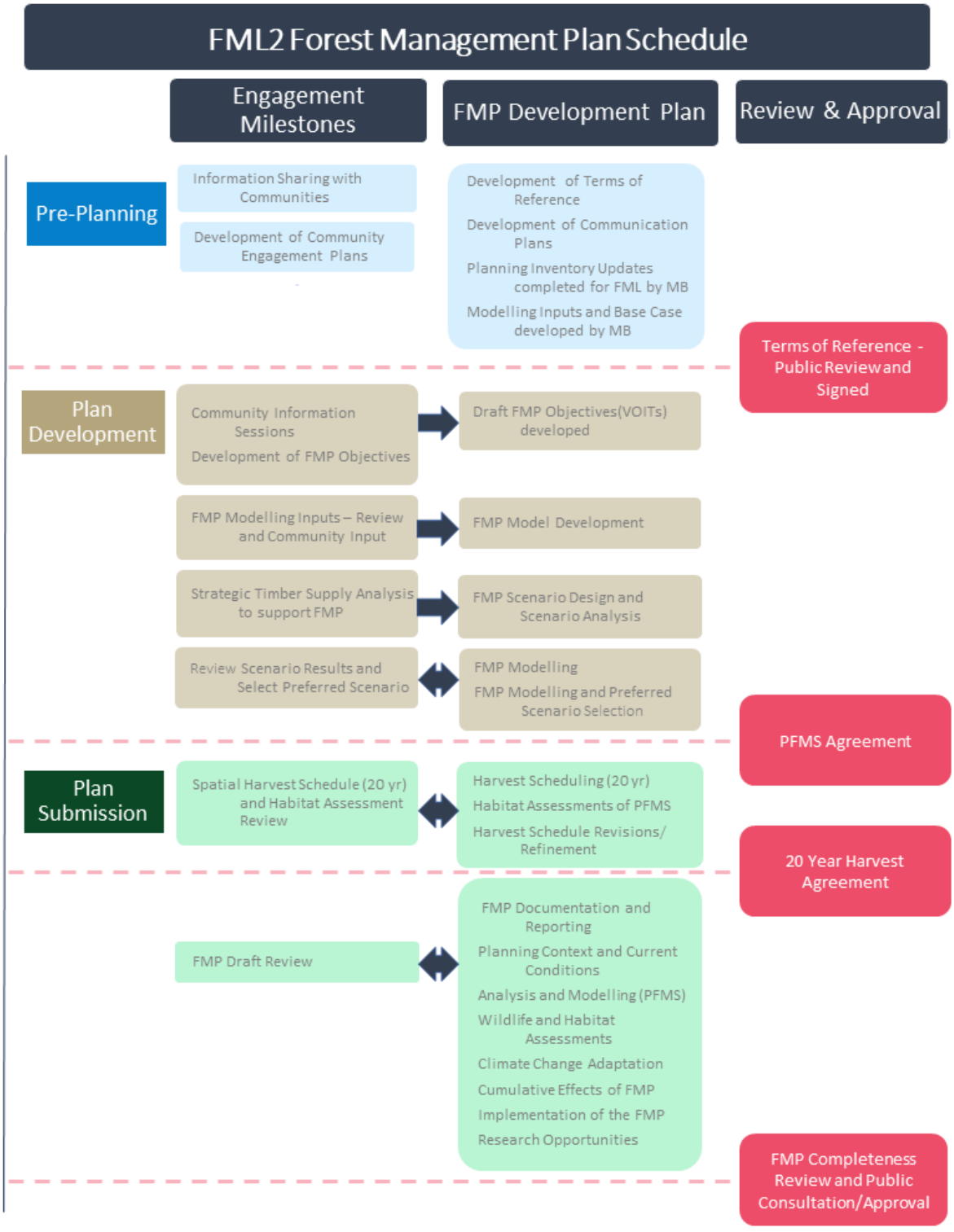


Figure B. FML 2 Forest Management Plan Schedule showing the alignment of engagement milestones with forest management plan development and approval phases.

Milestone 1 – Pre-Planning (2021)

Engagement at this Initial milestone focused on introducing the 20-year forest management plan, its purpose, and the development process. Engagement at this early stage also focused on laying the foundation for collaborative planning. Key activities included:

- Sharing of the Terms of Reference and Communication Plan with right holders and stakeholders;
- Giving presentations that introduced the roles and responsibilities of NFMC, planning partners, and communities;
- Gathering contact information and establishing initial points of communication with leadership and committees; and,
- Clarifying expectations and timelines for engagement through the full planning process.

Milestone 2 – Forest Management Plan Objectives (2022)

Engagement at this milestone emphasized gathering input on forest values and collaboratively building the forest management plan's objectives. Key activities included:

- Hosting workshops and information sessions held during Sustainable Forest Management Committee's (SFMC) quarterly meetings and within communities to gather forest values and concerns;
- Presenting on and discussing carbon, biodiversity, and natural range of variation (NRV) to introduce and build upon the concept of measurable forest indicators and objectives; and,
- Using engagement tools like the Canadian Council of Forest Ministers (CCFM) *Framework of Criteria and Indicators of Sustainable Forest Management in Canada* (2005) to help participants categorize forest values (e.g., biodiversity, water, community, etc.).

Milestone 3 – Forest Management Plan Modelling Inputs (2023)

Engagement at this milestone focused on the technical foundations involved in the generation of the forest management plan's 20-year direction through the use of forest modelling, including the inputs and assumptions that would influence timber supply while balancing ecological considerations like habitat. Key activities included:

- Presenting an overview of the key aspects of forest modelling, including forest inventory, growth and yield assumptions, and landscape classification;
- Presenting and discussing the Values, Objectives, Indicators, and Targets (VOITs) used in forest modelling and how they support the balance of ecological and economic sustainability; and,
  For more information, see Part 2 – Analysis and Modelling section 9 Values, Objectives, Indicators, and Targets.
- Engaging with technical participants and communities to review wildlife habitat considerations, particularly for moose, boreal woodland caribou, and boreal songbirds.

Milestones 4 and 5 – Strategic Timber Supply Analysis, Scenario Results Review, and Selection of Preferred Scenario (2023–2024)

Engagement at these milestones made the most sense to occur alongside each other as they are inherently intertwined. It focused on a pivotal stage in the forest management planning process that would have the most direct influence on the future forest condition of the FML. It is at this stage that a preferred scenario was developed and selected for strategic direction (for more information on strategic direction, see Part 2 – Analysis and Modelling section 8 Resource Analysis). A scenario is a specific set of assumptions and conditions used to explore how resources (like forests, water, wildlife) might behave under different management strategies, environmental changes, or future events. In the context of a forest management plan, a scenario is analyzed using a forest model. A preferred scenario is selected by the Planning Team based on the scenario's alignment with key sustainable forest management objectives and desired outcomes. For more information, see Part 2 – Analysis and Modelling section 13 Preferred Forest Management Scenario. Key activities for this milestone included:

- Presenting alternate timber supply analysis scenarios developed to illustrate trade-offs between key objectives and indicators;
- Facilitating sessions where stakeholders could explore impacts on forest indicators such as timber supply, biodiversity, habitat, and carbon; and,
- Gathering feedback that went on to be used in the selected preferred scenario that balances social, economic, and ecological objectives.

Milestone 6 – Spatial Harvest Schedule and Habitat Assessment (2024)

Engagement at this milestone connected the engagement and forest management planning that had occurred to-date directly to the local forest that individuals and groups were most familiar with. Through the drafting of maps that highlight where potential forest harvest could occur over the 20-year duration of the forest management plan (referred to as the spatial harvest schedule), engagement focused on sharing and reviewing this draft plan in a way that was geographically identifiable. Key activities included:

- Providing the opportunity for communities and stakeholders to review the spatial harvest schedule developed through the selected preferred scenario;
- Seeking feedback on maps showing harvest areas and modelled habitat projections (e.g., moose);
- Emphasizing and highlighting that the 20-year spatial harvest schedule maps illustrate the potential planned harvest areas that, if selected for operations during Forest Management Operating Plan development (See Part 3 – Implementation and Monitoring section 16 Implementation strategies), would help meet the objectives of the forest management plan. Not all areas presented on 20-year spatial harvest schedule maps are inherently scheduled for harvest; and,
- Discussing with rightsholders and stakeholders that on-going engagement opportunities exist and will occur throughout the 20-year implementation of the plan to provide additional feedback at a more local-level scale.

Milestone 7 – Forest Management Plan Draft Review (2025 to June 2027)

At this engagement milestone, information sessions and presentations were provided to help stakeholders, rightsholders and the advisory group navigate the completed forest management plan to find information related to values and concerns discussed and shared during the planning process. The development of the forest management plan is a long project, and the resulting components included in the plan can be daunting to navigate. NFMC provided sessions that explained what information could be found where in the draft forest management plan prior to the formal review process. Much of the information presented at this milestone is also contained within the following section: Gathering and Addressing Values and Concerns. Key activities included:

- Hosting information sessions and presentations to help explain the sections and organization of the forest management plan, including how and where to find information that related to specific values and concerns. A key component of this engagement was to highlight that information related to a specific topic or value may be found within a number of sections in the forest management plan as Parts 1, 2, and 3 focus on forest management planning at varied scales;
- Providing information for the draft forest management plan review period that will begin following the completeness check, highlighting that updates and documentation will be posted to the Manitoba Public Registry;
- Sending update letters to all participants to highlight this significant milestone, the timeline and location for the review period.

Communication Plan Tools

A variety of tools were used to share information and engage participants throughout the plan development process. The subsections below describe some of these tools but are not an exhaustive list.

Presentations and Workshops

Presentations and workshops were a key engagement activity that assisted in communicating information in a way that was digestible to a wide range of demographics and could ensure that messaging and language used between groups was consistent. A series of presentations were developed at the start of the forest management plan (FMP) development process that were familiarly referred to as "FMP School". These presentations were used to introduce topics related to forest management planning and build a knowledge foundation within communities as engagement activities were being initiated. Topics at this stage included an overview of forest management planning, forest modelling, wildlife, and operational implementation. Later, topics such as herbicide were added to address concerns that were heard from communities.

As groups and communities became more familiar with forest management planning concepts, any of the presentations could then be adapted to each audience's interests, values, and technical knowledge level. These presentations followed the themes of the engagement milestones, with supplemental community-specific presentations being given when requested.

A key audience for presentations and workshops was the Sustainable Forest Management Committee (SFMC), whose members often have a more in-depth understanding of forestry concepts and could provide feedback on both presentation content and forest management plan development prior to delivering the same or similar content to communities.

NFMC designed and held a core workshop soon after engagement initiatives began that was designed to gather forest-based values and concerns from individuals, groups, and communities local to the FML. NFMC hosted communities and groups at a local venue and engaged attendees to identify what their forest values were in the context of the Canadian Council of Forest Ministers (CCFM) *Framework of Criteria and Indicators of Sustainable Forest Management in Canada* (2005). NFMC used interactive brainstorming techniques that aimed to keep participants engaged, and the use of the CCFM framework as a tool for prompting the consideration and categorization of forest values helped increase engagement during these workshops and resulted in hundreds of values and concerns being gathered and recorded.

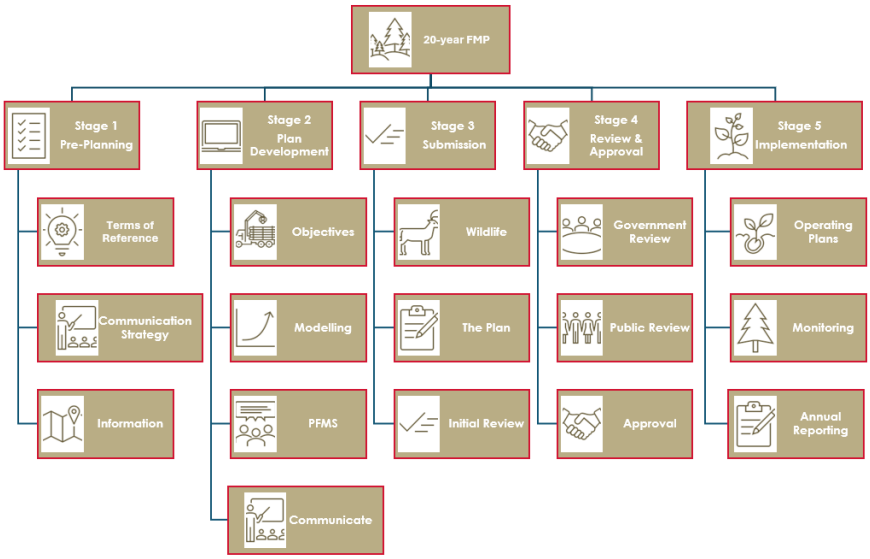


Figure C. An example of an overview graphic used in engagement presentations as a tool to familiarize participants with the forest management plan development process and to help orient participants to the current engagement stage.

Website

The NFMC and Canadian Kraft Paper websites hosted forest management plan background information, visuals, and contact details. Throughout plan development, information directly related to the 20-year forest management plan was added to www.niso.ca to provide an accessible source of information, continuity of the planning process presentations online, and highlight engagement opportunities. The website also features information related to NFMC as a corporation, Forest Management Operating Plan development and reporting, environmental and sustainable forest management policies, certification - including Canadian Standards Association Sustainable Forest Management standard certification annual reporting, careers, and contact information (Figure D). This website will continue to be updated throughout plan implementation with relevant information related to planning and operations.

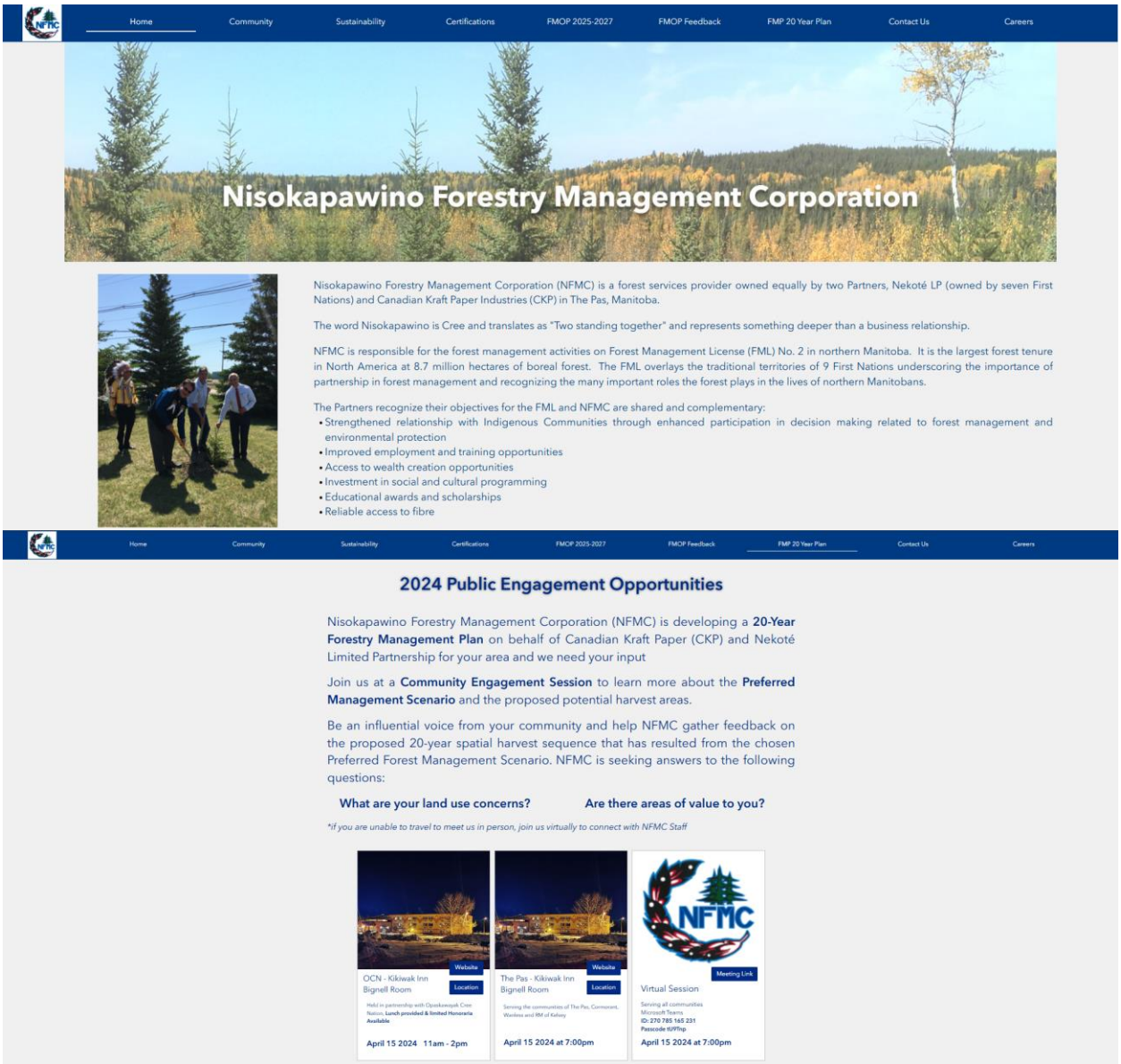


Figure D. Examples of www.niso.ca content related to the corporation (above) and upcoming engagement opportunities related to the 20-year forest management plan (below).

Formal Letters

Formal quarterly letters were sent to ensure that forest management planning updates were being distributed throughout the development process in a way that was consistent in both frequency and content. NFMC maintains a mailing list from previous correspondence and operational planning communications that was used as a starting point for these letters that then grew as the forest management plan was developed. Recipients of these letters included, but were not limited to, Indigenous communities, local government, resource users, public advisory group members, Resource Management Board members, and other interested groups or individuals. This was an important way to notify them of relevant forest-management-plan-related news and upcoming engagement opportunities.

For a summary of the content of each letter that was sent, see Appendix U – Engagement Activity Details.

Public Meetings and Open Houses

Public meetings and open houses were held at the start of the forest management plan development process and at key milestones. These sessions were held both in-person and virtually to share maps, model outputs, background information, to gather comments, values, and concerns, and to invite feedback. Meetings were advertised through local media, such as online and through radio, to reach a wider audience and increase participation where possible. Figure E is an example of an ad that ran in several newspapers local to municipal regions such as Flin Flon, Thompson, and The Pas at the beginning of the forest management plan development process in 2022.

Radio Interviews and Local Media

Radio interviews and local media were used in The Pas and Flin Flon to reach a broader audience and inform the public about ongoing engagement events. In November of 2022, NFMC's General Manager had an opportunity to sit down with local radio stations CHTM and CJAR and answer questions about the forest management plan. A recording of the radio interview with CJAR was made available to listen to on NFMC's website www.niso.ca.

NFMC's General Manager also had the opportunity to discuss the development of the forest management plan with the editor of The Pas's *Opasquia Times* for an article published March 8, 2023: *NFMC sign terms of reference for Forest Management Plan*. The article focused on plan development, the gathering of values and concerns, and NFMC's commitment to continue to work with rightsholders to incorporate values and objectives for the forest from a diverse group of users.

Figure E. An example of an advertisement that was distributed to several newspapers local to municipal regions at the beginning of the forest management planning process in 2022.

Communication Plan

The FML 2 forest management plan engagement strategy was designed to include three broad participant groups: Rightsholders, stakeholders, and the public advisory group, the Sustainable Forest Management Committee (SFMC). Each group played a unique role in shaping the forest management plan, and the Communication Plan outlined in the Terms of Reference (see Appendix T) provided tailored approaches to facilitate appropriate and timely engagement throughout the planning process.

Rightsholders

Rightsholders are individuals, groups, or communities with recognized rights related to the use and protection of a region, including the forest and its associated resources. On FML 2, Indigenous communities are the primary rightsholders, and engagement was structured to recognize that each community has unique priorities, capacities, and preferred approaches to engagement. As outlined in the Terms of Reference, NFMC committed to working collaboratively with rightsholders to develop engagement plans that could be custom-tailored to each community and that reflected their unique capacity and interests.

Where communities were willing and interested, engagement plans were co-developed with support from NFMC/Nekoté liaisons and community-appointed representatives. These plans aimed to align engagement activities with local governance structures and accommodate time or resource limitations. For communities not ready to participate in the development of a full engagement plan, NFMC maintained regular outreach efforts and remained open to future collaboration.

Custom-tailored engagement included options such as:

- Participating through existing committees or standing meetings within the community;
- Merging milestones into single engagement sessions, presentations, and/or workshops;
- Prioritizing topics of interest (e.g., spatial harvest schedules, wildlife and habitat); and/or,
- Adjusting meeting frequency or format (e.g., virtual, in-person, correspondence).

The ability to adapt to each community's preferences and circumstances was essential in respecting their role as rightsholders and ensuring that engagement remained meaningful and manageable throughout the forest management plan development process.

In addition to community-specific engagement plans, NFMC further supported engagement through:

- Community Committees and Representatives – Communities were encouraged to establish engagement committees or appoint a representative(s) that could work and/or liaise directly with NFMC to provide feedback and information throughout the planning process;
- Updates to Chief and Council – Regular update letters and briefings were offered to Chiefs and Councils to support keeping leadership informed and engaged at appropriate milestones; and,
- Resource Management Boards (RMBs) – NFMC participated in existing regional resource management boards, where applicable, and leveraged these as additional forums for coordination and gathering of feedback and information.

Stakeholders

Stakeholders include public individuals, groups, communities, and organizations who are local to the forest management licence area, such as local forest-based citizens, resource users, committees and groups, non-governmental organizations (NGOs), municipalities, forest industry partners, other natural resource industries. Public engagement focused on raising awareness of the planning process, sharing key information, and gathering input on values, concerns, and forest-use priorities. NFMC's stakeholder outreach included:

- Virtual Information Sessions – To improve accessibility, especially for geographically remote stakeholders or those unable to attend in-person events, virtual information sessions were held. Early engagement initiatives were shaped in part by the COVID-19 pandemic restrictions on

gathering, which led to some sessions being delayed or held virtually. The use of a virtual platform proved to be useful in broadening participation across the forest management licence area;

- Community Open Houses – Held in key locations across FML 2, community open houses were held to facilitate face-to-face dialogue, showcase maps and draft content, and collect feedback through comment forms and discussions. Prioritizing and maintaining an in-person presence in communities helps build trust and transparency throughout both strategic and operational planning; and,
- Direct Outreach via Letters and Emails – Stakeholders with a known interest in forest use—such as outfitters, trappers, recreational groups, and local municipal governments—received targeted updates and invitations to participate at various stages of the forest management plan development process.

The Terms of Reference (see Appendix T) committed NFMC to engaging public stakeholders at significant planning milestones. This commitment included structured outreach at the following stages:

- Initial Contact – NFMC sought opportunities to address local governments and resource user groups at the outset of the planning process to introduce the forest management plan process, establish a point of contact, and highlight how to stay involved;
- Forest Management Plan Objectives Development – Summary information was presented on VOITs and forest management plan objectives. Concerns and values were discussed and collected when shared as feedback on draft plan objectives and sustainability indicators.
- Selection of the Preferred Scenario and Spatial Harvest Schedule – Presentation material was delivered on the selected preferred scenario and maps associated with the spatial harvest schedule were prepared. Open houses and information sessions were held where participants were invited to review, comment, and provide feedback; and,
- Forest Management Plan Completion and Review Opportunities – Once the draft forest management plan was complete, it became available publicly through the Manitoba Public Registry. Stakeholders had the opportunity to review and provide comments through the provincial registry. Letters were mailed to provide timelines and locations for review opportunities.

NFMC also responded to requests for additional briefings or clarification, maintaining a communication log throughout the planning process to document outreach events, information shared, and feedback received. This multi-channel approach helped NFMC reach a broad audience while tailoring the content and format to the nature of the engagement opportunity. Participants were also invited to join NFMC's existing mailing list to receive ongoing updates on forest planning, including the development of 2-year forest management operating plans. NFMC will continue to maintain this list as a regular communication tool.

Public Advisory Group (Sustainable Forest Management Committee)

The Sustainable Forest Management Committee (SFMC) functions as the primary public advisory group for FML 2, fulfilling the Canadian Standards Association (CSA) Sustainable Forest Management (SFM) standard certification requirement for ongoing public participation of sustainable forest management planning. Originally established in 1996 as the Forest Resource Advisory Committee (FRAC), the SFMC has evolved into a formal advisory body composed of a diverse cross-section of interests from across the forest management licence area, including Indigenous community members, municipal governments, environmental organizations, resource users, and the public.

The SFMC supports NFMC's planning by providing an open forum for dialogue, feedback, and knowledge-sharing related to forest values, objectives, and operations. It plays a critical role in supporting transparency and accountability by serving as a consistent venue for engagement throughout the development and implementation of the forest management plan.

The involvement of the SFMC throughout the forest management plan development process included:

- Quarterly Meetings – NFMC provided updates and facilitated dialogue at quarterly scheduled committee meetings that aligned with key forest management plan milestones;

- Workshops and Technical Reviews – Where required, topic-specific sessions were held to gather committee input on areas of interest such as wildlife habitat assessment models, strategic forest management plan objectives, and the balancing of trade-offs during the development of the preferred scenario.
- Document Circulation and Comment Opportunities – Committee members received summary materials and draft content at key milestones, including the development of objectives, the review of the selected preferred scenario, and 20-year spatial harvest schedule maps. Presentation material presented was provided to the group as a reference.

NFMC provided additional information (in addition to regular forest management plan update presentations at quarterly meetings) at three major planning milestones, each of which was supported by meeting materials, summary documents, and dedicated agenda time:

- Forest Management Plan Objectives Development – This included extended workshop and brainstorming sessions to support the identification of key forest values, objectives, and indicators. Additional background information on carbon storage and sequestration, climate change vulnerability, and forest and habitat modelling were provided prior to a brainstorming of values and concerns using the Canadian Council of Forest Ministers (CCFM) *Framework of Criteria and Indicators of Sustainable Forest Management in Canada* (2005);
- Selection of the Preferred Scenario and Spatial Harvest Schedule – Members were invited to review forest modelling output/results and participate in discussions about scenario trade-offs and long-term implications to environmental and economic sustainability. The process for selecting the preferred scenario and its outcomes were discussed with the committee following the Planning Team's selection.
- Forest Management Plan Completion and Review Opportunities – Committee members received an overview of the draft forest management plan, a summary of how their values, concerns, and feedback had been addressed, how/where to find relevant information within the plan, and additional information on the timing of the posting of the complete forest management plan draft to the Manitoba Public Registry for review and comment.

Alignment With Canadian Standards Association Sustainable Forest Management Standard Certification

To maintain standard certification, forest managers are required to demonstrate that they are:

- Engaging a broad and representative public advisory group;
- Providing opportunities for meaningful participation and feedback;
- Incorporating input into the development of values, objectives, indicators, and targets (VOITs);
- Reporting on how input was considered; and,
- Conducting regular evaluations of the public participation process.

NFMC satisfies these requirements through its engagement with the SFMC. Participation satisfaction is tracked through self-assessment surveys, and feedback is logged and analyzed to support improvements to the engagement process.

For more information on Canadian Standards Association (CSA) Sustainable Forest Management (SFM) standard certification, see Part 1 – Planning Context, Forest Administration section 6.4 Forest Certification Systems.

ENGAGEMENT OUTCOMES

The objectives, or goals, for the forest and the forest management plan are developed to protect or enhance things that people, communities, and governments identify as a value of forests, or where there is a concern around an important forest value. As part of NFMC's engagement strategy, an extensive process was undertaken to collect values and concerns from various sources with the intent of developing forest management plan

objectives that would address as many values as possible prior to a preferred scenario being selected and a spatial harvest schedule being identified.

Taking into consideration the values collected, the existing government policy and regulation, and the economic goals for NFMC and the region, values, objectives, indicators, and targets (VOITs) were developed for this forest management plan. VOITs are an accepted method for tracking sustainability criteria in forest management plans across Canada. VOITs for FML 2 are organized as they pertain to the six criteria identified in the Canadian Council of Forest Ministers (CCFM) *Framework of Criteria and Indicators of Sustainable Forest Management in Canada* (2005). The criteria are:

1. *Biological Diversity*
2. *Ecosystem Condition & Productivity*
3. *Soil & Water*
4. *Role in Global Ecological Cycles*
5. *Economic & Social Benefits*
6. ***Society's Responsibility***

Using these six criteria to talk about forest values and sustainability helps to ensure that the focus of a forest management plan goes beyond the forest, operations, and economics. A forest management plan, and the strategic objectives to guide future direction, must consider a wide variety of values. Figure illustrates the six sustainability criteria from CCFM that were used to lead discussions with rightsholders and stakeholders to gather and listen to concerns and values.

The inherent purpose of this forest management plan is to serve as a strategic guide and respond to the diverse values and concerns raised by rightsholders, stakeholders, and members of the Sustainable Forest Management Committee throughout engagement. The insights heard influenced all aspects of plan development, from the design of forest management plan objectives and indicators to the technical assumptions used in forest modelling and habitat assessment, and even the framing of implementation strategies and mitigation practices.

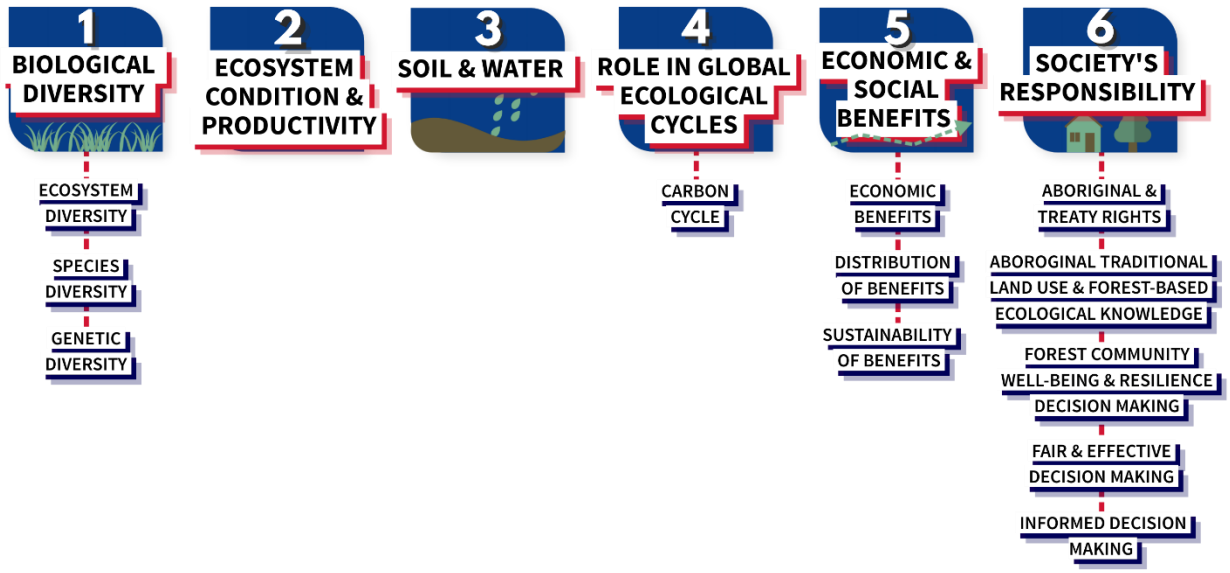


Figure F. Canadian Council of Forest Ministers (CCFM) criteria and indicators for sustainable forest management in Canada graphic used to lead discussions with rightsholders and stakeholders during the process of gathering values and concerns.

Throughout the forest management plan development process, NFMC used what was heard through engagement to:

- Revisit or refine draft forest management plan objectives and/or indicators;
- Incorporate community observations into wildlife habitat assessment models;

- Adjust the communication approach for key forest management planning milestones and/or assumptions—this often included adjusting wording or the ways in which concepts were introduced to be better-suited to supporting active and meaningful participation; and,
- Identify areas for ongoing monitoring, research, and/or adaptation.

To support this, the forest management plan is organized into three main parts, within which more specific sections are nested, that together form the full forest management planning and implementation framework.

A key differentiation to make is that forest management planning occurs at two core levels: strategic and operational.

Strategic planning is what occurs when forest managers consider the "big picture" of the forest system over an extended period of time. It emphasizes broad-scale components of forest management, such as forest age class and composition, and how these components may influence key forest values such as the amount and arrangement of habitat types. Strategic planning provides the framework of operating areas where forest management activities may occur to achieve the goals of the plan over the long-term, but it does not detail how these activities will be operationalized in the real world. Strategic planning is captured in:

- Part 1 – Planning Context – Describes the ecological, cultural, social, and industrial setting of the forest management licence area, including baseline conditions for forests, wildlife, communities, and infrastructure.
- Part 2 – Analysis and Modelling – Explains how forest values are translated into measurable indicators that can be analyzed in the context of forest management plan objectives through forest and habitat modelling. This part includes:
  - Values, objectives, indicators, and targets (VOITs) development;
  - Wildlife habitat modelling and assessment (e.g., for moose, boreal woodland caribou, and boreal songbirds);
  - Timber supply analysis using a forest model, the concept of scenario analysis and design, and the development and selection of the preferred scenario;
  - Climate change and identifying adaptation opportunities through a Climate Vulnerability Assessment (CVA); and,
  - Cumulative effects and evaluating how forest management activities interact with each other at all levels of planning through a cumulative effects assessment (CEA), to aid in identifying potential risk to sensitive values such as biodiversity, water, wildlife, and carbon.

Operational planning is what occurs during the 20-year implementation of the forest management plan and focuses on the finer-filter components of forest management that need to be taken into consideration in order to apply the strategic framework on the ground (i.e., the actual harvest and forest renewal activities). It is at this level that local-level adjustments are most effectively made in response to site-specific conditions or community input. Operational planning is captured in:

- Part 3 – Implementation and Monitoring – Describes how NFMC will meet its objectives through:
  - 2-year forest management operating plans (FMOPs);
  - Harvest, access (road), and forest renewal planning, design, and mitigation;
  - Wildlife habitat, and other non-timber value mitigation at the local level (e.g., protection of wildlife features like mineral licks, denning areas, riparian buffers);
  - Harvesting and forest renewal methods; and,
  - Monitoring and reporting.

When gathering values and concerns, a common challenge was that the development of a forest management plan takes place at the strategic level, while a vast majority of what was heard was related to operational-level topics and activities. Figure G summarizes the distribution of what was heard by planning level and highlights that over half (63%) of the hundreds of values and concerns gathered during engagement were most relevant and effectively addressed through operational-level planning.

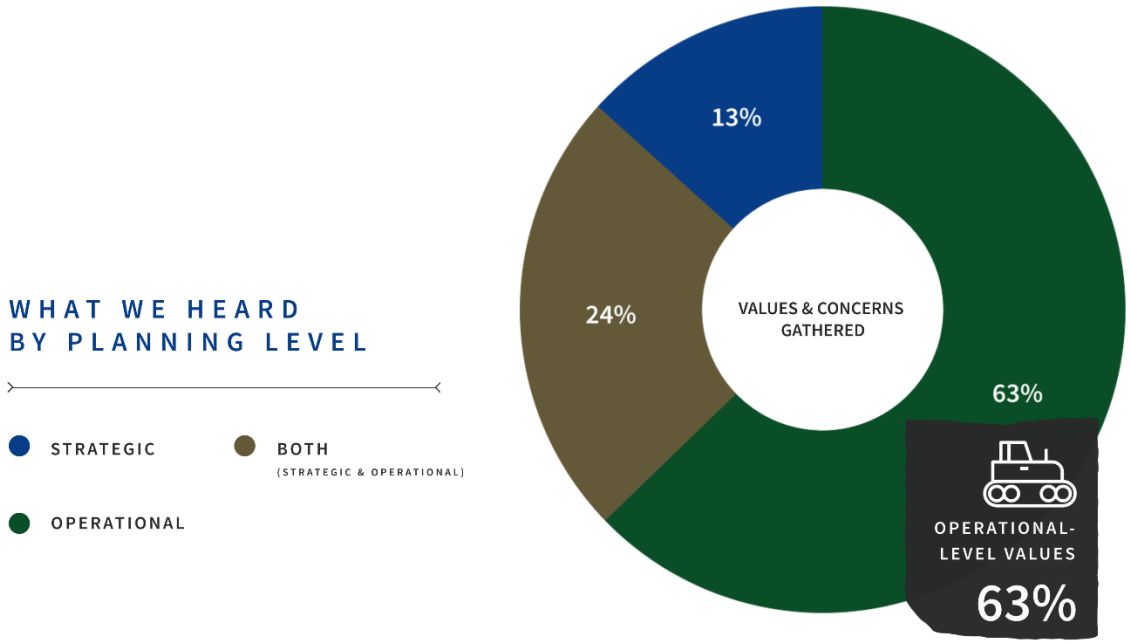


Figure G. A summary of the hundreds of values and concerns gathered during engagement by planning level.

This reflects a common reality in forest management planning—that many participants are most connected to, and primarily concerned with, changes that affect them locally. Operational-level concerns are often the most tangible and urgent as they are tied to road access, wildlife, safety, and land-use near communities and Traditional Territories. While operational-level values and concerns can be, to some degree, addressed within a forest management plan, they are able to be considered most effectively during the development of 2-year forest management operating plans.

While these planning levels are distinct, a single value or concern may be reflected at both levels and appear in multiple sections of this forest management plan. For example, moose and moose habitat were a frequent topic across all engagement groups and are discussed several times within this plan, such as:

- In Part 1, as part of providing planning context for the ecological landscape of FML 2;
  See Ecological and Physical Description subsection 2.5.2.1.1 Ungulates.
- In Part 2, as part of the forest management plan objectives, modelling of wildlife habitat, and preferred scenario selection;
  See Modelling Wildlife Habitat and Habitat Elements subsections 11.1 Matrix of Habitat Elements for Wildlife Species and 11.3 Moose Habitat Elements.
  See Scenario Analysis subsections 12.2.2.3 Biodiversity and 12.2.2.3.3 Wildlife Habitat and Habitat Elements (Moose Habitat).
  See Preferred Forest Management Scenario subsections 13.2.3 Biodiversity and 13.2.3.3.2 Moose Habitat.
  See values, objectives, indicators, and targets (VOITs) 12 and 13.
- In the cumulative effects assessment (CEA), in which the potential impacts of forest management on moose are assessed independently of, and in addition to, those for biodiversity as a whole; and,
  See Cumulative Effects subsections 15.4 Biodiversity and 15.5 Moose.
- In Part 3, as part of the in-block mitigation approaches in place during forest management operating plan development.
  See Implementation Strategies subsection 16.1.1.4.2.2 Moose Habitat and Habitat Elements.

This demonstrates how a value raised during engagement can influence both the strategic direction and how that direction is applied operationally on the ground. The following section provides greater context related to what

was heard during engagement and how these topics might be addressed within the forest management plan and beyond.

Gathering and Addressing Values and Concerns

Following through with the Communication Plan provided NFMC with a number of opportunities to engage with individuals, groups, and communities local to the FML that revolved around a diverse range of forest-based topics. As engagement initiatives began, it was quickly acknowledged that the influx of information being gathered would require a record-keeping approach that was detailed and robust. The development of a record-keeping system served a few fundamental purposes throughout the forest management planning process:

1. It allowed NFMC to maintain a record of what was heard in a way that could be categorized and continually reviewed;
2. It allowed NFMC to maintain a record of where in the forest management plan *or* the overall forest management planning process what was heard could be addressed ; and,
3. It allowed NFMC to maintain a record of what was heard from each unique Indigenous community or stakeholder group so that subsequent engagement opportunities could be more custom-tailored to their identified values. In some instances, this involved returning to a community and providing value-specific information (e.g., a more in-depth presentation on herbicide). In other instances, this involved returning to a community with a summary of what was heard and how the forest management planning process considers and addresses the values identified.

Figure H. A word cloud of the topics heard throughout the gathering of values and concerns during engagement. Word size indicates the frequency of the topic heard. The larger the word, the more common that topic was across all engagement groups.

The primary avenue for gathering values and concerns was through workshops held with rightsholders, stakeholders, and the public advisory group that leveraged the Canadian Council of Forest Ministers (CCFM) *Framework of Criteria and Indicators of Sustainable Forest Management in Canada* (2005) as a tool to assist participants in considering and identifying forest values. However, the gathering of values and concerns was not limited to these workshops and continued to be recorded from a variety of sources throughout the entire forest management plan development process. This included values from community and/or Indigenous Land Use Plans (both published and draft) when shared, and from direct correspondence and documentation shared with NFMC such as memorandums and third-party reviews.

During discussions with rightsholders, stakeholders, and the public advisory group, forest-based values and concerns were heard and recorded by NFMC that can be broadly categorized into four core themes:

- Community;
- Environment;
- Industry; and,
- Wildlife.

Within each theme, NFMC subcategorized what they heard into more specific topics, or "subthemes", that assisted in bringing together a clearer understanding of what the strategic objectives of the forest management plan should focus on addressing. Table A provides a summary that highlights the variety of values identified across FML 2, with the following subsections providing a more in-depth summary of the four core themes and where in the forest management plan relevant information may be found.

Table A. A summary of the four core themes and associated subthemes NFMC recorded when gathering forest values and concerns during engagement.

Community	Environment	Industry	Wildlife
			
• Collaboration • Culturally Significant Areas • Economics • Engagement • Indigenous and Treaty Rights • Knowledge sharing • Livelihood • Local management activities • Recreation • Traditional Knowledge, Values, and Territory • Youth and education	• Biodiversity • Carbon • Climate change • Deforestation • Forest health • Forest renewal • Invasive species • Land use planning • Plants • Traditional Foods, Medicines, and Plants • Soil • Water and watersheds • Wetlands • Wildfire	• Economics • Employment • Herbicide • Local opportunity • Monitoring • Pollution • Reporting • Roads (access, safety, and decommissioning) • Safety • Sustainable forest management • Training and mentorship	• Bears • Birds and waterfowl • Boreal woodland caribou • Deer • Fish • Furbearers • Habitat • Hunting • Moose • Trapping

Community

Participants emphasized the importance of safeguarding community well-being and preserving access to the land for cultural purposes, recreation, and as a source of livelihood. A key component of maintaining these values was to maintain or increase collaboration and engagement initiatives within communities to continue to support a range of industry participation opportunities. What was heard regarding community values included but was not limited to:

- Respecting Indigenous and Treaty Rights, Indigenous governance, Traditional Territory, and Ancestral Lands;
- Preserving Indigenous values such as Culturally Significant Areas (including burial sites), locations where foods, plants, and medicines were gathered, trapping and trapline areas, and hunting;
- Needing clear communication from NFMC related to planned or proposed forest management activities (e.g., harvest, forest renewal, herbicide, surveying, monitoring) and road development and decommissioning near communities;
- Sharing Traditional Knowledge with NFMC that would be considered during the planning process;
- Preserving recreational areas and their access;
- Supporting ongoing collaboration and engagement throughout, not only the development of the forest management plan, but the 20-year implementation period of the plan as well.

Many community-based values and concerns are addressed through ongoing engagement. This section of the forest management plan, the Engagement Strategy, highlights ways in which the forest management plan addresses what was heard, how what was heard shaped plan development, and how communities can continue to engage with NFMC over the next 20 years. The 20-year Forest Management Plan itself is just one component of the overall sustainable forest management approach. Forest management operating plans will continue to be developed every 2 years to operationalize the strategic direction identified in this document. This means that, in addition to being able to contact NFMC directly, rightsholders and stakeholders will have the opportunity to engage regarding proposed operations and forest management activities at 2-year intervals to ensure their values continue to be identified.

Community-based values are also reflected and supported through the values, objectives, indicators, and targets (VOITs) that fall within CCFM Criterium 6 – Society's Responsibility, that set forest management plan objectives to:

- Respect Indigenous Rights and Traditional Land use by retaining forests on Indigenous Reserve Land, Treaty Land Entitlements, and lands identified under the Grand Rapids Forebay and Northern Flood Agreements;
  This objective sets a goal that no forest management activities are to occur by NFMC within the lands identified unless identified as an operation/activity of interest to a community or communities through engagement.
- Respect Indigenous and Treaty Rights through ongoing open and respectful communications with First Nations and Métis communities to foster meaningful engagement; and,
  This objective sets goals to collaboratively identify and develop the appropriate protection and buffers for Indigenous values such as Heritage Resources, Culturally Significant Areas, and any other areas identified during ongoing engagement; to maintain opportunities for all Indigenous communities on the FML to engage and provide feedback on the forest management planning process; and, to maintain or increase the number of Indigenous communities on the FML who are willing to develop or have developed an engagement plan for their community.
- Maintain fair and effective decision making through ongoing open and respectful communications with local forest-based communities to foster meaningful engagement, through ongoing opportunity for the participation of and engagement with the local Sustainable Forest Management Committee, and through compliance with sustainable forest management third-party certification.

Environment

Participants who voiced values and concerns related to the environment generally focused on overall environmental protection, forest sustainability, habitat conservation, wildfire, and the impacts of forestry on the condition of water and soil. Some of the most common environment-based values that were gathered focused on biodiversity, climate change, and water.

Discussions throughout engagement frequently highlighted that the impacts of resource extraction on the environment is often cumulative (i.e., that a number of small impacts can add up to have one large impact). Using something called a cumulative effects assessment can help identify how forest management activities may affect a sensitive value like water. This forest management plan includes a cumulative effects assessment that assesses a number of values, including biodiversity, carbon, and watersheds, that can assist in addressing the concerns. For more information, refer to Part 2 – Analysis and Modelling section 15 Cumulative Effects. This risk assessment tool was used in the development of the plan to identify potential gaps, and to pro-actively fill those gaps with strategic or operational objectives, best management practices or guidelines and regulations.

Biodiversity

Numerous values highlighted the overall significance and importance of biodiversity across FML 2, sparking discussions related to ecosystem and forest health, plant biodiversity, and the protection of areas in which Traditional Plants, Medicines, and/or rare plant species occur. Participants voiced concerns that biodiversity may be at risk as result of forest management activities.

Sustainable forest management inherently seeks to protect biodiversity and integrates a number of necessary objectives to consider biodiversity at both the strategic and operational scales. The majority of the objectives of this forest management plan (and any other sustainable forest management plan!) revolve around some aspect of maintaining biodiversity at varying scales and levels of specificity. Biodiversity values are reflected and supported through the values, objectives, indicators, and targets (VOITs) that fall within CCFM Criterium 1 – Biodiversity, however, objectives within other criteria often inherently support biodiversity, such as through maintaining ecosystem condition and productivity (Criterium 2). This forest management plan sets biodiversity-specific objectives to:

- Maintain a forest with an age class structure and composition that resembles that of a fire-driven boreal forest ecosystem that is capable of supporting a broad range of species;
- Maintain a forest landscape condition with valuable ecosystem representation through the retention of all forests within protected areas or any others areas within which forestry is prohibited;
- Maintain a forest landscape condition which has retained existing habitat features; and,
- Move towards, over time, a forest with a landscape pattern resembling a fire-driven boreal forest ecosystem that is capable of supporting a broad range of species.

Many of these objectives are applied using resource analysis and a forest model. A forest model is an important tool used to look ahead and predict what the future forest may look like if different management activities were to take place. For more information, refer to Part 2 – Analysis and Modelling sections 10 Forest Modelling, 11 Modelling Wildlife Habitat and Habitat Elements, and 12 Scenario Analysis.

Climate Change

Values related to climate change came in a number of different forms. Some of what was heard were concerns regarding climate change as a whole, leading to discussions of how forestry may assist in exacerbating or mitigating local climate change impacts, such as wildfire and the presence of invasive species. Despite wildfire being a natural disturbance event in the region, wildfire was a very common concern raised. A universal concern was the increased frequency and intensity of wildfire across FML 2. Where one individual or community may have valued the ability for targeted forest management activities to mitigate local wildfire risk, others voiced concerns that forestry may be increasing the risk of wildfire across the region.

Values related to carbon were also mentioned frequently in the context of climate change, particularly the ability for forests and wetlands on FML 2 to support carbon storage and sequestration. Concerns were raised regarding how forest management activities may impact carbon storage and how carbon was being considered during the planning process.

A key component of this forest management plan is understanding how the forest management plan implementation might be vulnerable to climate change and identifying adaptation strategies to mitigate potential impacts so that plan objectives can be met. This was done through a climate vulnerability assessment, which can address a number of climate-change-related values and concerns that were heard throughout engagement. Additionally, both the strategic and operational planning processes are an inherent form of adaptive management as they allow for the incorporation of recent climatic events and new regulation, research, policy, and direction to be considered and integrated into forest management. By revisiting the strategic direction every 2 years through the development of forest management operating plans, forest managers are forced to reassess the direction of the forest management plan in the context of the most relevant information available.

Values and concerns related to climate change and carbon are also primarily reflected and supported through the values, objectives, indicators, and targets (VOITs) that fall within CCFM Criteria 2 – Ecosystem Condition and Productivity and 4 – Role in Global Ecological Cycles, that set forest management plan objectives to:

- Maintain a forest landscape condition that supports ecosystem condition and productivity by adapting to changing climate conditions; and,
- Support a forest landscape condition that maintains its role in global ecological cycles through forest carbon storage and sequestration.

Water

Values regarding water focused on the protection of watersheds, lakes, rivers, and wetlands from forestry-related disturbances. Concerns focused on fluctuations in water levels and potential impacts to water quality through contamination from runoff and herbicide use.

A number of operational approaches that NFMC uses and that are described in Part 3 – Implementation and Monitoring can further assist in addressing concerns related to operations that occur near water. Implementation Strategies subsections 16.1.1.4.1 Riparian Areas, 16.2.4 Water Crossings, and 16.4.1.3 Vegetation Management are a good place to start.

Water-based values are also reflected and supported through the values, objectives, indicators, and targets (VOITs) that fall within CCFM Criteria 3 – Soil and Water Resources and 4 – Role in Global Ecological Cycles, that set forest management plan objectives to:

- Maintain water resources by minimizing the impact of forestry-related disturbance on watershed scale.
- Maintain a forest landscape condition which has retained water resource features.
  This objective sets a goal that no forest management activities are to occur within riparian buffers and/or aquatic habitat.
- Support a forest landscape condition that maintains its role in global ecological cycles through forest carbon storage and sequestration.
  This objective sets a goal that no harvesting is to occur within identified wetland or forested wetland areas.

Industry

Engagement efforts gathered values and concerns that acknowledged both opportunities and challenges related to the forest industry itself. What was heard regarding the forest industry included but was not limited to:

- Valuing sustainable forest management and seeking proof that the forest management plan meets and adheres to sustainable forest management objectives and practices;
- Seeking support for local training, mentorship, employment, and operational opportunities (e.g., logging, monitoring, surveying) with NFMC;
- Road development and decommissioning, with communities valuing both the maintained accessibility and more intensive decommissioning of roads;
- Seeking opportunities for profit-sharing or stumpage;
- Voicing concerns that forest operations, the mill, and the application of herbicide are emitting pollutants into the air and waterways;
- Seeking a better understanding of forest certification systems and how they shape forest management planning.

Values related to the more industrial aspects of forestry are unique in that they can be addressed using a vast range of tools and information beyond the forest management plan itself. Sustainable forest management, for instance, is the keystone of plan development and is the inherent goal of this forest management plan and the next 20 years. Certification standards and provincial regulation both work to ensure that FML 2 is being managed sustainably and require frequent reporting to ensure these standards and regulations are being met. For more information, refer to Part 1 – Planning Context, Forest Administration subsection 6.4 Forest Certification and Part 3 – Implementation and Monitoring, Monitoring section 17 Monitoring and Assessment. Reporting documentation is also maintained as available on NFMC's website, www.niso.ca.

Values related to the socioeconomic benefits are in part addressed and discussed in Part 1 – Planning Context, Socio Economic Conditions subsection 5.3 Economic Contribution of the Mill to the Province, and Canadian Standards Association Sustainable Forest Management standard certification targeting that a percentage of financial spending go to contractors local to FML 2 as opposed to those outside the FML and/or province. Opportunities to engage in the forest sector through employment training or service provision is driven through NFMC's Annual Strategic Plan, which includes initiatives for building capacity at the community level, communicating opportunities within NFMC and/or Canadian Kraft Paper Industries Ltd and the forest sector at large, and is meant to support the enhancement of existing community capacity. There are, however, some economic aspects of the forest industry that fall within the Province's jurisdiction, such as stumpage sharing agreements, that NFMC is not able to influence directly.

Similarly, concerns related to the use of herbicide as a vegetation management strategy can also be widely addressed, including at both the strategic and operational scales of forest management planning, within provincial policy and regulation, and through forest certification standards. NFMC is obligated by provincial forest renewal and sustainable forest management standards to return conifer forests back to conifer forest post-harvest. This often requires the responsible use of vegetation management strategies, including herbicide, in softwood stands to prevent the dominance of and competition from deciduous tree species to reach forest renewal and receive the required Certificate of Reforestation from the Province. For more information, refer to Part 3 – Implementation and Monitoring, Implementation Strategies subsection 16.4.1.3 Vegetation Management and Monitoring and Assessment subsection 17.1.3 Forest Renewal Assessment Surveys.

More specific industry concerns such as those relating to pollutants can in-part, be addressed through the operational best management practices followed and maintained through NFMC's International Organization for Standardization Environmental Management Systems standard certification. These are described in some detail in Part 3 – Implementation and Monitoring and are summarized in Appendix O – Operational Best Management Practices.

Wildlife

Wildlife habitat was a consistent and intersectional value heard throughout all stages of engagement, with discussions often being focused on species of cultural, ecological, and regional importance such as moose, boreal woodland caribou, and furbearers. What was heard regarding wildlife values included but was not limited to:

- Protecting boreal woodland caribou habitat;
- Protecting moose habitat, including browsing, calving, and wintering habitat types;
- Maintaining overall habitat connectivity on the landscape and minimizing fragmentation from operations and road development;
- Protecting habitat for furbearers and avoiding impacts to traplines;
- Avoiding the destruction of local habitat features such as nests and dens;
- Better integrating Indigenous Traditional Knowledge of species presence and movement patterns into planning; and,
- Addressing specific concerns that herbicide may impact the quantity and quality of food sources for browse species.

The integration of wildlife and habitat throughout the forest management planning process is vital at both the strategic (20-year Forest Management Plan) and operational (2-year Forest Management Operating Plan) levels. NFMC is committed to supporting both landscape-scale wildlife habitat and local-scale wildlife habitat elements, and this is reflected and supported through the values, objectives, indicators, and targets (VOITs) that fall within CCFM Criteria 1 – Biodiversity and 2 – Ecosystem Condition and Productivity, that set forest management plan objectives to:

- Maintain a forest with an age class structure and composition that resembles that of a fire-driven boreal forest ecosystem that is capable of supporting a broad range of species;
- Maintain a forest landscape condition with valuable ecosystem representation through the retention of all forests within protected areas or any other areas within which forestry is prohibited;
- Maintain a forest landscape condition which has retained existing habitat features;
- Move towards, over time, a forest with a landscape pattern resembling a fire-driven boreal forest ecosystem that is capable of supporting a broad range of species;
- Maintain forested areas that would provide browse and cover for moose on the FML to maintain the distribution of moose habitat on the landbase;
- Consider the provision of forest area and structures that provide habitat requirements for selected boreal songbird species; and,
- Create a forest landscape condition that supports ecosystem condition and productivity by minimizing landscape fragmentation from access development.

Concepts related to ecological indicators like wildlife habitat are considered frequently throughout the forest management plan, but the following are some great places to start. Part 1 – Planning Context known information about plants and animals local to the FML in the Ecological and Physical Description subsection 2.5 Terrestrial and Aquatic Flora and Fauna, with the current condition of broad habitat characteristics, such as forest age class and composition, described in section 4 Current Forest Description. A core element of Part 2 – Analysis and Modelling is the consideration of wildlife habitat and habitat elements in the determination of the strategic direction of the forest management plan through the development and selection of the preferred scenario as described in section 11 Modelling Wildlife Habitat and Habitat Elements and Scenario Analysis subsection 12.2.2.3 Biodiversity. Section 15 Cumulative Effects also assesses potential forest management plan impacts for biodiversity, moose, and boreal woodland caribou. Part 3 – Implementation and Monitoring discusses how some of the more local-scale considerations are made for wildlife habitat during plan implementation and the development of 2-year forest management operating plans—see Implementation Strategies section 16.1.1.4 Non-Timber Resource Values.

Case Studies of Engagement Outcomes

Songbird Habitat Models – From Concern to Action

What we heard…

Early in the planning process, both community members and technical reviewers raised concerns that some of the Habitat Suitability Index (HSI) models previously used in Manitoba were not appropriate for FML 2. These models had not been validated with northern boreal data, and their assumptions were based on regions with different forest structures and species assemblages. This created a knowledge gap in how songbird habitat was being represented, especially for species of ecological or cultural significance.

How we responded…

NFMC responded by shifting away from outdated HSI models and pursuing a new approach to wildlife habitat assessment, focused on data-driven boreal songbird models. To achieve this, NFMC:

- Engaged researchers to support model development, including Dr. Rob Rempel, a leading expert in northern forest songbird modelling;
- Used real-world observation data from the *Atlas of the Breeding Birds of Manitoba* (birdatlas.mb.ca), filtering it to include only verified sightings within FML 2 and aligning it with updated forest inventory data; and,
- Developed new habitat models using this local data, refined through resource selection probability functions (RSPF) and validated through robust statistical testing.

How this was integrated into the forest management plan…

These newly developed habitat models were:

- Incorporated into the strategic forest modelling process, allowing habitat outcomes for songbirds to be evaluated under different scenarios and across varied future forest conditions; and,
  See Part 2 – Analysis and Modelling, Modelling Wildlife and Wildlife Habitat subsection 11.4 Boreal Songbird Habitat Elements and Preferred Forest Management Scenario subsection 13.2.9.2 Boreal Songbirds.
- Used to inform ecological objectives and provide additional assessment of more specific habitat elements to consider songbird habitat diversity alongside fibre supply and other values.

Next steps – Ongoing action during forest management plan implementation…

The forest management plan does not stop at strategic forest modelling. Recognizing that observation data remains limited in this region and is a concern, NFMC has committed to:

- A field-based monitoring program during implementation to collect new songbird data using autonomous recording units (ARUs), with survey design and data processing support from research partners; and,
- Integrating new data into the existing models to improve performance and accuracy, allowing continuous refinement of habitat representation in the local region over time.

This case study exemplifies feedback gathered from rightsholders and stakeholders helped identify a shortcoming in the planning approach, and how the concerns voiced by participants translated into meaningful, science-based improvements in both the current plan and future decision-making.

Moose Browse Quality – Responding to Habitat Concerns

What we heard…

During engagement sessions, a First Nation raised concerns that young forest created through harvesting did not offer the same quality of moose browse habitat as forest regenerating following a natural disturbance (such as wildfire). This challenged a key assumption in the modelling approach — that young forest, regardless of its origin, could be treated equally in terms of its value for moose browse habitat.

How we responded…

NFMC responded by refining how moose browse habitat was reported in the forest model, incorporating feedback that recognized ecological differences between harvest-origin and natural-origin early seral forest. To achieve this, NFMC:

- Created additional moose browse habitat reporting within the forest model to track habitat based on origin (harvest versus natural); and,
- Revisited assumptions with technical experts and incorporating ecological literature on forage quality and species use across disturbance types.

This allowed for a more robust consideration of moose browse habitat during the development of the preferred scenario.

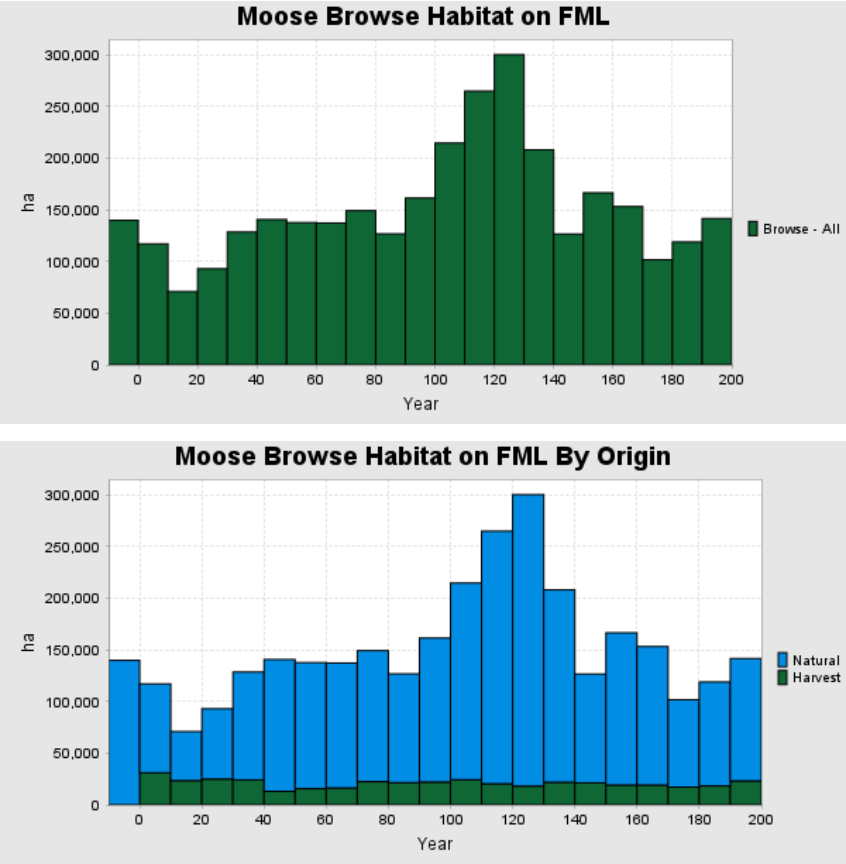


Figure I. Patchworks™ reports that summarize moose browse habitat area, in hectares (ha), on the FML resulting from the Preferred Forest Management Scenario (PFMS). The report on the top summarizes moose browse habitat as a whole, regardless of origin. The report on the bottom was created following what was heard during engagement to differentiate the source of moose browse habitat by origin—harvest (green) or natural (blue). For more information, see Part 2 – Analysis and Modelling section 11 Modelling for Wildlife Habitat and Habitat Elements and subsection 11.3 Moose Habitat Elements.

How this was integrated into the forest management plan…

This new way to report on and assess moose browse habitat:

- Produced results that were summarized by origin over a 200-year period based on different management scenarios and the predicted future forest condition. These reports highlighted that forest management activity was having minimal influence on the amount of browse habitat predicted to occur on the landscape in comparison to that created naturally. Naturally created browse areas over time fluctuated with the aging of initial wildfire areas and mortality of stands in the future;
- Helped clarify how management actions contribute to habitat outcomes; and,
- Acknowledges that origin may influence habitat quality, use, and cultural acceptability.

Next steps – Supporting better understand over time…

While this forest management plan does not commit to formal monitoring of moose habitat use, the refined browse information now available through the model can support future efforts. These outputs can be:

- Integrated into broader landscape-level studies on moose movement or habitat use;
- Compared against provincial or community-based knowledge and survey efforts; and,
- Used as a baseline for future validation work, should additional field data become available.

This example shows how a single comment challenged current representation of habitat in a traditional forest management planning context and led to improvements in reporting and avenues for further data collection, treating moose habitat not just as a number in a model, but as a value rooted in ecological and cultural context.

Ongoing Engagement Strategy

The conversation around forest management does not end with the approval of the 20-Year Forest Management Plan. It is a continuous process that benefits from sustained input from rightsholders, stakeholders, and the public. NFMC has established and will continue to build relationships across the FML 2 area to support the implementation of the forest management plan and each of its associated 2-year forest management operating plans.

NFMC has committed to maintaining ongoing relationships with rightsholder representatives, resource managers, elected councilors, Resource Management Boards and members, as well as other advisory bodies. These relationships have been central to the development of this forest management plan and will remain vital during its implementation.

Although this plan provides the overall strategic direction for the next 20 years, forest management planning is a form of adaptive management. Information collection, new research, and on-going feedback that becomes available during implementation will provide a foundation for the next forest management plan. Engagement going forward will contribute at both the strategic and operational levels:

- Strategic objectives defined in the forest management plan guide long-term planning and decision-making. As the plan and spatial harvest schedule is implemented, NFMC will be tracking, monitoring and reporting on how progress with the actual implementation aligns with the projected goals of the plan. Opportunities to engage with NFMC and review these reports and information will be provided.
- Operational concerns, particularly those addressed through 2-year forest management operating plans, are the focus of more localized and responsive engagement. On-going engagement at this level of planning will be the focus for NFMC as the plan is implemented.

The following sections will detail how rightsholder, stakeholders, and the public can remain engaged and stay up-to-date on information related to FML 2 over the 20-year implementation of this forest management plan.

Online Information

This forest management plan is a document that will provide the strategic direction for forest management activities for the next 20 years in FML 2. This strategic document captures decisions made based on the information available at the time, policies and legislation in place, and the operational and economic feasibility of implementation. As the plan is implemented, everyone can stay informed with up-to-date information through both the NFMC and Government of Manitoba websites. Websites provide a more adaptable format for keeping information relevant and accessible, for relaying contact information, and for providing interactive feedback through surveys or emails.

NFMC (www.niso.ca)

This is the main website for Nisokapawino Forestry Management Corporation, the proponent leading the forest management plan. It includes updates on plan development, plain language summaries, and opportunities to provide feedback on forest management operating plans (FMOPs). Users can access draft maps, learn about community engagement, or find contact information. This is the best place to stay informed about ongoing engagement specific to FML 2.

Canadian Kraft Paper (www.canadiankraftpaper.com/sustainability)

Canadian Kraft Paper's sustainability page focuses on the company's forest certification and responsible management practices. It provides background on CSA and ISO standards, environmental policies, and the company's role in the joint management of FML 2. Users interested in industry practices or the company's environmental commitments will find relevant information here. This site supports a broader understanding of how forest management connects to CKP's operations and global customers.

Government of Manitoba – Forestry Information (www.gov.mb.ca/nrnd/forest/forestry)

This provincial website provides information on forestry policy, forest management guidelines, inventory tools, and the legal framework for planning. It is useful for those seeking background on how forest management is regulated across Manitoba. The site includes technical documents and broader provincial planning context. This site provides links to Government led wood supply modelling and sustainable harvest level (base case) reports.

Government of Manitoba – Public Registry (www.gov.mb.ca/sd/eal/registries/3094.8)

The Manitoba Public Registry hosts the official records for the review of the FML 2 20-year Forest Management Plan under Project #3094.8. Previous forest management plan documents and extension requests for the Forest Management Licence Agreement (FMLA) and Environment Act Licence (EAL) are located in Project #3094.6. On this website, users can find draft submissions, review timelines, and information about the public comment process. It's the go-to source for formal documentation during the approval phase. This site is most relevant for individuals or organizations submitting feedback during Crown Consultation and public review. Any amendments to the forest management plan, letters of approval, or comments will be posted here during the review process and plan implementation.

Forest Management Operating Plans

Operational planning is what occurs during the 20-year implementation of the plan and focuses on the finer-scale components of forest management that need to be taken into consideration in order to apply the strategic framework on-the-ground (i.e., the actual harvest and forest renewal activities). Operational planning takes the strategic-level direction identified in a forest management plan and divides it into approachable, feasible, and focused 2-year forest management operating plans (FMOPs). If strategic planning (the forest management plan) provides the framework of operating areas, operational planning (the forest management operating plan) provides the step-by-step instructions on how to make that framework reality in the short-term.

The development of forest management operating plans is where the vast majority of on-going engagement opportunities will be provided over the 20-year duration of forest management plan implementation. Forest management operating plans outline the proposed forest management activities to be undertaken during the duration of the two-year operating period. This includes detailed information about operating areas, wood supply, planned access development, proposed harvest blocks, and subsequent forest renewal activities. This is the level of detail that NFMC has identified through this forest management plan development process that is most relevant and important to rightsholders, stakeholders and the public advisory group.

More detailed information about forest management plan implementation and forest management operating plan development are documented in Part 3 – Implementation and Monitoring, section 16 Implementation Strategies.

Forest management operating plans can be thought of as a smaller, shorter forest management plan that provide more frequent opportunities for engagement in a similar way to what has been described here in this Engagement Strategy overview. Forest management operating plans are developed every two years and are reviewed with communities through targeted engagement, including:

- Community meetings and information sessions;
- Opportunities to review detailed block-level plans and maps; and,
- Online surveys for feedback on proposed management activities.

Community information sessions are a part of the development of each forest management operating plan. During these sessions, rightsholders, stakeholders, and the public are encouraged to provide feedback on planned operations that may impact resources of interest. Community information sessions provide an opportunity for individuals and communities to provide additional values and concerns and allow NFMC to more directly address values and concerns that could not be captured at the strategic level. For instance, during engagement throughout forest management plan development, a number of values and concerns were gathered

from communities on the FML in relation to moose; however, moose are a species that are most effectively managed for at the operational level during implementation. Gathering information about fine-filter management values during forest management operating plan development is an opportunity to integrate operational-level concerns consistently throughout forest management plan implementation. Input from these sessions can be considered and accommodated, if possible and reasonable, at any point during plan implementation. Information provided on a confidential basis is used only internally within NFMC to develop appropriate mitigative strategies with respect to its planned forest management activities. Sensitive information, if provided, is not shown on any publicly available maps or planning documents.

The NFMC website (www.niso.ca) contains interactive maps of the current approved 2-year forest management operating plan and, for a six-month period while under development, information about the next 2-year plan. The website provides opportunities for anyone to explore the proposed maps and fill out a survey to provide feedback, concerns, or to provide contact information for future correspondence on forest planning.

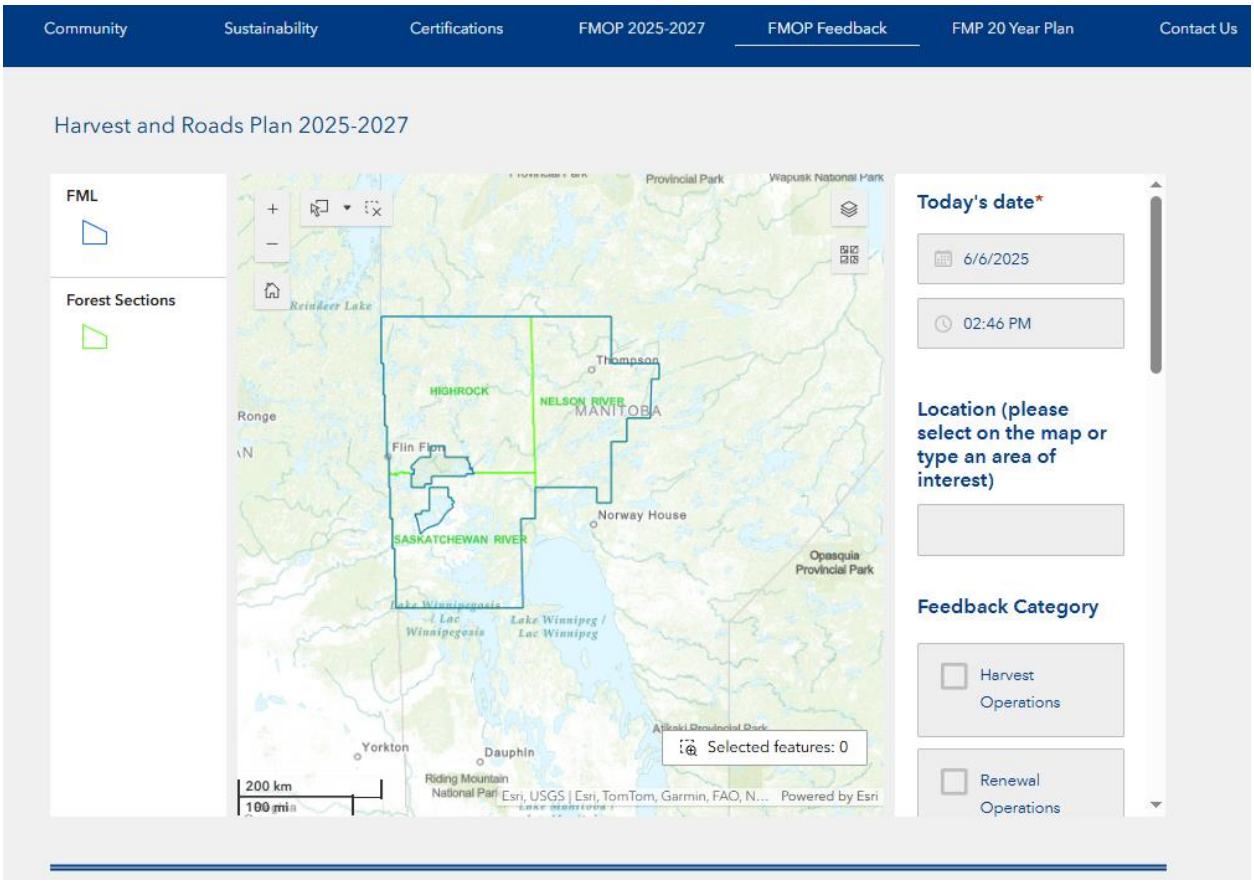


Figure J. An example of the online survey form for 2-year forest management operating plan feedback on NFMC's website (www.niso.ca).

Advisory Groups

The Sustainable Forest Management Committee (SFMC) has been established to serve as the Public Advisory Committee for Canadian Standards Association (CSA) Sustainable Forest Management (SFM) standard certification and as the Forest Resource Advisory Committee as outlined in the Forest Management Licence Agreement (FMLA). It is an ongoing forum where representatives from across the FMLA area can share knowledge, interests, views, values and concerns with respect to forest management activities. This forum is intended to allow for open, fair, and orderly discussion and includes representatives from a broad cross-section of stakeholders across FML 2. Currently, the committee meets quarterly at minimum and membership is open to

Indigenous rightsholders, community representatives, and general public and organizations. Participation in the SFMC includes opportunities for field visits of active operations or silviculture sites, regular meetings to provide continuity and issue resolution.

The SFMC is responsible for the regular review, update and reporting of CSA SFM standard indicators to maintain certification. An important and upcoming role for the SFMC will be to align the current CSA SFM standard indicators with forest management plan values, objectives, indicators, and targets (VOITs) and to look for opportunities to harmonize reporting for both.

Detailed information about the SFMC is available on NFMC's website including contact information for those who are interested in joining. This public advisory group has past agendas, newsletters and upcoming meeting dates for anyone looking for additional information or to see if this type of engagement opportunity may interest you or a representative from a local group.

Find more Sustainable Forest Management Committee information under the Community tab at www.niso.ca.

Resource Management Boards are another type of advisory group that NFMC has identified for ongoing engagement and information sharing opportunities. Through agreements between First Nations and the Manitoba Government, Resource Management Boards[1] were established to assist in the co-management of natural resources in defined Resource Management Areas. Indigenous and Northern Relations serves as the provincial lead in the management and implementation of the boards established under these agreements. During the development of the forest management plan, NFMC had the opportunity to be invited to speak and provide updates on the planning process and potential harvest areas. These meetings highlighted that the established Boards formed to address resource issues and management of natural resources would be an excellent network to establish new contacts to share information during the implementation of the plan.

NFMC recognizes that engagement is an evolving process and will continue to improve approaches to communication and participation, guided by feedback, lessons learned through implementation, and changing conditions on the land. The goal of this engagement strategy is to continue to build relationships, foster understanding, and support the collaborative management of FML 2 for the next 20 years.

[1] https://www.gov.mb.ca/ied/settlements/resource-management-boards.html

References

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2027-2046 FML 2 Forest Management Plan

PART 1 – PLANNING CONTEXT

Forest Management Licence No. 2 20-Year Forest Management Plan

2025-06-30

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Introduction

What is a forest management plan?

A forest management plan is a long-term, strategic plan that guides how forests on Crown land will be managed over the next 20 years. It takes a landscape-level view of the forest (i.e., looking at the big picture of the entire forest area), including where harvesting can happen, how wildlife habitat is maintained, and how forest health and renewal are supported.

Forest management plans are similar to municipal strategic plans or land use plans which set goals for how a town, city, or region may grow and change. In the same way, a forest management plan helps balance different values and objectives to support that the forest continues to provide environmental, cultural, and economic benefits for present and future generations.

Why do we need a forest management plan?

The forest management plan serves as a road map for the future of the forest. It lays out a long-term direction for how forests will be managed, cared for, and renewed, while balancing numerous values. Like a road map, it helps guide decisions and actions over time, ensuring we know where we are starting from, where we want to be, and what actions to take to reach our goals. In Manitoba, forest management plans are a required strategic document required for managing Crown forests. These plans support the Province's commitment to sustainable forest management.

Because trees grow slowly, and changes to the forest unfold over decades, it is important to take a long-term, strategic view. A forest management plan helps forest managers understand how the decisions that are made today may shape the forest of tomorrow for both the land and the people who depend on it.

What is considered "planning context"?

Planning context provides the foundation for developing a forest management plan. It describes the forest as it exists today—its history, who uses it, how it has been managed, and what rules apply. This includes information about the land itself, the forest's current condition, local communities, economic activities, and other land use in the area.

The planning context of this forest management plan is based on the best available information at the time of writing—such as updated forest inventories, recent disturbance history, and current social and ecological conditions. Because a forest management plan looks 20 years into the future, it is important to understand that each plan reflects the conditions and knowledge of its time.

Forests are dynamic (always changing), and so is the knowledge we have about them. New data, changing conditions, and evolving priorities will shape the next plan. As new data becomes available or conditions change, future planning cycles will build on this context and adapt accordingly. In that way, each forest management plan is both a product of its time and a steppingstone into the future.

Why is the forest management plan divided into three parts?

The forest management plan is divided into three core parts to reflect the natural flow of good planning: start with what we know, use that to look ahead, then lay out how we will act on it.

- Part 1 – Planning Context gathers the foundational information such as the ecological and physical description of the area, the historical management of the forest, the current condition of the forest, who is involved in forest management, what policies apply, where administrative boundaries lie, and what standard certifications the forest is held to. This is the starting point for all future planning decisions.
- Part 2 – Analysis and Modelling uses the information in Part 1 to look at possible future outcomes. Strategic tools and models are used to explore how different decisions would affect the forest over time, balancing social, ecological, and economic values. This leads to the selection of a preferred forest

management approach and strategic direction for the next 20 years.

- Part 3 – Implementation and Monitoring translates the strategic direction identified in Part 2 and describes what operational management approaches can be taken to achieve this direction. It explains how the plan will be carried out on the ground through more local-scale 2-year forest management operating plans, how values will be monitored and reported, and what future research we can do to improve our understanding of the forest in the future.

Together, these three parts demonstrate how the plan flows from gathering an understanding of today's conditions to creating a long-term vision—and then putting that vision into practice.

1 Corporate Overview and Facility Description

Nisokapawino Forestry Management Corporation (NFMC) is a forest services provider owned equally by two Partners, Nekoté Limited Partnership (LP) and Canadian Kraft Paper Industries Limited (CKP)—often referred to as "the Company" for this purposes of this forest management plan. In November of 2016, CKP purchased the sawmill and pulp and paper mill located in The Pas, Manitoba from Tolko Industries Limited and acquired the Forest Management Licence Agreement (FMLA) with the Province of Manitoba for Forest Management Licence No. 2 (FML 2).

NFMC arose as the finalization of the partnership agreement on July 6, 2018 between Nekoté LP, a corporation representing seven First Nations Communities, and CKP. This included shared forest management responsibilities on the FML. NFMC is responsible for the development of forest management plans, managing renewal activities, maintaining environmental certifications, strengthening engagement with rightsholders and stakeholders, and improving access to employment and business development opportunities.

The Company is committed to a series of policies and principles with regard to undertaking forest management activities that are ecologically suitable, economically feasible, and socially acceptable.

Nisokapawino Forestry Management Corporation

Vision Statement

NFMC will be recognized for its excellence as a forest services provider, in facilitation of Indigenous and Forest Industry relationships, and actions that promote reconciliation.

Mission Statement

NFMC works to deliver the objectives of its Partners - Fibre security through strengthened relationships with the Nekoté Nations by: Inclusion in forest management decisions; Access to employment, training, and wealth opportunities; Investment in social and cultural programs and educational awards.

Values Statement

Safety: Be safe every single day. Have the courage to challenge any behaviour that doesn't promote a culture of safety.

Honesty and Integrity: Integrity means being honest even when it is difficult. We strive to always be honest with ourselves, our Partners, our clients, and the public.

Respect and Empathy: Our success is centred around relationships. Respect and empathy are key to building trust and bridging gaps between people with differing perspectives.

Attitude and Team Spirit: A positive attitude, sense of humour and team spirit are essential in this dynamic and demanding field of work. We can only achieve our goals by being open minded, creative, and adaptable.

Work Ethic: Work hard. Be disciplined. Inspire others with your example and enjoy the satisfaction of accomplishment.

Reconciliation: Reconciliation is a word of action. We acknowledge and use the Calls to Action of the Truth and Reconciliation Commission to guide our efforts. We pursue opportunities to expand our knowledge of the cultures and histories of Indigenous peoples within Canada.

Canadian Kraft Paper Industries Limited

Vision Statement

To be a sustainable world-class global supplier of A-grade high performance unbleached kraft paper.

Mission Statement

We will be a sustainable and profitable company by investing in our people and operations. We have a strong commitment to safe production, quality, and customer service through continuous improvement and teamwork.

Values Statement

Safety: It is in everything we do.

Respect for People: We value our people and diversities; encourage their development and recognize their performance.

Customer Commitment: We measure our success through customer satisfaction and loyalty.

Sustainability: We are responsible in our decisions and actions ensuring environmental, economic, and social well-being for the benefit of present and future generations.

Team Work: We work together across boundaries and toward the same goals to meet the needs of customers.

Integrity: We hold ourselves and each other to the highest standard of ethical, trustworthy, and accountable behavior.

Continuous Improvement: We have an on-going commitment to improve products, services, and processes.

Nekoté Limited Partnership

Nekoté LP is a corporation representing seven First Nations:

Chemawawin Cree Nation *Misipawistik Cree Nation* *Opaskwayak Cree Nation* *Wuskwi Sipihk First Nation*
Mathias Colomb Cree Nation *Mosakahiken Cree Nation* *Sapotaweyak Cree Nation*

Of the nine First Nations whose territory are overlain by the FML 2, seven have chosen to be owners of Nekoté LP. The other two Nations still have the ability to join the Nekoté partnership. Nekoté LP is a 50% owner of NFMC.

NFMC employs a Liaison and a Managing Coordinator who both foster improved communications and understanding at the community level of the activities of NFMC and CKP. Their work is resulting in stronger communication and more meaningful relationships between the Communities and NFMC and CKP.

For more information on Nekoté LP, visit their Facebook page at www.facebook.com/people/Nekote-LP/100065143806791/.

1.1 CORPORATE POLICIES

1.1.1 Environmental Policy

Canadian Kraft Paper Industries Ltd (CKP) and Nisokapawino Forestry Management Corporation (NFMC) are committed at all levels of the Organization to the protection of the benefit of present and future generations. We will ensure this through the following activities:

- Internal monitoring and external audits to assess our environmental performance and taking corrective actions through a continual improvement process on an ongoing basis;
- Adhering to compliance standards including regulations, legislation and any voluntary commitments that we undertake;
- Managing operations to minimize pollution and waste;
- Practicing sustainable forest management through our Sustainable Forest Management (SFM) Policy;
- Communicating environmental performance with our employees, the public and other stakeholders;
- Encouraging and recognizing employees for their contribution towards improving our environmental performance.

1.1.2 Quality Policy

Canadian Kraft Paper is committed to providing quality products and service with the aim of enhancing customer satisfaction.

Quality means collaboration with our sales partner to ensure a continued, in-depth knowledge of how to better serve the needs of our customers. We are dedicated to building and maintaining meaningful relationships and partnerships by having open communication and feedback through the supply chain.

We value our employees and their contributions and are dedicated to tapping into the diversities of the individuals by encouraging career development and supporting their interests towards improving their knowledge and expertise in the industry.

We are committed to sustainability in the industry by managing risks and investing in capital projects where the greatest impact is measured on improving efficiency, effectiveness, and quality of our products.

We are a team who works together to face challenges, develop effective strategies, and explore new opportunities. We are committed to building systems that support operations and process improvement initiatives that are mutually beneficial to our customers, our company, and our community in a cost effective, environmentally responsible, and safe manner.

1.1.3 Respectful Workplace Policy

All employees of Canadian Kraft Paper are entitled to a workplace that is free of harassment. As such, CKP is committed to ensuring, so far as is reasonably practicable, that employees are provided with a safe, healthy, harassment-free, and respectful workplace. All employees will be treated in a fair and respectful manner. Bullying, harassment, discrimination, and workplace violence are not acceptable or tolerated in the workplace. This policy applies to permanent and temporary employees and contractors. It also applies to interpersonal and electronic communications.

1.1.4 Safety Policy

Canadian Kraft Paper is committed to providing a safe and healthy work environment for all workers where an incident-free workplace is a core value. All laws and regulations pertaining to safety and health will be strictly adhered to. Management and employees will also ensure a healthy and safe workplace through commitment to the continual improvement in our safety and health management system and performance.

Canadian Kraft Paper management team will systematically integrate safeguards into work practices at all levels, so that all company activities are accomplished in a safe and secure manner. This work includes ensuring that employees receive the appropriate education and training necessary to carry out their duties in a safe and effective way. All employees are required to support the Workplace Safety and Health program and incorporate safety and health initiatives into their daily activities.

Safety is everyone's responsibility; it rests with all levels of management and with each and every employee.

1.1.5 Sustainable Forest Management Policy

Canadian Kraft Paper and Nisokapawino Forestry Management Corporation commits to ensuring our forest management operations are compliant with Canadian Standards Association (CSA) Sustainable Forest Management (SFM) standards by:

- Achieving, implementing and maintaining CSA SFM and Programme for the Endorsement of Forest Certification (PEFC) Chain of Custody certifications;
- Meeting or exceeding all relevant legislation, regulations, policies, and other requirements to which the organization subscribes;
- Providing public participation;
- Respecting and recognizing Aboriginal Title and Rights, and Treaty Rights;
- Providing participation opportunities for Aboriginal Peoples with rights to and interests in SFM within the FML;
- Providing conditions and safeguards for the health and safety of FML-related workers and the public;
- Honoring all international agreements and conventions relevant to SFM to which Canada is signatory;
- Improving knowledge about the forest and SFM, monitoring advances in SFM science and technology, and incorporating these advances where applicable; and
- Demonstrating continual improvement of SFM.

1.2 WOODLANDS CORPORATE STRUCTURE

The Woodlands department is made up of three distinct teams: Harvesting, Planning, and Silviculture (Figure 1.1).

The harvesting team is responsible for supplying the mill with all of its fiber needs. This includes purchasing off licence fiber, harvest operations, fiber delivery and scaling. The harvesting team is responsible for building and maintaining all company roads. They ensure proper implementation of the planned operations.

The planning team is responsible for all the harvest and access planning. This includes 20-year forest management plans, 2-year forest management operating plans, and associated permitting. The team works with the government to ensure all harvest blocks and road operations are planned in accordance with government requirements and certification standards. The planning team also engages with the public and rights holders to review and discuss forest management activities.

The Silviculture team is responsible for all reforestation and certification of harvested areas. This includes tree planting, scarification, vegetation management, and surveying to ensure harvested areas receive a Certificate of Reforestation from the government. The team also champions the Canadian Standards Association (CSA) Sustainable Forest Management (SFM) standard certification and the International Organization for Standardization (ISO) Environmental Management System (EMS) standard certification (see Section 6.4 Forest Certification Systems for more information).

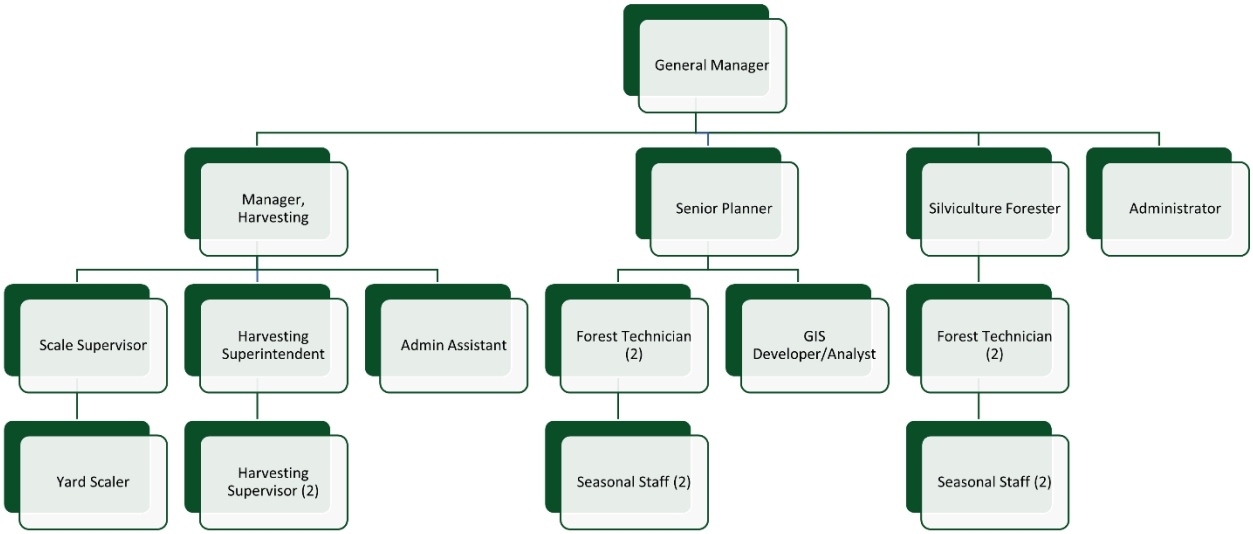


Figure 1.1. Organizational chart for woodlands operations at Canada Kraft Paper Industries Ltd and Nisokapawino Forestry Management Corporation.

1.3 FACILITY, NATURE OF PRODUCTS PRODUCED, AND MARKETS

Canadian Kraft Paper Industries Ltd (CKP) operates an unbleached kraft paper mill in The Pas producing several grades and strengths of paper. CKP is primarily a supplier to North American and global sack markets. The mill has an annual production capacity of 160,000 metric tons of unbleached sack kraft paper. The grades produced are principally used to manufacture goods requiring high strength papers such as multiwall bags, mailers, etc.; applications where strength and stretch characteristics are paramount requirements. The softwood trees in northern Manitoba's boreal forest are universally recognized as an excellent source of long and strong fiber for high performance sack kraft paper. Multiwall shipping sacks are used for many commodities including construction products such as cement, chemicals, as well as agricultural products such as seeds, powdered milk, flour, animal feed & potatoes.

CKP is the single largest exporter of unbleached kraft paper into the United States. It is solidly positioned as the key supplier to the North American niche market of high performance (high strength) extensible kraft papers, achieved by offering grades that allow multiwall bags to be manufactured using fewer plies or lower basis weights, while producing the required strength characteristics for optimum bag performance during handling. A product guide can be found on the CKP website at www.canadiankraftpaper.com/our-products.

1.4 WOOD SUPPLY REQUIREMENTS AND PRODUCTION CAPACITY

The projected mill consumption is 850,000 m^3 of softwood chips a year. Acceptable softwood species for the use of the operations are black spruce, white spruce, jack pine, and to a limited extent, balsam fir. This volume is fulfilled from three primary sources: Canadian Kraft Paper contract logging operations, Manitoba third party operator purchase supplier, and Saskatchewan purchase suppliers.

The kraft paper mill operates a power boiler to meet the electricity requirements for the papermaking process. The power boiler burns either waste oil or hog fuel which produces steam and is converted into electricity. When the sawmill was active, much of the hog fuel requirement was met with the by-products of the lumber-making process – sawdust, trimmings, etc. Since its closure, Canadian Kraft Paper has had to supplement the hog fuel requirements with other sources. Hardwood (poplar) on the licence area was identified as a viable option. As the FML Agreement does not include hardwood harvest on the licence area, a request was made to the Province to make hardwood available through purchase from third-party operators.

In 2019/2020, the paper mill produced 146,482 metric tonnes of unbleached kraft paper. Total consumption by the paper mill during this time was 489,268 cubic metres (m^3) of fibre (Table 1.1). The paper mill operated 353 days with an average production of 415 tonnes of paper per operating day. In 2020/2021, the mill operated 361 days with an average production of 403 tonnes of paper per operating day. With consumption of 447,982 cubic metres (m^3) of fibre, the mill produced 145,487 metric tonnes of unbleached kraft paper.

The Diehl processor on site produced 107,082 m^3 whole log chips used at the paper mill in 2019/20. An on-site mobile chipper produced an additional 6,033 m^3 of whole log chips. The Diehl in 2020/2021 produced 76,041 m^3 of chips. The mobile chipper did not operate on site in 2020/2021. Hog production on site in 2019/2020 totalled 68,429 m^3 from the following sources: residue from the Diehl processor and mobile chipper; and whole log processed hog from on-site poplar grinder. In 2020/2021 the on-site hog production totalled 57,518 m^3 from the Diehl processor and poplar grinder combined (Table 1.1).

Table 1.1. Woodyard production and kraft paper consumption in cubic metres (m^3) for FML 2 between the years of 2019 and 2021.

Woodyard Production		Production (m^3) 2019-2021
Whole Log Chip Production [1]		
	Diehl Processor	484,447
	On-Site Mobile Chipper	15,928
	Chip Production Subtotal	*499,375*
Hog Production [2]		
	Diehl Processor	87,031
	On-Site Mobile Chipper	950
	Poplar Grinder	113,535
	Hog Production Subtotal	*201,516*
	Total Woodyard Production	*700,891*
Kraft Paper Consumption		**Consumption (m^3) 2019-2021**
Wood Chips [1]		1,479,933
Hog Fuel [2]		602,670
	Total Mill Consumption	*2,082,603*

[1] Wood Chips consumption is measured in oven-dry tonnes (ODT). An average density of 2.64 m3/ODT was used to convert oven-dry tonnes to cubic metres

[2] Hog fuel volumes were converted from green tonnes to cubic metres using estimated conversion factor of 1.6. There is no standard formula to convert hog fuel from green tonnes to cubic metres.

2 Ecological and Physical Description

Understanding the ecological and physical context of the landscape is a key part of managing and planning for the Forest Management Licence (FML) area. This section of the forest management plan aims to answer questions such as:

- How is FML 2 ecologically and geologically described?
- What are the current and historical climate conditions generally experienced on FML 2?
- What plants (flora) and animals (fauna) exist on FML 2 and what do we know about them?
- What water and wetland features exist on FML 2?

These aspects of the FML area are generally static (do not change—at least not usually at a scale we can perceive!) and provide the foundation for identifying the appropriate forest management approach for the region.

2.1 ECOZONES AND ECOREGIONS

Ecozones and ecoregions are part of a hierarchical classification system used to describe landscapes based on ecological and geological characteristics. Ecozones are broader classifications of area that are generally defined by similarities in geological features, historical climate conditions, and generalized groupings of plant and animal species. Across Canada, there are fifteen terrestrial (land-based) ecozones, five of which overlap the province of Manitoba. Ecoregions are subclassifications of ecozones that are more specific, describing areas in which ecosystems and environmental conditions are relatively consistent based on landforms, local climate conditions, soil types, identification of more specific populations of plants and animals, etc.

2.1.1 Ecozones

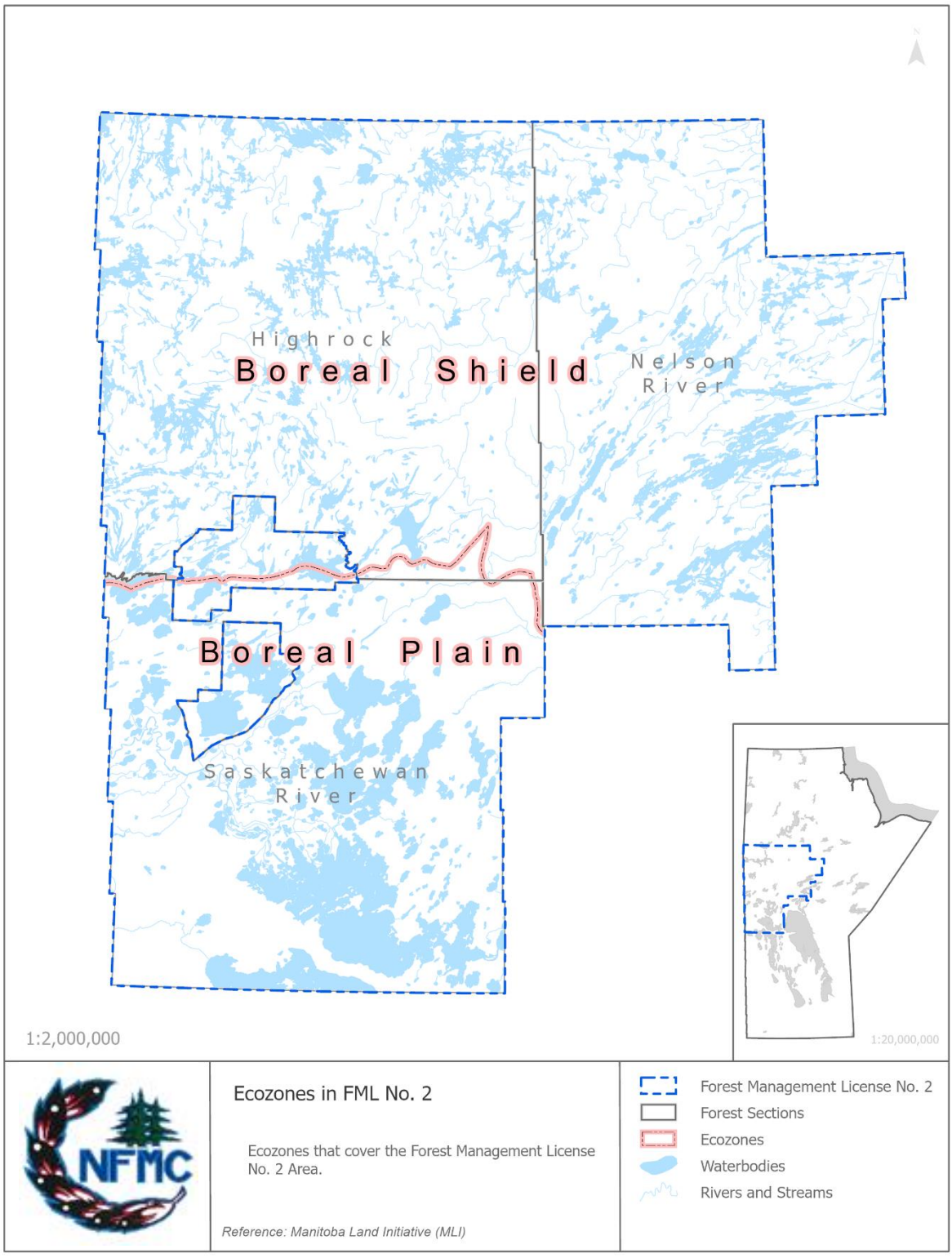
FML 2 lies within two ecozones: the Boreal Shield ecozone and the Boreal Plain ecozone (Map 2.1). The Boreal Shield ecozone is the largest of the ecozones with a total area of 2,228,038 km^2 (Smith, et al., 1998). This zone is a broad, U-shaped area that extends from northern Saskatchewan east to Newfoundland, passing north of Lake Winnipeg, the Great Lakes, and the St. Lawrence River. The Boreal Plains ecozone is much smaller in both size (752,593 km^2) and geographic extent. This ecozone extends in a wide band from the Peace River region of British Columbia in the northwest to the southeastern corner of Manitoba.

2.1.1.1 The Boreal Shield Ecozone

The Boreal Shield ecozone forms a broad band across central and southeastern Manitoba and incorporates the Highrock and Nelson River Forest Sections within FML 2. This zone is dominated by broadly rolling uplands and lowlands. The surficial geology is composed of Precambrian granitic bedrock outcrops, moraines, and glaciofluvial deposits characteristic of the Highrock Forest Section, and lacustrine deposits characteristic of the Nelson River Forest Section. The climate is continental, characterized by relatively warm but short summers, and cold snowy winters. Luvisols are characteristic of the lacustrine deposits, while brunisols and podzols are more characteristic of the moraines and sandy glaciofluvial materials. Organic deposits occupy the poorly drained sites and bedrock depressions.

This zone supports closed stands of conifers, mostly black and white spruce and jack pine on the better drained sites, and black spruce and tamarack on the poorly drained sites. Broadleaf species such as trembling aspen and white birch occur on better drained sites with balsam poplar occurring on the poorly drained sites.

Major wildlife species include mammals such as woodland caribou, moose, black bear, marten, fisher, lynx, and red squirrel. Representative birds include boreal and great horned owl, common loon, yellow rumped warbler, raven, and evening grosbeak.



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199 *Map 2.1. Ecozones within FML 2.*

2.1.1.2 The Boreal Plain Ecozone

The Boreal Plain ecozone covers much of central Manitoba and incorporates Saskatchewan River Forest Section within FML 2. The landscape is level to gently rolling, characterized by lacustrine deposits and hummocky to kettled glacial moraine. A key feature within this FML is a stony, poorly drained compact till known as The Pas Moraine. The climate is subhumid, moderately cold cryoboreal characterized by cold winters and moderately warm summers.

Soils are varied and range from black chernozems in the south to brunisols and organics in the north. Vegetation is characterized by pure and mixed stands of white and black spruce, jack pine, tamarack, trembling aspen, white birch, and balsam poplar.

Wildlife species include characteristic mammals such as white-tailed deer, moose, coyote, black bear, marten, fisher, mink, and chipmunk. Representative birds include boreal and great horned owl, blue jay, rose-breasted and evening grosbeak, Franklin's gull, red-tailed hawk, and northern harrier.

2.1.2 Ecoregions

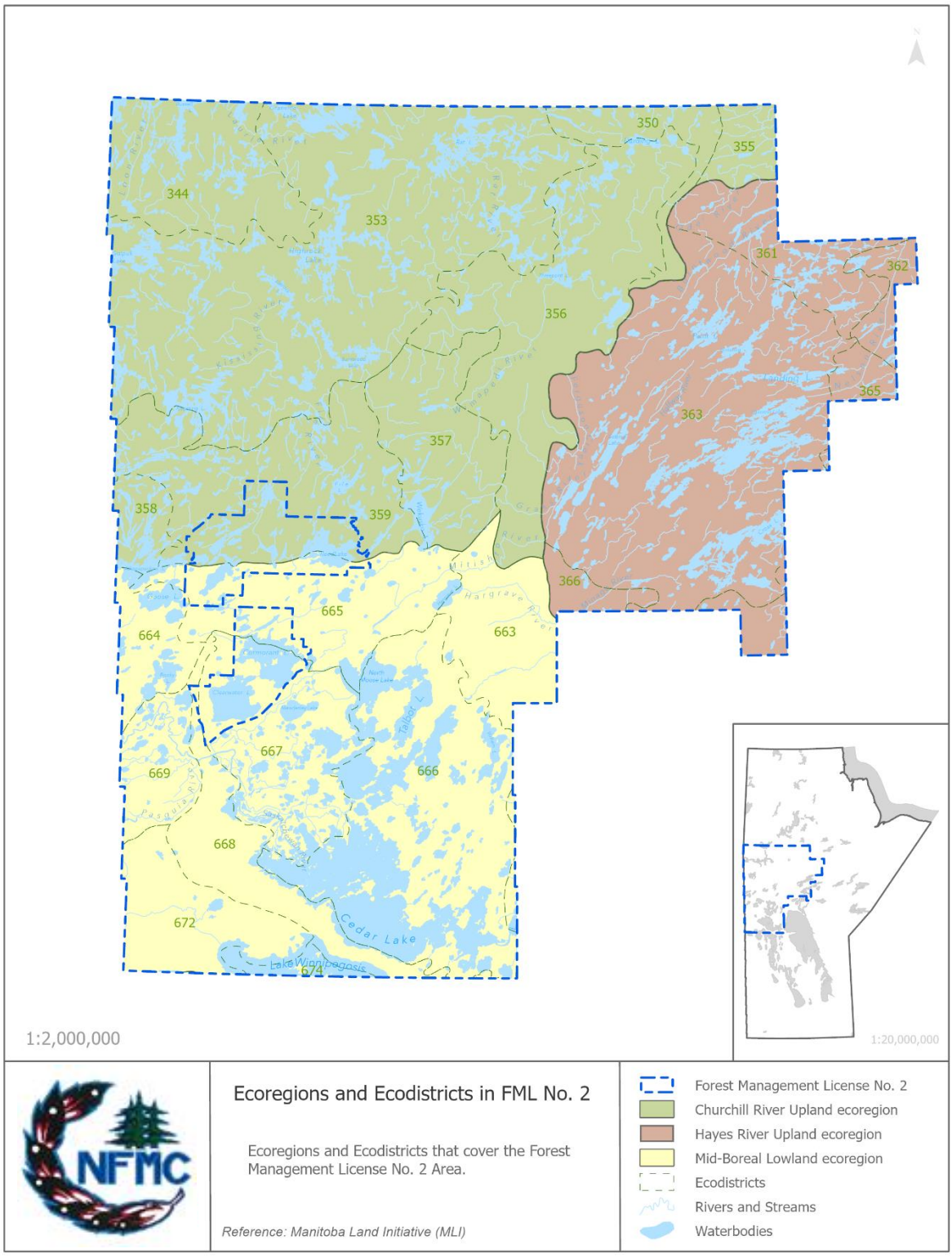
FML 2 lies within three ecoregions: the Churchill River Upland and Hayes River Upland, both within the Boreal Shield ecozone, and the Mid-Boreal Lowland found within the Boreal Plain ecozone (Map 2.2). Table 2.1summarizes the area representation of each ecozone and ecoregion within the FML (Smith, et al., 1998).

Table 2.1. Ecozone and ecoregion representation within FML 2 by area. Adapted from Soil Landscapes of Canada v3.2 Ecological Framework (Agriculture and Agri-Food Canada).

Ecozone	Ecoregion	Area of Ecoregions (ha)		Portion of Ecoregion Occurring in FML 2
		Canada	FML 2	
Boreal Shield	Churchill River Upland	19,615,549	4,052,762	20.6%
	Hayes River Upland	14,171,588	1,891,233	13.3%
Subtotal Area		*33,787,137*	*5,943,995*	
Boreal Plain	Mid-Boreal Lowland	9,061,109	2,833,244	31.3%
	Interlake Plain	4,011,461	285	0.0%
Subtotal Area		*13,263,100*	*2,833,529*	
Total Area		*47,050,237*	*8,777,724*	

2.1.2.1 Churchill River Upland

The Churchill River Upland dominates the northwest part of FML 2 and includes the Highrock Forest Section. Extending northwestward into north-central Saskatchewan, this ecoregion is characterized by cool summers and very cold winters. It is classified as having a subhumid high boreal ecoclimate. It forms part of the continuous coniferous boreal forest that extends from northwestern Ontario to Great Slave Lake in the Northwest Territories. Black spruce is the climatic climax forest species; however, it is often mixed with jack pine. Depending on drainage, surficial material, and local climate, jack pine, trembling aspen, white birch, and to a lesser extent white spruce and balsam fir, also occupy significant areas. Bedrock exposures typical of the Highrock Forest Section have fewer trees and are covered with lichens. Closed to open stands of stunted black spruce with ericaceous shrubs and a ground cover of sphagnum moss dominate poorly drained peat-filled depressions. Permafrost is distributed throughout the ecoregion but is only widespread in organic deposits. Although local relief rarely exceeds 25 metres, ridged to hummocky, massive Archean rocks form steeply sloping uplands and lowlands. Small to large lakes, comprising 30-40% of the ecoregion, drain northeastward via the Burntwood, Churchill, and Nelson River systems. Sandy glaciofluvial uplands are common in the area as are sandy, acidic tills. Brunisolic soils have developed on the upland sites with mesisols and organic cryosols associated with the shallow to deep peatlands. The ecoregion is frequently disturbed by wildfire.



Map 2.2. Ecoregions and ecodistricts within FML 2.

Wildlife in this ecoregion includes caribou, moose, black bear, lynx, wolf, beaver, snowshoe hare and red-backed vole. Bird species include raven, common loon, spruce grouse, bald eagle, gray jay, hawk owl, and waterfowl. Forestry, mining and mineral exploration, hydro development, trapping, hunting, fishing, and tourism are the dominant uses of land in this region.

2.1.2.2 Hayes River Upland

This ecoregion lies northeast of Lake Winnipeg and extends east into northwestern Ontario. The ecoregion is found exclusively within the Nelson River Forest Section. It is marked by cool summers and very cold winters. This ecoregion is classified as having a subhumid high boreal ecoclimate. Black spruce is the climatic climax tree species, but stands consist predominantly of medium to tall, closed stands of black spruce and jack pine with some trembling aspen and white birch. The shrub layer is dominated by ericaceous shrubs, willow, and alder. The ground cover consists of mosses and lichens, low ericaceous shrubs, and some herbs. Depending on drainage, surficial material, and local climate, trembling aspen, white birch, and white spruce also occupy significant areas. Bedrock exposures have fewer trees and are covered with lichens. Closed to open stands of stunted black spruce with ericaceous shrubs and a ground cover of sphagnum moss dominate poorly drained peat-filled depressions. Permafrost is found throughout the ecoregion but is only widespread in organic deposits. Archean granites and gneiss's form locally steep-sloping uplands. Upland surfaces within the FML are covered with discontinuous deposits of calcareous, loamy till. Thin clayey lacustrine deposits cover a large part of the till deposits, especially in low-lying areas. These lacustrine deposits are, in turn, often overlain by shallow to deep peat materials. Fluvioglacial moraines and eskers are locally prominent. Gray luvisols are associated with upland clayey lacustrine and, to some extent, loamy till deposits. However, eutric brunisols are dominant on calcareous loamy till and calcareous sandy deposits, whereas dystric brunisols are associated with noncalcareous fluvioglacial materials. The dominant peatland soils are mesisols and organic cryosols. Many small, rock-bound lakes and medium to large lakes, linked by the primary drainage ways of the Nelson, Stupart and Hayes Rivers, are a prominent feature of this ecoregion.

Wildlife in the ecoregion includes wolf, lynx, otter, marten, beaver, moose, black bear, woodland caribou, snowshoe hare, red squirrel, short-tailed weasel, and red-backed vole. Bird species found in the region include spruce grouse (an important upland game bird), sharp-tailed grouse, willow ptarmigan, common nighthawk, raven, gray jay, bald eagle, hawk owl, and numerous passerine and waterfowl species. Forestry, mining and mineral exploration, hydro development, trapping, hunting, fishing, water-oriented recreation and tourism are the principal uses of the land.

2.1.2.3 Mid-Boreal Lowland

This ecoregion occupies the northern section of the Manitoba Plain from the eastern shore of Lake Winnipeg to the Cumberland Lowlands in Saskatchewan. Within FML 2, the ecoregion dominates the Saskatchewan River Forest Section. The climate is marked by short, warm summers and cold winters. The ecoregion is classified as having a subhumid mid-boreal ecoclimate. It is part of the boreal mixed coniferous and deciduous forest, extending from Lac Seul in northwestern Ontario to the foothills of the Rocky Mountains. It is a relatively flat, low-lying region with extensive wetlands covering approximately half the area. The cold and poorly drained fens and bogs are covered with tamarack and black spruce. The mixed deciduous and coniferous forest is characterized by medium to tall, closed stands of trembling aspen and balsam poplar with white and black spruce, jack pine and balsam fir occurring in late successional stages. Permafrost occurs in isolated patches in peatlands and is more prevalent in the region's northeastern section. Underlain by flat-lying, Palaeozoic limestone bedrock, the ecoregion is covered almost entirely by level to ridged glacial till, lacustrine silts and clays, and extensive peat deposits. The Pas Moraine is the dominant landform feature of the ecoregion within the FML. Eutric brunisols developed on extremely calcareous, loamy glacial till and mesisols on forest peat are codominant and are associated with local areas of limestone bedrock outcroppings and gray luvisols on loamy to clayey-textured lacustrine deposits.

Wildlife in this ecoregion includes moose, black bear, wolf, lynx, snowshoe hare, waterfowl including duck, goose, pelican, sandhill crane, ruffed grouse, and other birds. Forestry, hydro development, water-oriented recreation, trapping, fishing, and hunting are the dominant uses of land in this region, although seed grains, oilseeds and forage crops are produced where soils and drainage are suitable, particularly in The Pas region.

2.2 CLIMATE

Climate is the "average weather" described in terms of the mean and variability of features such as temperature, precipitation and wind over a period ranging from months to thousands or millions of years. The usual period for describing climate in Canada is 30 years and referred to as a climate normal (Edwards, et al., 2015).

FML 2 lies within a midcontinental setting, and aside from Hudson Bay, at a great distance from the moderating climatic effects of the open ocean. As a result, summer temperatures are high, winter temperatures are low, and the annual temperature range exceeds the international average for this latitude (Hopkins & Smith, 1982).

Climate data from weather stations located within FML 2 were extracted from the Environment and Climate Change Canada Historical Climate Data website (climate/weather/gc/ca/index_e.html) on July 7, 2022 for the period of 2006 to 2021. Stations were grouped by ecoregion (Churchill River Upland, Hayes River Upland, and Mid-Boreal Lowland) and utilized to summarize recent climatic averages for the area.

The climographs shown in Figure 2.1 corroborate that there are notable variances in climate across the FML, most notably in the amount of precipitation. On average, the Mid-Boreal Lowland receives a higher volume of precipitation in the months of May and June than the other two ecoregions. July consistently receives the highest volume of precipitation across all ecoregions, while February receives the lowest, and is generally consistently the driest time of year across the licence area. February has been recorded as the coldest month across the licence area in recent years with an average temperature of -18.4°C, and July the hottest, with an average of 18.4°C. Temperatures outside of these months are more variable between ecoregions.

The climographs shown in Figures 2.2 and 2.3 depict the wider range of variability in climate across the FML as a whole. When averaged across the entire FML, the data demonstrates an increase in climatic extremes in the warmest (29.4°C to 35°C) and coolest (-36.9°C to -43°C) temperature ranges.

2.2.1 Frost-Free Days

Frost-free days are defined as the number of consecutive days within a year in which the average daily temperature is above 0°C. Frost-free days can be utilized to understand how long the frozen-ground operational season is as well as how many days are available for plant productivity. Between 2006 and 2021, there was an average of 166.4 frost-free days across the entire licence area. Between ecoregions, there was an average difference of 13 frost-free days between the ecoregions with the lowest average being in the Hayes River Upland and most (Mid-Boreal Lowland) average number of frost-free days annually (Table 2.2). The data additionally shows that the number of frost-free days has remained relatively consistent over the past 15 years, with only a slight, progressive decrease toward recent years (Figure 2.4).

Table 2.2 Average number of frost-free days for the ecoregions within FML 2 between 2006 and 2021.

Ecoregion	Churchill River Uplands	Hayes River Upland	Mid-Boreal Lowlands
Frost-free Days	167.8	158.5	171.5

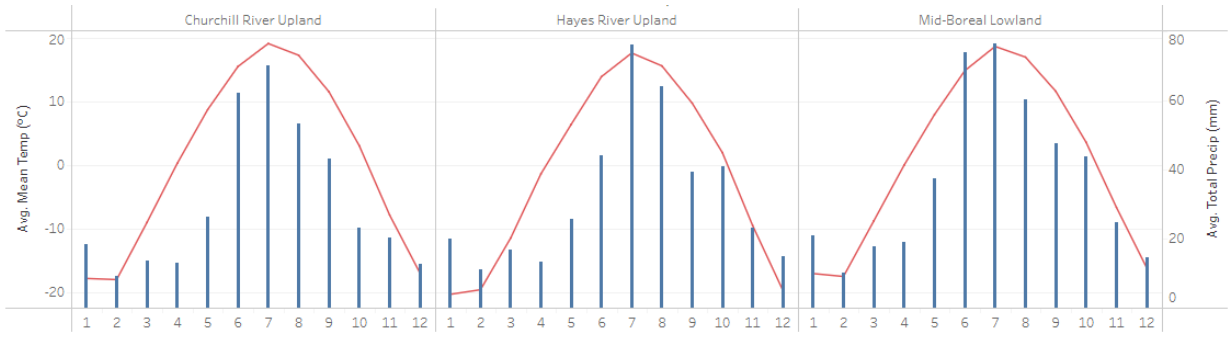


Figure 2.1. Climographs of the monthly average temperature (orange lines) and total precipitation (blue bars) for the ecoregions within FML 2 between the years of 2006 and 2021. Extracted from the Environment and Climate Change Canada Historical Climate Data website (climate.weather.gc.ca/index_e.html) on July 7, 2022.

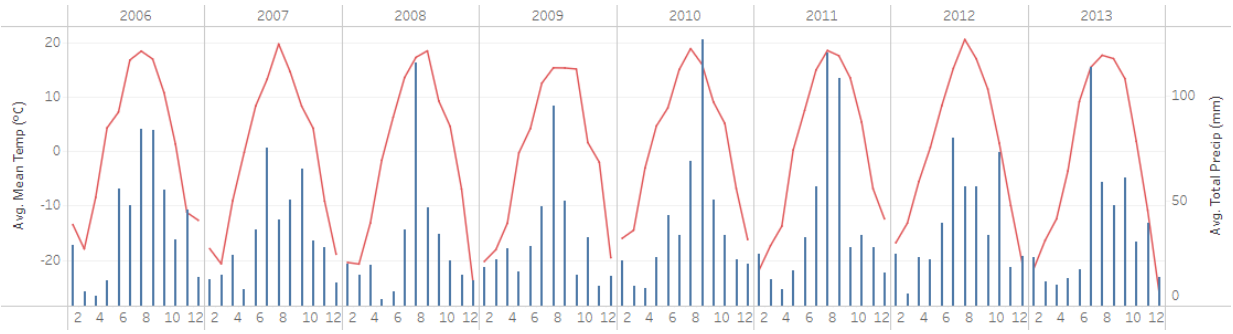


Figure 2.2. Climograph of the monthly average temperature (orange lines) and total precipitation (blue bars) for the entire FML 2 area between the years of 2006 and 2021. Extracted from the Environment and Climate Change Canada Historical Climate Data website (climate.weather.gc.ca/index_e.html) on July 7, 2022.

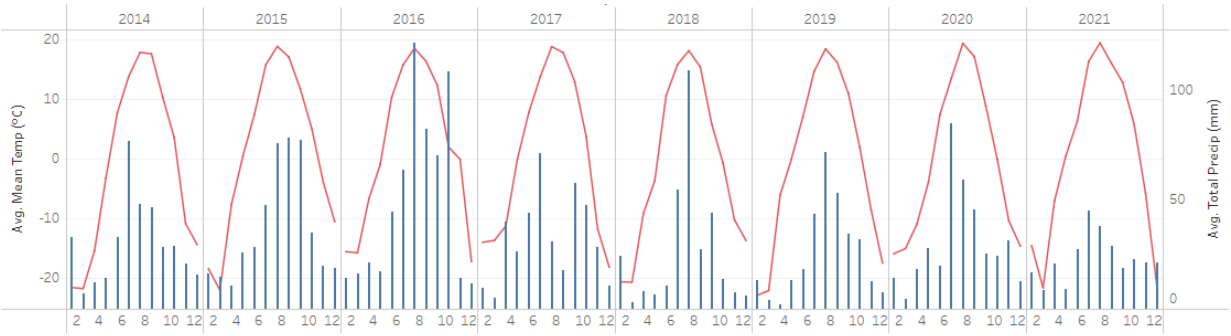


Figure 2.3. Climograph of the monthly average temperature (orange lines) and total precipitation (blue bars) for the entire FML 2 area between the years of 2014 and 2021. Extracted from the Environment and Climate Change Canada Historical Climate Data website (climate.weather.gc.ca/index_e.html) on July 7, 2022.

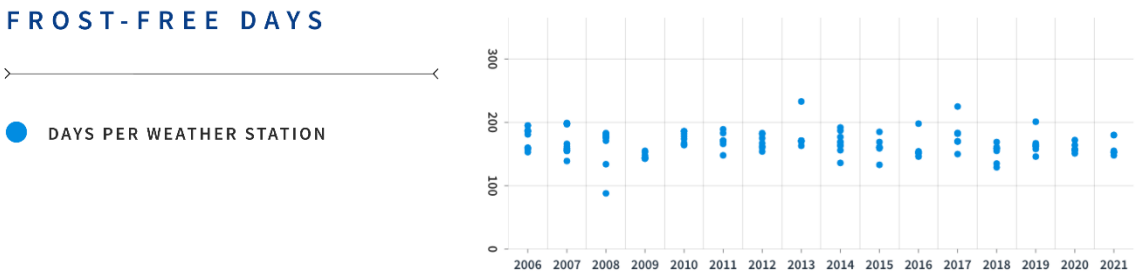


Figure 2.4. The number of frost-free days per weather station per year within FML 2 between 2006 and 2021.

2.2.2 Climate Moisture Index

Climate moisture index (CMI) measures the difference between annual precipitation and estimated loss of water vapour from a vegetated landscape. The CMI values can range from -20 or less, signifying the driest conditions, and 20 or greater, signifying conditions that are very moist. Any value above zero indicates a balanced moisture conditions and can support forest productivity (Wang, et al., 2014).

The CMI value is lowest in the southernmost forest section of the FML, Saskatchewan River, averaging at 7.4 CMI and variably ranging between 1.1 and 11.3. The two northern forest sections, Highrock and Nelson River, have similar CMI values averaging between 11.2 and 11.9, respectively (Table 2.3, Map 2.3) (Wang, et al., 2014).

Table 2.3. Climate moisture index (CMI) reference values for the 1981 to 2010 period by forest section on FML 2.

Forest Section	Minimum CMI	Maximum CMI	CMI Range	Mean CMI	CMI STD
Saskatchewan River	1.1	11.3	10.2	7.4	2.7
Highrock	7.6	15.8	8.3	11.2	1.2
Nelson River	9.6	15.3	5.7	11.9	1.4

2.3 SOILS

There are several soil classifications that are identifiable within FML 2 that are variably distributed across the landbase (Map 2.4; Agriculture and Agri-Food Canada), three of which are fairly distinct and correlate approximately with the major ecoregions. They are described based on this correlation below (Soil Classification Working Group, 1998). For the coinciding soil drainage regimes and soil erosion risks within the FML, see Map 2.5 and Map 2.6. For a table summary of soil classification characteristics within the FML, see Table 2.4.

2.3.1 Boreal Shield Ecozone

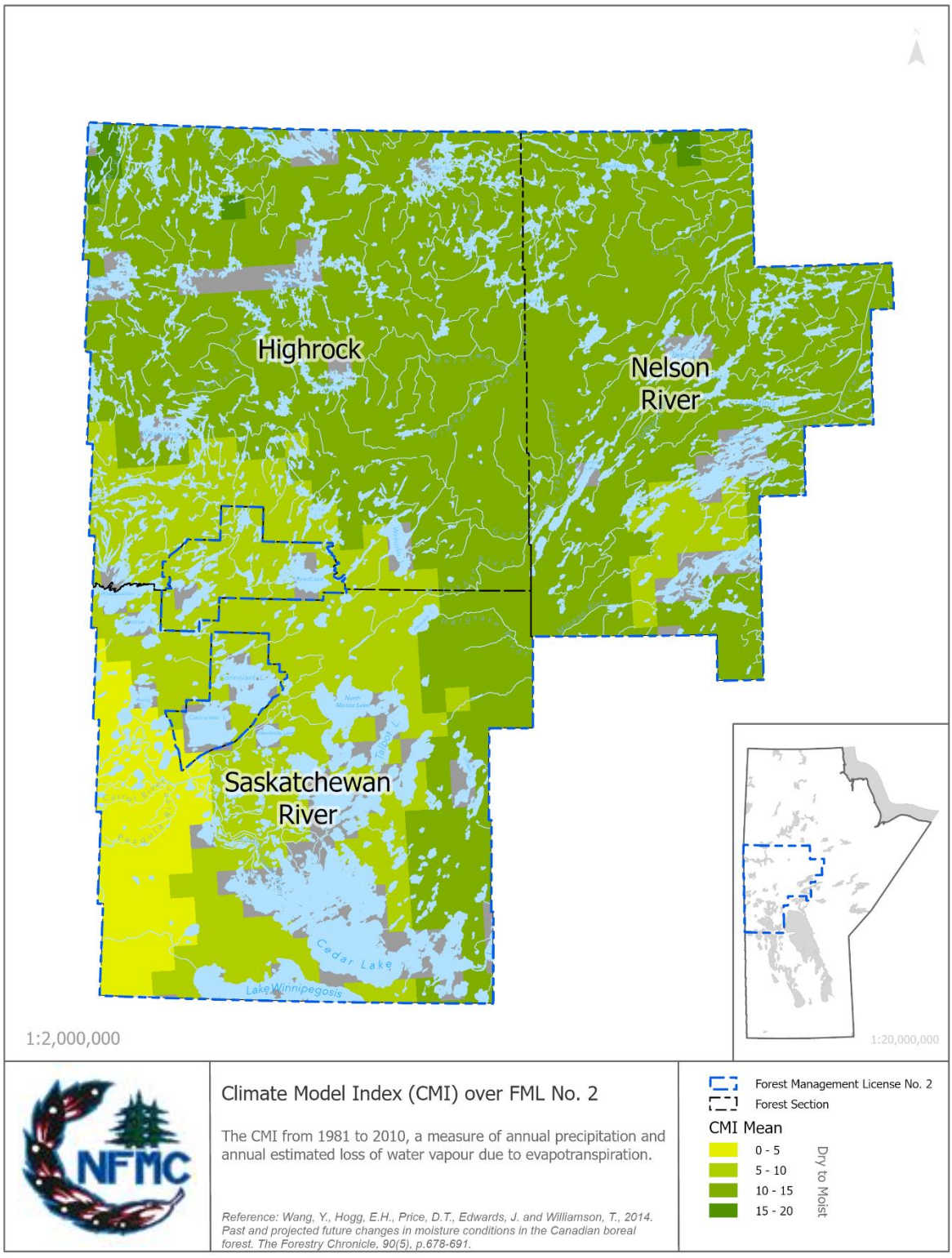
2.3.1.1 Hayes River Upland Ecoregion

The northeast forest section of FML 2 is dominated by gray luvisols on clay parent material, which likely originated as Glacial Lake Agassiz deposits. The terrain is hummocky to rolling and slopes are on the order of 10-15%. These soils are well to imperfectly drained and strongly calcareous. Water tables are typically close to the surface, ranging from 0 to 3 metres in depth. Gray luvisols occur typically under boreal zones, mixed forest vegetation zones, and forest-grassland transition zones across a wide range of climatic environments. They generally have light-coloured eluviated horizons in which clay is the main accumulation product.

2.3.1.2 Churchill River Upland Ecoregion

The northwest forest section of FML 2 is dominated by deposits of dystric brunisols and bedrock, but also has significant areas along the major water courses dominated by gray luvisols, primarily around the large lakes of the Churchill River. The dystric brunisols occur primarily in the northwest along the Saskatchewan border and are formed on sand parent material of morainal origin. The terrain is hummocky, and slopes are on the order of 10-30%. These soils are well-drained, non-calcareous, and depth to the water table is typically greater than 3 metres. Dystric brunisols are acidic soils that lack a well-developed mineral-organic surface horizon. They occur widely on parent materials of low base status and often under forest vegetation.

In areas where bedrock has become exposed, outcrops are typically of an acidic nature (e.g., granite), the terrain is hummocky, and slopes are on the order of 16-30%.



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366 *Map 2.3. Average climate moisture index (CMI) values between 1981 and 2010 over FML 2.*

2.3.2 Boreal Plain Ecozone

2.3.2.1 Mid-Boreal Lowland Ecoregion

The soils in this portion of FML 2 (southwest) are quite variable. They are dominated by organic mesisols and eutric brunisols. Small deposits of gray luvisols, gleysols, regosols, and bedrock and/or rockland also occur.

Organic mesisols occur extensively along the northern shorelines of Lake Winnipeg and extend northward into the northwest forest section of the FML. This soil type is formed on mesic sedge material and is classified as a bog. The mesic sedge class type soils occur along the northwest shores of Lake Winnipeg and Cedar Lake and are physiognomically classified as fens. The terrain for both soil types is generally flat. These soils are poor to very poorly drained with depth to the water table being generally less than 0.5 metres. Mesisols are composed largely of organic materials and include most of the soils commonly known as peat, muck, or bog soils. They are often saturated with water for prolonged periods of time and occur widely in poorly drained depressions and/or level areas in regions of subhumid to perhumid climate. They are derived from vegetation that grow within such sites.

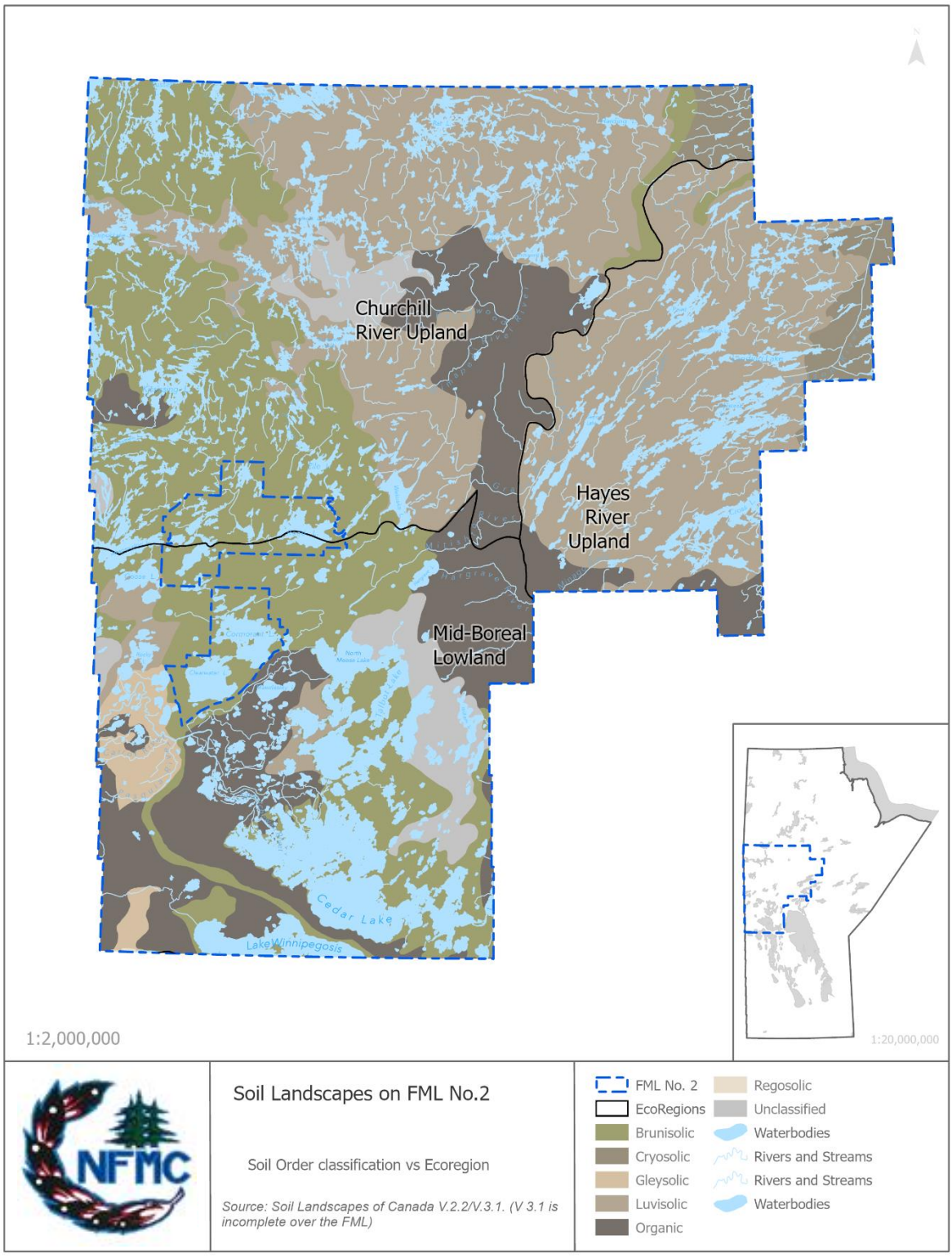
Eutric brunisols in this are formed on loamy morainal parent material and occur on level, hummocky, or ridged terrain. Slopes vary according to terrain from 1-15%. These soils are well to imperfectly drained and are extremely calcareous. Depth to the water table varies from 0 to 3 metres. These soils have a relatively high degree of base saturation and lack a well-developed mineral-organic surface horizon. The parent material they form on is usually of high base status under forest or shrub vegetation.

Other soil classifications in this ecoregion include a small area dominated by gleysols just west of the Town of The Pas. Gleysols are formed on clay loam parent material laid down in an alluvial setting. Terrain is generally level with slopes on the order of 1-3%. These soils are poorly drained, strongly calcareous, and have depths to the water table of approximately 0 to 2 metres. gleysolic soils occur commonly in shallow depressions and on ephemerally saturated, level lowlands. They are typically associated with a high groundwater table at some period of the year or temporary saturation above a relatively impermeably layer. Some gleysolic soils may be submerged under shallow water throughout the year. The native vegetation commonly associated with gleysolic soils differs from that of nearby soils of other orders.

There are some gray luvisols that can be found northwest of The Pas and west of Moose Lake in this ecoregion.

Table 2.4. Summary characteristics of the soil classifications generally dominating the landscape by ecoregion within FML 2 (Soil Classification Working Group, 1998).

Ecozone	Boreal Shield			Boreal Plain		
Ecoregion	Church River Upland		Hayes River Upland	Mid-Boreal Upland/Lowland		
Soil Classification	Bedrock	Dystric Brunisols	Gray Luvisols	Organic Mesisols	Eutric Brunisols	Gleysols
Terrain	-	Hummocky	Hummocky to rolling	Level	Level, hummocky, or ridged	Level
Parent Material	Granite	Sand	Clay	Mesic sedges	Morainal loam	Clay loam
Slope Grade	16-30%	10-30%	10-15%	0%	1-15%	1-3%
Drainage	-	Well	Imperfect	Poor to very poor	Well to imperfect	Poor
Calcareousness	-	Non-calcareous	Strongly calcareous	Non-calcareous	Extremely calcareous	Strongly calcareous
Depth to Water Table	0 m	> 3 m	0 to 3 m	< 0.5 m	0 to 3 m	0 to 2 m
Defining Environments	Exposed bedrock	Forest vegetation of low base status	Boreal, mixed forest vegetation, and forest-grassland transition zones	Bogs, fens	Forest/shrub vegetation of high base status	Ephemerally saturated lowlands, variable native vegetation



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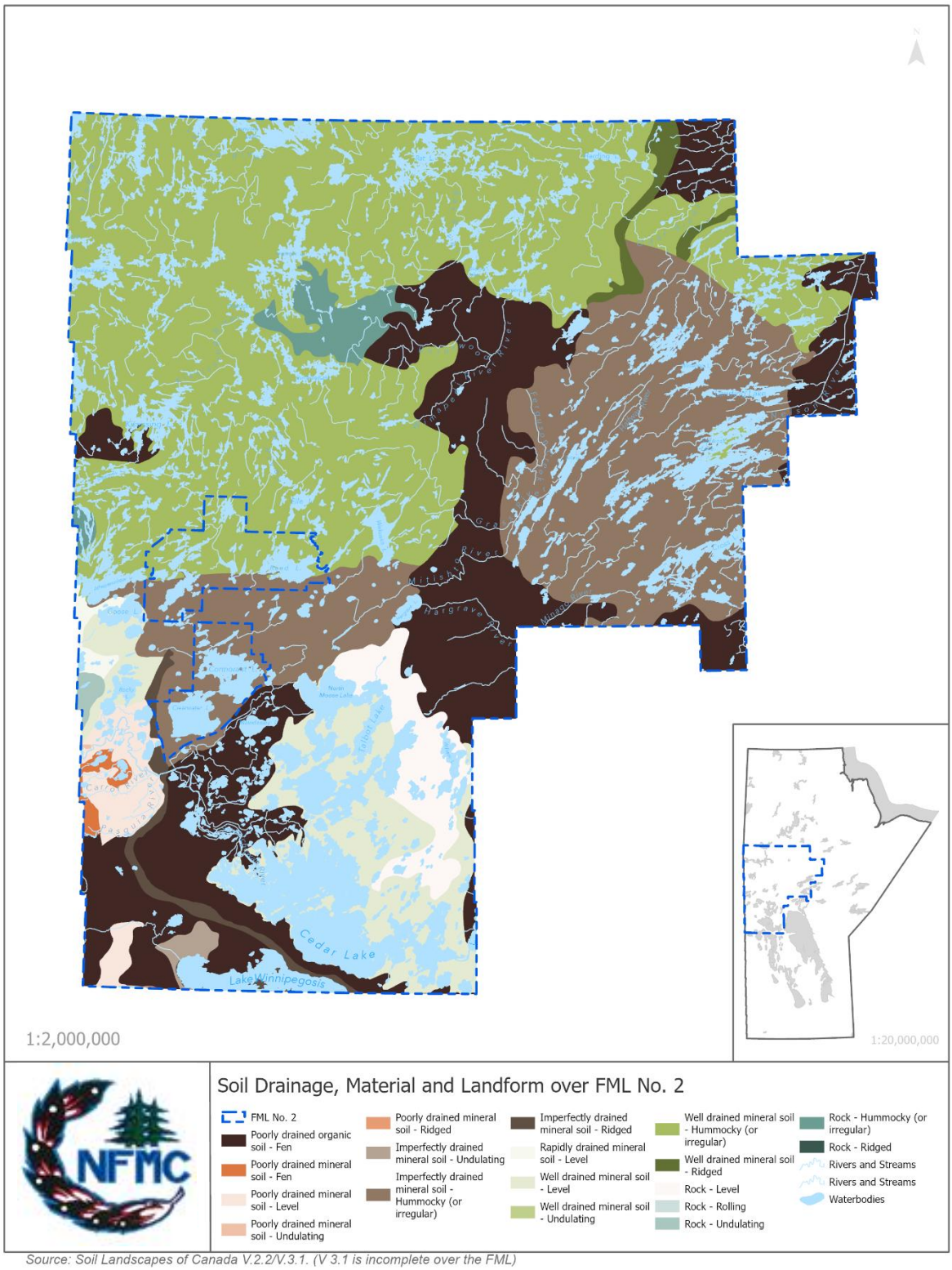
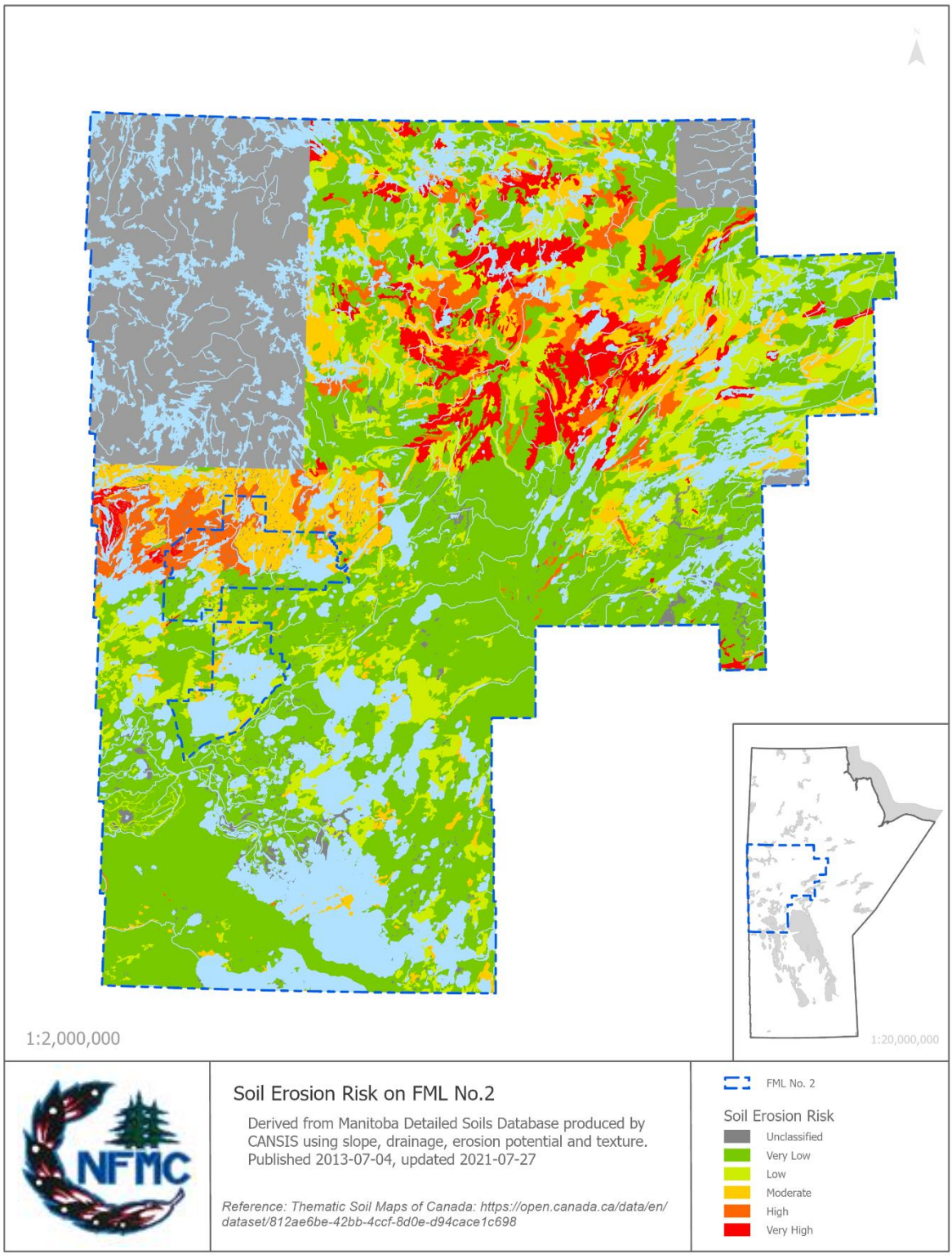
396 *Map 2.4. Soil landscape order classifications by ecoregion on FML 2.*



Source: Soil Landscapes of Canada V.2.2/V.3.1. (V 3.1 is incomplete over the FML)

Map 2.5. Soil drainage, material, and landform regimes over FML 2.



Map 2.6. Soil erosion risk on FML 2.

2.4 SURFICIAL GEOLOGY

Surficial geology refers to the study of loose sediments that makes up earth's surface material (i.e., above bedrock) and can assist in understanding things like landform and erosion patterns.

Information in this section comes from the Manitoba Mineral Resources (2013) Manitoba 2007-2011 geoscientific database and map gallery and the prior 1997-2009 FML 2 Forest Management Plan (Repap Manitoba Inc, 1996). The rock of Manitoba falls naturally into two groups based on age and lithology. Precambrian rock, the most ancient group, consists of crystalline rock of metamorphic and igneous origin. The Precambrian rocks are overlain by a younger group of sedimentary rocks deposited in seas during the Phanerozoic Eon. The Phanerozoic Eon is further subdivided into the Paleozoic, Mesozoic, and Cenozoic eras. The youngest deposits of Manitoba are glacial and post-glacial in origin, formed during Pleistocene times. These deposits occur only at the surface and generally cover the Precambrian and Cretaceous rock.

2.4.1 Major Formations

A map of the bedrock geology within FML 2 is shown in Map 2.7 with a relatively distinct geological division within the area depicted: Rock units are youngest in the southwest and oldest in the northeast.

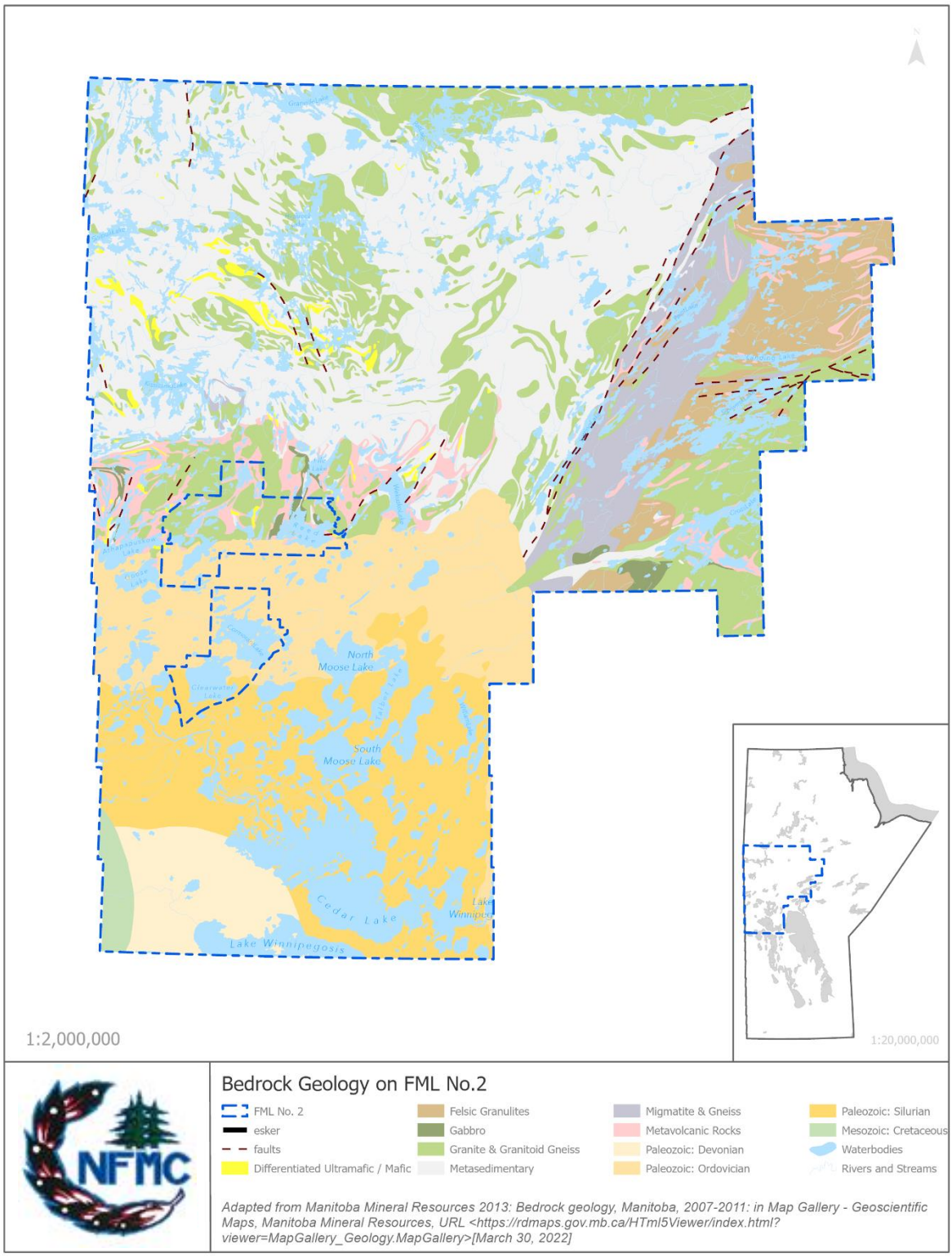
In the south, geology is dominated by four northwest to southeast trending units of shales, dolomites, and limestones that would have been deposited during the Paleozoic and Mesozoic eras. This southwest corner consists of Mesozoic/Cretaceous rocks and includes the Swan River Formation (Map 2.8), composed primarily of quartzose sandstone and kaolinitic shale while also containing minor deposits of lignite and glauconitic sandstone, which includes channel and karst fill in Mesozoic and Paleozoic outcrop belts.

To the east of the Swan River Formation are a series of Devonian deposits. These include the Souris River Formation, the Dawson Bay Formation, the Winnipegosis Formation, and the Ahern Formation (Map 2.8). The Souris River Formation consists of basal red shales, along with argillaceous, high-calcium limestones and dolomites. The Dawson Bay Formation is more complex, consisting of basal red shales, bituminous dolomite, high-calcium micritic limestone, calcareous shale, coral-stromatoporoid high-calcium limestone, and dolomite. The Winnipegosis Formation is comprised largely of dolomite.

To the north and east, the geology of the described landscape is replaced at the surface by a series of Silurian deposits known as East Arm and Atikameg Formations (Map 2.8). They consist of micritic, fossiliferous, stromatolic, and biostromal dolomites, and sandy argillaceous marker beds.

In the north, geology is composed of a complex mixture of Precambrian granites and other metamorphic deposits, perhaps the most complex bedrock geology of the province. This is seen particularly in the Precambrian deposits of the Churchill River Upland ecoregion, in and to the east of Flin Flon. Deposits include: Mafic and intermediate metavolcanic rocks such as basalt, andesite, amphibolite, calc-silicate gneiss, marble and minor quartzite; Felsic metavolcanic rocks, rhyolite and dacite; Metasediment, gneiss, and schist derived from greywacke, mudstone, and siltstone that are highly metamorphosed and partly migmatitic derivative; Metasediment, gneiss, and migmatite derived from arkose, arenite, quartzite, and minor greywacke and conglomerate; Anorthositic gabbro diorite, and enderbite; And granite and granitoide gneiss, tonalite-granodiorite, and porphyritic granite.

Concerning Precambrian deposits of the Hayes River Upland ecoregion, immediately east of Provincial Trunk Highway (PTH) 6 is a narrow band of layered migmatitic gneiss, with minor outcrops of amphibolite and calc-silicate gneiss. East of this band, particularly to the east of Thompson, there is a large deposit of felsic granulates and associated granitoid complexes with minor gabbro and anorthosite. Similarly, minor deposits of amphibolite and calc-silicate gneiss will also occur. Large portions of the Hayes River Upland ecoregion are covered by extensive deposits of glacial drift.



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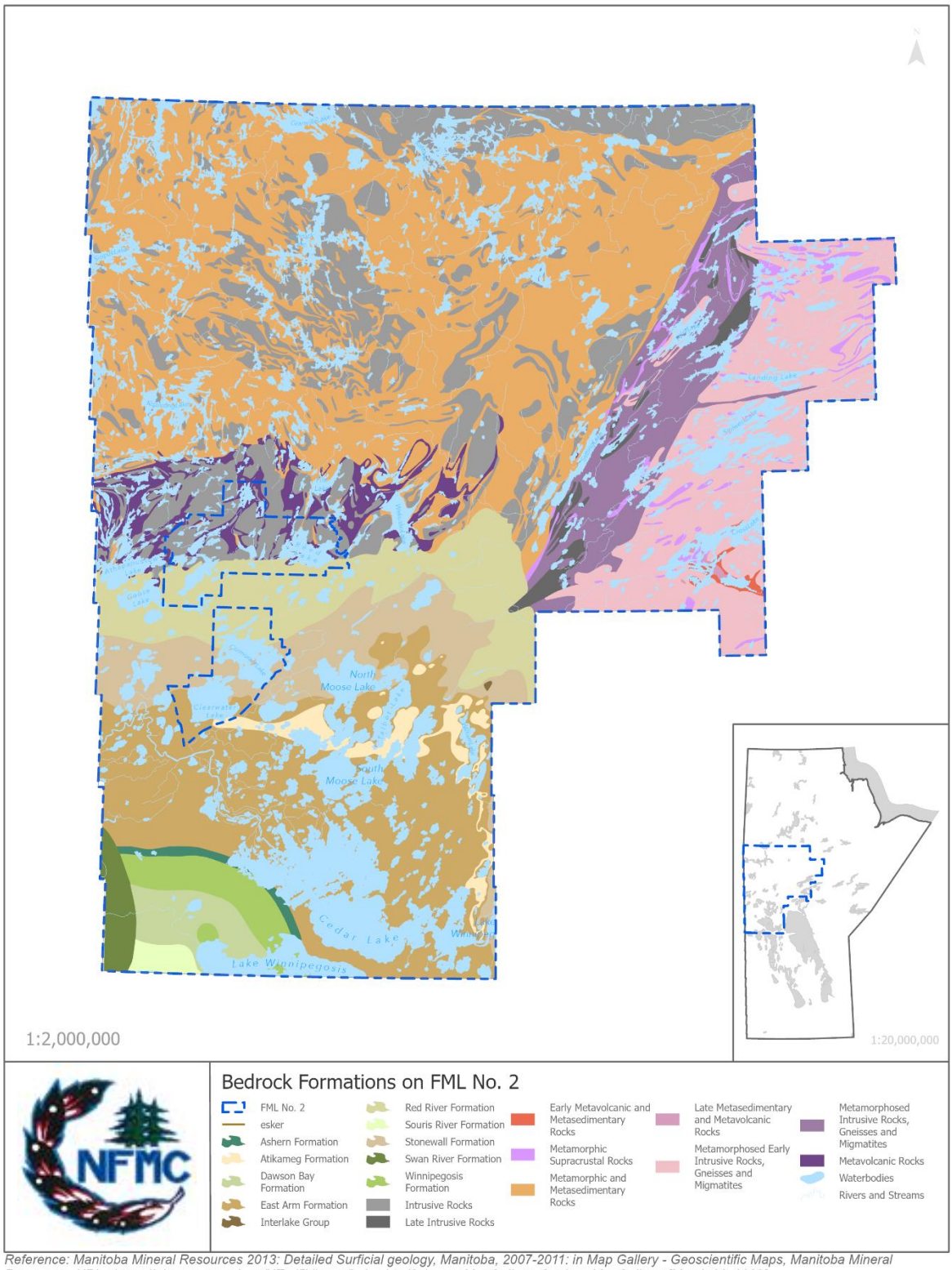
444 *Map 2.7. Bedrock geology on FML 2.*



Reference: Manitoba Mineral Resources 2013: Detailed Surficial geology, Manitoba, 2007-2011: in Map Gallery - Geoscientific Maps, Manitoba Mineral Resources, URL <https://rdmaps.gov.mb.ca/HTml5Viewer/index.html?viewer=MapGallery_Geology.MapGallery>[March 30, 2022]

Map 2.8. Bedrock formations on FML 2.

Immediately south of PTH 39, forming the central portion of the FML, are Ordovician deposits comprised of the Red River Formation and the Stonewall Formation, adjacent to the Silurian deposits to the south. The Stonewall Formation consists primarily of dolomite, with medial sandy argillaceous marker beds that may define the Ordovician/Silurian boundary. The Red River Formation consists of mottled dolomitic limestone, grading northward to dolomite, as well as cherty, calcareous dolomite, and cherty, high-calcium limestone that grades northward to dolomite, aphanitic, cherty dolomite, shaly marker beds, and high-calcium limestone beds.

2.4.2 Topography and Landforms

FML 2 encompasses two of the primary physiographic units found within Manitoba—the Precambrian Shield and the Manitoba Lowlands.

The Precambrian Shield lies to the north, exposed in a fairly level, though uneven, hummocky terrain. The central area of the shield is characterized by the Nelson depression, also referred to as a trough, which slopes downwards towards Hudson Bay and is drained by the Churchill, Nelson, and Hayes Rivers. Local relief is accentuated by lakes and rivers which are generally entrenched by 15 to 30 metres. Rocky hills and moraine ridges add to the roughness of the terrain. The surface of the shield in this area is hilly with frequent rock outcrops and contains numerous glacial features such as eskers and drift ridges.

In the southwest corner of the FML lies the northernmost extent of the Manitoba Lowlands. This area is dominated by large areas of peat bogs and swamps, as well as large lakes such as Winnipeg, Winnipegosis, and Cedar Lakes, which are remnants of glacial Lake Agassiz.

2.4.2.1 Glacial History and Resulting Landforms

Each of the physiographic units mentioned above are the result of the effect of repeated glaciation during the Pleistocene, but most notably the effects of the most recent glaciation – the Wisconsinan.

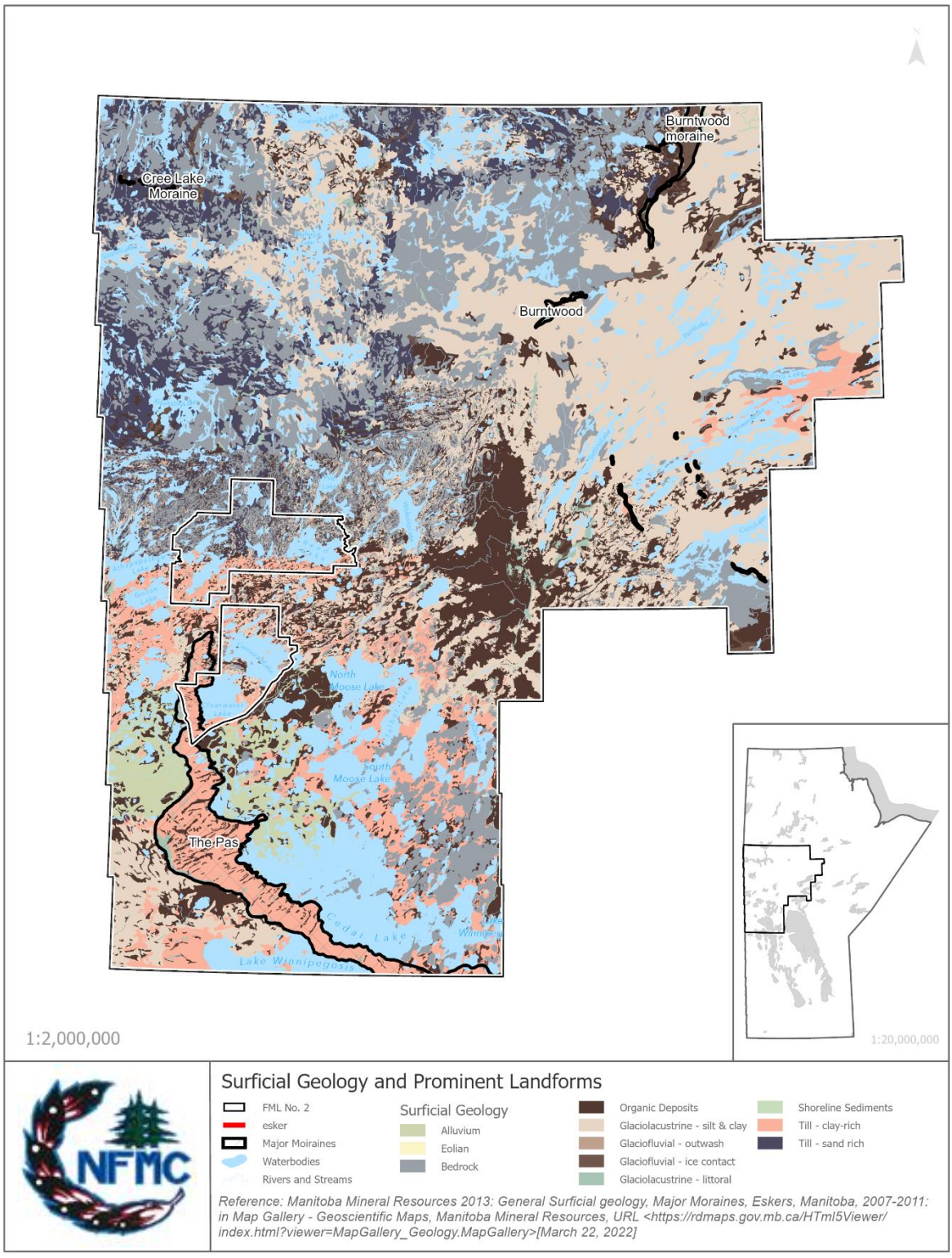
Approximately 13,000 years ago, the Wisconsinan ice sheet had retreated to a point approximately midway between the northern and southern shorelines of the present Lake Winnipeg. The ice sheet stayed in this position for some time, resulting in the formation of glacial Lake Agassiz to the south of the ice sheet, and the deposition of significant end moraines at its terminus. The most notable of these are The Pas and Hargrave Moraines.

Lake Agassiz was formed by the damming of glacial melt waters between the ice margin and the Manitoba Escarpment. As the ice retreated, the lake extended north along the east side of the Escarpment. The waters drained southwards to the Mississippi River. Until the spillway was lowered by erosion, the lake level was stable and a conspicuous beach, the Campbell Beach, was formed at a height of 315 metres on the international border (Bird, 1980). Farther north, west of Dauphin, subsequent uplift or rebound of the earth's crust has raised the Campbell Beach nearly 30 metres above the southern end. The strand lines of this phase of the lakes are often very conspicuous, consisting of gravel bars, shingle beaches, and the wave-cut cliffs along the Manitoba Escarpment. Rivers enter the lake from the west-built deltas, the largest of which was constructed by the Assiniboine River in the southern part of the province.

Approximately 11,000 years ago, retreat of the ice sheet uncovered outlets in northwestern Ontario and the lake fell, possibly disappearing. The ice advanced once again, however, and although it failed to occupy southern Manitoba completely, the level of Lake Agassiz rose once again, until it covered 350,000 square kilometres. The water has been estimated to have been more than 200 metres deep at Winnipeg. Subsequently, the level began to fall, and after several fluctuations, the lake drained to Hudson Bay as the ice barrier disappeared about 8,000 years ago (Bird, 1980). This left behind the ancestral forms of Lakes Winnipeg, Manitoba, and Winnipegosis. Deposits of silt and clay that had settled on the lake bottom cover a large portion of the province today.

2.4.2.2 Glacial Landforms and Topography

A few notable glacial features occur in FML 2 (Map 2.9). The most significant moraine formation currently is The Pas Moraine, which extends almost 300 kilometres from north of The Pas east to Lake Winnipeg. This moraine



Map 2.9. Surficial geology deposits and prominent landform complexes on FML 2.

reaches tens of metres in height and marks the limit of a minor readvance from the north. In the west, this moraine trends north-south, forming the western edge of Clearwater Lake. Its trend then changes abruptly to east-west, forming the interfluve between Cedar Lake and Lake Winnipegosis, eventually terminating as the Long Point promontory in Lake Winnipeg.

The southern portion of this moraine is composed of drift that was likely deposited before the last glacier advance. The fluted nature of its surface suggests that it was overridden (Klassen, 1967). The crest of the moraine in the southern portion is near the edge of a southward facing, beached escarpment. From the crest of the escarpment to the plain immediately south of it, the elevation drops some 30 metres over approximately 300 metres, whereas to the north, there is a more gradual slope, falling about 30 metres in 16 kilometres (Klassen, 1967).

Large deposits of glacio-lacustrine deposits occur to the north of The Pas and in, and to the south of Thompson.

The northwestern part of FML, within the Churchill River Upland ecoregion, is largely bedrock dominated, although significant deposits of glacial till occur. In most cases, this is a till veneer, usually less than 1 metre thick, interspersed with areas of thicker till, bedrock, and marine or lacustrine sediments. Very few significant glacial features occur in this ecoregion, however a second major moraine complex, The Settee Moraine, occurs northwest of Thompson on Provincial Road (PR) 391 on the way to Nelson House.

2.5 TERRESTRIAL AND AQUATIC FLORA AND FAUNA

Flora refers to vegetation (i.e., plant species) while fauna refers to wildlife (e.g., animal, insect species). Terrestrial refers to flora and fauna that are generally earth-bound in habitat, while aquatic refers to flora and fauna that are generally water-bound.

2.5.1 Flora and Fungi

The Manitoba Conservation Data Centre (MBCDC; 2021) has identified at least 913 plant species within Manitoba. Of these, 833 are vascular plants and 80 are non-vascular plants. There are 84 identified fungi (including lichens) within the province.

2.5.1.1 Vulnerable, Threatened, and Endangered Flora and Fungi

Information on vulnerable, threatened, and endangered flora in Manitoba has been compiled from two sources: The *Manitoba Endangered Species and Ecosystems Act* (MESEA, 1990) and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), who influences the federal *Species at Risk Act* (SARA; 2002) statuses. In addition, the Manitoba Conservation Data Centre (MBCDC) tracks the status of plants and lichens based on a ranking system. Table 2.5 lists the COSEWIC, SARA, MESEA, and MBCDC statuses of twenty-one plants and one lichen within FML 2. The table is up to date as of July 2022. As the information is updated periodically, refer to the source websites for the most current information.

Table 2.5. Summary of the Committee on the Status of Endangered Wildlife In Canada (COSEWIC), Species at Risk Act (SARA), Manitoba Endangered Species and Ecosystem Act (MESEA), and Manitoba Conservation Data Centre (MBCDC) statuses as of July 2022 of twenty-two plant and lichen species found within FML 2.

Species Category	Species Common Name	Species Scientific Name	COSEWIC Status	SARA Status	MESEA Status	MBCDC Status (1 – High risk, 5 – Low risk) (B – Breeding, N – Non-breeding)
Flora	Auricled twayblade	*Listera auriculata*				S1
Flora	Black ash	*Fraxinus nigra*	Threatened			
Flora	Bodin's milkvetch	*Astragalus bodinii*				S1
Flora	Cathcart's woodsia	*Woodsia oregana ssp. cathcartiana*				S1
Flora	Daisy-leaf Moonwort	*Botrychium matricariifolium*				S1

Species Category	Species Common Name	Species Scientific Name	COSEWIC Status	SARA Status	MESEA Status	MBCDC Status (1 – High risk, 5 – Low risk) (B – Breeding, N – Non-breeding)
Flora	Elk sedge	*Carex garberi*				S1?
Flora	Engelmann's Spike-rush	*Eleocharis engelmannii*				S1S2
Flora	Few-flowered Meadow-rue	*Thalictrum sparsiflorum*				S1S3
Flora	Fringed orchid	*Platanthera lacera*				S1S2
Flora	Gastony's cliffbrake	*Pellaea gastonyi Windham*			Endangered	S1
Flora	Gattinger's agalinis	*Agalinis gattingeri*	Endangered	Endangered	Endangered	
Flora	Ground-fir	*Diphasiastrum sitchense*				S1
Flora	Limestone oak fern	*Gymnocarpium robertianum*				S1
Flora	Long-fruited Sedge	*Carex michauxiana*				S1
Flora	Moor rush	*Juncus stygius var. americanus*				S1S2
Flora	Pallas buttercup	*Coptidium pallasii*				S1S2
Flora	Rose pogonia	*Pogonia ophioglossoides*				S1
Flora	Rough agalinis	*Agalinis aspera*	Endangered	Endangered	Endangered	
Flora	Small Grass-of-Parnassus	*Parnassia parviflora*				S1
Flora	Spatulate moonwort	*Botrychium spathulatum*				S1S2
Flora	Wahlenberg's woodrush	*Luzula wahlenbergii*				S1
Lichen	Flooded Jellyskin (lichen)	*Leptoguim rivulare*	Special Concern	Special Concern		S1

2.5.2 Fauna

The Manitoba Conservation Data Centre (MBCDC; 2021) has identified at least 662 vertebrate wildlife species that live in Manitoba, and an additional 3,458 invertebrates.

The wildlife accounts below are based on representative species which have either social, cultural, economic, or ecological significance as species of concern or indicator species as relating to this plan. However, this does not imply that these species are more important ecologically.

2.5.2.1 Mammals

2.5.2.1.1 Ungulates

Woodland Caribou (*Rangifer tarandus caribou*)

The woodland caribou (*Rangifer tarandus caribou*) is found across Canada in a wide swath of the boreal forest (Banfield, 1974). The range of the woodland caribou in Manitoba covers much of the province except for the most southern and northern sections (Johnson, 1993). Within FML 2, woodland caribou are found in all three ecoregions and include 10 of the 27 herds thought to occur in the province (Johnson, 1993). According to *Manitoba's Boreal Woodland Caribou Recovery Strategy* (2015), in 2006, the province's boreal caribou population estimate was between 1,500 and 3,100 animals.

Boreal woodland caribou are listed as threatened under Manitoba's *Endangered Species and Ecosystems Act* (1990) and the federal *Species at Risk Act* (2002). Activities such as forest harvested create temporary loss of habitat, while other human activities create permanent habitat loss. Linear features such as roads, trails and seismic lines can create easier access into caribou habitat and make them more vulnerable to predation. More information about Manitoba's management efforts and NFMC's collaborative efforts to address caribou habitat management within the 20-Year Forest Management Plan see Section 7.1.5 Woodland Caribou (*Rangifer tarandus caribou*) Action Plan Integration.

The following description of caribou and their preferred habitat are excerpts from *Manitoba's Boreal Woodland Caribou Recovery Strategy (2015)*:

> During the calving and summer periods, females are generally solitary, and space away from one another to reduce predation risk. For the remaining periods of the year, boreal caribou form mixed-sex groups of around 20 caribou. Calving activities of individual female boreal caribou are more independent than

migratory tundra caribou, and are co-ordinated with respect to timing, but not in space. Boreal caribou make their longest movements during spring and early winter and are most dispersed and the least mobile during the calving season and late winter. The year-to-year location of their winter ranges can be variable, however females have fidelity to general calving areas, if not specific sites.

Boreal caribou have distinct habitat requirements at different scales. The selection of habitat by boreal caribou at multiple scales reflects strategies used to offset low population numbers and reproductive rates by maintaining low levels of predation. At the coarse scale, habitat selection enables predator avoidance with boreal caribou selecting for peat land complexes intermixed with mature (60 to 80 year old) pine, black spruce and tamarack-dominated upland. At the fine scale, habitat is selected to meet forage requirements, with caribou selecting habitat having abundant arboreal and terrestrial lichens in winter, and making use of habitats containing more varied food sources such as leaves of deciduous trees, sedges, pitcher plants and mushrooms, during summer. Because of these preferences, they generally inhabit lichen-rich areas of the boreal forest. At the coarse scale, large tracts of undisturbed habitat are required. Such habitat reduces predation risk in several ways. First, boreal caribou require sufficient space to spread out within the landscape, thereby maintaining themselves at low densities, which reduces the hunting efficiency of predators. Second, large expanses enable caribou to select habitats with low densities of moose and white-tailed deer, which normally form the primary prey species for wolves, and thereby are associated with lower wolf densities and less likelihood of wolf encounters. Finally, relatively undisturbed habitats enable avoidance of linear developments like roads and power lines that increase the hunting efficiency of predators and people. The suitability of the landscape is not only determined by the amount of habitat available but also by the spatial configuration of areas of preferred habitat, particularly in fragmented landscapes. This necessitates the need for the identification of seasonal use areas of suitable habitat and ensuring that connectivity is maintained between these areas (ex: habitat fragmentation is minimized). Seasonal use habitats essential to securing the persistence of boreal caribou in Manitoba's wildlife mosaic include winter and summer foraging, calving, and calf-rearing, rutting and migration corridors capable of providing thermal cover and escape from predation.

Boreal caribou are threatened by anthropogenic and natural disturbances that cause habitat loss, degradation or fragmentation, which in turn can increase predation rates. Anthropogenic disturbances affecting boreal caribou include industrial developments such as logging, mining, and construction of linear features, which in turn can increase mortality rates. Various studies have demonstrated that boreal caribou avoid the vicinity of industrial and other human developments, even when forest habitat conditions adjacent to these developments are otherwise suitable resulting in additional functional habitat loss. Natural disturbances such as wildfires, windstorms and forest disease are part of the natural cycle, but pose threats where habitat is already limiting or human activities have altered or affected natural cycles.

Additional threats in the future may include those caused by global climate change, such as range expansion of forest insects, increase in ungulate parasites, and increased frequency and numbers of wildfires. Fires are a natural component of the boreal forest ecosystem. They play an essential role in the evolution of natural habitats at natural frequencies over protracted time scales, but destroy lichens and other vegetation in the short term. Boreal caribou selection for mature forests means burned areas are avoided for 50 years or more following a fire. Boreal caribou have evolved to coexist with fire if suitable habitat is available in adjacent areas. These threats are interrelated in complex ways and have cumulative direct and indirect impacts on caribou and their habitat. For example, habitat changes can increase the carrying capacity for cervids such as moose and white-tailed deer, which may result in increased predator populations and subsequently increased predation on caribou. Roads and other linear corridors with packed winter trails and off-road vehicle trails for recreational or other uses can enhance access to caribou habitats by both predators and white-tailed deer, thereby facilitating predation and the spread of potentially lethal parasites and diseases.

Boreal caribou habitat is dynamic and what is unsuitable habitat today may be suitable in the future as the forest matures and changes. Appreciation of these dynamics offers opportunities to work with fire management and forestry in an adaptive process that assists in cycling habitat through natural regeneration and silvicultural processes. Ensuring that landscape level forest harvesting and silvicultural planning occurs may provide opportunities to maintain a landscape suitable for caribou on a rotational basis.

For additional information on woodland caribou in Manitoba, refer to the Provincial website.[1] For additional information on how boreal woodland caribou are considered in forest management planning on FML2, see forest management plan Part 2 – Analysis and Modelling, Modelling Wildlife Habitat and Habitat Elements subsections 11.1 Matrix of Habitat Elements for Wildlife Species and 11.2 Boreal Woodland Caribou Habitat Elements and Cumulative Effects subsection 15.6 Boreal Woodland Caribou.

Moose (*Alces alces*)

Moose are distributed across much of forested Canada (Banfield, 1974) and are common within the Boreal Shield and Boreal Plains ecozones across the FML.

An estimate of the total number of moose within the FML is not available; however, population surveys within specific Game Hunting Areas (GHA) are conducted annually by the Province. The results of these surveys provide local density and population estimates. The density of moose varies depending on the forest type, successional stage, and latitude. Within all portions of the FML, densities vary depending on a number of factors including those noted above, local hunting pressure, and road infrastructure with pockets of moose in higher densities where conditions are more favourable.

The most important habitats within the boreal forest are produced in the early stages of plant succession (Krefting, et al., 1974). The quality of moose habitat are constantly changing because of forest succession and populations fluctuate accordingly. The highest moose densities are usually associated with the subclimax type, with populations gradually declining as the forest reaches maturity (Krefting et al., 1974). Moose also use lake shores and alder swamps, and forage for aquatic plants in rivers and lakes during summer months (Banfield, 1974).

Within the central and northern portions of the FML, the highest moose densities were found in young mixed wood stands and lowest in mature mixed wood stands (Elliott, 1988; Repap Manitoba Inc, 1996). It is probable that moose populations will shift as a result of fire and timber harvesting. As old mature mixed forests are replaced by young stands (10 to 15 years), preferred moose habitat is created (Repap Manitoba Inc, 1996).

Many factors combine to influence vegetation and thereby become important to the ecology of the moose. Climate, soils, and time combine to shape the environment (Peterson, 1955). The importance of soils in influencing vegetation types suitable for moose has been recognized within the FML as described by Cross (1991).

In addition to the recognized association of moose to the early stages of forest succession due to the higher amount of suitable forage, optimum moose habitat is found where food is interspersed with blocks of cover. Cover provides an important component of moose habitat by providing areas for moose to thermoregulate with minimum loss of energy and find security from predators.

For additional information on how moose are considered in forest management planning on FML2, see forest management plan Part 2 – Analysis and Modelling, Modelling Wildlife Habitat and Habitat Elements subsections 11.1 Matrix of Habitat Elements for Wildlife Species and 11.3 Moose Habitat Elements and Cumulative Effects subsection 15.5 Moose.

[1] https://www.gov.mb.ca/nrnd/fish-wildlife/wildlife/boreal_caribou/index.html

2.5.2.1.2 Furbearers

American beaver (*Castor canadensis*)

The beaver is widespread across North America and is found throughout Manitoba and the FML. Current populations are high, and the species is expanding into new areas (Repap Manitoba Inc, 1996).

Beavers depend upon aquatic habitats and a plentiful supply of deciduous trees and shrubs. They are found along most waterways in Canada south of the tree line. However, they do avoid watercourses with fast flows, areas with severe wave action on the shoreline, or where the water level fluctuates significantly during the year (Novak, et al., 1987).

Lynx (*Felis lynx*)

The lynx is a Holarctic species and is found in northern boreal forests throughout Asia, Europe, and North America. It is found throughout central and northern Manitoba and the whole of FML 2. Lynx are primarily solitary and except for the female with her young, are not seen together. Likewise, they do not often vocalise, so except for their tracks in the snow, scent posts, and the results of trapping, there is little evidence of their presence in the boreal forest (Repap Manitoba Inc, 1996).

Lynx populations only reach high levels when there is an abundance of their primary prey, hares, and because hare populations fluctuate in approximately ten-year cycles, the lynx population is closely tied to the numbers of snowshoe hares and fluctuates in a like manner.

Lynx are found across most of the boreal landscape in Canada, they have long-thrived in the ever-present natural disturbance patterns the boreal is known for. The most prevalent of these disturbances, fire, creates a wide variation of successional forest stages on the landscape. Lynx habitat includes areas where high-intensity fire are common, and the species is therefore not unaccustomed to the presence of young stands, as models suggest that young forests have long been characteristic in the boreal region (Agee, 1999). As such, Lynx are often found in dense climax forest with dense undercover of thickets and windfall (Banfield, 1974).

Wolverine (*Gulo gulo*)

The wolverine is a wide-ranging, medium-sized carnivore found in the boreal forests of North America and Asia (Hash, 1987). It is found throughout the boreal forest of Manitoba and within the FML. The wolverine resembles a small bear in appearance and has disappeared from much of its previous range, shunning human occupation. The wolverine is listed as a species of Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2021).

Wolverine use a wide variety of habitats within their large home range. They are omnivorous, feeding on a wide range of edible roots and berries, small game such as mice and ground squirrels, birds' eggs, fledglings and fish. Wolverines are sometimes able to catch beavers (*Castor canadensis*), are particularly fond of porcupines (*Erethizon dorsatum*), and manage to kill large game animals with some regularity (Banfield, 1974).

American marten (*Martes americana*)

Marten are found in a wide belt across the boreal and mixed forests of North America as far north as the tree line, but a considerable amount of habitat has been lost in the southern part of their range. They are present across the boreal forest of Manitoba and are found throughout the FML. The quality of habitat and available food significantly affects population density and there is evidence that their population often fluctuates in synchrony with their small mammal prey (Weckwerth & Hawley, 1962). In addition, a population is made up of both resident animals and dispersing individuals and so fluctuates at different times of year (Francis & Stephenson, 1972; Taylor & Abrey, 1982).

Marten prefer mature conifer or mixed woods forests, though will tolerate a variety of forested habitats if food and cover are available (Douglas & Stickland, 1987; Taylor & Abrey, 1982). Winter is considered a critical season for marten due to reduced foraging opportunities (Raine, 1981)). Coarse woody debris on the ground is important for denning, cover and feeding habitat (Manitoba Forestry/Wildlife Management Project, 1994).

2.5.2.1.2 Small Mammals

Many small mammals occur across the province and FML 2 which are important components of forest ecosystems.

Vole and mice represent major food items for furbearers and many raptors (Wiebe & Bortolotti, 1995) and according to zoology professor Falls of the University of Toronto, are responsible for the distribution of seeds of many tree and shrub species (1992). Some of these species show significant population cycles which are well-documented and affect the distribution and abundance of larger vertebrates (Repap Manitoba Inc, 1996).

Shrews are also present in large numbers in the boreal forest, but very little is known about them and their role in maintaining forest ecosystems. Because they are largely carnivorous with very high metabolic requirements, it is believed that they are responsible for the consumption of numerous forest insects, many of which are pests (Banfield, 1974), and their presence helps provide a balance to the ecosystem.

Bats

Information for this section was provided by the Fish and Wildlife Branch of the Manitoba Department of Natural Resource and Northern Development (Joynti, 2022).

Six bat species are known to live in Manitoba, including the silver-haired bat (*Lasionycteris noctivagans*), hoary bat (*Lasiurus cinereus*), eastern red bat (*Lasiurus borealis*), big brown bat (*Eptesicus fuscus*), little brown bat (*Myotis lucifugus*) and northern long-eared bat (*M. septentrionalis*). The first three species listed are migratory and leave the province for the winter, while the remaining three use hibernacula to over-winter in the province. Five of these bat species are known to inhabit the boreal forest, with a high probability that the big brown bat also uses this habitat.

Threats to bat populations include habitat loss, climate change, and disease. White-nose syndrome (WNS), a disease spread by a fungus that affects hibernating bats, was first found in Manitoba in 2018. The little brown bat was historically the most abundant bat species in the province. However, WNS has killed millions of bats in North America, and is particularly hard on little brown and northern long-eared bats. Both these species are now listed as endangered species under Provincial and Federal legislation and as such, trigger legal requirements when working near their critical habitat (e.g., hibernacula).

There are around twenty-five caves known to overwinter bats in Manitoba. Research indicates the existence of other as yet unidentified high quality overwintering habitat in the province. Industry needs to monitor for discoveries of new hibernacula and respond appropriately to each finding. Further work is required to better understand the importance of forested habitat around hibernacula and the protection of high-quality natural roosting environments (e.g., buffer distances).

2.5.2.2 Birds

Information in this section has been drawn from the prior 1997 to 2009 Repap Manitoba Inc (1996) Forest Management Plan and has been supplemented with newer, more relevant information if available.

The boreal forest consists of mixed and coniferous forests as well as spruce-tamarack bogs, and the distribution of bird species may not be uniform within any one area. However, the species diversity of breeding birds across the mixed wood forests of Manitoba is relatively high for North America.

It is estimated that over 200 bird species are present within the FML including permanent and seasonal residents and species which pass through during their migration.

Resident Game and Non-Game Birds

Game birds such as spruce grouse (*Canachites canadensis*), ruffed grouse (*Bonasa umbellus*), sharptailed grouse (*Pedioecetes phasianellus*), grey partridge (*Perdix perdix*) and willow ptarmigan (*Lagopus lagopus*) are found within the licence area (Godfrey, 1986) and as recorded on the *Checklist of the Birds of Manitoba* (1986).

Ruffed grouse are generally found in deciduous habitats, particularly second growth, although they may occur in conifer-dominated forests. Aspens provide the best quality cover and food resources at each stage of the bird's annual cycle and appears to be critical to the maintenance of moderate to high-density ruffed grouse populations (Manitoba Forestry/Wildlife Management Project, 1996). Conifer habitat is used for shelter (Godfrey, 1986).

Resident non-game bird species include a wide variety of passerines including red-breasted nuthatch (*Sitta canadensis*) and hairy woodpecker (*Picoides villosus*). Some of these species are truly resident, while others are often short distance migrants in that they move further in the province or to adjacent states and others are irruptive species.

Woodpeckers, including the hairy, are dependent upon insects associated with tree trucks and branches and are generally able to find sufficient food to survive the winters in the boreal forest, though in extreme winters, may move further south. They are dependent upon larger trees, particularly mature and overmature individuals in which there are a large number of insects in the bark and wood.

Nuthatches (*Sitta* sp.) also use mature trees in which there are abundant seeds as well as suitable cavities for nesting (Repap Manitoba Inc, 1996).

2.5.2.2.1 Raptors

Raptors include hawks, eagles, osprey, falcons, and owls. Raptors are either diurnal or nocturnal and the two major groups of diurnal raptors includes the accipiters (osprey, eagles, and hawks) and the Falconidae (kestrel, merlin, goshawk, etc.). The nocturnal raptors include all the Strigiformes or owls.

Because raptors are carnivorous and at the top of the food chain, they are present in generally low numbers in the boreal forest community. Most raptors feed on rodents such as mice and voles, small birds, fish, or insects.

Bald eagle (*Haliaetus leucocephalus*)

The bald eagle nests throughout North America in a diversity of habitats that are close to water. Their distribution is linked to a good fish supply, water quality, and little disturbance (Repap Manitoba Inc, 1996; Koonz, 1987) and they are present in the forested regions of Manitoba. Bald eagles are primarily fish-eaters and are largely dependent upon sufficient fish in nearby waters. Their nests are constructed of large sticks in the tops of trees and nests may be used for as many as twenty years, with refurbishing occurring when necessary (Cadman, et al., 1987; Koonz, 1988).

Great gray owl (*Strix nebulosa*)

Great gray owls occur in the boreal forest regions of Canada. In Manitoba, the great gray owl, which is recognized as the provincial bird, is a permanent resident of most of the mixed wood and northern coniferous forests (Nero, et al., 1984; Vanderburgh, 1994) and is present across the FML. The great gray owl may be nomadic, choosing wintering and breeding areas based on vole populations (Mikkola, 1983).

This species prefers to nest in mature poplar forest adjacent to muskeg (Nero, 1980). Since great gray owls depend on the nests of other species in which to lay their eggs, this predilection may reflect the nesting preference of other species (Nero, 1980). Islands of tamarack within spruce stands, along wet areas, or as large stands also appear to be important nesting habitat (Nero, 1980). Areas that have been recently burned over provide grassy habitat for prey populations (Nero, et al., 1984).

2.5.2.2.2 Neotropical and Short-Distance Migrant Birds

Short-distance migrants are species of bird which breed in one location and move to the south for the winter months, usually within North America. Some short-distance migrants may move to only more southern parts of the province while others move to the central and southern parts of the United States. Alternatively, neotropical migrant birds migrate to the Caribbean, Central and South America for the winter months (Kuhnke, 1993; Martin & Finch, 1995).

The highest combined densities of neotropical migrants occurs in old forests, whereas short distance migrants are more abundant in young forests (Kirk, et al., 1996). The white-throated sparrow (*Zonotrichia albicollis*) is a short-distance migrant species that can generally be considered boreal habitat generalists and have been known to breed in boreal forests of every cover type (coniferous, deciduous, and mixed) of every seral stage (Artuso, 2018). The common yellowthroat (*Geothlypis trichas*) is a neotropical migrant that can be detected primarily in more mature boreal hardwood forests where its favoured shrubby wetland habitat is most abundant. These birds go on to winter in parts of the southern U.S.A., Panama, and the Caribbean (Taylor, 2018). The black-and-white warbler (*Mniotilta varia*) winters in similar locations as the common yellowthroat but are more commonly found in boreal hardwood and mixedwood forests, particularly forests with tall, mature deciduous trees, including along riparian corridors (Artuso, 2018).

The olive-sided flycatcher (*Contopus cooperi)* is a neotropical long-distance migrant species that is found across the boreal forest and winters in Central and South America. It is most commonly found centrally in boreal softwood forests. The olive-sided flycatcher is listed as a threatened species both provincially and federally, although the cause of population decline is not clear. It's possible that deforestation in its wintering grounds in the Central and South America as well as variability in insect populations from climatic and/or environmental changes can be accumulating to affect populations (Berger, 2018).

2.5.2.2.3 Waterfowl, Waterbirds, and Shorebirds

The extensive amount of water in the form of lakes, rivers and streams, small ponds, and beaver floods provide a large amount of suitable waterfowl and waterbird habitat. Overall, the density of breeding waterfowl in the boreal forest is low when compared to the southern pothole regions of the prairies and parkland. However, within the Saskatchewan River Delta there is extensive, productive, shallow wetland habitat where waterfowl densities can be as high as areas in southern latitudes. Other waterbirds such as the loon and grebe are consistently found within the FML associated with water in lakes, rivers, and fringing wetlands.

Wetlands in the northern regions are less susceptible to drought than southern wetlands and become particularly important when southern wetlands periodically dry up. During these periods of southern drought, waterfowl by-pass these dry areas and seek refuge in northern wetlands. In addition, northern wetlands provide important spring and fall staging habitat for waterfowl which breed further north.

Colonial nesting birds within the area include a variety of largely fish-eating species that breed in nesting colonies close to the water and either nest in trees and shrubs or on the ground. Because of their susceptibility to predation, their preferred nesting colonies are usually within wetlands and on islands or shorelines. These species include double-crested cormorant (*Phalacrocorax auritus*), great blue heron (*Ardea herodius*), and Franklin's gull (*Larus pipixcan*).

Shorebirds are found along the edge of lakes and rivers and on mud flats or sand bars. They include a large number of species, many of which are migrants passing through Manitoba to breed in the arctic and subarctic. The shallow shores of many lakes, particularly in the Mid-Boreal Lowland ecoregion, provide important staging areas. This group includes the lesser yellowlegs (*Tringa flavipes*) and the endangered piping plover (*Charadrius melodus*).

2.5.2.3 Reptiles and Amphibians

There are a few reptile and amphibian species found within the FML including Canadian toad, northern spring peeper, boreal chorus frog, wood frog, northern leopard frog, western painted turtle, and red-sided garter snake. The northern leopard frog in particular is listed as a species at risk (Repap Manitoba Inc, 1996).

Northern leopard frog (*Rana pipiens*)

The northern leopard frog (*Rana pipiens*), a species of Special Concern, is widespread in the southern two-thirds of Manitoba (Preston, 1998) and is found throughout the FML. This species is found in grasslands and wet woods, with adults often wandering far from water but populations being numerous around lake shore in spring and fall (Preston, 1998). During the breeding season, males typically call while floating in water (Cook, 1984). Hibernation for the species occurs in the silty bottoms of deep bodies of water, often at a considerable distance from shore (Preston, 1982).

2.5.2.4 Aquatic Fauna

Approximately 18% of FML 2 is open water. Some fish species are likely restricted to localized areas, whereas others have a wide distribution throughout the FML.

For aquatic invertebrates, the dominance of a taxon can change in a particular waterbody dependent upon season and variable environmental conditions. Overall, *Diptera*, particularly *Chironomidae*, are frequently the most common dominant taxon in waterbodies within the FML. Benthic macroinvertebrates form an important component of the fish diet (Repap Manitoba Inc, 1996).

2.5.2.5 Vulnerable, Threatened, and Endangered Fauna

Information on vulnerable, threatened, and endangered fauna in Manitoba is compiled from two sources: *The Manitoba Endangered Species and Ecosystems Act* (MESEA) and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), which influences the federal *Species at Risk Act* (SARA, 2002) statuses. In addition, the Manitoba Conservation Data Centre (MBCDC) tracks the status of animals based on a ranking system. Table 2.6 lists the COSEWIC, SARA, MESEA, and MBCDC status of one amphibian, thirty-three birds, three fish, six invertebrate, seven mammals, and one reptile within FML 2. The table is up to date as of July 2022. As the information is updated periodically, refer to the source websites for current information.

Table 2.6. Summary of the Committee on the Status of Endangered Wildlife In Canada (COSEWIC), Species at Risk Act (SARA), Manitoba Endangered Species and Ecosystem Act (MESEA), and Manitoba Conservation Data Centre (MBCDC) statuses as of July 2022 of fifty-one fauna found within FML 2.

Species Category	Species Common Name	Species Scientific Name	COSEWIC Status	SARA Status	MESEA Status	MBCDC Status (1 – High risk, 5 – Low risk) (B – Breeding, N – Non-breeding)
Amphibian	Northern leopard frog	*Lithobates pipiens*	Special Concern	Special Concern		S4
Bird	American white pelican	*Pelecanus erythrorhynchos*				S4B
Bird	Bald eagle	*Haliaeetus leucocephalus*				S5B
Bird	Bank swallow	*Riparia riparia*	Threatened	Threatened		S5B
Bird	Barn swallow	*Hirundo rustica*	Threatened	Threatened		S4B
Bird	Barred owl	*Strix varia*				S4
Bird	Bobolink	*Dolichonyx oryzivorus*	Threatened	Threatened		S4B
Bird	Buff-breasted sandpiper	*Tryngites subruficollis*	Special Concern	Special Concern		
Bird	Canada warbler	*Cardellina canadensis*	Threatened	Threatened	Endangered	S3B
Bird	Chimney swift	*Chateura pelagica*	Threatened	Threatened	Threatened	S2B
Bird	Common nighthawk	*Chordeiles minor*	Special Concern	Threatened	Threatened	S3B
Bird	Eastern whip-poor-will	*Antrostomus vociferus*	Threatened	Threatened	Threatened	S3B

Species Category	Species Common Name	Species Scientific Name	COSEWIC Status	SARA Status	MESEA Status	MBCDC Status (1 – High risk, 5 – Low risk) (B – Breeding, N – Non-breeding)
Bird	Eastern wood-pewee	*Contopus virens*	Special Concern	Special Concern		
Bird	Eastern wood-pewee	*Contopus virens*				S4B
Bird	Eskimo curlew	*Numenius borealis*	Endangered	Endangered	Endangered	
Bird	Evening grosbeak	*Coccothraustes vespertinus*	Special Concern	Special Concern		
Bird	Golden-winged warbler	*Vermivora chrysoptera*	Threatened	Threatened	Threatened	S3B
Bird	Great blue heron	*Ardea herodias*				S5B
Bird	Great gray owl	*Strix nebulosa*				S4
Bird	Harris' sparrow	*Zonotrichia querula*	Special Concern			
Bird	Horned grebe	*Podiceps auritus*	Special Concern	Special Concern		S4B
Bird	Hudsonian godwit	*Limosa haemastica*	Threatened			
Bird	Loggerhead shrike	*Lanius ludovicianus*	Non-active	Endangered	Endangered	
Bird	Olive-sided flycatcher	*Contopus cooperi*	Special Concern	Threatened	Threatened	S3B
Bird	Peregrine falcon	*Falco peregrinus anatum/tundrius*	Not at Risk	Special Concern	Endangered	S1B
Bird	Piping plover	*Charadrius melodus circumcinctus*	Endangered	Endangered	Endangered	S1B
Bird	Red-headed woodpecker	*Melanerpes erythrocephalus*				S3B
Bird	Rusty blackbird	*Euphagus carolinus*	Special Concern	Special Concern		S4B
Bird	Short-eared owl	*Asio flammeus*	Special Concern	Special Concern	Threatened	S2S3B
Bird	Sprague's pipit	*Anthus spragueii*	Threatened	Threatened	Threatened	
Bird	Trumpeter swan	*Cygnus buccinator*			Endangered	S1B
Bird	Western grebe	*Aechmophorus occidentalis*	Special Concern	Special Concern		
Bird	Whooping crane	*Grus americana*	Endangered	Endangered	Endangered	
Bird	Yellow rail	*Coturnicops noveboracensis*	Special Concern	Special Concern		S3B
Fish	Lake sturgeon	*Acipenser fulvescens*	Endangered			
Fish	Shortjaw cisco	*Coregonus zenithicus*				S2
Fish	Silver chub	*Macrhybopsis storeriana*				S5
Invertebrate	Gypsy cuckoo bumble bee	*Bombus bohemicus*	Endangered	Endangered		
Invertebrate	Mapleleaf mussel	*Quadrula quadrula*	Threatened	Endangered	Endangered	
Invertebrate	Monarch butterfly	*Danaus plexippus*	Endangered	Special Concern		
Invertebrate	Nine-spotted lady beetle	*Coccinella novemnotata*	Endangered			
Invertebrate	Sage grasshopper	*Hypochlora alba*				S3S5
Invertebrate	Transverse lady beetle	*Coccinella transversoguttata*	Special Concern			
Mammal	Grizzly bear (Western population)	*Ursus arctos*	Special Concern	Special Concern	Extirpated	
Mammal	Little brown bat	*Myotis lucifugus*	Endangered	Endangered	Endangered	S2N, S5B
Mammal	Mule deer	*Odocoileus hemionus*			Threatened	
Mammal	Northern long-eared bat	*Myotis septentrionalis*	Endangered	Endangered	Endangered	S3S4N, S4B
Mammal	Wolverine	*Gulo gulo*	Special Concern	Special Concern		
Mammal	Wood bison	*Bison bison athabascae*	Special Concern	Threatened		
Mammal	Woodland caribou	*Rangifer tarandus caribou*	Threatened	Threatened	Threatened	S2S3
Reptile	Red-sided garter snake	*Thamnophis sirtalis parietalis*				S4

2.6 WATER RESOURCES

2.6.1 Groundwater

The major type of bedrock aquifers in the Saskatchewan River Forest Section within the Mid Boreal Lowland ecoregion are carbonate rocks (limestone and dolomite) with sandstone and sand occurring as a belt along the Saskatchewan border (Rutulis, 1986). Carbonate rock beds are thick and extensive and may contain minor shale beds. Domestic wells generally yield more than one litre per second (L/s). Water quality ranges from good to very salty but is good to fair throughout most of the area. Sandstone and sand beds are interbedded with shale, silt, and clay. Aquifers occurring in this sandstone area are typically relatively continuous. The thickness of the sandstone area varies from a metre to tens of metres. Wells yield generally around one litre per second (1.0 L/s), but often exceed that amount. Water quality ranges from excellent to poor.

Sand and gravel aquifers are scattered in the Saskatchewan River Forest Section (Rutulis, 1986). These aquifers occur in till and other surficial deposits, at depths ranging from a few metres to more than 100 metres. Their size varies over a wide range, from less than a hectare to several square kilometres. Well yield ranges from less than 0.1 L/s to more than 10 L/s. Water quality varies from very poor to excellent.

2.6.2 Watersheds

FML 2 overlays five basins that are further subdivided into twenty-six watersheds. A basin, as defined by the Province, is “an area of land which drains into a major river system or water body” (Province of Manitoba). The basins within the FML include Churchill River, Hayes River, Lake Winnipegosis, Lake Winnipeg, Nelson River, and Saskatchewan River (Map 2.10, Table 2.7; Rutulis, 1986). The Province then defines a watershed as “a defined geographic area where all surface water drains to a common point”, of which there are many within the FML (Map 2.10, Table 2.7; Rutulis, 1986).

Table 2.7. A summary of the five basins and twenty-six watersheds within FML 2.

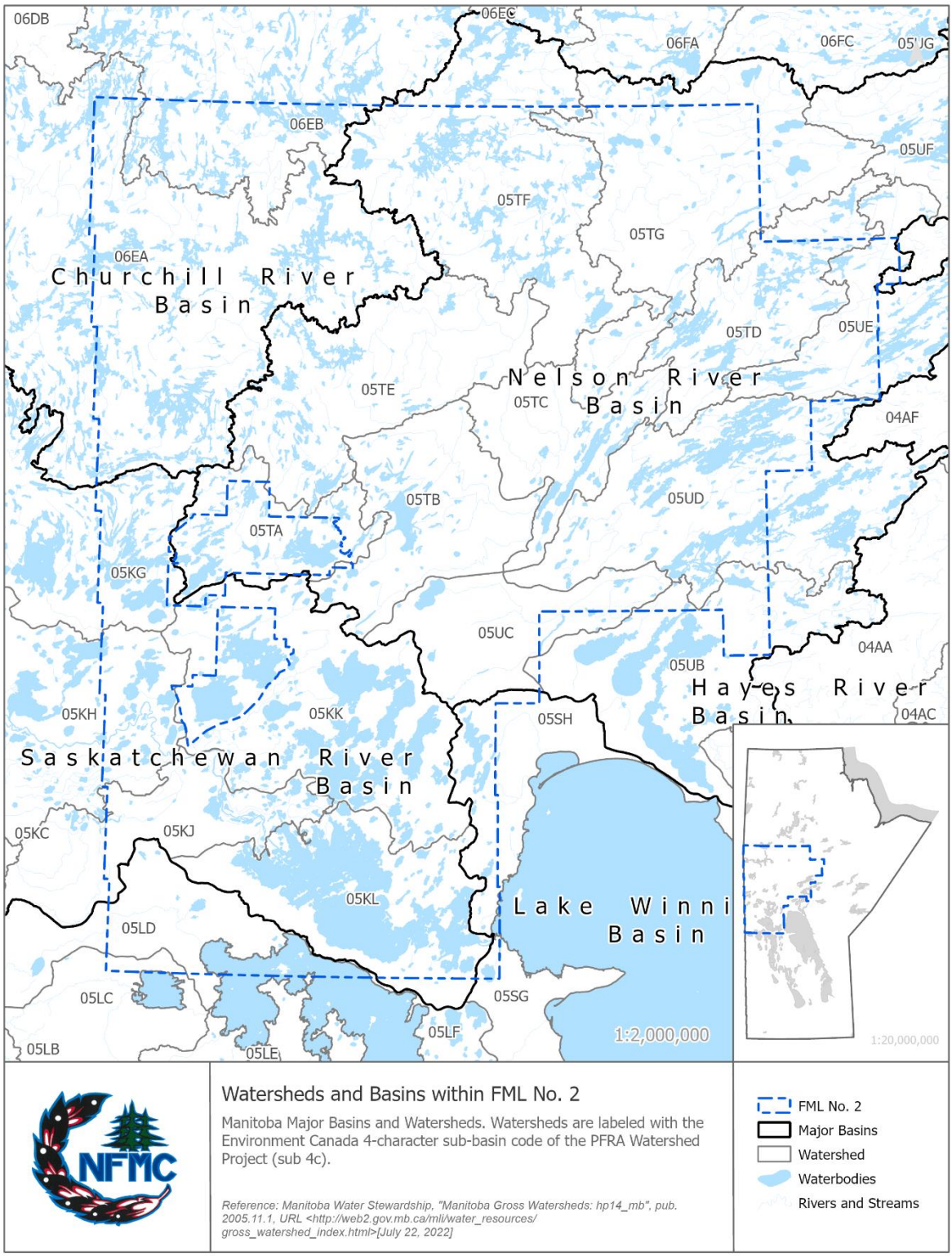
Basin	Total Number of Watersheds	Total Area (ha)	Watersheds within FML 2	Total Area within FML 2 (ha)
Churchill River	12	15,888,237	2	1,535,471
Hayes River	6	10,924,006	1	5,284
Lake Winnipeg	29	18,835,268	7	491,866
Nelson River	15	9,162,101	11	4,710,366
Saskatchewan River	11	8,175,598	5	2,034,736

2.6.2.1 Surface Water Resources

There is an extensive network of rivers and lakes within the boundaries of FML 2, particularly on the Precambrian Shield. Major rivers include the Churchill, Nelson, Grass, Burntwood, and Saskatchewan Rivers. The first two eventually flow into Hudson Bay while in the southern portion of the FML rivers drain into Lake Winnipeg or Lake Winnipegosis. In total, of the approximately 9 million hectares within FML 2, approximately 18% of the area is open water.

Compared to watercourses located on the Precambrian Shield, the flat-lying areas in the southern portion of the FML has rivers carrying significant amounts of silt, washed down particularly during peak flood periods and after rainfalls. The delta formed in Cedar Lake results from the deposition of large volumes of silt and clay at the mouth of the Saskatchewan River (Repap Manitoba Inc, 1996).

The area additionally contains a significant proportion of open water bodies. The largest lakes are Lake Winnipeg (northwestern extent) and Cedar Lake. Medium-size lakes include South Moose, North Moose, Talbot, William, Kississing, Athapapuskow, Wekusko, Cross, Sipiwesk, Rat, and Granville Lakes (Map 2.11).



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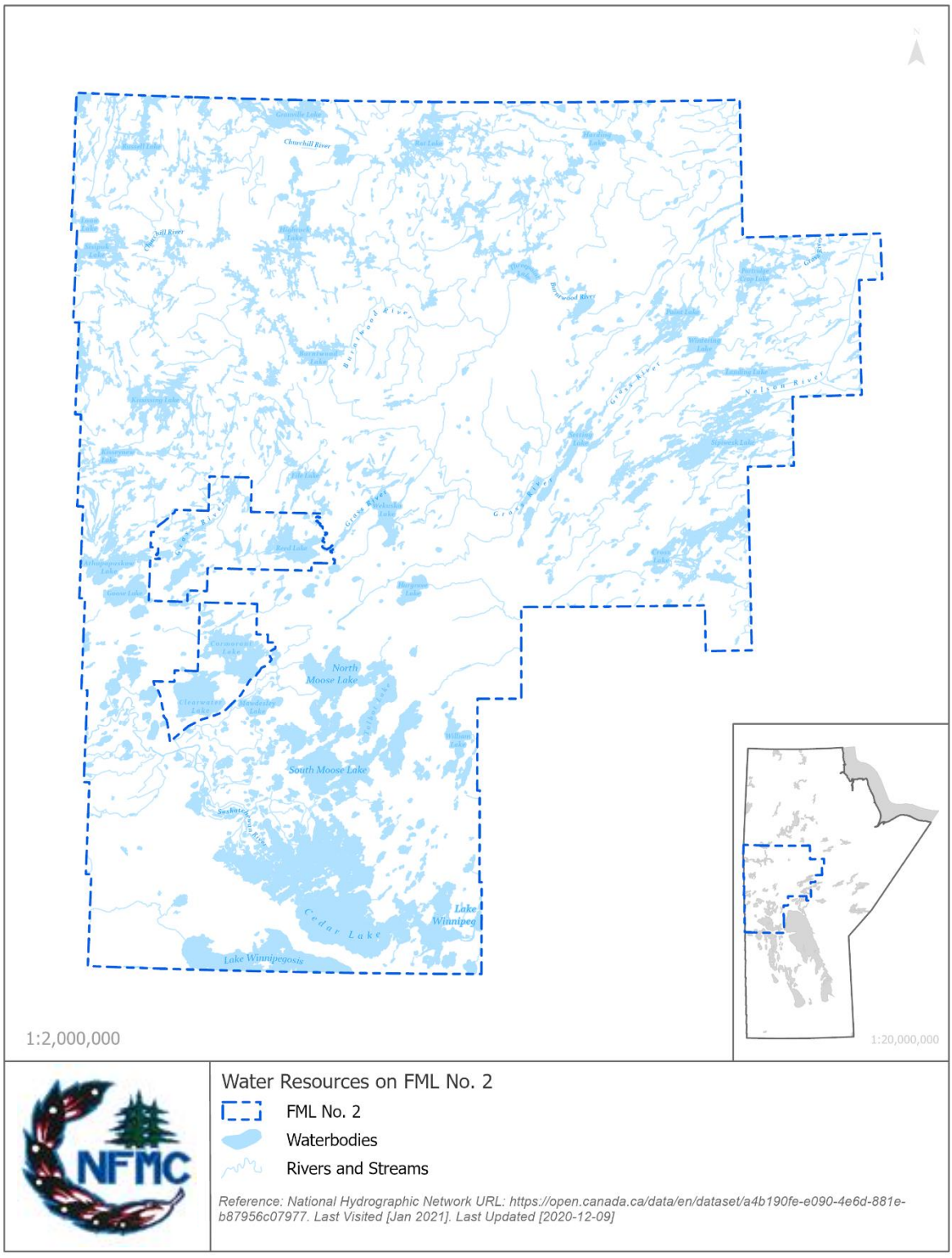
878 *Map 2.10. Basins and watersheds within FML 2.*



Map 2.11. Surface water resources on FML 2.

2.7 WETLANDS

According to the *Canadian Wetland Classification System* (National Wetlands Working Group, 1997) wetlands are defined as:

> "... land that is saturated with water long enough to promote wetland or aquatic processes as indicated by poorly drained soils, hydrophytic vegetation and various kinds of biological activity which are adapted to a wet environment."

Classifying wetlands is important for understanding their properties and functions. Boreal wetlands are typically characterized as organic wetlands (peatland bogs, fens, and some swamps), and mineral wetlands (swamps, marshes, and shallow open water wetlands). Mineral wetlands typically have shallow organic soils, underlain by mineral sand, silt and clay. In these systems, vegetation litter becomes incorporated into the mineral soil horizon or forms a highly decomposed, generally thin (i.e., less than 40 centimetres) layer of organic soil. Mineral shallow open water wetlands are distinguished from boreal ponds and lakes by their maximum 2-metre water depth.

Peatlands are characterized by the presence of organic deposits (or peat) typically greater than 40 centimetres in depth. Waterlogged, acidic conditions and cool soil temperatures prevail in peatlands slow vegetation decomposition and allow plant materials to accumulate as litter and be converted to peat. Canada contains one-third of the world's carbon-rich peatlands (Hugelius et al., 2020). These peatlands are of great importance to estimating the soil organic carbon stores in Canada, which is why accurate estimates of soil organic carbon require a wetland inventory.

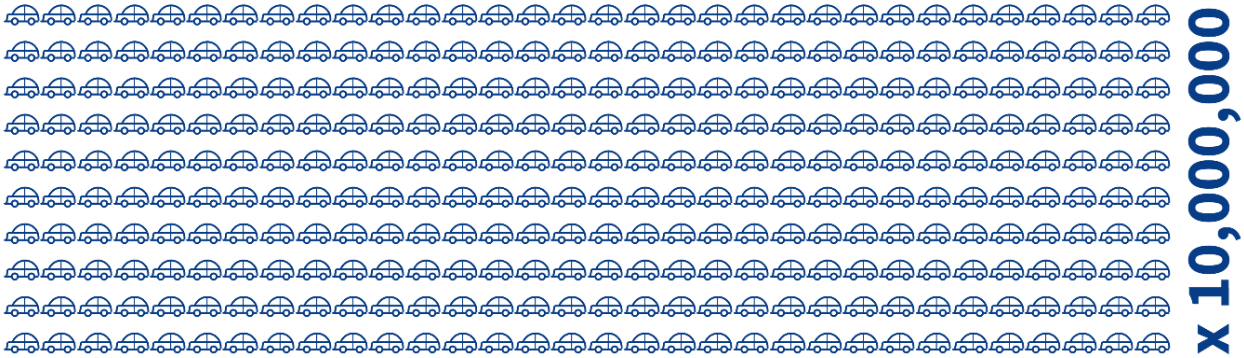
Ducks Unlimited Canada (DUC) has built on the *Canadian Wetland Classification System* by expanding the five detailed wetland classes (Table 2.8) into nineteen minor wetland classes, referred to as the *Enhanced Wetland Classification* (DUC, 2011). This classification system was developed for the boreal plains ecozone but can be applied to other ecozones in the absence of a detailed classification system.

Table 2.8. Wetland area by wetland class on FML 2 provided by Ducks Unlimited Canada and up to date as of August 2022. For a more detailed breakdown of wetland classification by forest section, see Appendix B (DUC, 2022).

Wetland Class	Area (ha)
Bog	1,343,658
Fen	1,210,645
General Peatland	888
Open Water Wetland	1,611,821
Mineral Wetland	492,105

For this enhanced wetland classification system, bogs and fens are split into minor classes based on vegetation structure: Treed, shrub, or open/graminoid. Fens are further divided into rich and poor categories, reflecting their pH and nutrient regimes. Swamps are similarly split by the dominant woody vegetation type: Shrubby, hardwood, mixed wood, conifer, or tamarack. Marshes are dominated by graminoid vegetation of two types: Emergent and meadow marsh. Shallow open water wetlands are similarly defined as three types: Open water, aquatic bed, and mudflats. These minor classes are described in the following subsections, using information from DUC's *Field Guide: Boreal Wetland Classes in the Boreal Plains Ecozone of Canada* (2015).

According to Ducks Unlimited Canada, the wetlands within FML 2 contain over an estimated 3.5 billion tonnes of soil organic carbon, equivalent to 13 billion tonnes of carbon dioxide (CO_2) or the annual emissions of over 2.8 billion cars (DUC, 2022; Appendix B). That is 10 million more cars than the number of cars below.



2.7.1 Open Water Wetlands

Often called ponds or sloughs, these mineral soil wetlands are defined by their typically permanent standing water that is less than two metres deep, covering more than 75% of the wetland area. They host submerged and floating aquatic vegetation and are deep enough that emergent plants, such as cattails and rushes, do not dominate the wetland cover. Water levels may fluctuate seasonally, resulting in exposed mudflats.

Open Water	Aquatic Bed	Mudflats
The open water class is the potion that is exposed with more than 75% water (clear, stained, or turbid), and anywhere from 0 to 25% vegetation.	This class is transitional between the open water and emergent marsh wetland classes. It consists of floating and submerged aquatic vegetation, including duckweeds and pond lily, over 25% cover.	This class is transitional between the open water and emergent marsh wetland class that is formed by fluctuating water levels exposing bare soil mudflats, particularly during dry periods.

2.7.2 Marshes

Occupying the transition zones between open water and uplands, these mineral soil wetlands are defined by their greater than 25% cover of grass-like plants (grasses, sedges, rushes and cattails), with shallow organic deposits. They are also known as floodplains or riparian areas. Water levels fluctuate seasonally, allowing them to dry out periodically, exposing the soils to oxygen and resulting in a nutrient rich area.

Emergent Marsh	Meadow Marsh
This class is transitional between open water and meadow marsh wetlands. They are saturated to permanently flooded with greater than 25% vegetation emerging above the water surface, such as bulrushes and cattails.	This class is transitional between emergent marsh and uplands. They are saturated to temporarily flooded with greater than 25% aboveground vegetation dominated by water-tolerant grass-like species such as bluejoint grass, sedges, and rushes.

2.7.3 Fens

These are peatlands, or organic soil wetlands that have developed thick layers of partially decomposed organic deposits (peat) greater than 40 centimetres. They are characterized by dynamic water movement, able to transport above and belowground water volumes across the landscape during wet periods and acting as important water sources to adjacent wetlands and uplands. Because of surface and groundwater inputs they tend to be more nutrient rich than bogs and as a result have greater plant species diversity such as tamarack, birch, sedges, and brown moss mixed with other wetland species, such as black spruce and sphagnum (peat) moss.

Graminoid Rich Fen	Shrubby Rich Fen	Treed Rich Fen
These fens have less than 25% tree and shrub cover, they are nutrient rich and dominated by brown mosses and herbaceous species such as sedges, buckbean, and marsh five-finger. They are typically saturated or flooded and have a high nutrient content with less than 20% sphagnum moss.	These fens have less than 25% tree cover, but more than 25% shrub cover, dominated by bog birch, willow, and sweet gale less than 2 metres tall. As they are nutrient rich, the ground cover is dominated by brown mosses and herbaceous species. They are typically saturated and have a high nutrient content with less than 20% sphagnum moss.	These fens have greater than 25% tree cover. Trees are typically less than 10 metres in height and composed of tamarack with some black spruce. As they are nutrient rich, the shrub and ground covers resemble other rich fens, although they are typically drier.
Graminoid Poor Fen	**Shrubby Poor Fen**	**Treed Poor Fen**
These fens have less than 25% tree and shrub cover. They are nutrient poor and have characteristics that resemble a bog, with a mix of sphagnum mosses, brown mosses, wire sedge, and cotton grass. They are typically saturated or flooded.	These fens have less than 25% tree cover, but more than 25% shrub cover, dominated by bog birch, willow and Labrador tea less than 2 metres tall. They are nutrient poor and have characteristics that resemble a bog, with ground cover a mix of sphagnum mosses, brown mosses, and other fen species. They are typically saturated.	These fens have between 25% and 60% tree cover. Trees are typically less than 10 metres in height and are composed of black spruce with some tamarack. As they are nutrient poor, the shrub and ground cover resemble other poor fens, although they are typically drier.

2.7.4 Bogs

These are peatlands, or organic soil wetlands that have developed thick layers of partially decomposed organic deposits (peat) greater than 40 centimetres. They can be slightly elevated or domed above the surrounding land, with a water table at or below the surface. The primary water source in bogs is precipitation, which make these wetlands nutrient poor since they do not receive mineral-rich groundwater inputs. They are often characterized as “stagnant” (no to gradual water movement). However, like all wetland types, bogs have the potential to move water during wet periods and can act as important water sources to adjacent wetlands and uplands. Bogs often have relatively low plant diversity due to low nutrient availability and acidity. They are predominantly composed of Sphagnum mosses, Labrador tea and black spruce. In permafrost settings, drier bogs may have a dominant lichen ground cover.

Open Bogs	Shrubby Bog	Treed Bog
These bogs have less than 25% tree and shrub cover. Sphagnum moss dominates the ground cover, with occasional cotton grass and ericaceous shrubs less than 1 metre tall, such as Labrador tea, leatherleaf, and bog cranberry.	These bogs have less than 25% black spruce cover (other tree species are rare) and more than 25% shrub cover. Sphagnum moss dominates the ground cover, with occasional cotton grass and ericaceous shrubs less than 1 metre tall, such as Labrador tea, leatherleaf, and bog cranberry. .	These bogs have between 25% and 60% black spruce cover (other tree species are rare), typically under 10 metres tall. Sphagnum moss dominates the ground cover, with occasional cotton grass and ericaceous shrubs less than 1 metre tall, such as Labrador tea, leatherleaf, and bog cranberry.

2.7.5 Swamps

Swamps are forested or shrubby wetlands, with greater than 60% tree cover, typically greater than 10 metres tall, or greater than 25% shrub cover, typically greater than 2 metres tall. Their soils are generally mineral soils, but they can have deep (i.e. greater than 40 centimetres) organic soils, typically consisting of highly decomposed woody (silvic) peat deposits. In these cases of peatland swamps, tree cover is usually greater than 60%, further

differentiating them from peatlands bogs and fens. The water regime can be stagnant or dynamic, with seasonal water level fluctuations. Water can often be seen pooling in hummocks of the understory. The nutrient regime varies between rich and poor. Swamps are diverse and often referred to as lowland forests, forested wetlands, treed swamp forests, wooded swamps, or shrub swamps. They are commonly recognized as shoreline/riparian areas of rivers and lakes.

Conifer Swamp	Hardwood Swamp
These swamps occur in densely treed areas with mineral or organic soils and are often transitional between bogs/fens and uplands. They are black spruce dominant, with trees that are greater than 10 m tall and more than 60% canopy cover. In areas of the boreal forest with low topographic relief, wetlands are often highly connected resulting in a large expanse or "complex" of several wetlands transitioning from one wetland type to another across the landscape.	These are often found in mineral soil drainage areas or riparian floodplains. They consist of white or Alaskan birch and balsam poplar trees that cover more than 60% of the wetland area.

Mixedwood Swamp	Shrub Swamp	Tamarack Swamp
These are often a transition between conifer/tamarack and hardwood swamps. They are a mix of tamarack, black spruce, white or Alaskan birch, and balsam poplar trees more than 60% canopy cover with no clear dominant species.	These are often the transition zone between upland and meadow marshes. They are most often found in mineral soils and have tree cover less than 60% and shrub cover greater than 25%, with shrubs such as willow and alder dominating, typically taller than 2 metres in height.	These swamps occur in high nutrient drainage areas of peatlands and are often transitional between rich treed fens and other swamps. They consist of tamarack that are greater than 10 metres tall and more than 60% canopy cover.

2.8 PHYSICAL INFRASTRUCTURE

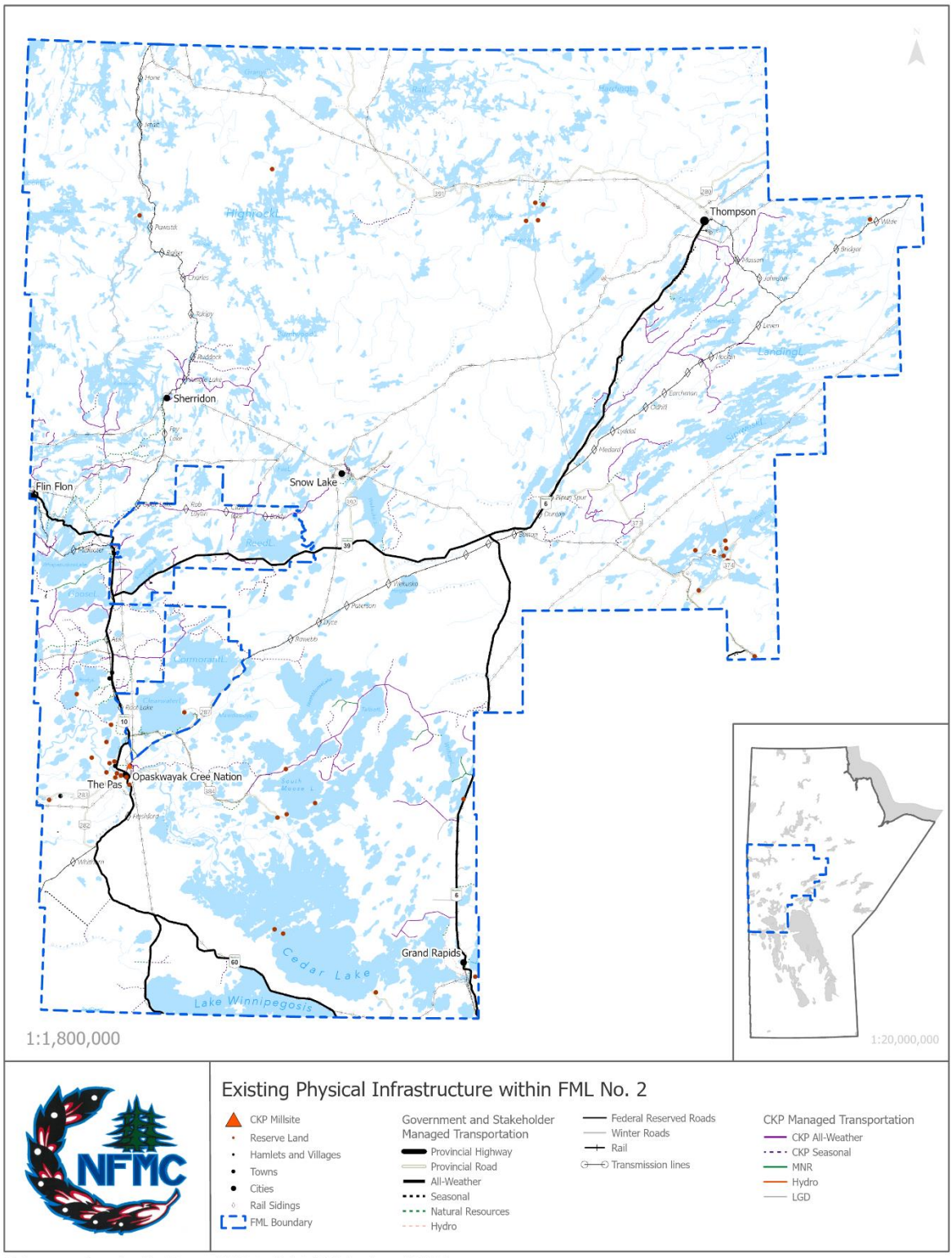
Map 2.12 illustrates the current physical infrastructure found within FML 2. Physical infrastructure contains linear features such as roads, railways and transmission lines.

The provincial road network throughout FML 2 is made up of two major road classes: Provincial Trunk Highways (PTH) and Provincial Roads (PR).

PTH 10 provides access through the west side of the licence area. The eastern side of the licence area is serviced by PTH 6. East-west flow of traffic north of The Pas is provided by PTH 39, and by PTH 60 south of The Pas. These PTHs are all-weather two-lane paved roads.

In general, PTHs within the licence area are rated as Resource Tracking Assessment Committee (RTAC) roads, permitting year-round truck traffic to a maximum gross vehicle weight (GVW) of 62,500 kilograms.

Throughout the licence area, there are PRs that provide access from various communities to major PTHs. Additional numbered and unnumbered collector roads provide access to communities, recreational areas, and active and non-active resource areas within FML 2.



References: Canadian Kraft Paper, MB Data Hub, MB Hydro, Inco, HBM&S

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967 *Map 2.12. Existing physical transportation infrastructure not managed by Canadian Kraft Paper Industries Ltd within FML 2.*

2.9 HERITAGE RESOURCES

Information for this section was provided by the Historic Resources Branch of the Manitoba Department of Sport, Culture, and Heritage (Graham, 2022).

A total of 1,138 recorded Heritage Resource sites have been identified over the extent of FML 2. The majority of the sites have been identified along major watercourses like the Grass and Burntwood Rivers, or on major lakes like Sipiwesk, Wekusko, Split, and Cedar Lakes. This distribution pattern suggests that over the millennia, major water bodies within the FML served as important nexus for gathering and travel corridors. However, many of the sites in the region have either been identified as the result of Heritage Resource Impact Assessments, focused on identifying sites that would be affected by hydro or other narrowly focused infrastructure projects, or by archaeological base-line research survey programs that focused on easy-to-access lakes and shorelines. This uneven survey approach has biased the distribution of known sites in the region, and as a result the comprehensive picture of land use patterns over the past several thousand years remains incomplete.

NFMC recognizes that there is an opportunity to update the information available describing rightsholders history on their Traditional Lands and Territories. Through on-going engagement and discussion with our Nekoté partners NFMC would like to enhance the forest management plan with additional information to provide an Indigenous perspective. We welcome feedback or additional sources and contacts on the section below.

From what is known, human habitation of Manitoba by Early Precontact Indigenous people began approximately 7,000 to 13,000 years ago following retreat of the Wisconsin ice sheet and formation of the early stages of glacial Lake Agassiz. Evidence of this Early Precontact occupation of the northern forests of Manitoba within the FML is scarce; however, it is known primarily from the discovery of the base of a Plainview-like projectile point at the Cedar Lake Site (FhLv-001) (Hlady, 1970). Other sites reported with Early Precontact material include GjLp-032 on Wuskwatim Lake, FjMa-012 at the north end of Cedar Lake, GkLr-068 near Nelson House, and GlLt-004 on Wapisu Lake. While limited, the distribution of early sites across the area suggests that the region was inhabited by Indigenous populations relatively quickly after deglaciation.

For the Middle Precontact period, between 2,500 and 7,000 years ago, evidence of human occupation is known from artifacts of the Shield Archaic Complex, the Mckean Complex, and the Early Taltheilei Tradition (Cultural Affairs and Historic Resources, 1983; Hlady, 1970). The majority of artifacts are stone tools, like spear points and hide scrapers, and the lithic debris from tool making activities, using material quarried and mined from rock outcrops in the area. Sites from this period can be found near most of the major lakes and rivers, but one the key sites for the McKean Complex is near the mouth of the Saskatchewan River at Grand Rapids where projectile points have been discovered that date to approximately 4,500 years ago.

The Late Precontact period, between 500 to 2,500 years ago, sees the introduction and use of pottery and the bow and arrow. The earliest pottery is represented by the Laural Phase (Hlady, 1970), which has been found at several sites in FML such as at sites north of The Pas, at Lake Athapapuskow, on the Grass River, and at Second and Third Cranberry Lakes. There are also a number of sites with ceramic traditions associated with Clearwater Lake Complex (400 to 1300 years ago), Kame Hills Complex (350 to 1250 years ago), and Blackduck (400 to 1300 years ago; Cultural Affairs and Historical Resources, 1983). These overlapping ceramic traditions, along with evidence of Middle and Late Taltheilei sites along the northern edge of the FML indicates that there was a highly dynamic cultural landscape during this period.

The following Proto-Historic and Historic periods in the region see the influence of European explorers, traders and settlers playing a significant role in the changing use of natural resources in the area. English and French fur

trade activities in the 1700s lead to the establishment of trading posts throughout the central forested region, to take advantage of the previously existing continental trade networks. This economic shift caused significant change through the area, as lifeways became focused around supplying and participating in the fur trade industry. This continued until the collapse of the fur-bearing animal populations and signing of the Treaties in the late 1800's.

Surveyors began exploring and assessing the natural resource potential of land within FML 2 during the 1890s and early 1900s (Repap Manitoba Inc, 1996). Mining and forestry became established as the primary economic industries of the region, particularly in the Wekusko Lake region. Early prospecting in the region identified gold bearing quartz veins in 1914, which led to the creation of a boom town on the east side of Wekusko Lake, known as Herb Lake Landing. Despite much enthusiasm, the potential gold-bearing deposits did not materialize for most prospectors, and the community had faded into a ghost town by the 1940's.

3 Historical Forest Description

Forest management activities undertaken within FML 2 since the last forest management plan (1995-2009) are summarized below.

3.1 HARVEST ACTIVITIES

3.1.1 Annual Allowable Cut

The annual allowable cut (AAC) is the volume of wood that can be sustainably harvested annually from a forest management unit (FMU). AAC levels are determined by the Province based on forest inventory updates and base case wood supply analyse Province of Manitoba, 2014 & 2015) and is tracked over the cut control period of 5-year cycles.

The Company plans and harvests within the AAC for each FMU on an annual basis. This may not always be feasible due to access limitations in some FMUs, timber salvage requirements, and other operating constraints. In cases where the harvested amount is greater than the AAC in a particular FMU, it will be within the annual allowable limits set within the 5-year cut control period and will be approved in advance by the province. If there is an overcut at the end of the cut control period, it is carried forward to the next cut control period.

The AAC for all FMUs within FML 2, except FMUs 12 and 14, are based upon the utilization of softwood stands.. The AAC levels for FMU 12 and 14 are based upon the utilization of softwood volumes generated from hardwood stands. Previous hardwood operations in FMUs 12 and 14 of the Mountain Forest Section were carried out by Louisiana Pacific (LP) and other operators, however, FMUs 12 and 14 are no longer on the licence area.

3.1.1.1 1997 to 1999

AAC levels were calculated for 10-year cut control periods.

A negative AAC balance in FMU 56 of the Saskatchewan River Forest Section from the previous 1986 - 1995 period had been carried forward and included in the calculation of remaining AAC for the 10-year period. This previous negative balance was a result of prior management of the AAC on a forest section basis. Withdrawal of Company operations from this FMU resulted in a balance of the AAC as of the end of 1997.

A summary of harvest activity by volume that occurred within the FML during this period was not readily available as historical harvest data was not complete. However, all following periods have harvest data that can be found in Appendix C.

3.1.1.2 1999 to 2005

A summary of harvest activity by volume (m^3) that occurred within the FML during this period can be found in Table C.1 of Appendix C.

A 5-year cut control period policy was introduced in 1999 and replaced the previous 10-year period policy. The Company's FMUs which were not in an overcut situation started with a zero balance as of 1999 as directed by the Province of Manitoba. Only FMU 60 carried an overcut as a result of previous changes to the administration of logging in that FMU. The new 5-year cut control period was planned to span between 1999 and 2003.

In 2003, by agreement between the Province and the Company, the cut control period was extended to December 31, 2004, and became a 6-year period.

The 6-year cut control period was extended by 5 months in 2004 when the annual operating plan period was moved from the calendar year to the May 31 to June 1 time frame.

Flexible utilization was introduced during this cut control period. The Company requested modification of the 3-inch top utilization standards that would allow the Company to harvest to a 4-inch diameter top. This was reflected in an AAC reduction and reported in the flexible utilization column. The larger top diameter allowed for economical operations that produced lumber and residual chips for the paper mill.

In 2003, an agreement was reached between the Province and the Company to provide credit to the Company for utilizing wood below the Provincial minimum utilization level as a result of extensive wood chipping operations. This unmerchantable volume was not applied to quotas, timber sales, or deducted from the AAC.

Discussions were held between the Province and the Company to amalgamate the softwood AAC in several of the FMUs located in the Highrock and Nelson River Forest Sections.

Mountain and Interlake Forest Sections have since been amalgamated within the Saskatchewan River Forest Section (see 2015 to 2020).

3.1.1.3 2005 to 2010

A summary of harvest activity by volume (m^3) that occurred within the FML during this period can be found in table C.2 of Appendix C.

An agreement was reached on the amalgamation of the Highrock FMUs during this period, combining the six Highrock FMUs (excluding FMU 60) into 3 larger units. FMUs 61, 62, portions of 63, 64 and 65 were combined into the new FMU 67. Portions of FMUs 63, 64 and 66 created the new FMU 68. The remaining portions of FMUs 64, 65, and 66 made up the new FMU 69.

In 2008, the reductions from utilized unmerchantable wood (below the Provincial minimum utilization level) were incorporated into annual scale factors that are calculated by Manitoba based on the previous five years of data and vary by product and region of origin.

The decision by the Province to remove the Grass River Provincial Park (FMU 60) from the FML became effective in 2009.

3.1.1.4 2010 to 2015

A summary of harvest activity by volume (m^3) that occurred within the FML during this period can be found in table C.3 of Appendix C.

Between 1999 and 2009, the softwood harvest level being reported against the AAC was the volume cut in that reporting year. Since not all wood cut in any year was delivered to the mill prior to the preparation of the report, bush inventories were included in the calculations. Bush inventories were considered estimates of the actual harvest volume, and as such these figures were subject to revision once the wood was finally hauled to the mill site and scaled. Starting with the 2009 to 2010 operating year, at the request of the Province, harvest levels reported against the AAC reverted to delivery volumes only, removing the requirement to report and reconcile bush inventories.

The Company requested to carry forward undercut volumes in a few FMU's in order to deal with challenging economic and operating conditions.

3.1.1.5 2015 to 2020

A summary of harvest activity by volume (m^3) that occurred within the FML during this period can be found in table C.4 of Appendix C.

In the 2015 to 2016 operating year, all wood delivered from the Saskatchewan River Forest Section started using new boundaries of FMUs 50, 58 and 59. These boundaries were developed in collaboration with the Province of Manitoba to follow more distinct features (e.g. lakes, rivers, etc.). The new FMU boundaries also included and

amalgamated the portions of FMU 12 (Mountain) and FMU 47 (Interlake) that were within FML 2. FMUs 53 and 57 have remained unchanged.

3.1.1.6 2020 to 2025

A summary of harvest activity by volume (m^3) that occurred within the FML during this period can be found in Table C.5 of Appendix C.

New boundaries are being developed for the FMUs in Nelson River Forest Section by the Province.

3.1.2 Actual Depletions

Actual depletions show the total area harvested from forested land strata as defined by the Forest Resource Inventory (FRI) and Forest Lands Inventory (FLI) provided to the Company by the Province. The version of FRI/FLI is dependent on harvest year as all strata are pre-harvest, but where possible the most recent version of FRI/FLI was used in the calculations (see Appendix G for full list of FML 2 inventory references by forest management unit). Company harvesting activities from 1997 to 2021 are summarized below. Harvest area by stratum totals are within 5% of the actual harvest areas reported above.

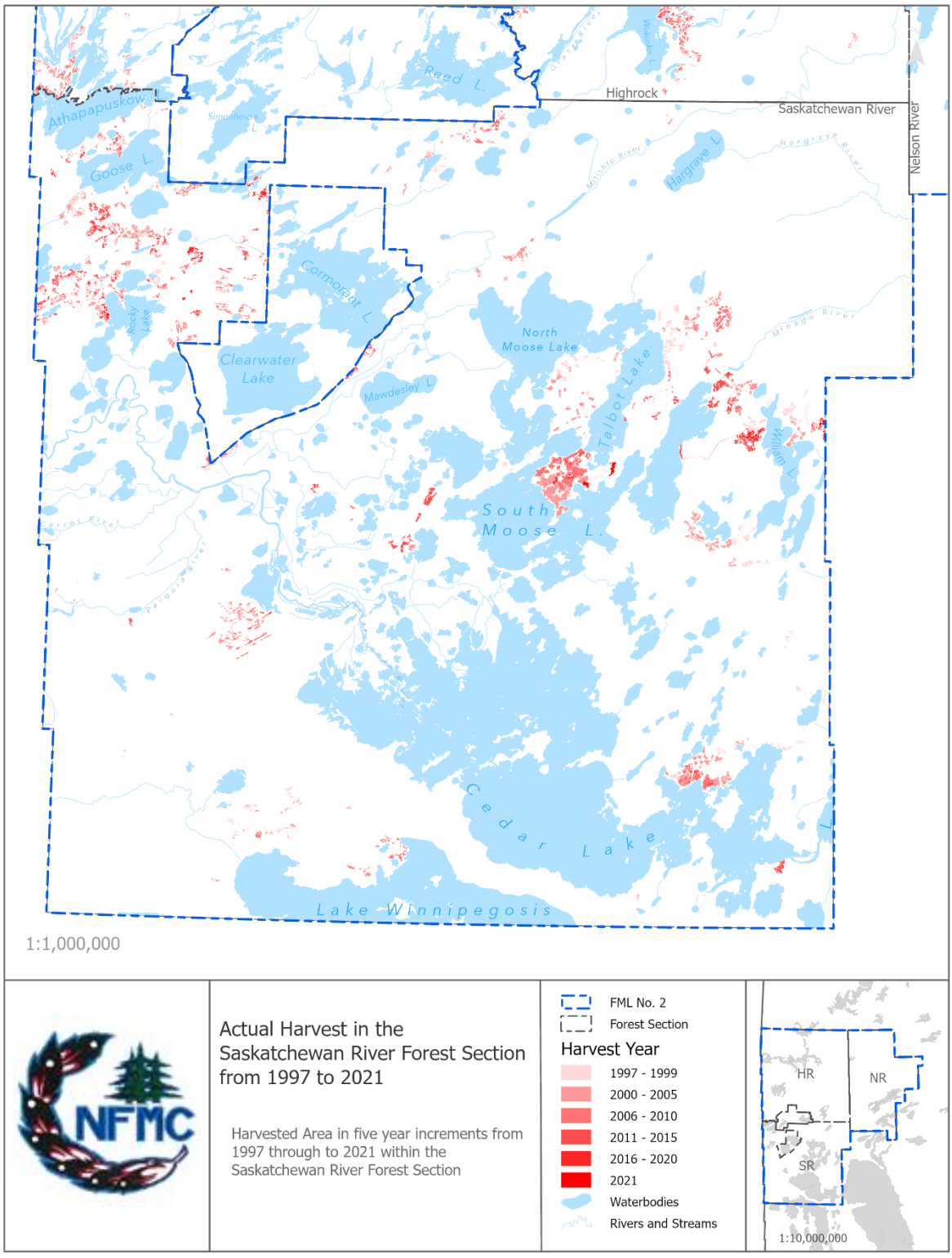
< 0.01%

Area Harvested
Less than 0.01% of the FML forest is harvested each 5-year period.

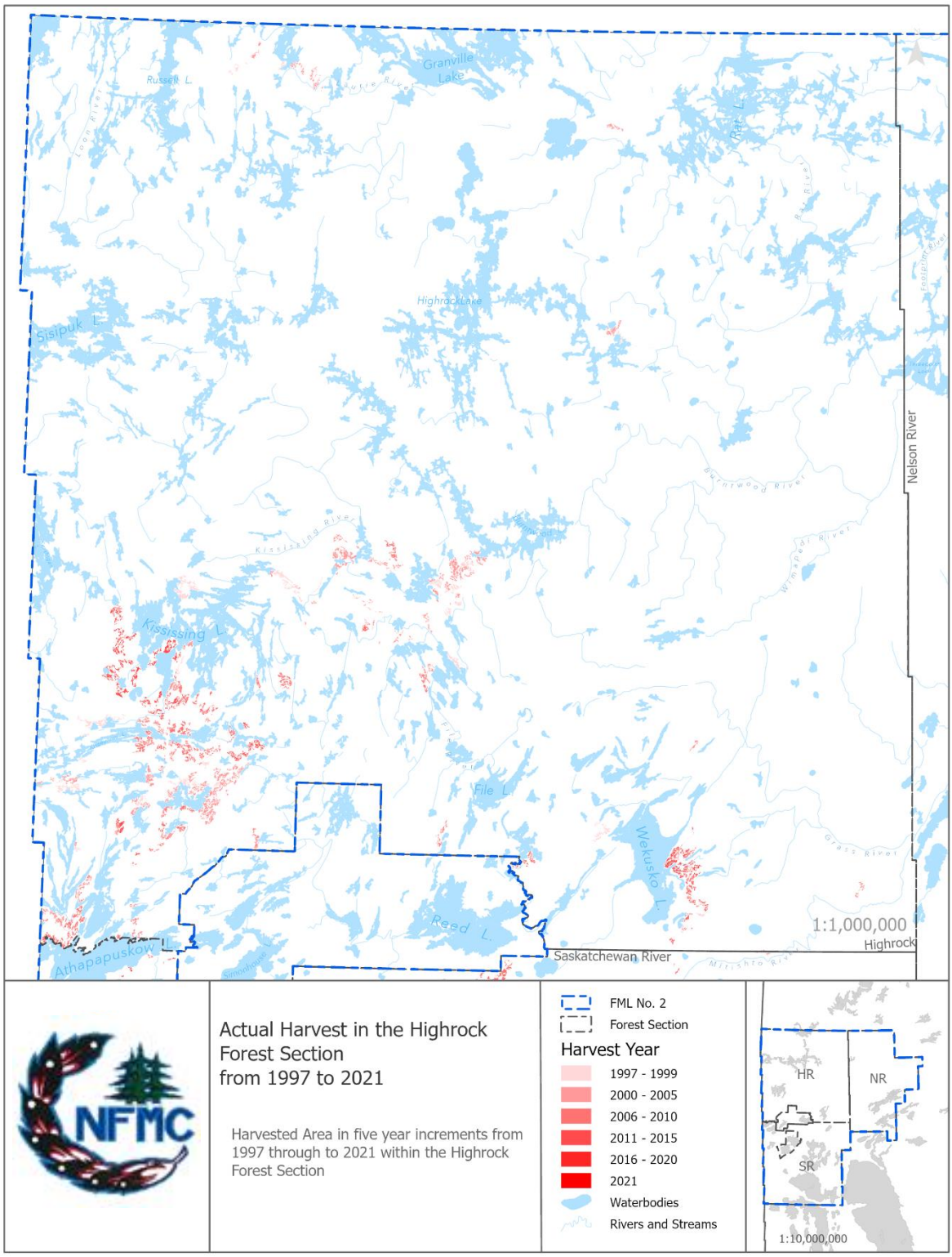
Maps of depletions for each forest section within FML 2 between 1997 and 2021 onwards can be found after the following actual depletions table (Table 3.1) in Map 3.1 (Saskatchewan River), Map 3.2 (Highrock), and Map 3.3 (Nelson River).

Table 3.1 Actual depletion areas in hectares by stratum for FML 2, based on pre-harvest FRI/FLI.

Stratum Code	Stratum Description	Actual Harvest Area (ha) Per Period					
		1997-1999	2000-2005	2005-2010	2010-2015	2015-2020	2021
Softwood							
JP	Jack pine	1,394	1,459	1,197	1,424	378	22
LBS	Lowland black spruce	2,338	4,283	2,164	1,047	427	0
OSFWD	Other softwood mix	0.02	1.85	9.64	0.14		
STL	Black spruce and tamarack	15	80	197	126	43	0
SFWD	Pure softwood mix	3,689	8,953	5,581	3,858	1,476	55
UBS	Upland black spruce	854	1,141	1,950	3,283	413	24
	Subtotal	*8,291*	*15,918*	*11,098*	*9,737*	*2,738*	*101*
Mixed Wood							
MSPF	Softwood-leading mixedwood	3,307	5,741	1,688	1,125	457	3
NSPF	Harwood-leading mixedwood	1,730	3,683	954	769	781	7
	Subtotal	*5,037*	*9,425*	*2,643*	*1,893*	*1,238*	*9*
Hardwood							
CHDWD	Pure hardwood mix	94	274	126	189	32	3
TA	Trembling aspen	285.79	385.94	247.34	205.45	168.65	
	Subtotal	*380*	*660*	*373*	*395*	*200*	*3*
Non-Forest / Non-Productive							
NF/NP	Non-forested / Non-productive	867	4,608	4,004	536	107	2
	Subtotal	*867*	*4,608*	*4,004*	*536*	*107*	*2*
	Total	*14,575*	*30,611*	*18,117*	*12,561*	*4,283*	*115*



Map 3.1. Actual harvest depletions within Saskatchewan River Forest Section of FML 2 between 1997 and 2021.



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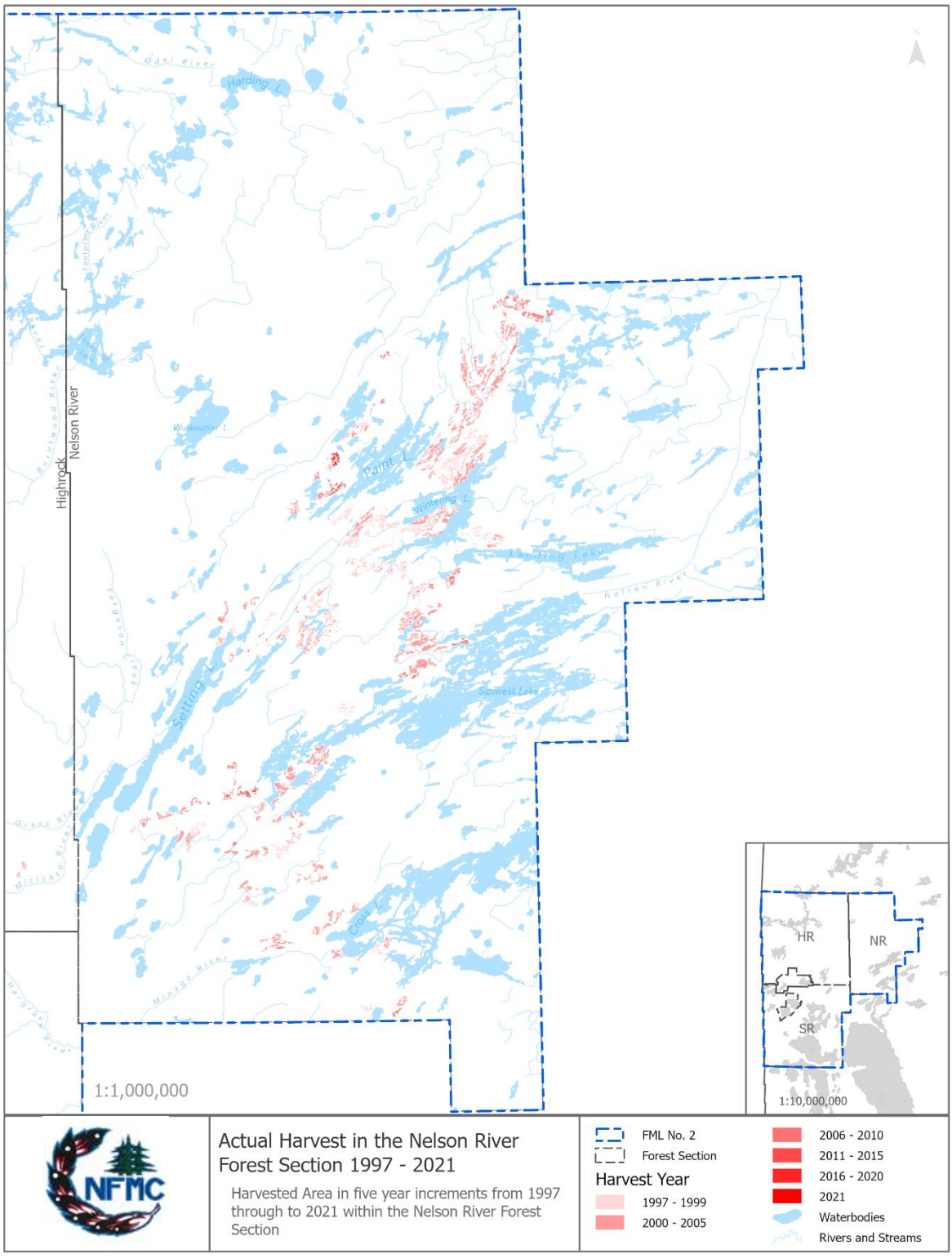
1118 *Map 3.2. Actual harvest depletions within Highrock Forest Section of FML 2 between 1997 and 2021.*



Map 3.3. Actual harvest depletions within Nelson River Forest Section of FML 2 between 1997 and 2021.

3.2 ACCESS DEVELOPMENT AND DECOMMISSIONING

Access development is a key component in the management of forest resources throughout FML 2. Contributing factors such as the management of the annual allowable cut and the long-term balancing of delivery costs make it necessary to gain access into various areas to conduct harvesting and forest renewal activities. A summary map of the transportation infrastructure across FML 2 can be found on the following page (Map 3.4).

3.2.1 Road Management

To meet the timber requirements of the Company's mill production, access development including road construction, and construction of watercourse crossings, is required.

In addition to Category 1 and 2 all-weather roads, the Company, and third-party operators on FML 2 make use of Category 3 and 4 seasonal roads to provide access from the all-weather road network to cut blocks. These roads have a relatively short life expectancy and seasonal access constraints. These roads are typically identified in subsequent forest management operating plans (FMOPs).

Primary and secondary road management is summarized in the Road Ledger in Appendix D. Active and available roads managed by Canadian Kraft Paper Industries Limited. are inspected on an annual basis. Some brief statistics are listed below in Table 3.2.

Table 3.2. Quantity of managed roads and road area within FML 2 as of 2021. For a more detailed summary, see Appendix D.

Total Count of Roads	100
FML 2 Productive Area (ha)*	3,946,077
Road Area (ha) (Active, abandoned, MI transfer and temporarily decommissioned roads)	599
Percent Productive Land Occupied by Roads	0.015%

**See the following section 4 Current Forest Description for more information.*

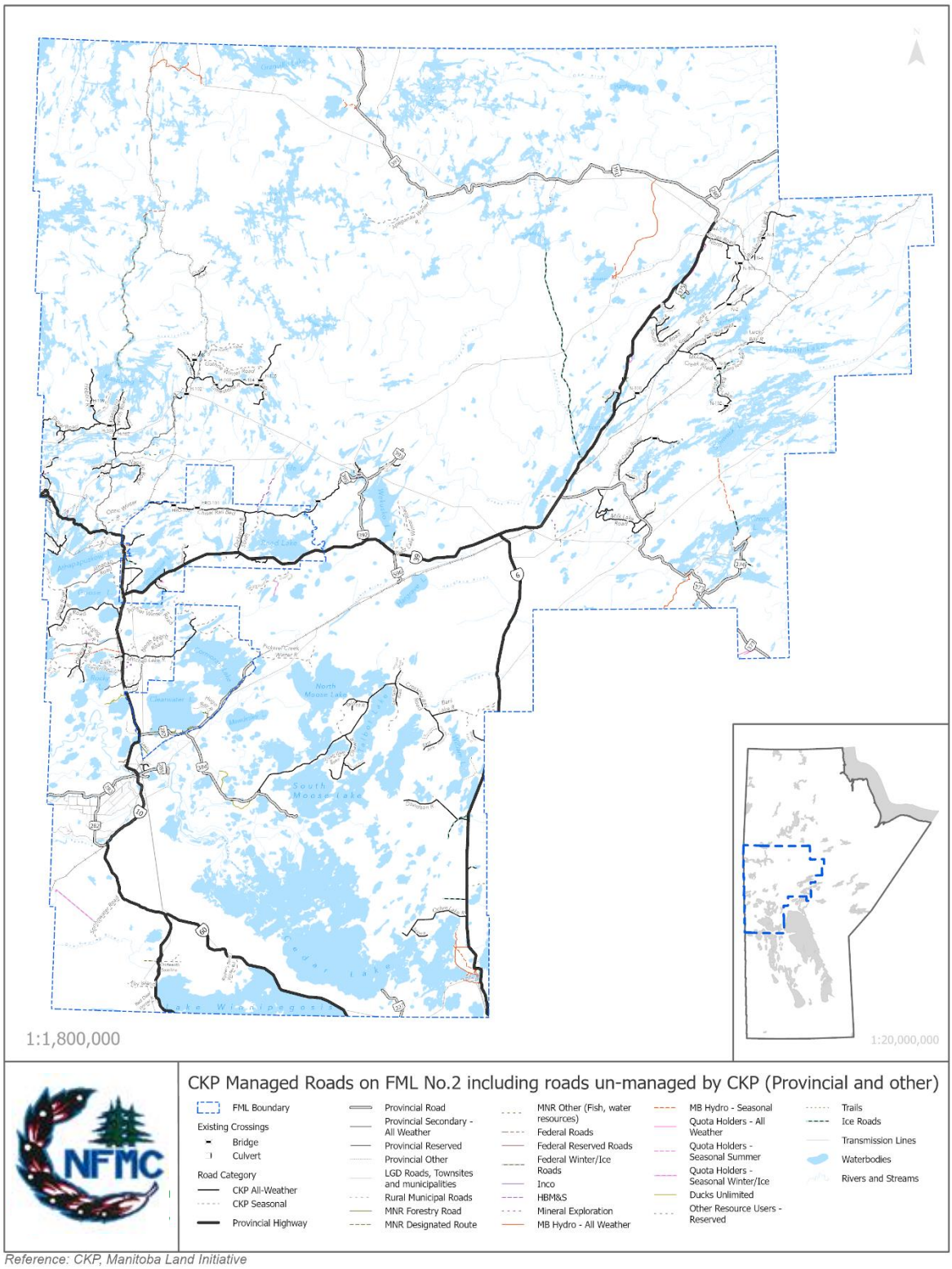
3.2.2 Watercourse Crossing

Watercourse crossings are established in compliance with processes outlined by Fisheries and Oceans Canada and detailed information is provided to Transport Canada as required under the *Navigation Protection Act*.

The Company inspects and maintains all water crossings on primary and secondary all-weather roads.

3.2.2.1 Major Water Crossings

Major crossings are built on primary and secondary roads over creeks, streams, and rivers where pipe culverts would not be sufficient. Temporary winter crossings of creeks, streams and rivers are also considered major water crossings. New crossing locations are planned and described in Forest Management Operating Plans. Existing major crossings are summarized in Appendix E.



Reference: CKP, Manitoba Land Initiative

Map 3.4. Transportation infrastructure by status across FML 2.

3.3 FOREST RENEWAL

Nisokapawino Forestry Management Corporation (NFMC) is responsible for reforestation of all harvest areas within FML 2 where the harvest volume is subsequently delivered to the mill site. Where harvested timber is retained by third party operators, the responsibility of reforestation remains with the Province. The Company pays the Province forest renewal charges and other applicable dues for wood delivered to the mill site from third party sources with the FML.

NFMC accrues a silviculture liability for all blocks harvested since 1989 in which the Company assumes renewal responsibility. Harvested blocks remain on the liability ledger until they receive a Certificate of Reforestation from the Province. This ensures funds are available not only for basic silviculture work such as site preparation and planting, but also for potential costs such as vegetation management, replanting, and future survey work. NFMC's renewal obligation accrues on a block-by-block basis to reflect all expected future treatments.

A summary of forest renewal activities for each forest section within the FML can be found in Appendix F.

3.3.1 Site Preparation

Site preparation is a treatment to mechanically enhance the biological and operational effectiveness of tree planting by creating improved conditions for rooting and growing seedlings, decreasing undesirable competition, regulating spacing and improving access for planters. Site specific prescriptions include separating and aligning logging slash, decreasing the depth of organic material over mineral soil, temporarily reducing woody or herbaceous competition for light, moisture, nutrients, and enhancing infill of natural regeneration to augment the planted seedlings.

Current harvesting techniques and silviculture management decisions no longer regularly require site preparation for the promotion of desirable microsites for tree plant activities, therefore site preparation is rarely executed anymore. See Map 3.5, Map 3.6, and Map 3.7 for locations of site preparation activities between 1997 and 2021 across each forest section within FML 2.

3.3.2 Scarification and Tree Planting

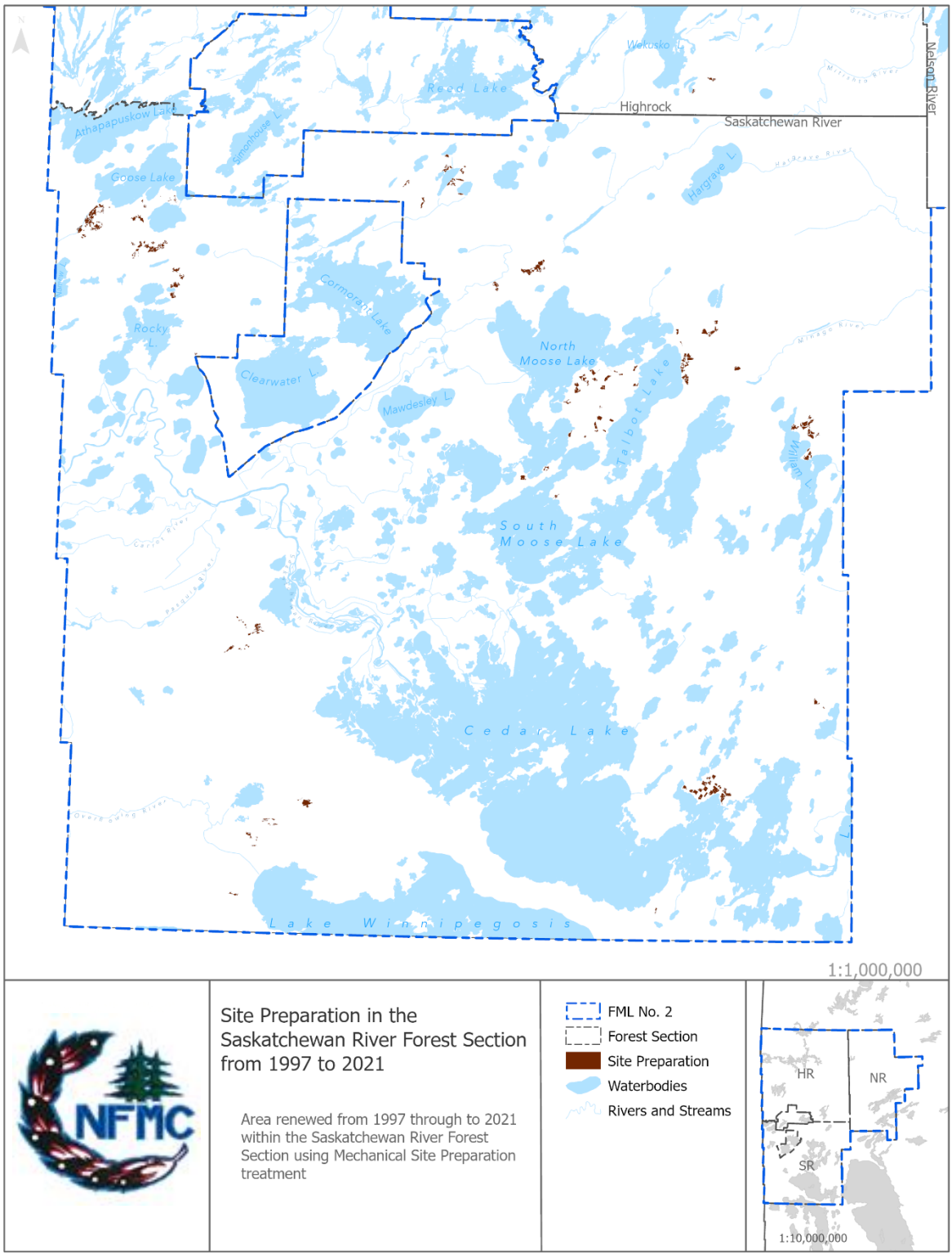
Scarification is the treatment used to enhance natural regeneration, most commonly, of jack pine stands. Scarification treatment consists of pulling shark-fin barrels and spiked anchor chains across cutovers to expose mineral soil and scatter the cones and seed. It creates the conditions necessary for seed germination and growth and improves spacing by distributing existing seed more evenly.

Seedlings for planting are custom grown in containers and shipped as either boxed frozen spring crop or boxed summer crop. In both cases the seedlings are extracted from the container prior to shipping. Tree species planted on FML 2 are black spruce, white spruce, and jack pine. See Map 3.8, Map 3.9, and Map 3.10 for locations of scarification and tree planting activities between 1997 and 2021 across each forest section within FML 2.

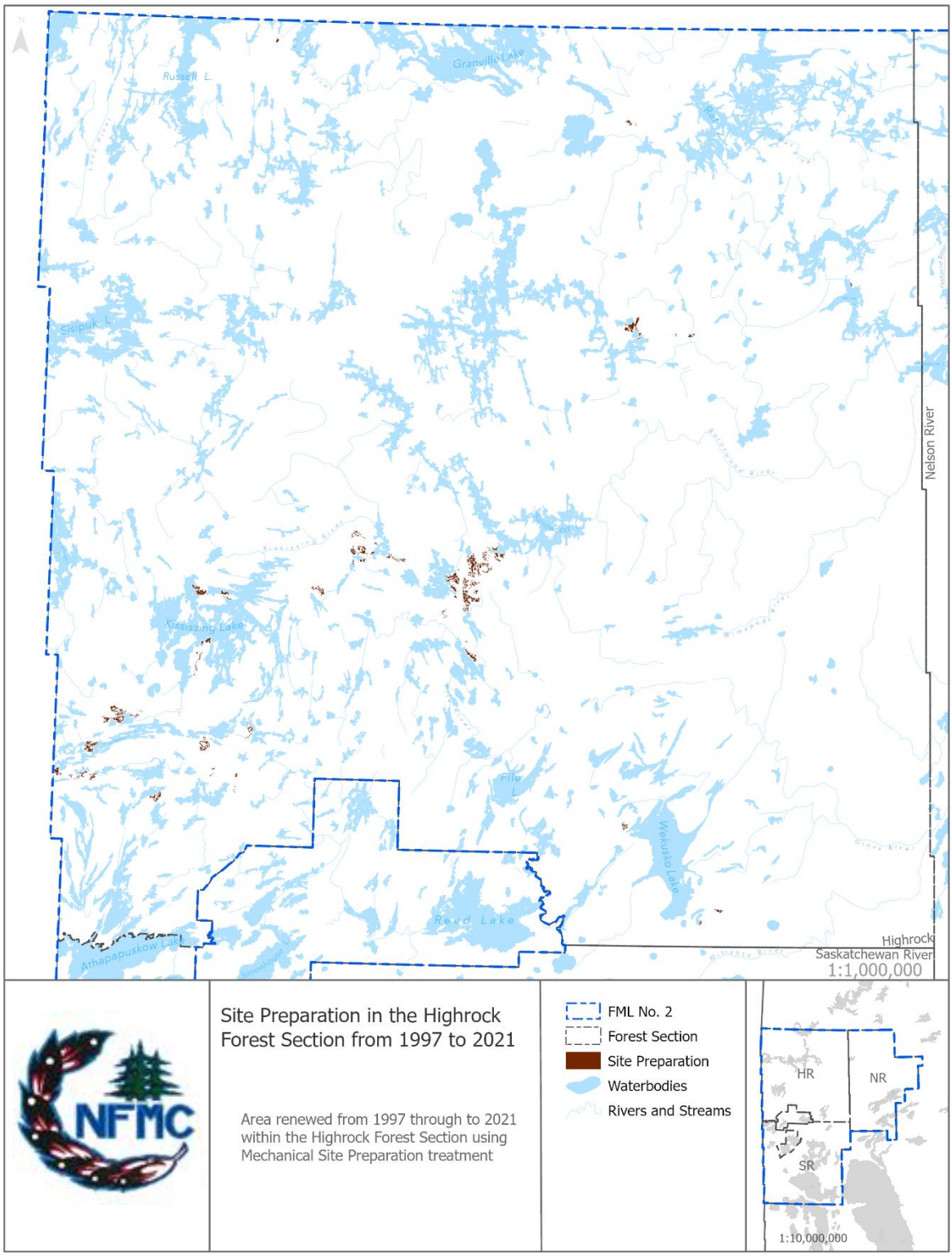
3.3.3 Stand Tending – Vegetation Management

Vegetation management is done exclusively by aerial application of the herbicide glyphosate. Glyphosate is applied in late August and early September to suppress hardwood (aspen, poplar, birch) trees, allowing the smaller softwood (spruce, pine) trees to grow more vigorously. This is also known as "releasing" the softwood trees from competition.

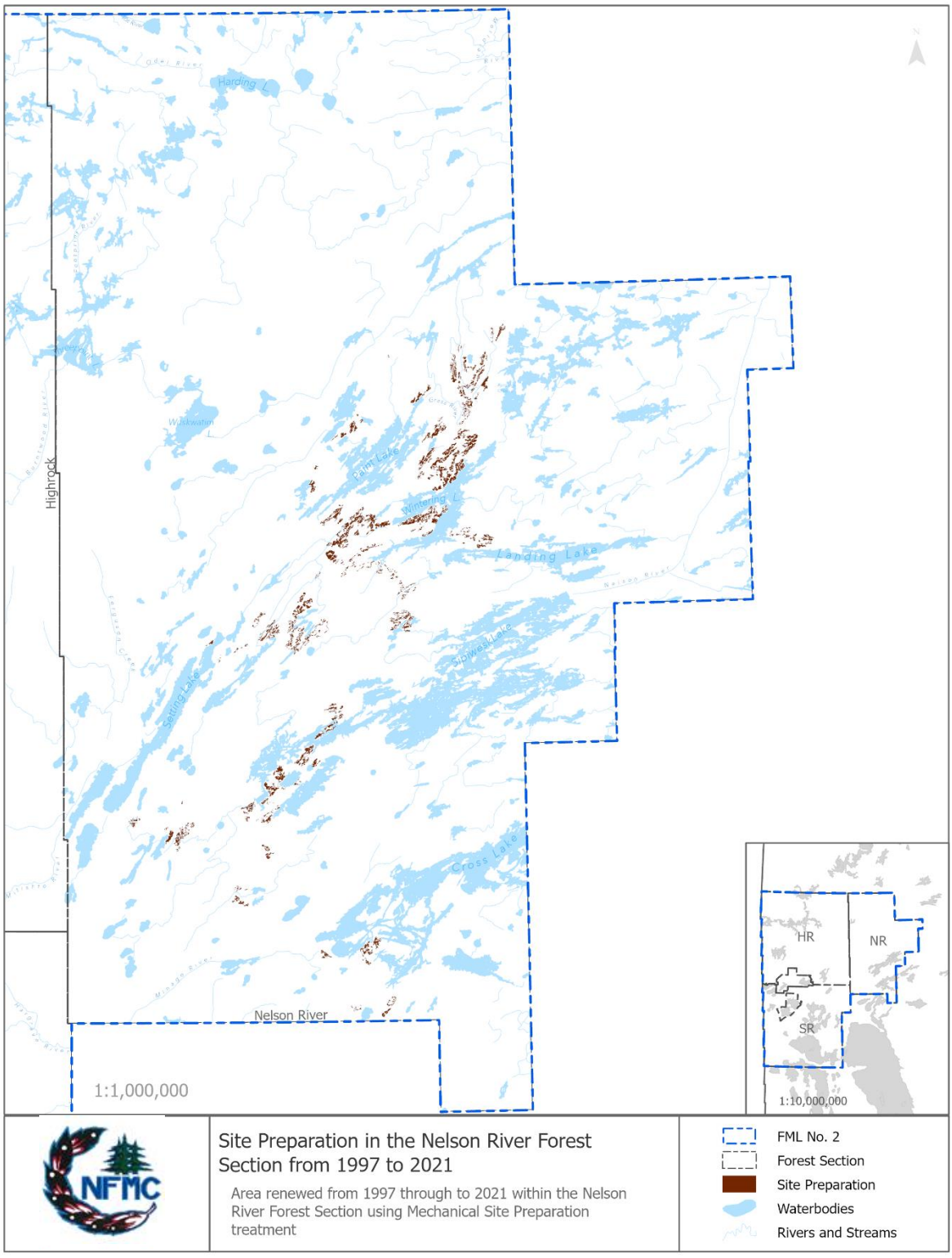
Blocks requiring vegetation management are identified from heliocular surveys (i.e., surveys executed from a helicopter using the human eye). During the surveys, portions of the blocks which required treatment are mapped out, along with any sensitive areas (lakes, waterways, sensitive habitat, wetlands, etc.) requiring buffering. Further buffering of sensitive areas occur using satellite and/or cutover imagery. See Map 3.11, Map 3.12, and Map 3.13 for locations of vegetation management activities between 1997 and 2021 across each forest section within FML 2.



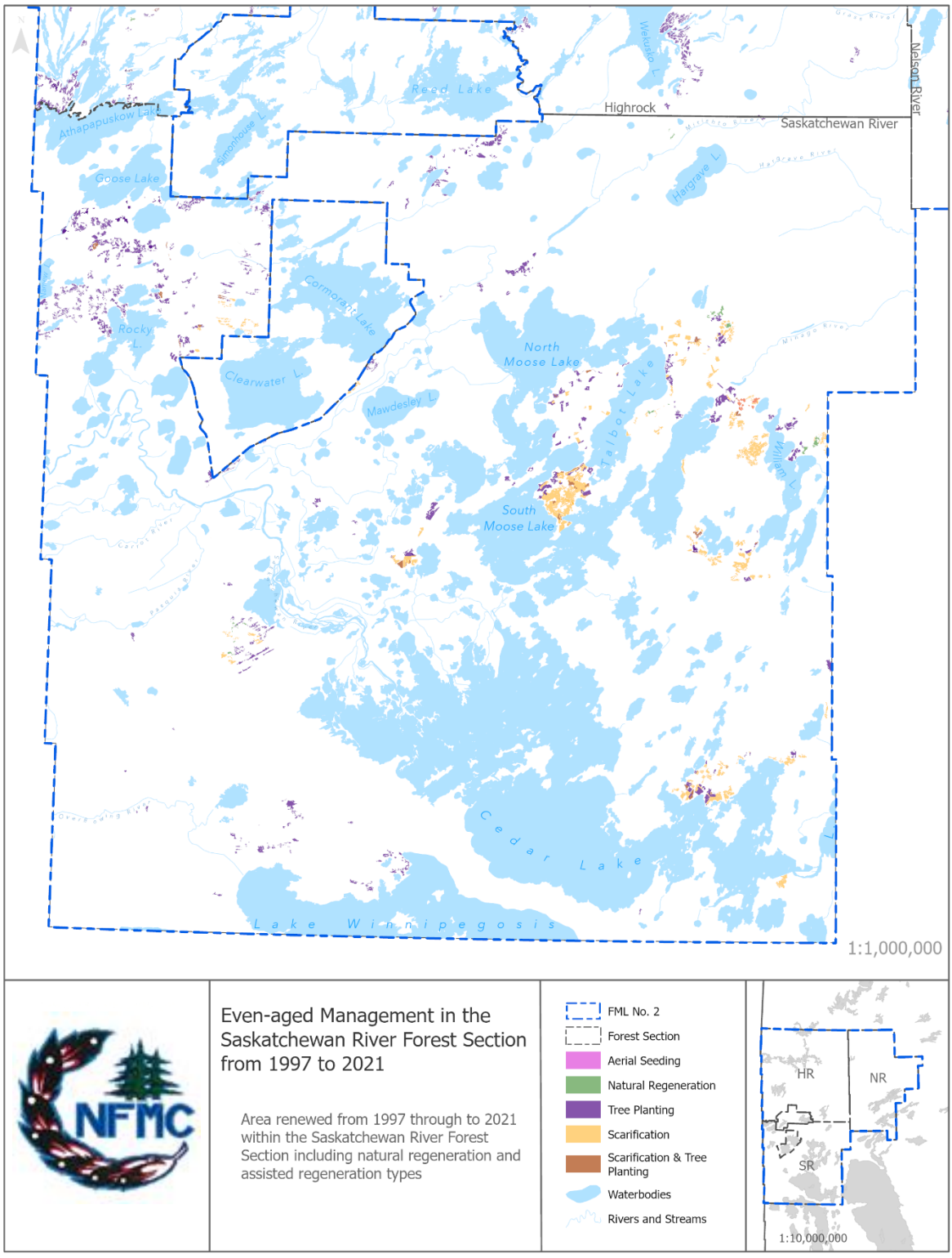
Map 3.5. Site preparation activities for forest renewal between 1997 and 2021 in the Saskatchewan River Forest Section of FML 2.



Map 3.6. Site preparation activities for forest renewal between 1997 and 2021 in the Highrock Forest Section of FML 2.



Map 3.7. Site preparation activities for forest renewal between 1997 and 2021 in the Nelson River Forest Section of FML 2.



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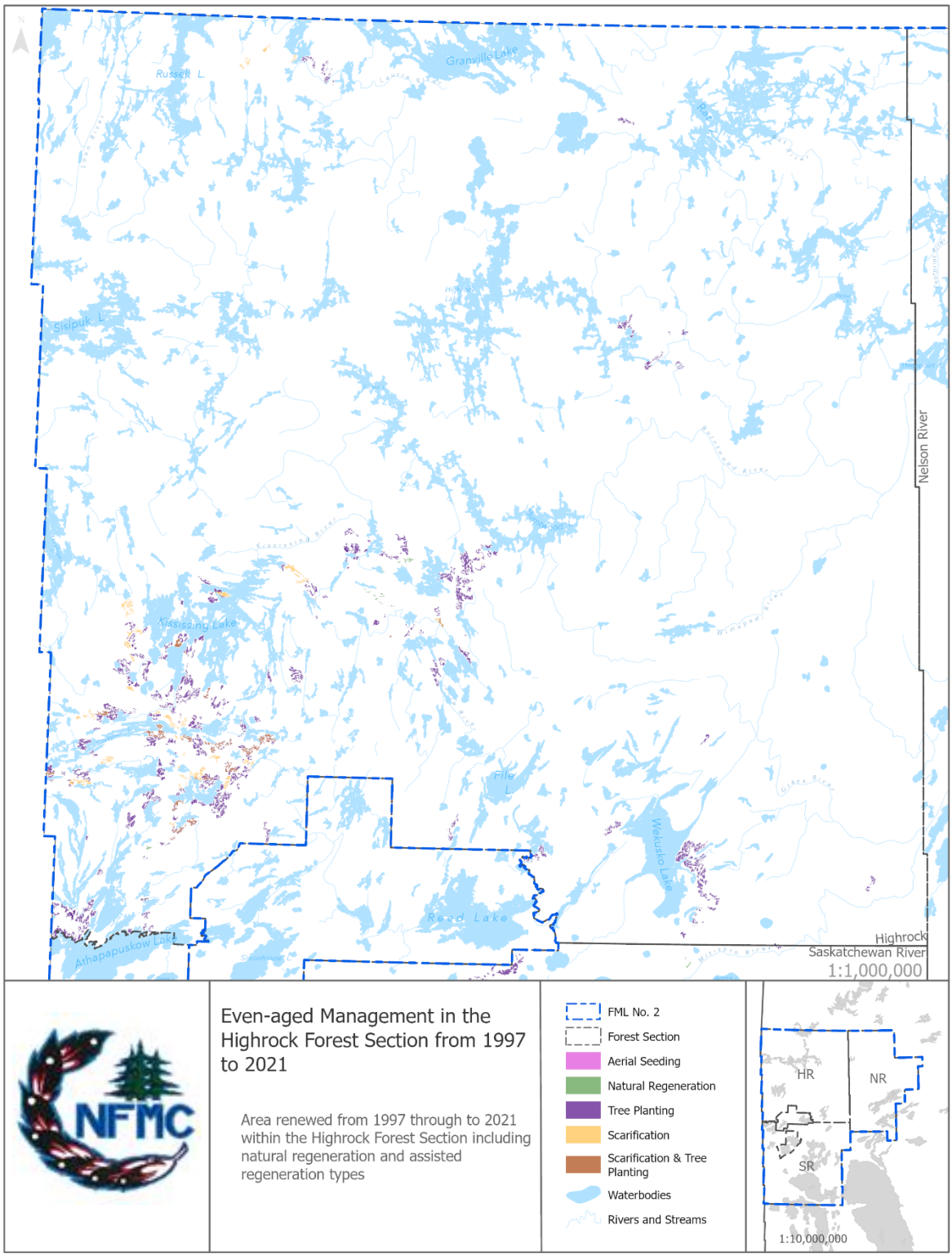
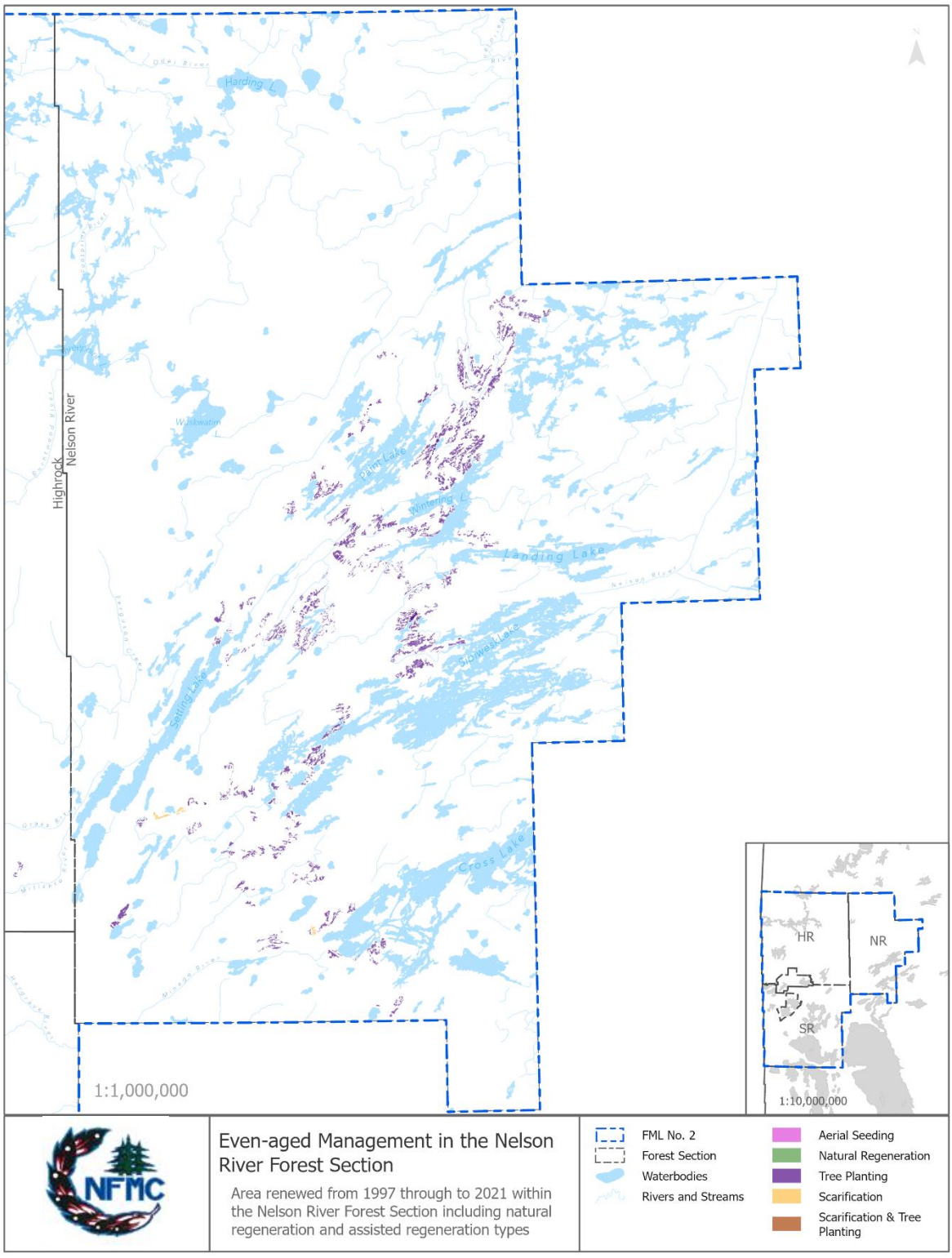
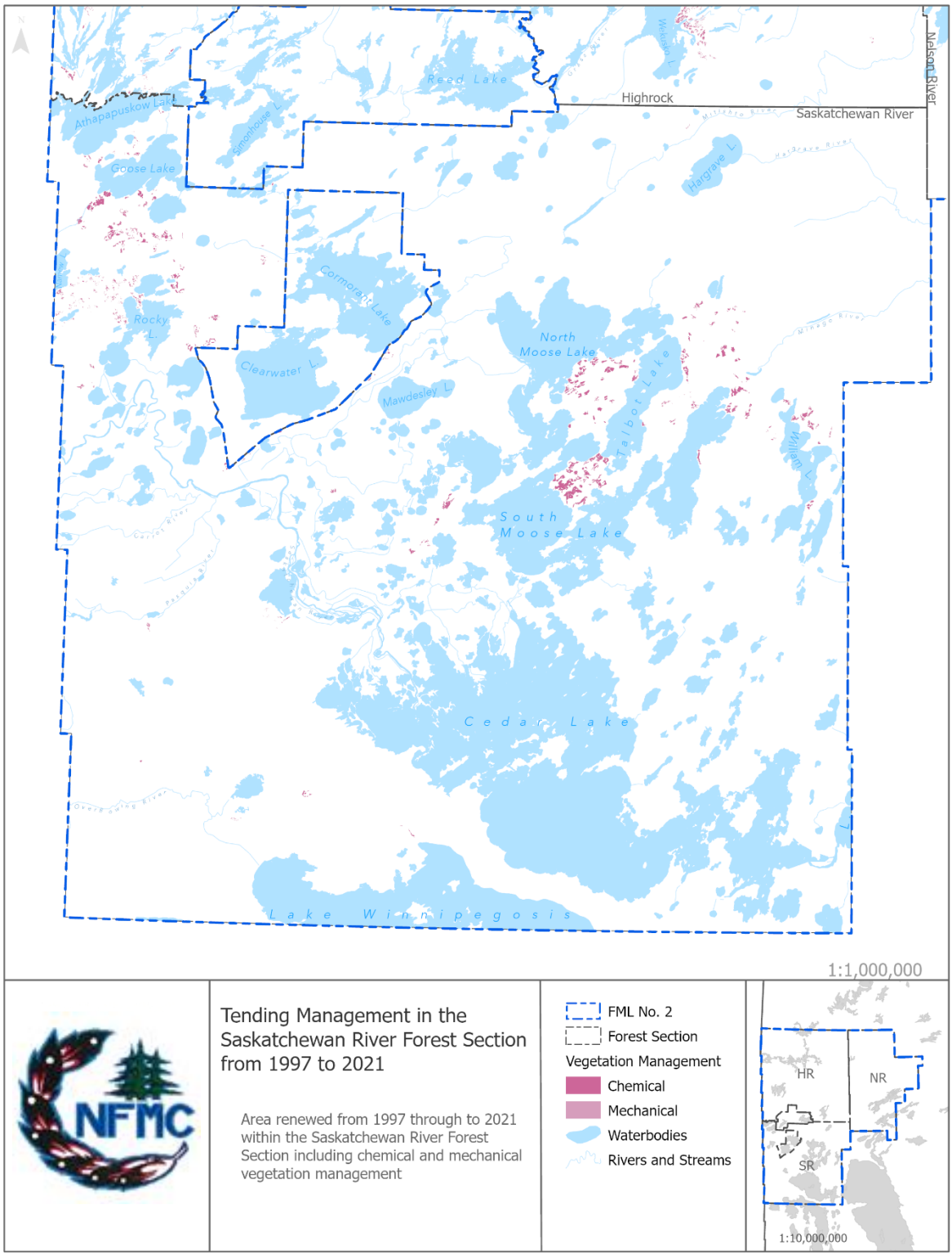
1198 *Map 3.8. Management activities for forest renewal between 1997 and 2021 in the Saskatchewan River Forest Section of FML 2.*



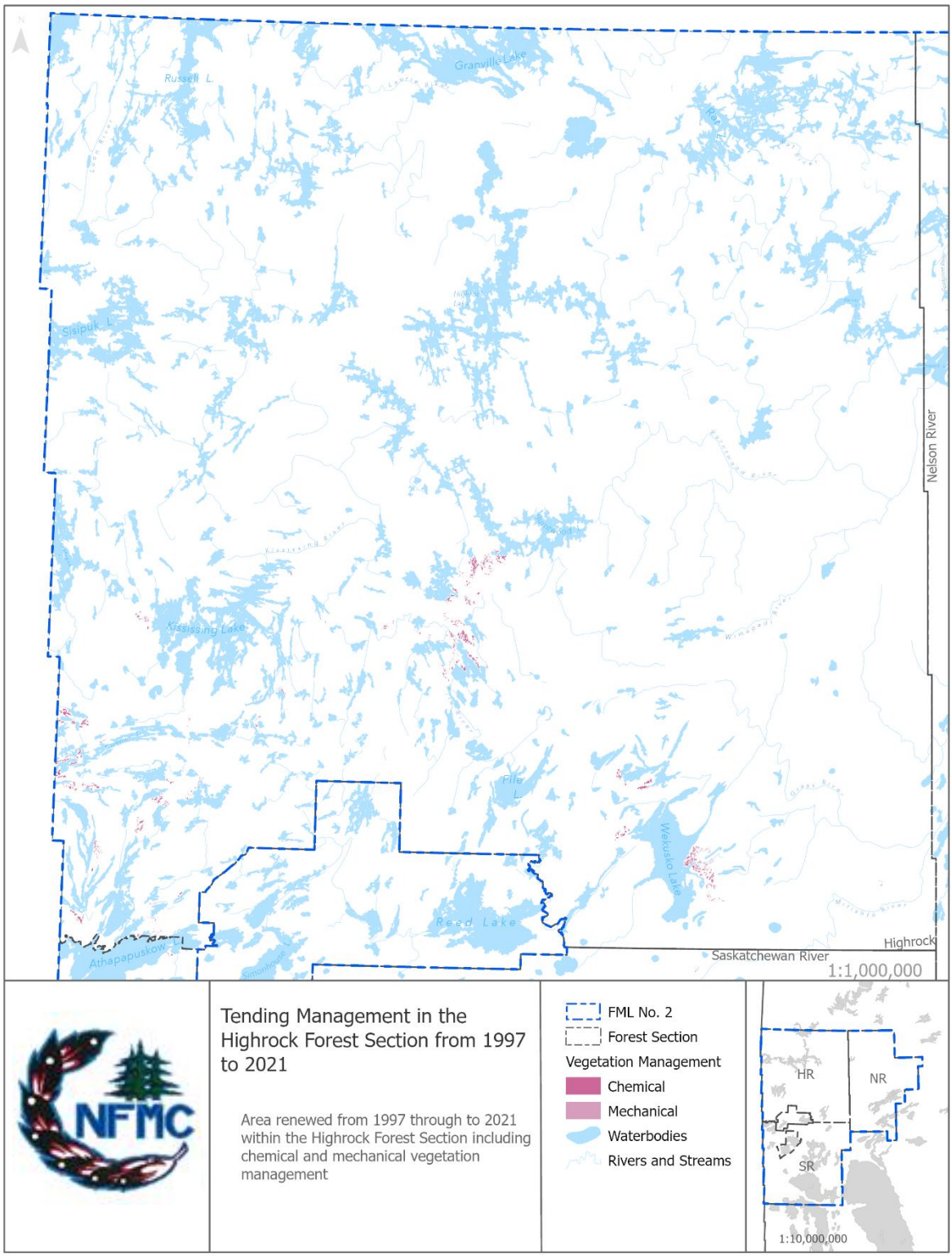
Map 3.9. Even-aged management activities for forest renewal between 1997 and 2021 in the Highrock Forest Section of FML 2.



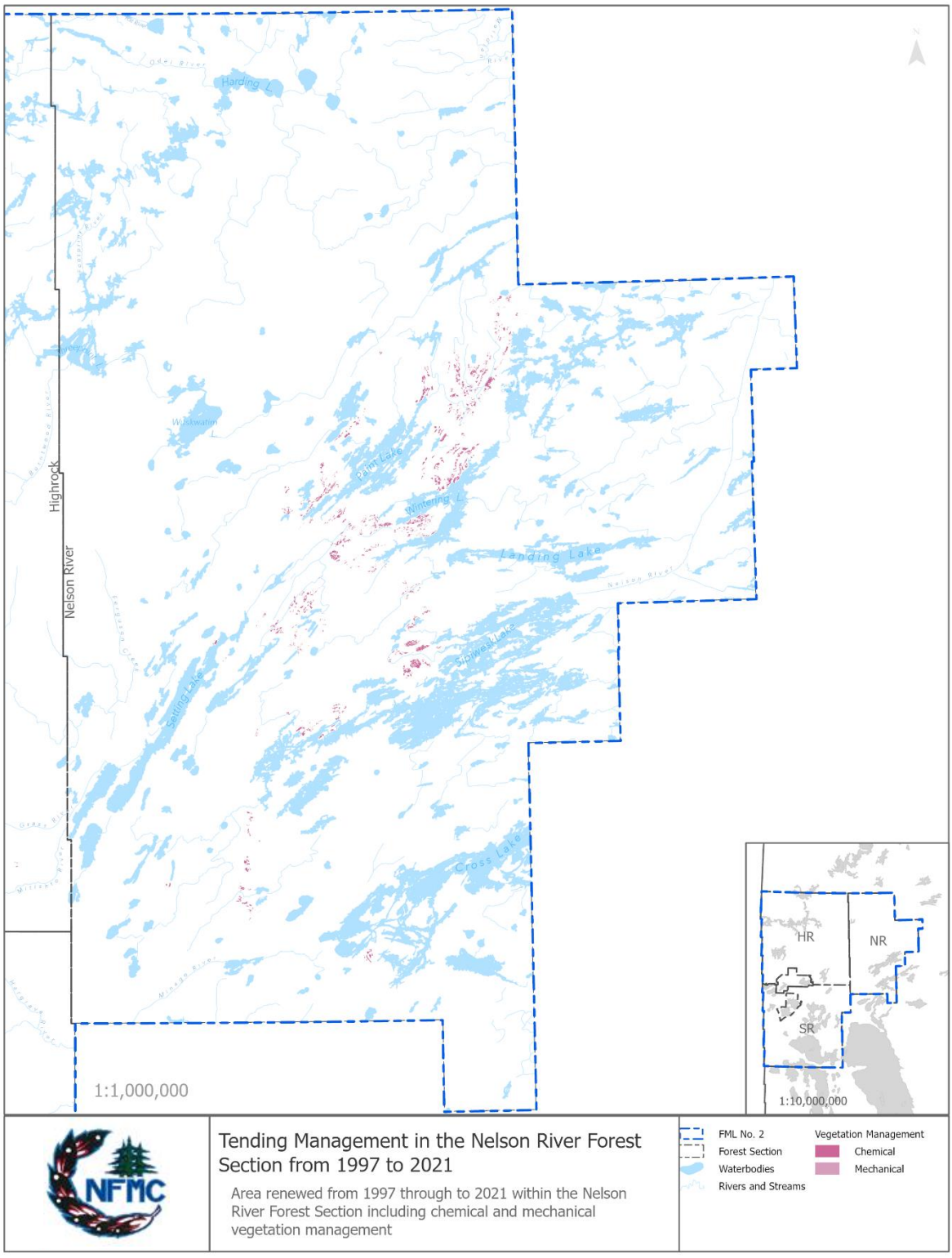
Map 3.10. Even-aged management activities for forest renewal between 1997 and 2021 in the Nelson River Forest Section of FML 2.



Map 3.11. Vegetation management activities for forest renewal between 1997 and 2021 in the Saskatchewan River Forest Section of FML 2.



Map 3.12. Vegetation management activities for forest renewal between 1997 and 2021 in the Highrock Forest Section of FML 2.



Map 3.13. Vegetation management activities for forest renewal between 1997 and 2021 in the Nelson River Forest Section of FML 2.

3.3.4 Silviculture Surveys

Since 1997, three types of silviculture surveys have been implemented: regeneration surveys, free-to-grow (FTG) surveys, and the current forest renewal assessment (FRA) surveys. Previously, a regeneration survey was conducted at 7 years following depletion and a free-to-grow survey at 14 years after depletion. Due to changes in provincial survey requirements, regeneration surveys and free-to-grow surveys are no longer conducted by the Company as of 2013 and 2018, respectively.

In 2018, the Company signed a memorandum of understanding with the Province of Manitoba to implement forest renewal assessment surveys. With input from industry through the Silviculture Technical Committee, the Province released the official *Forest Renewal Assessment Manual* (Manitoba Agriculture and Resource Development, 2020) which officially replaced the *Manitoba Free To Grow Survey Manual* (Manitoba Conservation and Water Stewardship, 2014) in 2020.

Table 3.3 summarizes harvest area since 1997 that has been surveyed up to 2015. Reporting is only up to 2015 as there is a delay following harvest in which an area must be given sufficient time to regenerate. Based on these results, over 98% of the Company's harvest areas have been surveyed as achieving sufficient regeneration Note that recorded NSR areas in 2011 and 2012 are attributed to wildfire affecting regeneration before survey could occur. Renewal follow-up continues to be ongoing for any outstanding area.

Table 3.3. A summary of the hectares (ha) of harvest area surveyed by survey type, harvest year, and achievement standard. Standard achievement codes are detailed at the bottom of the table.

	Harvest Area Surveyed (ha)									
	Forest Renewal Assessment			Free-to-grow						
Harvest Year	NSR	SR	SP	FTG-M	FTG-S	H	N	NFTG-M	NSR	REGEN
1997	-	-	2,522	25	1,380	-	-	-	-	-
1998	-	21	3,383	30	1,916	-	81	-	-	-
1999	-	-	2,821	299	1,658	-	18	-	4	-
2000	-	-	3,931	113	1,490	-	-	-	-	60
2001	-	-	3,134	331	1,221	-	-	-	-	-
2002	-	-	4,375	128	1,777	-	-	-	-	-
2003	-	177	5,056	-	1,425	-	-	-	27	-
2004	-	-	7,266	-	1,188	-	-	-	98	-
2005	-	-	3,094	-	1,717	-	-	-	-	-
2006	-	290	3,458	82	1,056	-	-	-	-	-
2007	-	130	3,606	171	1,967	-	-	-	-	-
2008	-	111	4,289	-	-	-	-	-	-	-
2010	-	44	3,670	-	-	-	-	-	-	-
2011	480	59	1,735	-	-	-	-	-	-	-
2012	610	156	1,883	-	-	-	-	-	-	-
2013	-	439	1,904	-	-	-	-	-	-	-
2014	-	383	1,568	-	-	-	-	-	-	-
2015	-	182	350	-	-	-	-	-	-	-
Total	*1,090*	*1,992*	*58,047*	*1,180*	*16,795*	*-*	*100*	*-*	*130*	*60*

Achievement standards:

NSR – Not sufficiently regenerated –This site is not sufficiently regenerating. Follow-up silviculture treatments required and resurveying.
SR – Sufficiently regenerated – This site has a sufficient number of trees to regenerate into an established stand.
SP – Sufficiently performing – This established site is healthy, vigorous, and could be left to produce future timber supplies without further intervention.
FTG-M – Passed a FTG survey as a softwood-leading mixedwood stand.
FTG-S – Passed a FTG survey as a softwood stand.
H – FTG status is "hardwood".
N – FTG status is hardwood-leading mixedwood.
NFTG-M – FTG status is "Not free to grow – mixedwood." Requires treatment and resurveying.
NSR – FTG status is "Not sufficiently regenerated." Requires fill-plant and resurveying.
REGEN – FTG status is "Regen." Needs to be resurveyed to meet free-to-grow status.

3.4 NATURAL DISTURBANCES

Boreal Forest ecosystems are reported to be geared to continuous disturbance to such degree that some authors have characterized them as being disturbance prone (Repap Manitoba Inc, 1996). The major agents involved are fire, windthrow, and insect outbreaks. Of the natural forces, fire is of major importance. The high fire incidence is reflected in the youthfulness of the majority of forest communities within FML 2.

3.4.1 Fire

The boreal forests of northern Manitoba originate from major disturbances and are predominantly of fire origin. Most of the upland forested sites within the FML have been burned by wildfires at one or more points in history. The occurrence of wildfires typically involves many years of light to moderate fire losses with infrequent years where weather conditions create extreme fire hazard resulting in catastrophic losses.

Although essentially all forest types are affected by fire, jack pine forests in particular develop invariably on burned-over sites. After fire, vegetation regeneration is usually simple, with an initial influx of the pine followed by an invasion of black spruce. Given time, a progression towards spruce-dominated communities ensues as pine fails to regenerate in the absence of fire. Similar patterns and dependence on fire can be observed in trembling aspen communities. The initial cohort of aspen has its origin in a combination of extensive suckering from surviving underground parts and natural seeding. Aspen forests become invaded by conifer species, such as spruce and pine. Lowland black spruce forests, on the other hand, due to site wetness, are generally less prone to burns, except in dry years. They are among the oldest forest communities and there is virtually no change in species composition over time, because of continuous black spruce revegetation, mostly through layering (Repap Manitoba Inc, 1996).

2021 saw the highest amount of forested area burned between 1997 and 2021 at 120,681 hectares, approximately 2,000 hectares more than the entire 2006 to 2010 period combined (Figure 3.1). It is expected that these numbers can be attributed to the increased number of extreme weather events and radically high population outbreak of jack pine budworm across the FML. Extreme temperature highs, drought, and increased forest pest outbreaks are three variables that cause forest fires to be more likely to occur, all of which were more frequent occurrences between 2020 and 2022.The areas disturbed historically during this same period can be seen in Map 3.14.

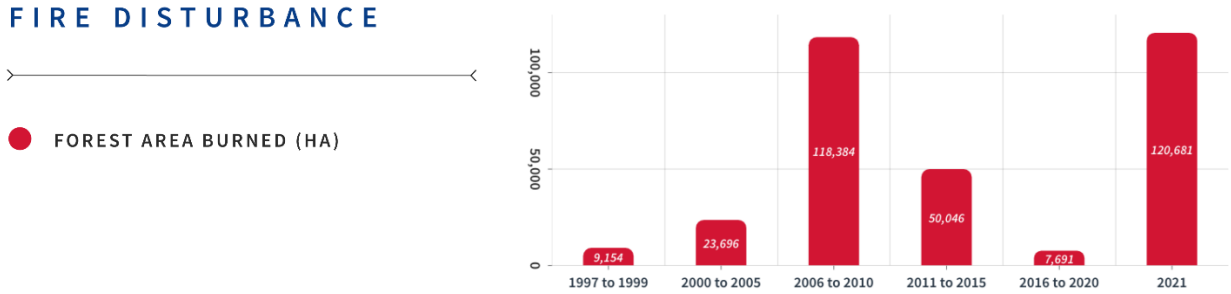
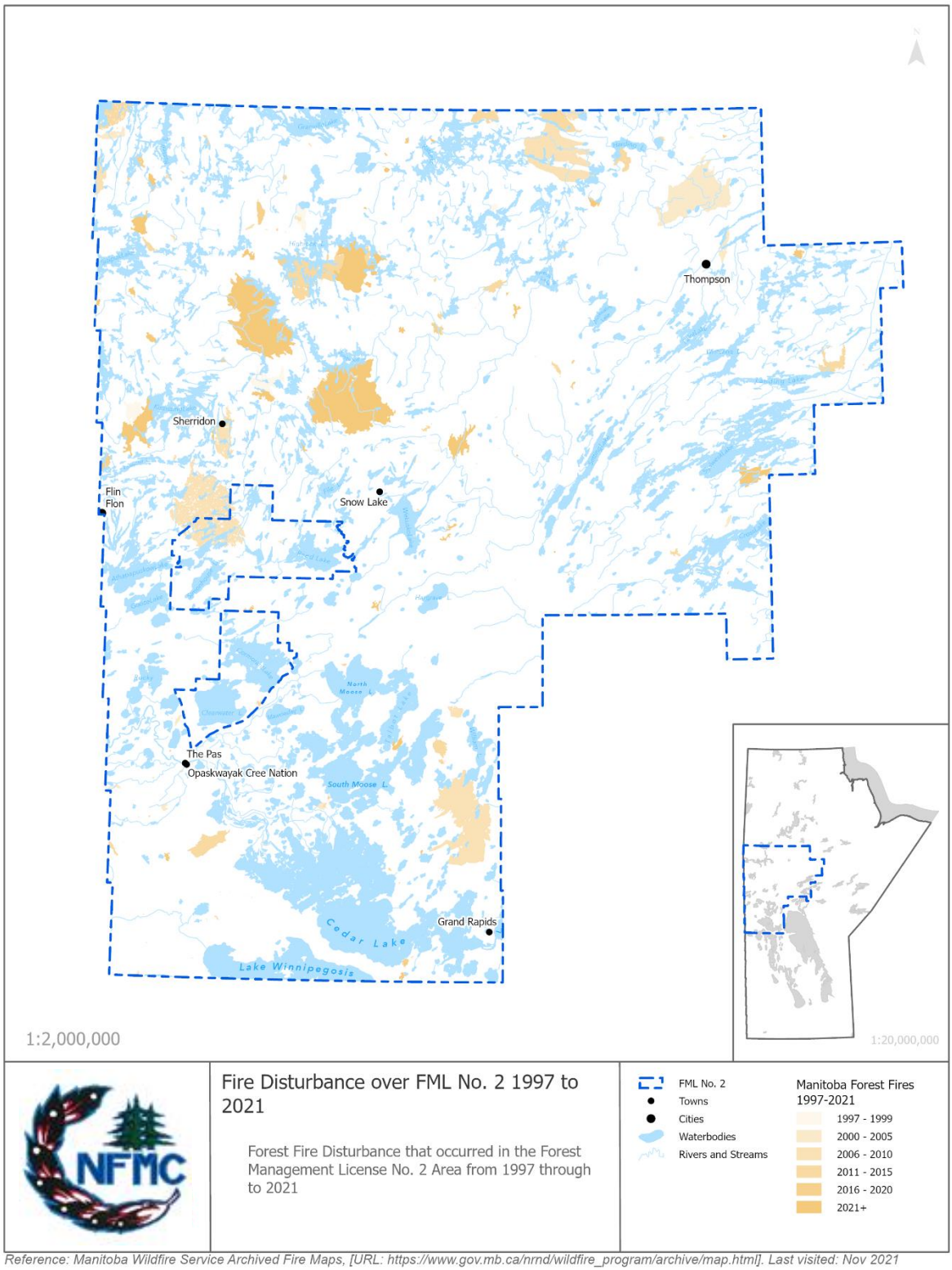


Figure 3.1. Hectares of forested area that has burned historically within FML 2. Forested area is determined by strata from FRI pre-burn.

3.4.2 Extreme Weather Conditions

Throughout FML 2, significant damage to both mature forest stands, and regenerating areas often occurs as a result of extreme weather conditions. This can include events such as late spring or early fall frosts, severe drought conditions, hail, and windstorms. Damage to forest stands from these types of occurrences is usually isolated to localized areas and happens on an infrequent basis.



Reference: Manitoba Wildfire Service Archived Fire Maps, [URL: https://www.gov.mb.ca/nrnd/wildfire_program/archive/map.html]. Last visited: Nov 2021

Map 3.14. Locations of major historical forest fire disturbance across FML 2 between 1997 and 2021.

Windthrow hazard can cause significant losses of timber. It varies from catastrophic (affecting large tracts of land) to endemic (localized and mostly related to site conditions and silvicultural practices). There are many factors affecting windthrow hazard, including stand density, tree height, species composition, fluctuating water table, soil texture, health of trees, and topographic location (Repap Manitoba Inc, 1996).

3.4.3 Forest Insects and Diseases

Boreal forest trees are also affected by a wide range of insects and fungal diseases (Natural Resources Canada, 2022). Of particular importance are lodge pole pine dwarf mistletoe (*Arceuthobium Americanum*), a parasitic flowering plant infecting jack pine stands and root rots *Armillaria* and *Inonotus*. Spruce budworm (*Choristoneura fumiferana*) is the primary insect affecting balsam fir and, to a lesser degree, white and black spruce. Older, fir dominated stands, are at higher risk than young stands. Aspen mixed woods containing larger proportions of fir are also frequently affected. In these forests, the most serious trembling aspen defoliator is the forest tent caterpillar (*Malacosoma disstria*). It also attacks other hardwoods, including bur oak, green ash, white birch, Manitoba maple and balsam poplar. The jack pine budworm (*Choristoneura pinus*) is the major insect affecting jack pine. It is a defoliator of jack pine stands of varying age.

The following summarizes the more common forest insects and diseases that occur most frequently within FML 2.

Dwarf mistletoe (*Arceuthobium americanum*)

Lodgepole pine dwarf mistletoe (*Arceuthobium Americanum*; Map 3.16*)* is a parasitic flowering plant which commonly infects jack pine stands within FML 2. Dwarf mistletoe infections cause infected branches to twist and produce spindle-shaped swellings called witches' brooms.

This disease causes the largest amount of annual loss in merchantable volume of jack pine within FML 2. Dwarf mistletoe impacts immature stands up to 50 years of age far greater by preventing them from reaching merchantable size and causing tree mortality.

Dwarf mistletoe spreads very slowly and can be prevented from spreading by elimination of infected trees. This can be accomplished through either felling or by using herbicides applied either aerially or by stem application. Once the host tree has been killed, the mistletoe plant is also eliminated. When a mistletoe infested area is harvested it is important that all infected and non-infected host trees are removed. Even trees which do not exhibit classic symptoms of dwarf mistletoe may still have latent infections. Planting of nonhost species in areas at high risk for reinfection is also an effective control measure.

Jack pine budworm (*Choristoneura pinus*)

Jack pine budworm (*Choristoneura pinus*; Map 3.15) is the major defoliator of jack pine in Manitoba. The larval stages of this insect feed primarily on the pollen cone buds and foliage of jack pine trees of varying age. Trees infested with this insect often turn a reddish-brown colour as partially eaten needles dry out. Infestations often last for a period of two to four years and occur on ten-year cycles.

Infested trees generally exhibit thinned crowns and top kill and in extreme cases, mortality. In cases where mature operable stands are severely affected, salvage harvesting may be undertaken and the sites, if suitable may be reforested with resistant species. Control of this insect in the case of large outbreaks can be accomplished by aerial spraying of either chemical or biological pesticides.

For more on jack pine budworm infestation across FML 2, see the following Section 3.4.3.1 Infestation History.

Spruce budworm (*Choristoneura fumiferana*)

The spruce budworm (*Choristoneura fumiferana*; Map 3.16) is the most common defoliator of balsam fir and spruce in Manitoba. The larval stage of this insect has a similar feeding pattern as the jack pine budworm. They feed in needles, unopened buds or staminate flowers and feed within expanding shoots. Evidence of damage is

seen as reddening of the trees as partially eaten needles dry out. Prolonged defoliation by spruce budworm can result in significant reduction in radial growth increment, branch and ultimately tree mortality.

In cases where operable stands have been severely damaged by spruce budworm accelerated harvest scheduling may occur. Control in cases of large outbreaks can be achieved by aerial spraying of either chemical or biological insecticides.

For more on spruce budworm infestation across FML 2, see the following Section 3.4.3.1 Infestation History.

Forest tent caterpillar (*Malacosoma disstria*)

The forest tent caterpillar (*Malacosoma disstria*; Map 3.15) is the most serious defoliator of trembling aspen in Manitoba. It also attacks other deciduous trees and shrubs. The young larvae of this insect usually hatch in the spring of the year, often coincident with the flushing of aspen foliage. They feed on the leaves of these trees often resulting in defoliation of large tracts of forest.

Persistent annual defoliation by forest tent caterpillars can result in reduced radial growth of hardwoods, but tree mortality is rare because the trees refoliate and can continue to carry on photosynthesis. The effects of forest tent caterpillar, though significant, usually do not warrant the use of pesticide control measures.

For more on forest tent caterpillar infestation across FML 2, see the following Section 3.4.3.1 Infestation History.

Sawyer beetles (*Monochamus scutellatus, M. notatus*)

There are two main species of sawyer beetles occurring frequently within FML 2. These are the white spotted sawyer beetle (*Monochamus scutellatus*) and the northeastern sawyer beetle (*Monochamus notatus*). Adult sawyer beetles feed on the foliage and bark of conifer trees in the spring and early summer. At that point, they deposit eggs in the bark of the tree and when hatched, the larvae begin feeding in the cambium and phloem. These larvae remain in the wood for two seasons before emerging as adults. During that time, they can penetrate deep into the heartwood, essentially destroying the timber's commercial value. However, this is not a concern for pulp wood.

Sawyer beetles generally attach dead or dying trees and usually do not threaten healthy forest stands. Populations tend to build up following large forest fires as insects infest the fire killed timber. In addition, infestations can build after forest harvesting as the insects are provided with feeding and breeding sites in logging slash.

Terminal weevils (*Pissodes strobi*)

There are many different species of terminal weevils in the prairie provinces; however, the most significant species within FML 2 is the white pine weevil (*Pissodes strobi*). Damage by this insect is caused by both adults and larvae. The adults emerge in spring after overwintering in forest litter. They begin feeding, leaving wounds on the bark below the dormant terminal buds. Eggs are deposited in these feeding punctures. Once the larvae are hatched, they feed within these punctures in the phloem. The larvae feeding results in complete girdling of the stem. Attacks by this insect kill or seriously injure the leaders of spruce and pine especially in young open growing stands. Two or more years of growth may be affected, and repeated attacks cause crooked or bushy trees of low value.

Control of this pest can be accomplished by pruning infected leaders below the lowest entry point before the insects emerge to overwinter and burning these tops to destroy the population.

3.4.3.1 Infestation History

Three major defoliators are seen across FML 2 between the period of 1997 to 2020. They are spruce budworm (*Choristoneura fumiferana*), jack pine budworm (*C. pinus*) and forest tent caterpillar (*Malacosoma disstria*). Population patterns for these three species can be seen in Figure 3.3.

A small pocket of spruce budworm defoliation was seen in 1997 at 1,647 hectares. This increased to 116,556 hectares of defoliation in 2003, and the population subsequently declining in 2008 to 932 hectares. From 2009 to 2015 the spruce budworm population remained low in the area, with no defoliation observed between 2012 and 2015 but small pockets observed in 2010 and 2011. From 2016 to 2020, populations increased across the FML to see 23,263 hectares of defoliation.

Jack pine budworm was not seen on the landscape until 2015, with 1,681 hectares of defoliation occurring in the FML. This increased sharply to 1,226,420 hectares of defoliation in 2020.

Forest tent caterpillar defoliation was seen significantly on the FML landscape between 2013 and 2018, peaking thus far in 2014 at 31,613 hectares of defoliation.

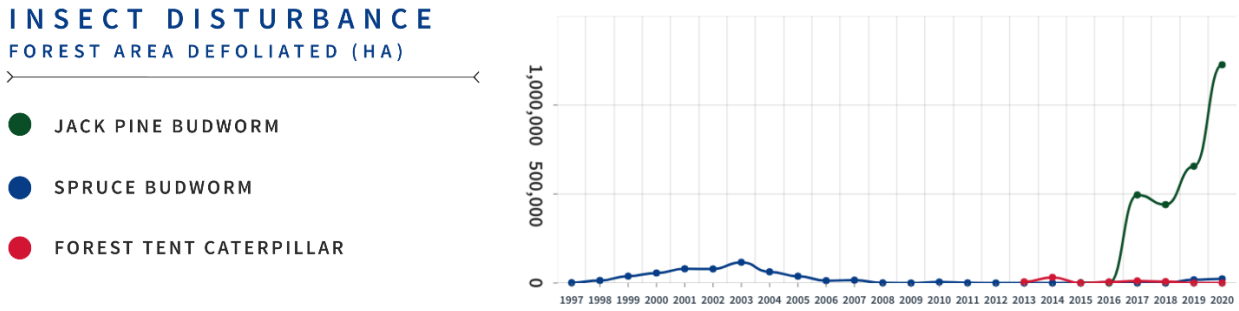
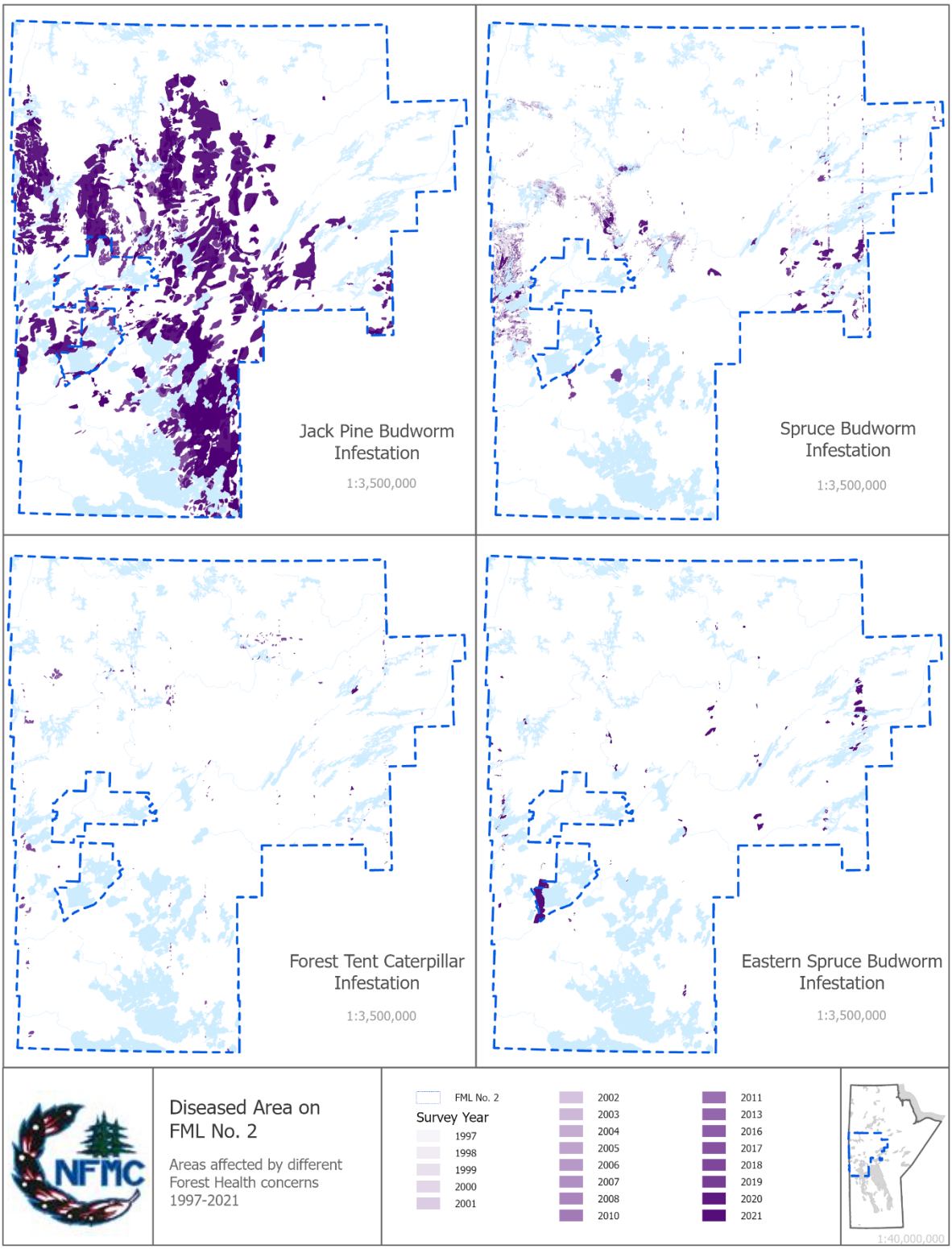


Figure 3.2. Hectares of defoliation across FML 2 between the period of 1997 to 2020 by the three major defoliators within the area: Spruce budworm, jack pine budworm, and forest tent caterpillar.

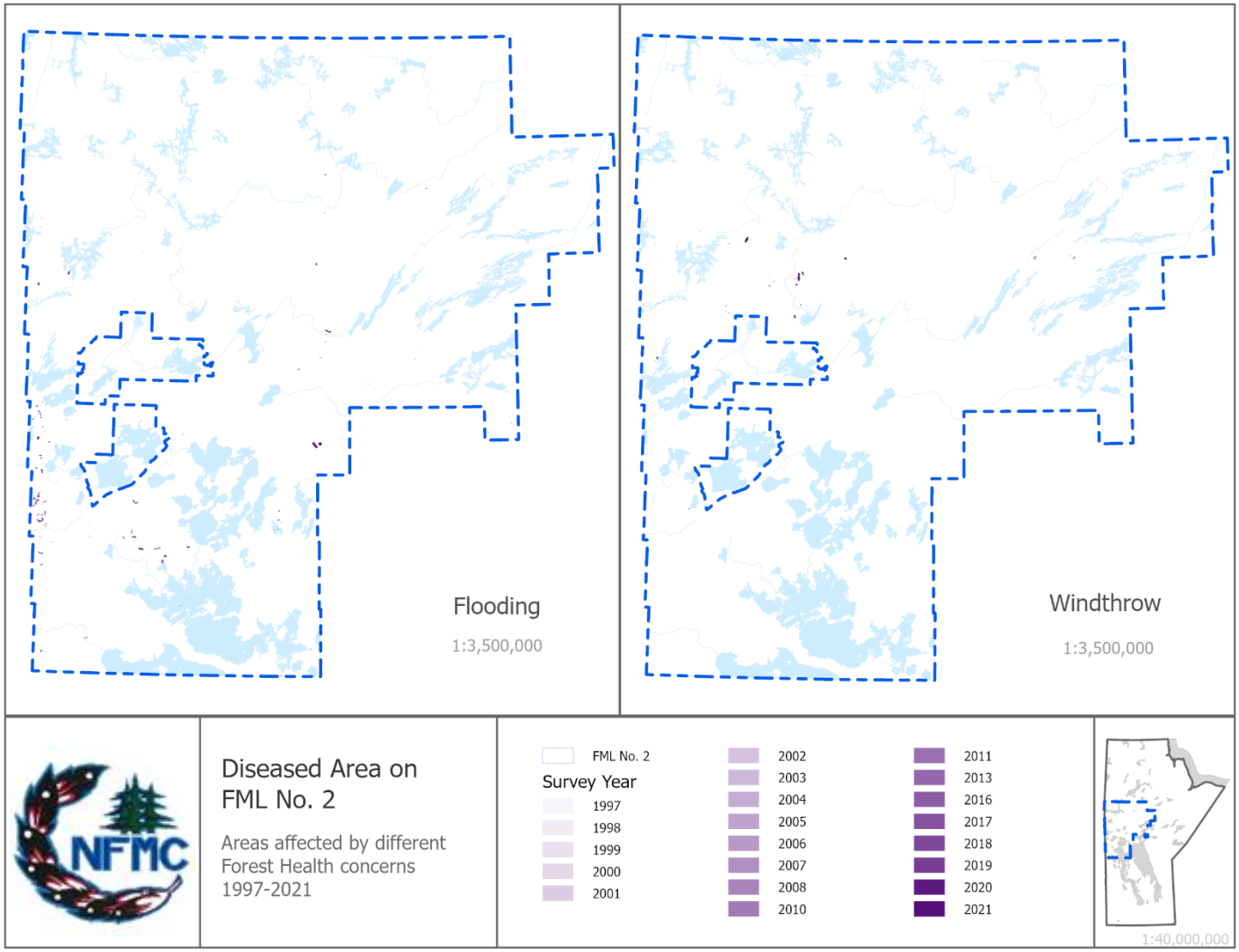


Reference: Manitoba Natural Resource & Northern Development [August 31, 2022]

Map 3.15. Forested areas within FML 2 affected by jack pine budworm, spruce budworm, forest tent caterpillar, and eastern spruce budworm infestations between 1997 and 2021.

Reference: Manitoba Natural Resource & Northern Development [August 31, 2022]

Map 3.16. Forested areas within FML 2 affected by bark beetle, foliar disease, dwarf mistletoe, and eastern larch beetle infestations between 1997 and 2021.



Reference: Manitoba Natural Resource & Northern Development [August 31, 2022]

Map 3.17. Forested areas within FML 2 affected by flooding and windthrow disturbance between 1997 and 2021.

4 Current Forest Description

The existing Forest Resource and Forest Lands Inventories (FRI/FLI; see Appendix G for full list of FML 2 inventory references by forest management unit) provided the baseline categorization of the forested land within FML 2. Information contained within forest inventories describes tree species types, composition, structure, and age that can be used to group similar types of trees into forest stands. This baseline inventory information was updated to reflect forest conditions in 2020 by including additions and deletions from the previous plan. This information was provided by the Province. Updates to the landbase included harvesting, regeneration, and free-to-grow management information, as well as natural disturbance changes from fire, blowdown, and insect outbreak. The landbase being used for the 20-year forest management plan was further updated by Nisokapawino Forestry Management Corporation (NFMC) to include more recent known harvesting activities, natural disturbance, and to give a more accurate representation of current age across the FML area. Attributes were adjusted for each forest section to provide consistent identification of forest types (strata) across the whole of FML 2 (see Appendix A for strata definitions and consolidation). This updated spatial description of the landbase provides the best representation of forest structure and composition to begin the forest management planning process. The effective date of the landbase used for this forest management plan is May 2022. For more information on the development of the landbase, see Part 2 – Analysis and Modelling, Forest Modelling subsection 10.1.2 Spatial Data Preparation.

For the purpose of forest management planning, the Province classifies land into one of five categories:

1. Productive forested land, as indicated by forest cover type, including all forest land capable of producing merchantable wood. Productive forest types include softwood (S), softwood-leading mixedwood (M), hardwood-leading mixedwood (N), and hardwood (H).
2. Non-productive forested land, including all forest land not capable of producing merchantable wood due to site conditions (soil, drainage, etc.).
3. Potentially productive forest land, including all forest that may have been recently affected by natural disturbance and is not yet known to be capable of producing merchantable wood post-disturbance.
4. Non-forested land, including land withdrawn from wood production for a long period of time due to site conditions or other land use.
5. Water, including lakes and rivers.

As of the 2022, the updated landbase indicates that over 6.4 million hectares of FML 2 is forested land, with approximately 3.9 million hectares of this area being productive forest and over 2.4 million hectares being considered non-productive. Non-productive forests do, however, provide valuable habitat and diversity across the landscape. Of the 3.9 million hectares of productive forest, approximately 2.8 million are available for harvest*. Otherwise, approximately 1.1 million hectares of the licence area is non-forested, while 1.6 million is open water (Table 4.1; Figure 4.1). For a further description of forest types, see the following Section 4.1 Forest Strata. For more information on how the landbase was adapted for use in the strategic planning and management of forest resources, see Part 2 – Analysis and Modelling, Forest Modelling subsection 10.1.2 Spatial Data Preparation.

Table 4.1. FML 2 area classified in hectares (ha) by category. Categories are productive, non-productive (NP) and potentially productive (PP) forest, non-forested (NF) area, and open bodies of water. Productive forests have been further classified as softwoods (S), softwood-leading mixedwoods (M), hardwood-leading mixedwoods (N), and hardwoods (H).

Forest Section	Productive (ha)					NP & PP (ha)	NF (ha)	Water (ha)	Total Area (ha)
	S	M	N	H	Total				
Sask. River	489,430	92,910	70,408	65,774	718,522	NP 961,266 PP 93,116	413,493	763,314	2,949,711
Highrock	1,300,156	196,156	143,706	82,420	1,722,436	NP 805,217 PP 127,321	487,537	529,384	3,671,895
Nelson River	1,187,857	143,847	102,106	71,309	1,505,118	NP 418,546 PP 64,100	202,915	342,861	2,533,540
Total	*2,977,442*	*432,912*	*316,220*	*219,502*	*3,946,077*	*NP 2,185,029 PP 284,536*	*1,103,945*	*1,635,559*	*9,155,146*

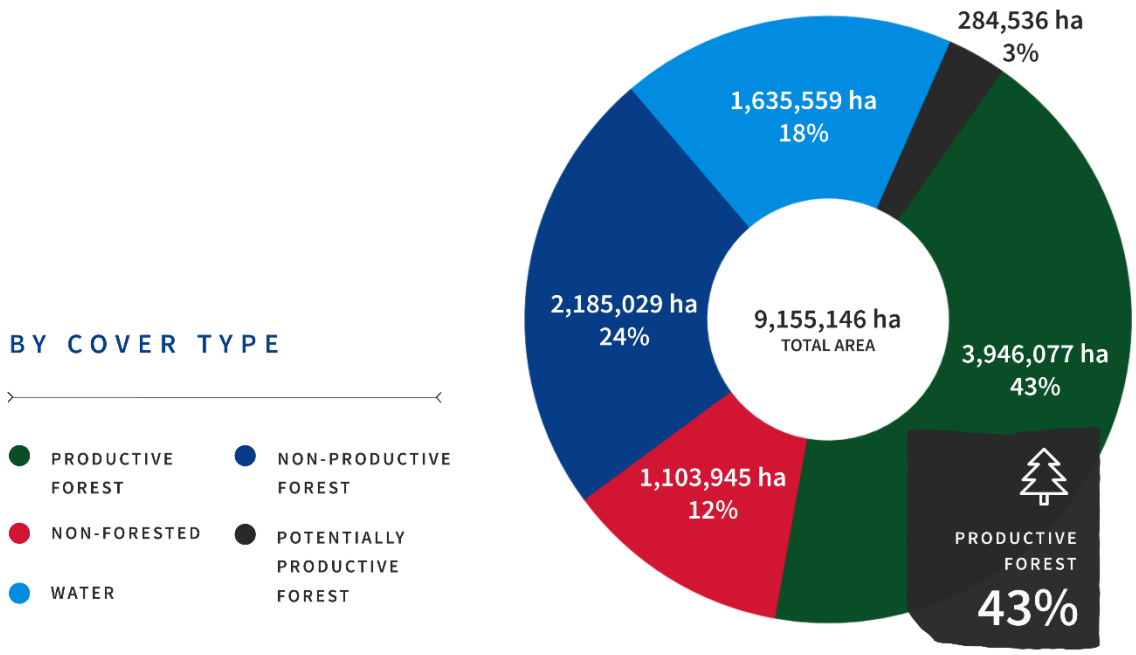


Figure 4.1. Distribution of land cover categories across FML 2 as of the 2022 updated landbase.

4.1 LANDSCAPE DIVERSITY

The intrinsic objective of sustainable forest management activities is the at the minimum maintain, but preferably enhance forest structure on the managed landscape (OMNR, 2014). This requires an understanding of the structure, pattern, function, and composition of the forest as it is represented on the landscape in natural aggregations. For FML 2, landscapes diversity is evident in the way forest pattern and composition vary across the vast FML area.

4.1.1 Forest Age

There are a wide range of age classes across FML 2 (Map 4.1; Map 4.2). As of the 2022 landbase update, the average age of the forest was 62 years old. There are significant portions of forest that are relatively young, with the age class containing the highest concentration of forested area being in the 0 to 20 years class (approximately 23%; Table 4.2). However, there are specific forest strata whose average age are 80 years or older, including lowland (90 years) and upland black spruce (81 years) forests as well as black spruce/tamarack forests (97 years). The youngest stands on the landscape are primarily within jack pine (55 years) and hardwood (50 years) forests, coinciding with recent fire and insect disturbance on the landscape. Some of the oldest forests on the landscape are concentrated in the southwest of the FML in the Saskatchewan River Forest Section and the interior of the Nelson River Forest Section.

Table 4.2. Hectares (ha) of forest (productive, non-productive, and potentially productive) by age class and seral stage across FML 2 as of the 2022 updated landbase.

Age Class	Age Class Area (ha)				Seral Stage	Seral Stage Area (ha)
	Productive	Non-productive	Potentially Productive	Total		
0 to 20 years	276,622	463,268	224,950	964,840	Young	1,812,847
21 to 40 years	816,764	82	31,160	848,006		
41 to 60 years	606,574	153	257	606,985	Immature	1,076,615
61 to 80 years	468,020	1,609	0	469,629		

Age Class	Age Class Area (ha)				Seral Stage	Seral Stage Area (ha)
	Productive	Non-productive	Potentially Productive	Total		
81 to 100 years	862,899	5,935	4	868,839	Mature	1,353,599
101 to 120 years	473,488	11,272	0	484,760		
121 to 140 years	347,821	8,557	14	356,392	Old	548,400
141 to 160 years	69,083	49,209	0	118,292		
161 to 180 years	23,849	30,807	0	54,656		
181 to 200 years	891	7,826	0	8,717		
201+ years	57	10,284	0	10,341		

As previously mentioned, there is a higher representation of young seral forests on FML 2, making up approximately 38% of all forested area (Figure 4.2). This prevalence is primarily attributed to natural fire disturbance, but insect infestation and blowdown are also notable contributing factors. When observed on the greater spatial scale, young forests that have developed from the more recent, high-intensity fires have created patches that are generally distributed in large, contiguous patterns. Young forest openings occur most frequently in small patches (Figure 4.3); however, the largest area of young forest falls within the greater than 5,000-hectare size class. This variation in size class is typical and representative of a boreal landscape disturbed by fire, providing the diversity of structure, composition, and pattern for sustaining wildlife habitat. For more information, see Part 2 – Analysis and Modelling, Scenario Analysis subsection 12.2.2.6.1 Examining Existing Openings on the Landscape.

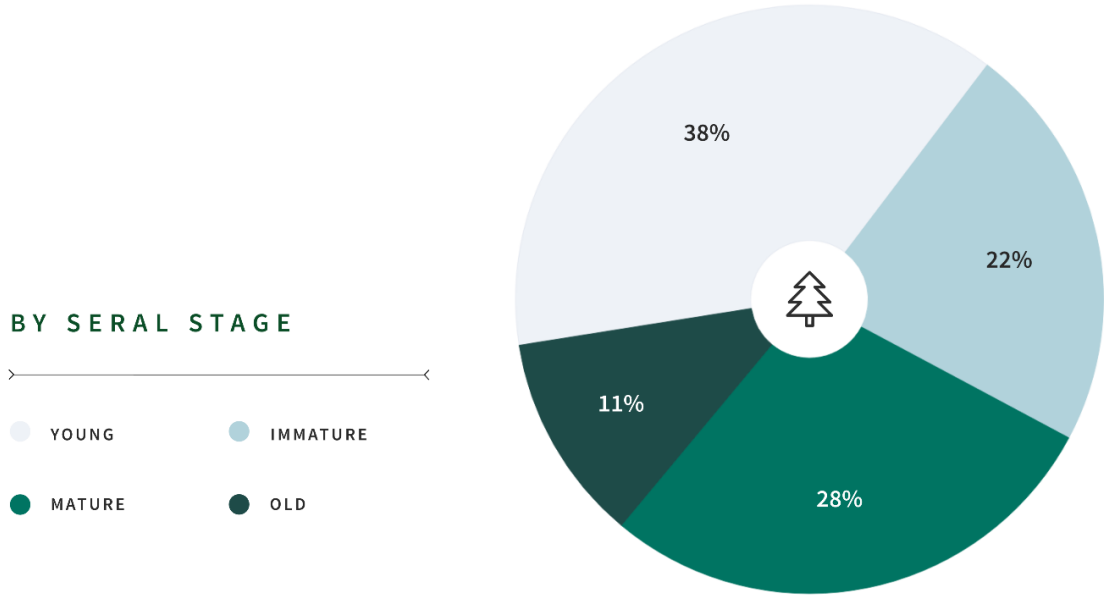


Figure 4.2. Distribution of seral stages of all forested area across FML 2 as of the 2022 updated landbase.

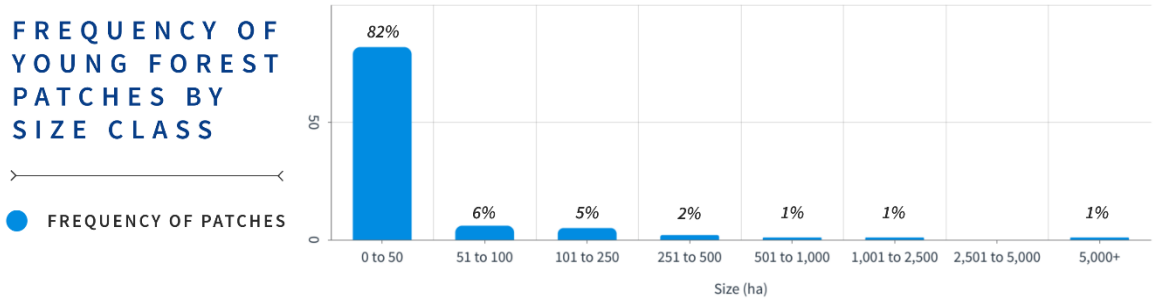
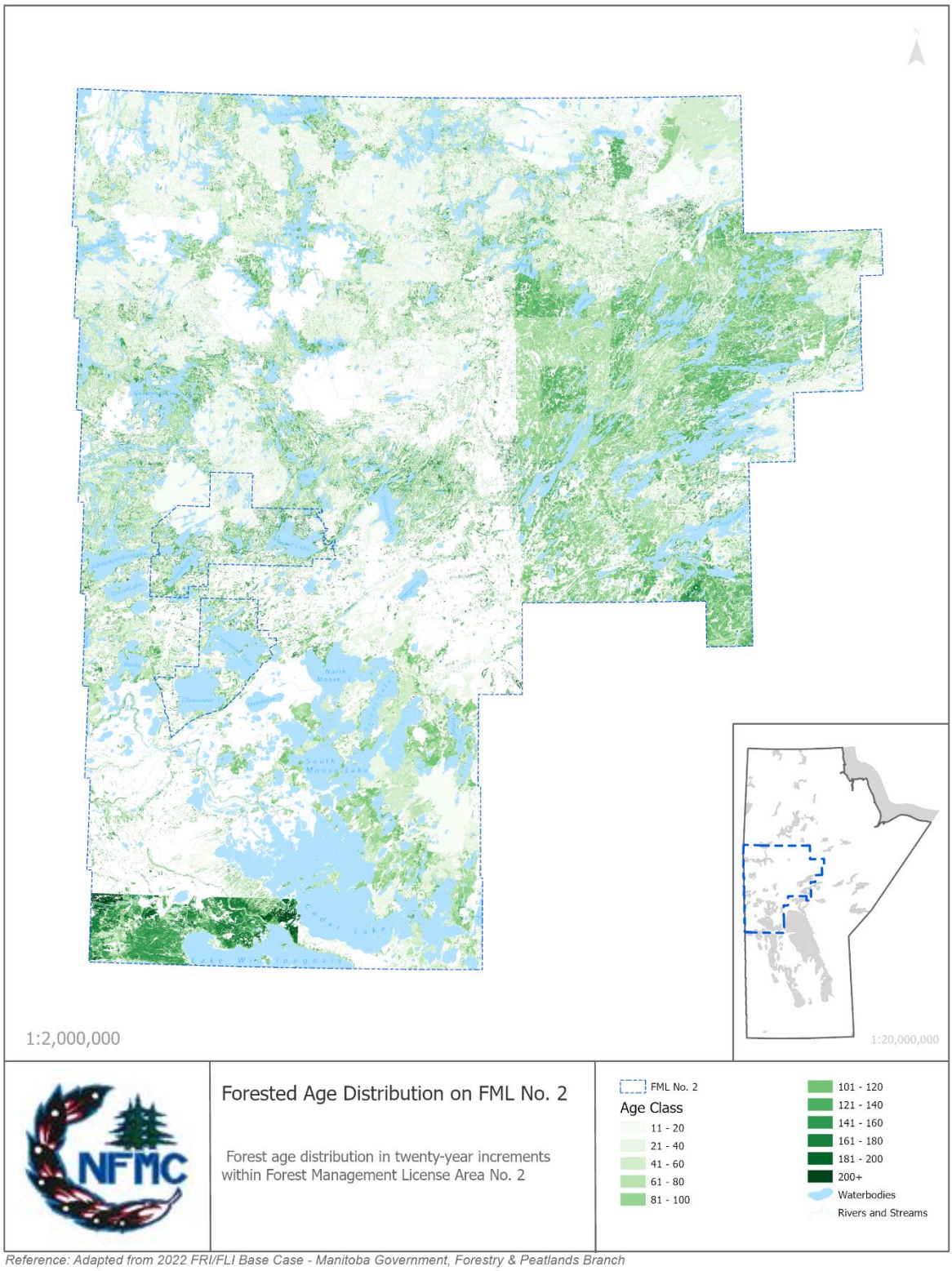
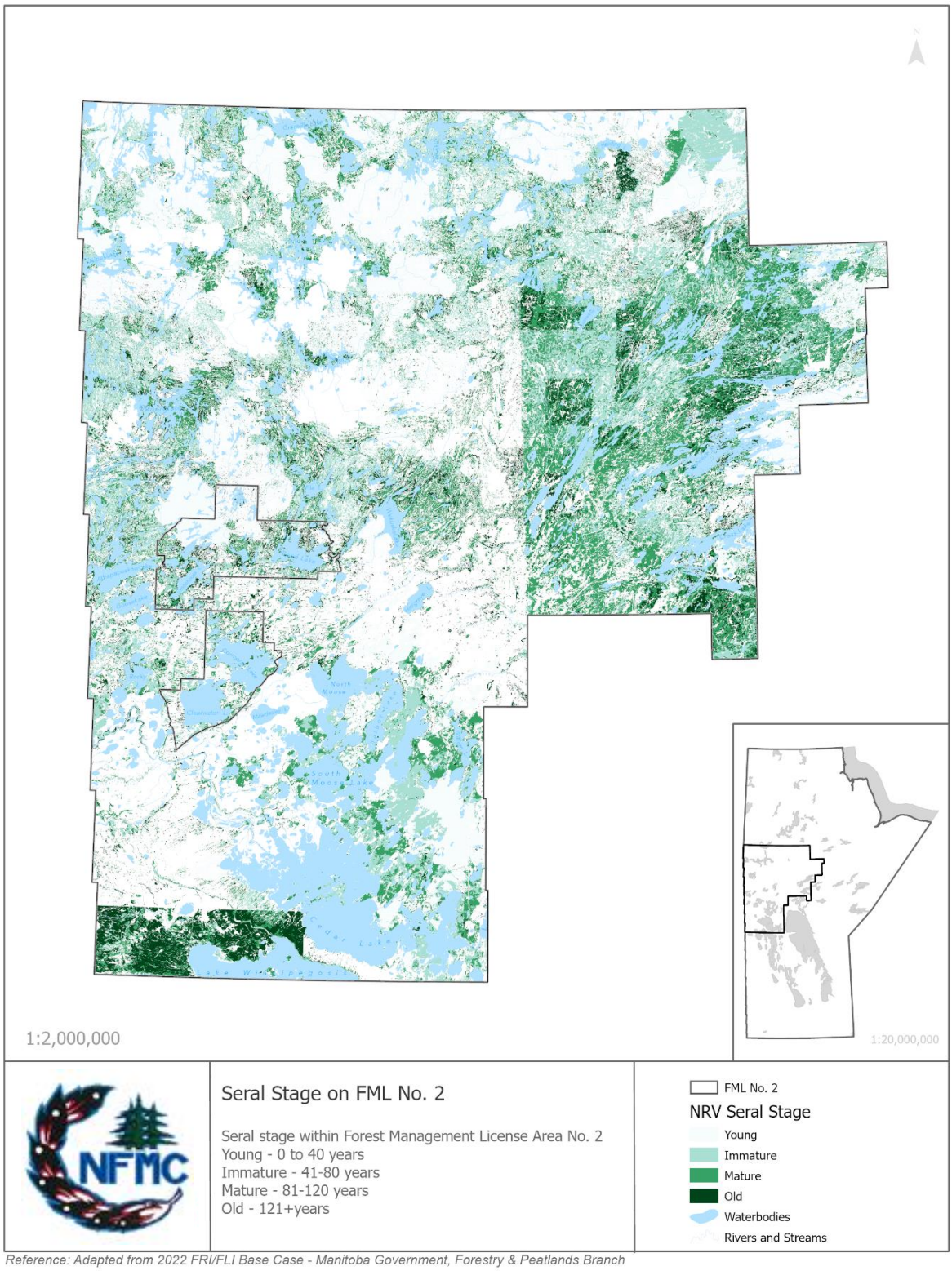


Figure 4.3. Frequency distribution of young forest patches by size class in hectares (ha) on FML 2 as of the 2022 updated landbase.



Reference: Adapted from 2022 FRI/FLI Base Case - Manitoba Government, Forestry & Peatlands Branch

Map 4.1. Age class distribution of productive forests across FML 2 as of the 2022 updated landbase.



1446

1447 *Map 4.2. Seral stage distribution of productive forests across FML 2 as of the 2022 updated landbase.*

4.1.2 Forest Strata

Forest cover across FML 2 is generally predominated by coniferous tree species (Figure 4.4; Table 4.3), the most common being black spruce (*Picea mariana*) forests (34%), followed by more generalist softwood forests (SFWD; 25%) in which the majority of tree cover is composed of a mix of balsam fir (*Abies balsamea*), black spruce, jack pine (*Pinus banksiana*), and/or white spruce (*Picea glauca*). The pure black spruce forests on the landbase are further divided into two categories: Upland (UBS) and lowland (LBS) black spruce, with the majority of forests falling into the former stratum. Stands of mixed wood forest (MSPF/NSPF) exist on approximately one fifth of the landbase, and pure jack pine (JP) forests are scattered across approximately one tenth of the landbase. Remaining forest cover consists of a mix of smaller populations of pure commercial hardwood (CHDWD), pure trembling aspen (*Populus tremuloides*; TA), black spruce and tamarack (*Larix laricina*; STL), and other softwood (OSFWD) forests.

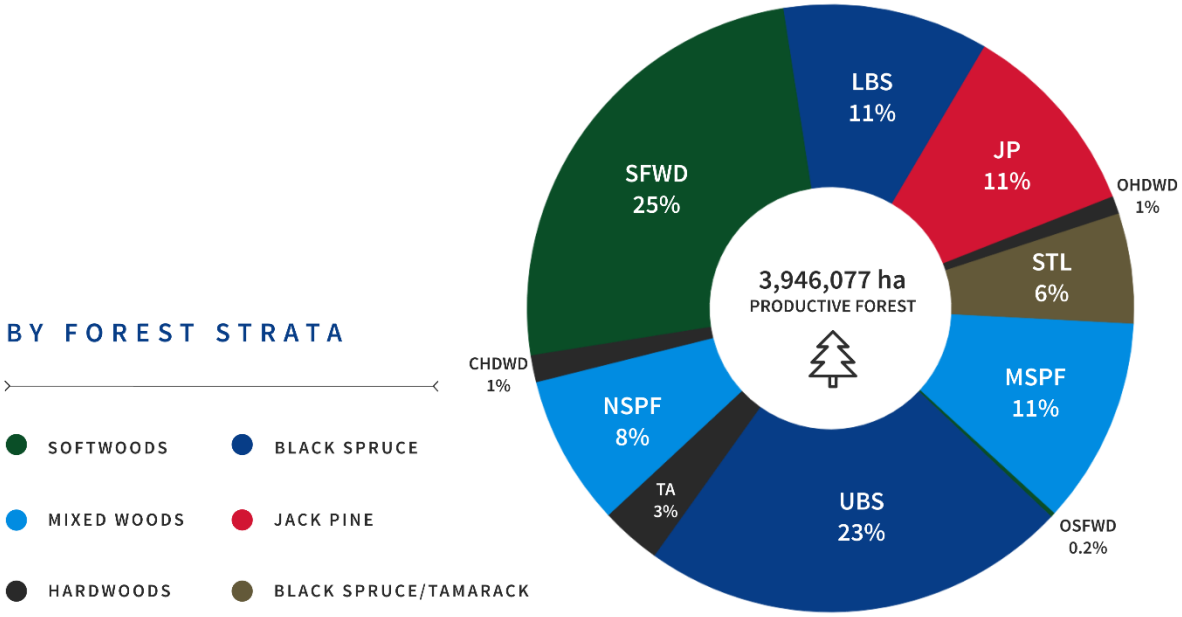


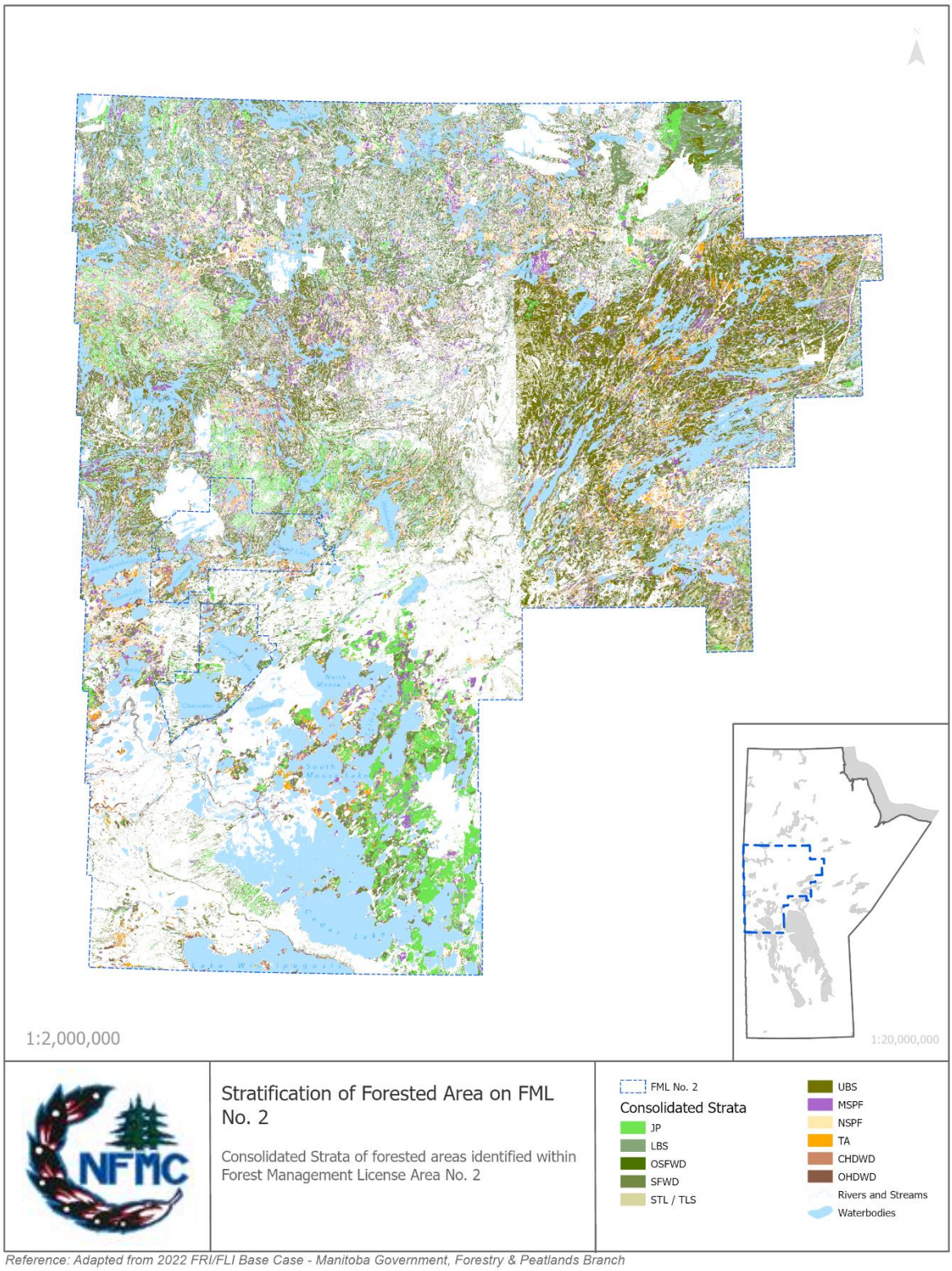
Figure 4.4. Distribution of strata of productive forests across FML 2 as of the 2022 updated landbase.

Table 4.3. Hectares (ha) of productive forest (PF) by broad cover type and strata across FML 2 as of the 2022 updated landbase. See Appendix A for a full description of FRI/FLI inventory strata and consolidation. Cover types are softwood (S), softwood-leading mixedwood (M), hardwood-leading mixedwood (N), and hardwood (H).

Cover Type	Strata		Strata Area (ha)	Cover Type Area (ha)
S	JP	Jack pine	415,710	2,977,442
	LBS	Lowland black spruce	432,128	
	OSFWD	Other softwood mix	9,359	
	SFWD	Pure softwood mix	987,757	
	STL	Black spruce and tamarack	231,465	
	UBS	Upland black spruce	901,020	
M	MSPF	Softwood-leading mixedwood	432,912	432,912
N	NSPF	Hardwood-leading mixedwood	316,220	316,220
H	CHDWD	Pure hardwood mix	55,224	219,502
	OHDWD	Other hardwood mix	37,301	
	TA	Trembling aspen	126,975	
			Total	*3,946,077*

Productive strata are generally more evenly distributed across the landscape in the northern extent of the FML (Map 4.3), while forests in Saskatchewan River Forest Section are more scattered amongst waterbodies and developed land. Jack pine is the most abundant forest strata in the south, while in the northwest, Highrock Forest Section contains a more balanced, evenly distributed mix of forest strata such as jack pine, lowland black spruce, and mixed wood forests, and the highest concentration of generalist softwood-dominated forests. In the northeast, the Nelson River Forest Section is predominated by populations of upland black spruce with notable populations of softwood forests alongside a more evenly distributed mix of spruce/tamarack, lowland black spruce, and mixed woods forests. Highrock Forest Section is the largest of the three forest sections, and appropriately contains the highest amount of forested land at approximately 1.7 million hectares.

In general, softwood forests, including generalists and "pure" black spruce or jack pine forests, are often found in larger, more contiguous patches across the FML while hardwood and mixed wood forests are typically found in smaller, more isolated patches on the landscape (Map 4.3). The spatial distribution of strata highlights the diversity of ecosystems on the landscape resulting from natural disturbances. Larger disturbance patterns from fire in conifer dominated areas and smaller disturbance patterns in hardwoods and mixedwoods from blowdown, succession, insects and lower intensity fires. These diversities in distribution represent the natural variability of the landscape and provides functional habitat for a range of flora and fauna species on FML 2.



Reference: Adapted from 2022 FRI/FLI Base Case - Manitoba Government, Forestry & Peatlands Branch

Map 4.3. Strata distribution of productive forests across FML 2 as of the 2022 updated landbase.

5 Socio Economic Conditions

5.1 COMMUNITY ECONOMIC PROFILES

Information for the following sections was gathered from *The Pas and Area Economic Profile, Flin Flon and Area Economic Profile, and Thompson and Area Economic Profile* published by the Province of Manitoba's Look North Initiative in 2021. The Town of The Pas and the City of Thompson communities fall within Statistics Canada Census Division No. 21, while the City of Flin Flon falls within Census Division No. 22.

5.1.1 The Pas and Area

The surrounding area of The Pas includes Cormorant, Easterville, Herb Lake Landing, the municipality of Kelsey, Moose Lake, Mosakahiken Cree Nation, Opaskwayak Cree Nation, and Sherridon communities.

In 2019, 14,878 people were living in The Pas and surrounding area. The total population had decreased by 1.2% since 1991.

A lower proportion of the population has an apprenticeship or trades certificate/diploma, University certificate/diploma/degree than the rest of the province. A higher proportion of the population is without a high school certificate or equivalent.

The percentage of households in most income brackets is either similar or slightly lower than the rest of the province. The only income bracket that has a higher percentage of households than the provincial average is the highest income bracket of $100,000 and greater.

In 2019, there were 6,174 jobs, with an increase of 894 jobs, or 16.9%, from 2014 to 2019. This exceeded the provincial average of a 4.3% increase. Seven percent (7%) of these 2019 jobs were manufacturing-based and 2% of these jobs were within agriculture, forestry, fishing and hunting. The manufacturing sector gained 161 jobs from 2014 to 2019. Agriculture, forestry, fishing, and hunting gained 35 jobs from 2014 to 2019. The number of agriculture, forestry, fishing, and hunting businesses in the area in 2019 were 82 – second highest category only to real estate and rental/leasing businesses.

5.1.2 Flin Flon and Area

In 2016, 5,865 people were living in Flin Flon and the surrounding area. The total population decreased by 24.3% since 1991.

In 2016, there were 4,279 jobs. There was a decrease of 253 jobs from 2011 to 2016. During this period, 6% of the jobs were in mining and oil/gas extraction, 40% of the jobs were in manufacturing, utilities and Construction, 53% of the jobs were tertiary (industries that provide goods and services to business and consumers, for example, accounting, retail), and 21% of jobs were in sectors traditionally funded by government (education, healthcare, and public administration).

5.1.3 Thompson and Area

The communities considered in the surrounding area of Thompson include communities from outside of FML 2. This includes Bunibonibee Cree Nation, Cross Lake (Incorporated Community), Cross Lake Band, Garden Hill First Nations, God's Lake First Nation, Gods Lake Narrows, Ilford, Island Lake, Manto Sipi Cree Nation, Mystery Lake (local government district), Nelson House (incorporated community), Nisichawayasihk Cree Nation, Norway House, Norway House Cree Nation, Pitwitonei, Red Sucker Lake, Red Sucker Lake First Nation, St. Theresa Point First Nation, Tataskweyak Cree Nation, Tataskweyak Cree Nation, Thicket Portage, Thompson (city), Wabowden, War Lake First Nation, Wasagamack First Nation, and York Factory First Nation.

In 2019, there were 45,900 people living in the area. The population decreased by 25.4% from 1991 to 2019.

A lower proportion of the population has a high school certificate or equivalent, apprentice or trades certificate/diploma, or college, CEGEP or other non-university certificate or diploma than the rest of the province.

The percentage of households in the majority of income brackets, including the highest income bracket of $100,000 and greater, is above the provincial average.

In 2019, there were 15,962 jobs. From 2014 to 2019 there was an increase of 1,813 jobs. During this period, 7% of jobs were in mining and oil/gas extraction, 16% of jobs were in construction, manufacturing, and utilities, 77% were in tertiary sectors, and 45% of jobs were in sectors traditionally funded by government (education, healthcare, and public administration).

5.2 COMMUNITY ECONOMIC DEVELOPMENT POLICIES

There are many organizations that have established economic development policies for communities within the FML such as the Communities Economic Development Fund, Community Futures Greenstone, Paskwayak Business Development Corporation, The Pas Community Development Corporation, and Flin Flon & District Chamber of Commerce.

NFMC welcomes additional sources and contacts to include more economic policies and development plans from communities.

5.2.1 Communities Economic Development Fund Look North Initiative

Communities Economic Development Fund's (CEDF) Look North Initiative has three purposes:

1) Inspiring an economic movement in northern Manitoba.
2) Identifying sustainable and long-term solutions that lead to economic growth and diversification.
3) Building understanding and collaboration across communities.

Six priority areas were identified as the foundation and framework of the initiative:

1) Northern mineral and other resource potential;
2) Indigenous engagement and partnerships;
3) Strategic infrastructure investment;
4) Housing challenges and opportunities;
5) Enterprise eco-system of support; and,
6) Education, training, and workforce development (CEDF, 2021).

5.2.2 Community Futures Greenstone

Community Futures Greenstone is a federally funded initiative that serves Bakers Narrows, Flin Flon, Cranberry Portage, Sherridon and Snow Lake within the FML. The initiative aims to help rural Canadians start or expand their business and help sustain and improve communities and their local economies.

Mission Statement	To invest in the future of our region by fostering economic growth, innovation, and diversification.
Vision Statement	To inspire collaborative projects that will unite the north, strengthen our capacity for community building, and harness the power of entrepreneurial spirit.

5.2.3 Paskwayak Business Development Corporation

Paskwayak Business Development Corporations (PBDC) main objectives are to pursue business, investment, and economic development opportunities that will grow Opaskwayak Cree Nation (OCN) wealth and help it provide quality social programs that support the local Cree community (PBDC, 2018).

Mission Statement	Paskwayak Business Development Corporation will generate wealth through profitable business management and corporate operations, which will provide increased opportunities for training, employment, and private business ownership.
Vision Statement	Paskwayak Business Development Corporation will be a major economic force in Manitoba and the largest employer in our region.

5.2.4 The Pas Community Development Corporation

The Pas Community Development Corporation (PCDC) has recently published their *Economic Framework and Roadmap* (2021). The leading principles of the PCDC are to:

- Pursue alignment with community stakeholders;
- Support community economic development efforts through services and programs;
- Embrace and adjust to change;
- Balance capacity with capabilities; and,
- Commit to transparency and accountability.

The corporation's key objectives are:

Partnership	Community economic development alignment of regional stakeholders.
Community Capacity Building	Socio-economic alignment.
Business Retention & Expansion	Seeking external investment to support regional economy.
Communication & Promotion	Proactive marketing.

5.2.5 Flin Flon and District Chamber of Commerce – Regional Economic Development Commission

The commission provides strategic leadership in economic development initiatives undertaken on behalf of three communities across two provinces: the City of Flin Flon, the Town of Creighton, and the Village of Denare Beach. The Commission is structured with the aim to continuously improve its region's capacity in fostering sustainable development, paralleled by planned efforts in guiding economic diversification.

5.3 ECONOMIC CONTRIBUTION OF THE MILL TO THE PROVINCE

Canadian Kraft Paper Industries Limited (CKP) has at any given time an average of 340 employees on payroll while also engaging many contractors for specialized work. In 2021, the Company spent a total of $189,999,999 (Figure 5.1). Of this spending, $105,471,515 (56%) contributed directly to the Provincial economy. The majority of economic contribution in 2021 came from expenditures that fall under Other Goods and Services. Of the amount 100% of spending within the Wages and Benefits ($38,512,286) category went directly to employees located within the province.

The Company makes an effort to award expenditures, where possible, to local Indigenous groups and communities. For example, in 2021 there were thirty-one signed Woodlands Service Agreements on the FML that were executed. These agreements would be included within a portion of spending under the Other Goods and Services category. Twenty-two of the agreements (63%) were awarded within the FML, seven held within the greater Manitoba area (30%), and the remaining agreements outside of Manitoba (7%; Figure 5.2). Ten of the thirty-one agreements were awarded to Indigenous groups within the FML, and three to Indigenous groups from the greater Manitoba area (53% total). The total value of Agreements awarded for FML 2 in 2021 was $7,361,740, with $6,876,961 (97%) being awarded to contractors from within the province.

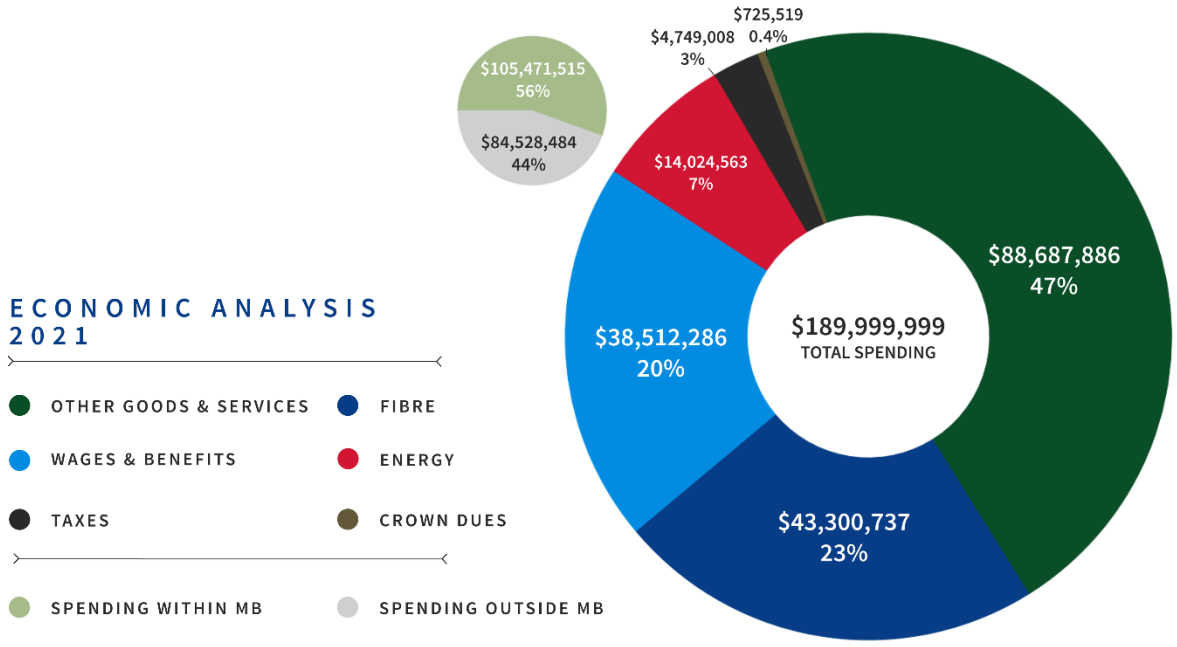


Figure 5.1. 2021 mill spending by category. Crown dues, energy (fuels and hydro), fibre, Manitoba (N taxes (property and Provincial), other goods and services, and wages and benefits, including the proportion of spending that contributed directly to Manitoba economy directly (smaller pie charts) as coded by colour to each category, with gray indicating spending on sources outside of Manitoba (MB).

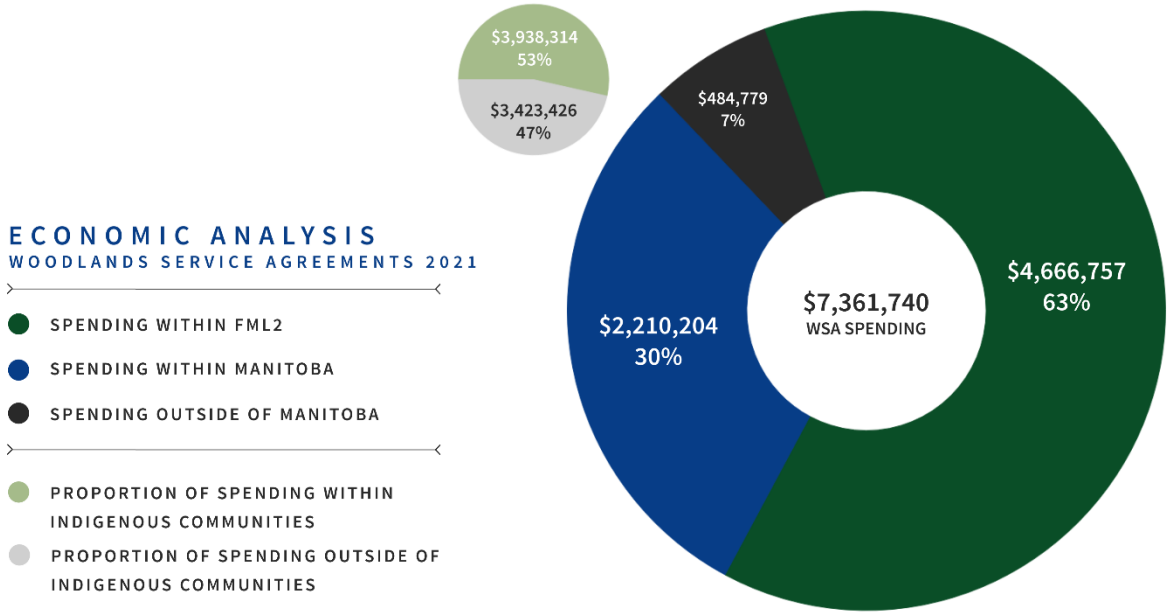


Figure 5.2. 2021 mill Woodlands Service Agreement spending by origin (within the FML 2, within the greater Manitoba area, or outside of Manitoba) and the proportion of the total spent amount awarded to Indigenous groups.

5.4 HYDROELECTRIC POWER

Manitoba Hydro services most communities within FML 2 with hydroelectric power. In fact, Manitoba Hydro is the largest electricity and natural gas utilities service in Canada and not only provides electricity to Manitoba but also trades in four markets within the US and Canada.

Manitoba Hydro is the biggest employer in Manitoba. According to the company board's *71st Annual Report* (2022), Manitoba Hydro-Electric had 4,962 full-time employees during the 2021 to 2022 fiscal year, 999 of which who were of Indigenous descent. In 2021/2022 fiscal year, the company posted a total revenue of $3.04 billion and serviced over 608,554 and 293,256 electric and natural gas customers, respectively.

5.4.1 Hydroelectric Power Infrastructure

Within FML 2, there are five hydro generation stations: Laurie River 1 and 2; Wuskwatim; Grand Rapids, and; Jenpeg. A Manitoba Hydro water flow control structure is located at Notigi Lake (Map 5.1).

FML 2 is transected and serviced by several high-voltage transmission lines (Map 5.1). There are three high-voltage direct current (HVDC; estimated at 450 kilometres) lines, two of which (Bipole I and Bipole II) originate at the Limestone, Long Spruce, and Kettle generating stations on the Nelson River. These lines run alongside each other and transect the licence area in the southwest between Thompson and Cross Lake, to the northwest end of Lake Winnipeg from which point the lines parallel to Provincial Trunk Highway (PTH) 6, eventually delivering power to the city of Winnipeg. The third HVDC line (Bipole III) was completed in 2018 and erected on a different route beginning at the Keewatinohk converter station approximately 80 kilometres northwest of Gillam. This line transects the licence area in the southwest, through Ponton to The Pas. It eventually follows PTH 10 and ends at the Riel converter station just east of Winnipeg. This third HVDC line improves the reliability of the HVDC system. Over 70% of electricity generated in Manitoba is delivered through these three transmission lines.

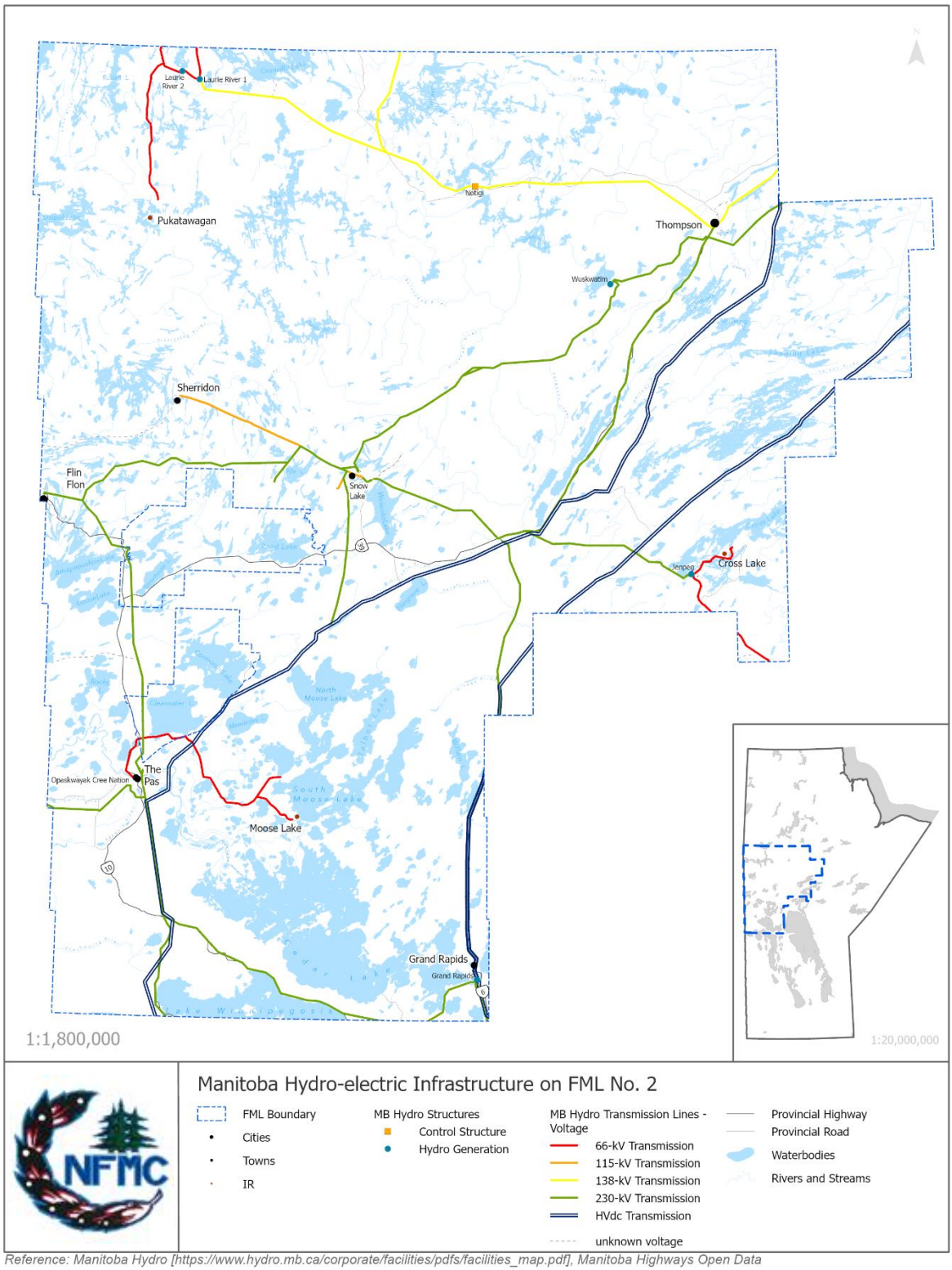
There are 2,200 kilometres of transmission line on FML 2, including 230 kilovolt (KV), 138 KV, 115 KV and 66 KV lines. 230 KV lines exist between the Wuskwatim generating station, branching at a point northwest of Ponton toward Ponton, Flin Flon, and The Pas. From Ponton, two lines branch toward the Jenpeg generating station and south to Grand Rapids. At Grand Rapids, one line runs southwest to Winnipeg and Dauphin. Communities along PTH 10 that receive power from 230 KV lines include Flin Flon, Cranberry Portage, Namew Lake, The Pas, Campbell (SK), Mafeking, Minitonas and Dauphin (Map 5.1).

Numerous 138 KV lines deliver power to communities within FML 2. Two lines are located between Thompson and the Kelsey generating station south of Split Lake, with one line running west from Thompson to eventually split southwest of Rat Lake to deliver power to Leaf Rapids and Laurie River. One additional 138 KV line connects the two major 230 KV lines running north-south between Grand Rapids and Overflowing River at the northwest extremity of Lake Winnipegosis (Map 5.1).

Flin Flon, Island Falls (SK), Sherridon, and Snow Lake are connected by a combination of 230 KV and 115 KV lines (Map 5.1). On a more local level, 66 KV lines provide power between the generating station at Laurie Lake (1) and Lynn Lake, the generating station at Laurie Lake (1) and the Fox Lake Mine, and Laurie Lake (2) and Pukatawagan. Lines also exist between Dunlop and Wabowden, Jenpeg generating station and Cross Lake, William River, Warren Landing and Norway House; The Pas, Clearwater Lake, Crossing Bay and Moose Lake (Map 5.1).

5.4.1.1 Planned Hydroelectric Development

There are no new proposed generating station developments planned on FML 2 for the duration of the forest management plan planning period. However, there has been a new 695-megawatt generating station built just outside of the licence area in the northeast between Split and Kettle Lakes. The Keeyask Project was developed by Keeyask Hydropower Limited Partnership, a venture between Manitoba Hydro and four First Nations (Tataskweyak Cree Nation, War Lake First Nation, York Factory First Nation, and Fox Lake Cree Nation) that saw seven generating units built between 2012 and 2022.



Reference: Manitoba Hydro [https://www.hydro.mb.ca/corporate/facilities/pdfs/facilities_map.pdf], Manitoba Highways Open Data

Map 5.1. Manitoba Hydro hydroelectric power infrastructure on FML 2.

5.5 MINING

Information for this section was provided by the Stewardship and Resource Development Branch of the Manitoba Department of Natural Resource and Development (Gallagher, 2022).

Mines are found primarily around the communities of Flin Flon, Thompson, and Snow Lake. As of August 2022, the following mines were within FML 2 (Table 5.1). 777 Mine completed mining in June 2022 and is now being decommissioned and undergoing mine closure plans.

Table 5.1. Status, operating corporation, location, and material mined for open mines within FML 2.

Status	Mine	Corporation	Location	Materials Mined
Active	Thompson Mine T1 & T3	Vale Limited	Thompson	Nickel, copper
Active	Lalor Mine	Hudbay Minerals	Snow Lake	Copper, zinc, gold, silver
Care & Maintenance	Birchtree Mine	Vale Limited	Thompson	Nickel, copper
Care & Maintenance	Bucko Lake Mine	CaNickel Mining Limited	Wabowden	Nickel
Decommissioning	777 Mine	Hudbay Minerals	Flin Flon	Copper, zinc

There are no major quarries in FML 2, however several smaller quarry operations exist throughout the region.

5.5.1 Mining Dispositions

Map 5.2 shows the mining claims, mineral exploration licences, mineral leases, surface leases, and patented mining claims within FML 2. The definition of these disposition types is described below.

5.5.1.1 Mining Claims

A mining claim gives the holder exclusive right to explore the area within the boundaries of the claim. A claim does not have to be surveyed. The maximum size of a claim is approximately 256 hectares, and the minimum size approximately 16 hectares. Claims in territory that has not been surveyed are physically staked by cutting posts, blazing lines, and clearing the underbrush to clearly delineate the claim line. The operator who staked the area then submits an application with a sketch showing the location of the mining claim by including topographical features, distances between posts, distance to lakes or rivers, etc.

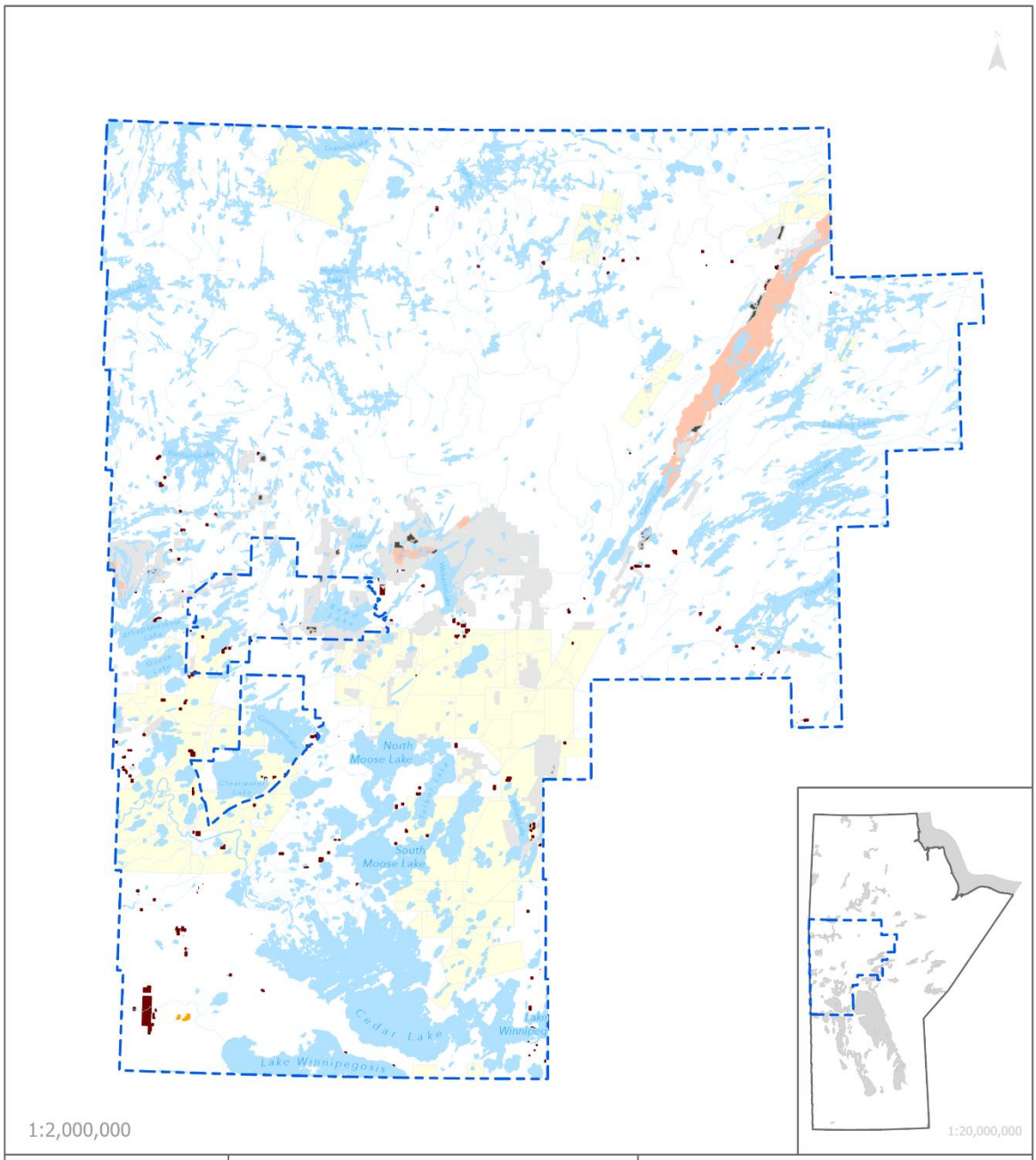
Mining Claim Leases are a past disposition type that's no longer issued and pre-dates the current *Mines and Minerals Act* (MMA; 1992). These were leases issued in the Thompson, Flin Flon, and Snow Lake areas for mining projects prior to the development of Mineral Leases. Each of the mining claim leases were continued as a lease under the MMA.

5.5.1.2 Mineral Exploration Licence

A mineral exploration licence (MEL) gives the holder exclusive right to explore the area within the boundaries of their MEL. MELs are acquired through a paper application and sketch giving the Mines Branch of the provincial government the GPS coordinates of their disposition so that it can be plotted on maps. MELs are large dispositions, between 5,000 and 100,000 hectares, and are usually used for early exploration purposes. Usually, large MELs are reduced to mining claims. MELs are not surveyed.

5.5.1.3 Mineral Leases

A mineral lease (ML) allows the holder of the mineral lease to produce within the boundaries of their ML. Mineral Leases are converted from existing mining claims and must be surveyed by a licenced surveyor within two years of the issue date of the mineral lease.



Mining Type	Count	Area (ha)	% of FML
Mining Claims	2626	369,247.4	4.21
Mineral Claim Lease	3338	115,127.3	1.31
Mineral Lease	29	10,533.2	0.12
Surface Lease	41	1,908.4	0.02
Patent Mining Claims	0	0	0
Quarries	968	38,180.8	0.43
Mineral Exploration License	65	1,320,255.8	15.04
Peat Harvest	2	386.5	0

Reference: Manitoba Natural Resource & Northern Development [August 3, 2022]

Map 5.2. Mining operations by disposition type across FML 2.

5.5.1.4 Surface Leases

A surface lease, issued by the Mines Branch of the provincial government, is a disposition for the efficient and economical performance of the mining operations. A surface lease must be linked to some other type of mining disposition (claim, lease, etc.) and provides the holder with surface rights but they must pertain to mining. A surface lease is not surveyed.

5.5.1.5 Patented Mining Claims

A patented mining claim is a parcel of land granted under the since-repealed Federal *Land Titles Act* without a reservation in right of the Crown in right of Canada in respect of minerals found in, on or under the land. Patented mining claims give the holder all rights – mineral and surface. Some patented mining claims were surveyed and registered in the Land Titles Office. These claims are no longer issued but they are maintained by collecting Mining Claim Tax annually.

5.6 PEAT HARVESTING

Information for this section was provided by the Forestry and Peatlands Branch of the Manitoba Department of Natural Resource and Development (Fedorchuk, 2022).

Premier Tech Horticulture holds the only Peat Harvest Licence (PHL #18) within FML 2, and it is currently inactive. The leased area is about 376 hectares in size and is in the very southwest corner of the licence area, 20 kilometres north of Red Deer Lake (Map 5.2). According to the Province there are no current plans to develop the area. The current management plan for the area (Premier Tech Horticulture, 2016) states that there is no clearing or peat harvesting activities planned for at least five years.

5.7 AGRICULTURE

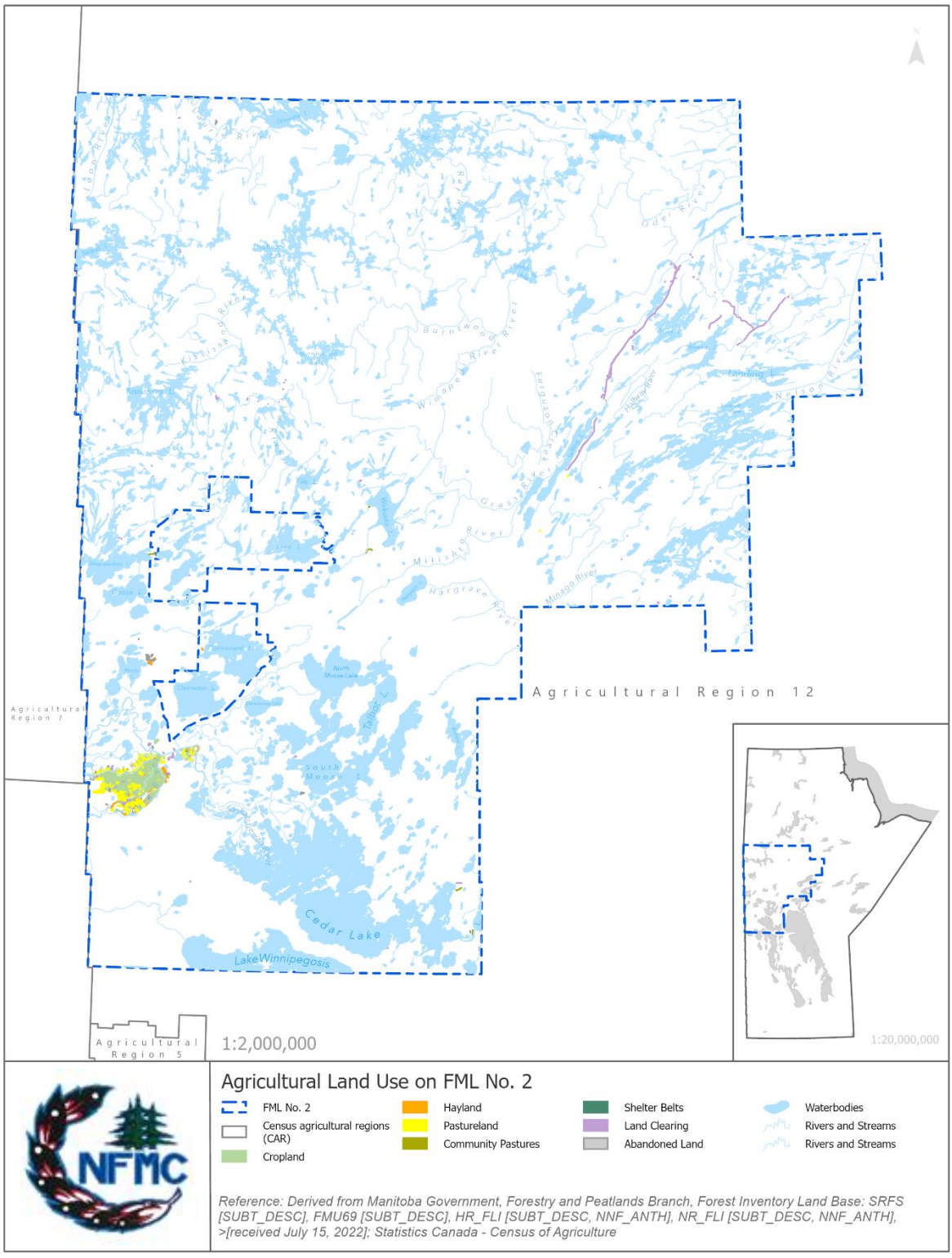
Relative to the size of FML 2, the amount of land under agricultural management is very small. The FML overlaps two agricultural divisions tracked by Statistics Canada's: Divisions No. 21 and No. 22. According to the Statistics Canada 2021 *Census of Agriculture*, within these divisions, there is 83,635 acres of total farm area, equivalent to 33,846 hectares of land. Farms are concentrated in the southwestern region of the licence area in forest management plan (FMU) 50 of the Saskatchewan River Forest Section (Map 5.3). The Statistics Canada 2021 census report indicates approximately 57 farms reporting 33,686 hectares of land in cultivation (Table 5.2) and 4,753 individual livestock being raised (Table 5.3). The primary product being produced on farms within FML 2 is canola, being grown by twenty-six farms on just over 11,000 hectares of land. To summarize the economic value generated by the farming community within FML 2, $17,351,561 in revenues were generated and $14,331,028 in expenses were paid, resulting in a net revenue of $3,020,533.

Table 5.2. Hectares of land in hectares in cultivation across FML 2 as of the 2021 Census of Agriculture (Statistics Canada).

Land Use	Area (ha)
Land in crops	23,266
Canola	*11,035*
Wheat	*5,368*
All other crops	*6,863*
Natural land for pasture	5,875
Woodlands and wetlands	2,052
Tame or seeded pasture	1,794
Summerfallow land	325
All other land	414
Total land in cultivation	*33,686*

Table 5.3. Quantity of livestock being raised on farmland across FML 2 as of the 2021 Census of Agriculture (Statistics Canada).

Livestock	Qty
Cattle and calves	4,146
Sheep and lambs	372
Hens and chickens	192
Pigs	26
Horses and ponies	9
Goats	8
Total livestock	*4,753*



1704

1705 *Map 5.3. Agricultural land use on FML 2.*

5.8 WILD RICE

Information in the following sections was provided by the Crown Lands Branch of the Manitoba Department of Natural Resource and Northern Development (Armstrong, 2022).

The provincial *Wild Rice Act* and embedded Wild Rice Regulation came into effect in 1988, primarily setting out the requirements for individuals to obtain licences, harvesting and buyer permits, as well as residency and export requirements. Wild rice does not grow in fields, but rather grows in water bodies and is not really a rice, but a member of the grass family.

Wild rice is not naturally occurring in northern Manitoba, rather seeded in the early 1980's by both producers and government to provide for local economic opportunities. When wild rice is harvested it contains approximately 50% moisture so it must go through a curing and parching process prior to packaging.

Wild rice crops are highly dependent on weather conditions and it is not unusual for several years to pass without a good crop being produced. Wild rice can be picked by hand or harvested by mechanic means equipped by airboats. The crop is generally ready for harvest in late August early September. The unique earthy flavor and texture make wild rice a sought after commodity, and a perfect accompaniment for numerous dishes.

Wild rice licences are allocated by issuing individuals three-year Development licences and ten-year Production licences, and the majority of wild rice exists in two areas of the province: Northwest and southeast regions. In the Southeast and more specifically within Whiteshell Provincial Park, wild rice is known to have existed and been harvested traditionally by First Nations for many years . In the Northwest wild rice was introduced by the province and producers to generate commercial harvesting opportunities under a licenced program.

In regards to commercial production licences, the current fee collected by Manitoba is based on a Licence Fee of $25.00 plus production fee of 3¢ per pound of average declared production over previous three-year period. The benefit of Manitoba Wild Rice, harvested from Natural water bodies over cultivated or paddy grown rice is it can be “Certified Organic” once it has been audited by an independent certifying agent.

Organic Producers Association of Manitoba (OPAM) is audited to ensure the wild rice is grown in soil/water that is free of pesticides, insecticides, and other contaminants. Thus, wild rice produced in Manitoba is known as “Canadian Lake Wild Rice”.

5.9 RECREATION AND TOURISM

5.9.1 Tourism

In 2019, Manitoba was listed in Lonely Planet’s Top 10 regions to visit. In 2019, tourism brought in 10.5 million visitors to the province, totaling $1.63 billion in spendings. The 2020 and 2021 tourism seasons were negatively impacted by the COVID-19 virus, with a total of 7.1 million visitors to the province with a total spending of $958 million in 2021. Travel Manitoba has a goal of recovering visitor spending to $1.6 billion and visitation levels to 10.6 million visitors by 2024 (Travel Manitoba 2021, 2022).

5.9.2 Historic Resources

Information for this section was provided by the Historic Resources Branch of the Manitoba Department of Sport, Culture, and Heritage (Graham, 2022).

The Province has Designated Heritage Sites and Provincial Plaques. The Provincial Plaque program commemorates significant locations through out the province, and highlight important contributions to the province’s heritage, whether that be historical, archaeological, geological, or natural. Designated Sites are protected under the *Heritage Resource Act* (1986), as they serve as examples of significant heritage structures or locations. There are currently twenty-six provincial plaques and six designated sites within FML 2. These sites include but are not limited to:

Courthouse and Community Building, The Pas – Provincial Designation in 1982
Bank of Commerce Building, The Pas – Municipal Designation in 2005
Charlebois Chapel, The Pas – Municipal Designation in 2005
Christ Church, The Pas – Municipal Designation in 2014
Cranberry Portage Railway Station, Cranberry Portage – Municipal Designation in 2012
Flin Flon Museum, Flin Flon – Municipal Designation in 2014
Heritage North Museum, Thompson – Municipal Designation in 2011

There are also a number of community museums within FML 2, that focus on promoting the history in the region:

Flin Flon Station Museum, Flin Flon
Heritage North Museum, Thompson
Snow Lake Mining Museum, Snow Lake
Sam Waller Museum, The Pas
Wabowden Historical Museum, Wabowden
Cranberry Portage Heritage Museum, Cranberry Portage
McCreary Museum, McCreary
Charlebois Heritage Museum, The Pas

5.9.3 Hunting

Hunting opportunities within Manitoba are provided for recreation, livelihood supplement, domestic consumption, and spiritual and/or cultural purposes. Species available for licenced hunting include upland game birds, waterfowl, deer, moose, wolf, caribou, and black bear, all of which are hunted within FML 2 except for woodland caribou.

Indigenous hunting rights fall under the federal *Constitution Act* (1982), Section 35. Such rights allow for the taking of wildlife without a licence or permit, on lands to which they have the right of access, and with no harvest limit. In Manitoba, this right is for subsistence, traditional, and ceremonial use and the wildlife cannot be sold. As the use of the animal is personal, these harvests are not tracked. Limits to harvest can be established but only if meaningful constitutional consultations have taken place.

Information for the following sections was provided by the Fish and Wildlife Branch of the Manitoba Department of Natural Resource and Northern Development (Bylo, 2022).

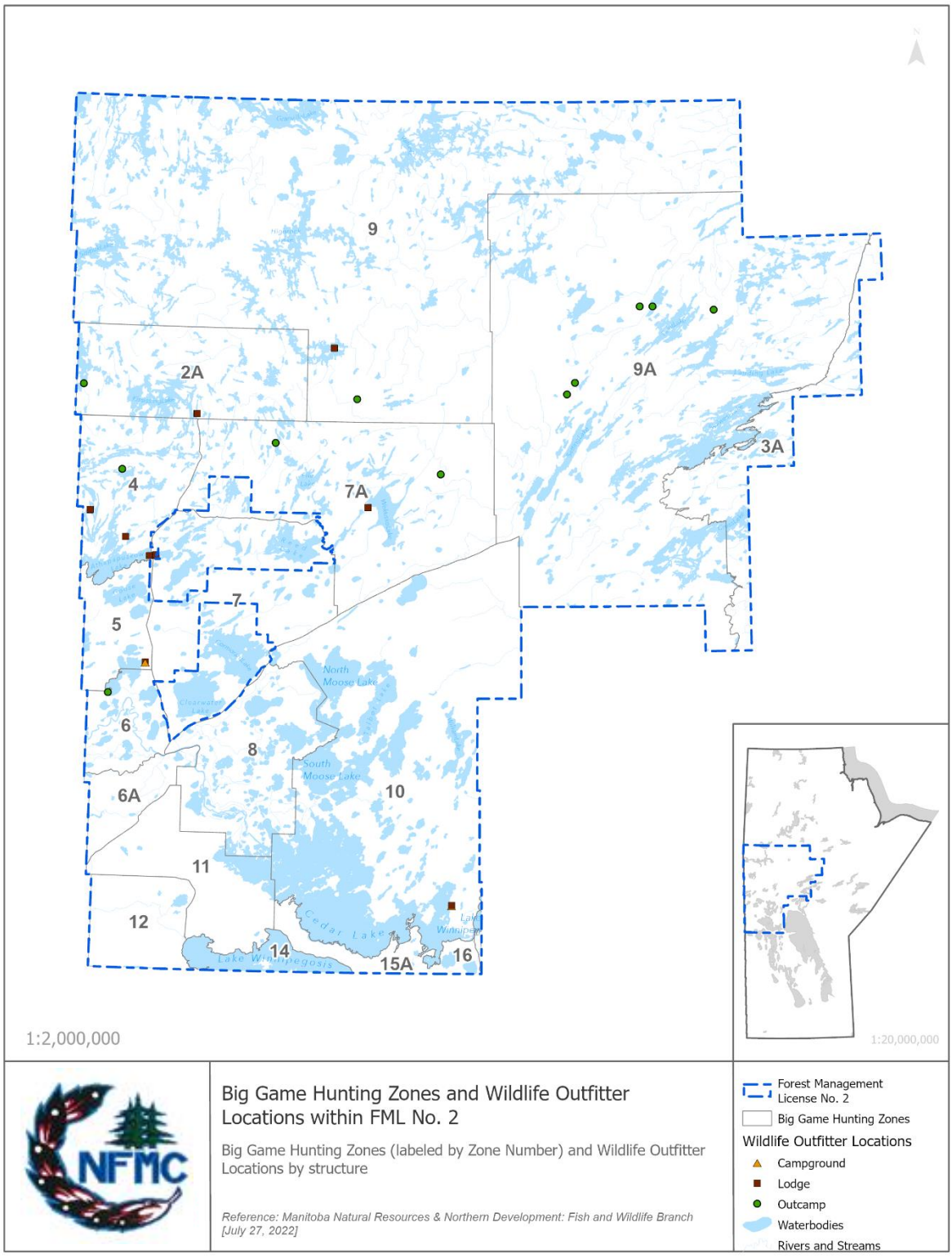
5.9.3.1 Administrative Regulation

The province is divided into four Game Bird Hunting Zones (GBHZ) and sixty-two Game Hunting Areas (GHA) for administering gamebird and big game hunting, respectively. The GBHZ and GHA boundaries are published annually by the province in the Manitoba Hunting Guide. The GHAs within FML 2 are illustrated on Map 5.4 and include all or parts of seventeen GHAs. Seasons, restrictions, and bag limits are designated by GBHZ, and GHA and resident and non-resident hunting restrictions may vary accordingly. The Province periodically monitors big game populations and develops big game management strategies by GHA.

With the exception of black bear and wolf, licenced hunting of big game is limited to late summer and fall seasons. For black bear, there is both a spring and fall season, while wolf can be hunted from late summer through until late spring. Waterfowl and upland game bird seasons are also open in the fall.

5.9.3.2 Recreational Hunting

During the 2021 hunting season there were approximately 39,320 individuals that participated in the licenced big game and game bird hunting in Manitoba (Table 5.4). For more information, refer to the annual *Manitoba Hunting Guide* (Manitoba Natural Resources and Northern Development, 2022) found on the provincial website.



Map 5.4. Game Hunting Areas (GHAs) and wildlife outfitter locations within FML 2.

Table 5.4. Total number of hunting licences sold for big game and game bird hunting throughout Manitoba in the last five years by residency.

Species	Residency	2017/18	2018/19	2019/20	2020/21 [1]	2021/22 [1]
Moose	Resident	2,033	1,139	1,106	1,005	1,121
	Resident – Conservation [2]	459	990	948	1,010	1,030
	Non-resident	26	21	31	33	30
	Foreign resident	142	171	160	-	6
Elk	Resident	2,277	2,316	2,022	2,013	1,980
Caribou	Resident	545	558	294	263	97
	Resident – Second	311	353	122	54	29
	Foreign resident / Non-resident	132	157	74	0	0
Black bear	Resident	1,698	1,627	1,722	2,182	2,456
	Resident youth	105	83	94	207	234
	Non-resident	108	66	60	55	92
	Foreign resident	1,773	1,917	1,840	-	86
Deer	Resident - General	27,532	30,305	29,865	32,405	31,586
	Resident – Second	1,675	1,389	1,273	1,581	6,596
	Resident – Third	129	132	120	171	164
	Non-resident	684	710	766	501	883
	Foreign resident	327	315	351	1	91
	Big Game Total	*39,956*	*42,249*	*40,848*	*41,481*	*46,481*
Game Bird	Resident	11,019	10,079	9,052	9,978	9,169
	Non-resident	680	656	622	317	762
	Foreign resident	3,648	3,702	3,352	7	1,451
	Game Bird Total	*15,347*	*14,437*	*13,026*	*10,302*	*11,382*

[1] These years were during the peak of the COVID-19 pandemic; Therefore, the foreign resident may not represent the true values we would have had in a more typical year.
[2] These numbers represent the number of licence packages sold, where each package is two hungers per one moose tag.

5.9.4 Trapping

Information for this section was provided by the Fish and Wildlife Branch of the Manitoba Department of Natural Resource and Northern Development (Berezanski, 2022).

Trapping is important to the biodiversity, economy, and social well-being of Manitoba. "Furbearing animals", or "furbearers", describe the group of mammals in Manitoba which are harvested by trapping for their fur or pelts. Harvests of furbearing animals are closely related to market demand (a driver of trapper effort), species population cycles, and to some extent tradition. Variables such as seasonal weather and habitat conditions also locally affect these harvests.

Trapping remains a significant source of seasonal income to many Manitobans, especially in remote communities. Sudden global economic downturns in the last few years drastically affected markets and trapping activity. Trapping remains necessary for mitigating human-wildlife conflict, such as with livestock predation and beaver flooding.

5.9.4.1 Trapping Management

In Manitoba, the management of furbearing animals is under two legislative regimes. The vast majority of management falls under provincial jurisdiction, specifically under *The Wildlife Act* (1988). Further direction is provided by the associated Trapping of Wild Animals Regulation and the Manitoba Furbearer Management Policy and Procedures.

There is substantial guidance given in the Province's *2022-2023 Trapping Guide* (2022). Licenced and permitted activities (in the Open and Registered Trapping areas, respectively; see below) account for the vast majority of trapping in Manitoba. An individual can obtain a Manitoba trapping licence or permit if they meet residency and education requirements. This licence or permit authorizes the trapper to harvest and sell a furbearing animal. Such furbearer harvests are tracked through mandatory reporting by licenced fur dealers, tanners, and taxidermists, and separate permitting such as export or possession permits (Berezanski, 2022).

The other legislative regime of harvest management is under rights granted to indigenous people (First Nations, Metis, and Inuit people) under Canada's *Constitution Act*, Section 35. Such rights allow for the taking of wildlife without a licence or permit, on lands to which they have the right of access, and with no harvest limit; in Manitoba, this right is for subsistence, traditional, and ceremonial use and the wildlife cannot be sold. As the use of the animal is personal, these harvests are not tracked. Limits to harvest can be established but only if meaningful constitutional consultations have taken place. For additional information, see Manitoba's *Interim Provincial Policy for Crown Consultations with First Nations, Métis Communities and Other Aboriginal Communities* (2009) and the "Rights-Based Trapping" section of the Province's *2022-2023 Trapping Guide* (2022).

Licenced and permitted trapping in Manitoba is managed according to species, location, seasons, and quotas. For the purposes of management, *The Wildlife Act* (1988) of Manitoba lists seventeen species as "Fur Bearing Animals", although trappers can also take two species listed as "Big Game Animals". The harvest of these species is further limited under regulations, according to time of year, location, and in some locations, by quota. Furbearer management is done in cooperation with the local trapper organization (usually affiliated with the Manitoba Trappers Association), resource management board, First Nation, and Northern Affairs Community Council.

Manitoba trapping activities are geographically separated into three different land designations: the Open Trapping Area, the Registered Trapping Area, and the Special Trapping Area.

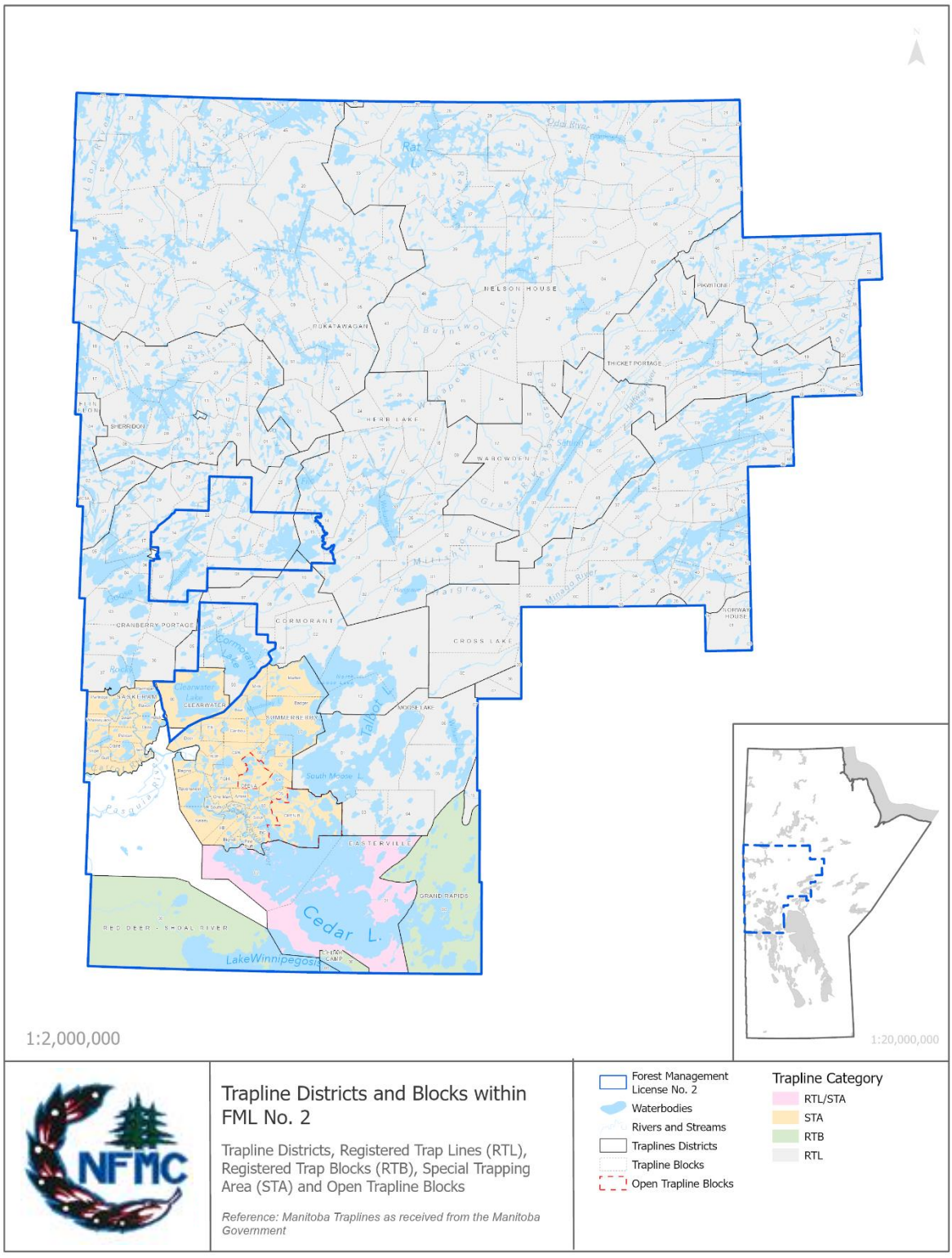
5.9.4.1.1 Open Trapping Area

The Open Trapping Area is comprised primarily of private lands, and the qualified holder of a Resident Open Area licence can go where they have the right of access. The lands include private land with permission and most Crown lands. Open Area Zone 5 is within FML 2.

5.9.4.1.2 Registered Trapping Area

The Registered Trapping Area is found throughout most of the FML, is virtually all Crown land, and management is under a registered trapline (RTL) system (Map 5.5). This system was created in the 1940's, in response to overharvesting and conflicts with local people by the uncontrolled influx of new trappers from the south after the Hudson Bay rail line was developed. An RTL "section" (originally called a "district") was created around a specific community which historically used the land. Individual line boundaries were identified by the trappers (often as a family) and the community, only after which the individual traplines were "registered" (Berezanksi, 2004; Carmichael, 1973; Province of Manitoba, 2022).

An RTL permit is issued to one "lineholder" for a specific line, thus limiting the trapping pressure. A lineholder may also have helpers at their discretion. In some RTL sections, no lines were established (also called RTL Blocks/RTB), and only qualified local community members are allowed to trap there. These trappers generally work out trapping areas between themselves (Province of Manitoba, 1988). FML 2 contains eighteen RTL sections, of which fourteen sections have individual lines and four are operated as RTL Blocks. Two traplines of the Cranberry Portage RTL Section are entirely within Grass River Provincial Park and are excluded from the FML. The remaining lines extend partly outside the park boundaries.



Map 5.5. Trapline districts and blocks within FML 2, including registered traplines (RTL), Special Trapping Areas (STA), registered trapline blocks (RTB), and dual the RTL/STA.

5.9.4.1.3 Special Trapping Area

A Special Trapping Area (STA) is managed as a blend of open and registered trapline (RTL) area. The largest STAs in the province, Saskeram and Summerberry, are found within the FML (Map 5.5). Individual STAs are usually wetlands in the Open Area that were developed as muskrat management areas in the late 1930s and early 1940s. (Berezanski, 2004; Carmichael, 1973).

One area around Cedar Lake in the FML is uniquely dual-designated as the "Easterville RTL Section and STA".

Individual RTL and STA lines are typically allocated to one lineholder through a public application process. In most cases, the members of the RTL section's specific community are the lineholders. Some situations exist whereby lines within one RTL section or STA can be allocated for several different communities. RTL and STA lines can also be operated as family lines, whereby only members of one family can trap there. RTL sections often have one community line, which is shared by people do not have their own trapline (Berezanski, 2022).

5.9.4.2 Land and Resource Uses

The holder of a provincial trapping licence or permit is authorized to trap fur bearing animals in specific areas and during specific times, as set out in the Trapping of Wild Animals Regulation section of *The Wildlife Act* (1988). This authorization is for trapping activity only, and no other land use authorizations or rights are conferred (e.g., exclusive land access, timber cutting, fishing, etc.). People trapping under their constitutional rights have various other rights which they can exercise when trapping. The removal of animals for scientific purposes and, when required, for mitigation of human-wildlife conflict must be authorized separately (Berezansk, 2022). The allocation of an RTL permit or an STA licence, however, confers a combination of privileges and responsibilities to that person.

For more information, refer to Manitoba's *2022-2023 Trapping Guide* found on the provincial website.

Table 5.5. Wildlife species taken by licenced and permitted trappers by divisions 1 and 2, big game animals and fur bearing animals, respectively, according to Schedule A of Manitoba's The Wildlife Act (1988).

Division	Species Common Name	Species Scientific Name
1 – Big Game Animals	Gray (timber) wolf	*Canis lupus*
	Black bear [(1)]	*Ursus americanus*
2 – Fur Bearing Animals	Arctic fox	*Canis lagopus*
	Coyote	*Canis latrans*
	Red fox	*Canis vulpes*
	Beaver	*Castor canadensis*
	Lynx	*Felis canadensis*
	Bobcat	*Felis rufus*
	Wolverine	*Gulo gulo*
	River otter	*Lutra canadensis*
	Marten	*Martes americana*
	Fisher	*Martes pennanti*
	Short-tailed weasel	*Mustela erminea*
	Long-tailed weasel	*Mustela frenata*
	Mink	*Mustela vision*
	Muskrat	*Ondatra zibethica*
	Raccoon	*Procyon lotor*
	Red squirrel	*Tamiasciurus hudsonicus*
	Badger	*Taxidea taxus*

[(1)] Can be taken only in the RTL and Northern STA.

5.9.5 Fishing

FML 2 intersects all four of Manitoba's fishing divisions. The Northwest and North Central Divisions cover 95% of FML 2 and contain data relevant to this area. Map 5.6 depicts fishing divisions and stocked lakes within the licence area.

Information for the following sections was provided by the by the Fish and Wildlife Branch of the Manitoba Department of Natural Resource and Northern Development (Kitch & Tethy, 2022).

5.9.5.1 Stocking

The North Central Division stocked 229,400 fish in the last five years and 82,492,012 fish between the years of 1997 and 2021 (Table 5.6). As part of Manitoba Hydro's Lake Sturgeon Stewardship & Enhancement Program, with assistance from the Nelson River Sturgeon Board, lake sturgeon eggs are collected from the Nelson and Burntwood rivers and brought back to Hydro's Grand Rapids Fish Hatchery to grow. The lake sturgeon is then stocked back into its native waterways to support populations in the area.

Within the Northwest Division, a total of 81,366,413 fish have been stocked between 1997 and 2021, 467,150 of which were stocked in the last five years (Table 5.6). Species stocked include brook trout (Salvelinus fontinalis), brown trout (Salmo trutta), lake sturgeon (*Acipenser fulvescens*), lake trout (*Salvelinus namaycush*), lake whitefish (*Coregonus clupeaformis*), rainbow trout (*Oncorhynchus mykiss*), splake (*Savelinus fontinalis* x *Savelinus namaycush*), tiger trout (*Salmo trutta* x *Savelinus fontinalis*), and walleye (*Sander vitreus*).

Table 5.6. Waterbodies in the North Central and Northwest fishing divisions that have been stocked with sportfish between 1997 and 2021, including species stocked.

Division	Waterbody	Species Common Name
North Central	Bowden Lake	Lake trout
	Crater Lake	Rainbow trout
	Cross Lake	Lake whitefish
	Digney Lake	Brook trout, Rainbow trout
	Eagle Lake	Rainbow trout
	Esker Lake	Brook trout, Rainbow trout
	Gemmel Lake	Brook trout, Rainbow trout
	Hambone Lake	Rainbow trout
	Leaf lake	Rainbow trout
	Little Troy Lake	Brook trout, Brown trout, Rainbow trout
	Liz Lake	Walleye
	Mid Lake	Brook trout, Brown trout, Rainbow trout, Splake, Tiger trout
	Nelson River	Lake sturgeon
	Nelson River (West channel)	Lake sturgeon
	Playgreen Lake	Walleye
	Ribbon Lake	Lake trout
	Southern Indian Lake	Walleye
	Upper Ospwagan Lake	Lake trout
	Vermilion River	Walleye
	Wasakamew Lake	Lake trout
Northwest	Amphipod Lake	Brook trout, Rainbow trout
	Barbe Lake	Brook trout, Rainbow trout
	Cedar Pond	Rainbow trout
	Chocolate Lake	Brown trout, Rainbow trout
	Clearwater Lake	Lake trout

Division	Waterbody	Species Common Name
Northwest	Cormorant Lake	Lake trout
	Fir Pond	Brook trout, Rainbow trout
	Footprint Lake	Brook trout, Brown trout, Rainbow trout, Tiger trout, Walleye
	Goose River	Brook trout
	Hidden Lake	Brook trout, Rainbow trout
	Kormans Lake	Brook trout, Rainbow trout
	One Portage Lake	Brook trout, Rainbow trout
	Pine Pond	Rainbow trout
	Retention Pond	Rainbow trout
	Rocky Lake	Walleye
	Rotary Wheel Pond	Rainbow trout
	Saskatchewan River	Lake sturgeon, Walleye
	Schist Lake	Lake trout
	Scotty Lake	Brook trout, Rainbow trout, Tiger trout
	Spruce Pond	Rainbow trout
	Tramping Lake	Lake trout
	Webster Lake	Rainbow trout

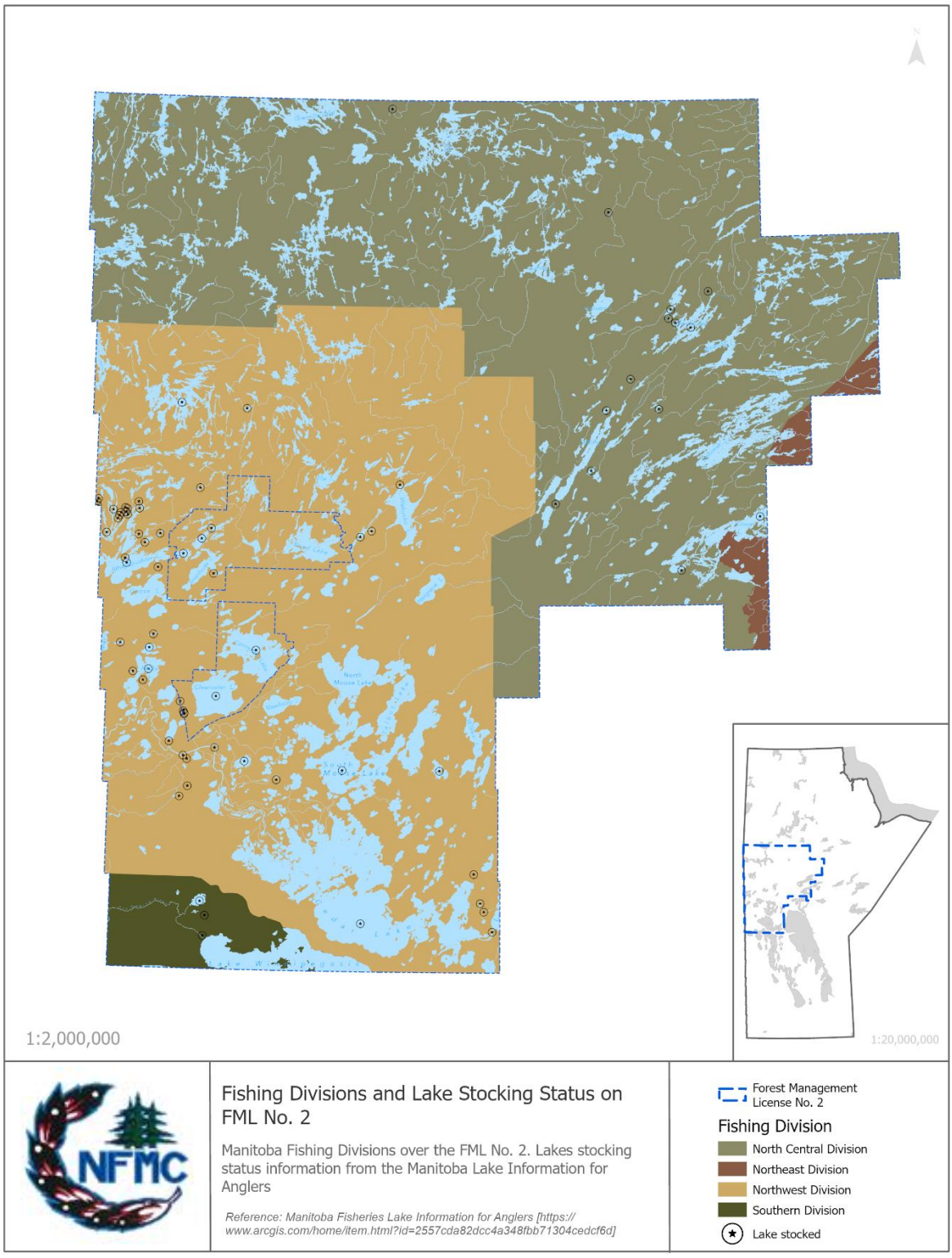
5.9.5.2 Commercial Fishing and Fishing Communities

The commercial fishing industry is a major provider of employment to many communities and brings significant economic value. Table 5.7 summarizes communities involved in commercial fishing, the number of fishers, and commercial fish species production (in kilograms) by community and fishing division. This data is managed by the Manitoba government and was last updated in 2016.

Table 5.7. Fishing communities involved in commercial fishing across the fishing divisions that overlap FML 2, including number of fishers and the total round weight of commercial production in kilograms.

Division	Community	Number of Fishers	Total Round Weight (kg)
North Central	Granville Lake	206	5,860.35
	Nelson House	284	40,168.87
	Pikwitonei	156	2,763.1
	Pukatawagan	363	88,014.57
	Thicket Portage	324	24,094.3
	Thompson	358	4,250.7
	Wabowden	380	169,877.315
Northwest	Cormorant	6	42,397.7
	Easterville	8	499,324.694
	Flin Flon	106	10,125.42
	Grand Rapids	340	563,071.797
	Moose Lake	344	220,950.82
	Sherridon	126	1,643.1
	Snow Lake	196	1,662.5
	The Pas	1814	3,080.27

In addition to communities involved in commercial fishing, there are forty-two commercial baitfish blocks in the Northwest Fishing Division, but no baitfish blocks exist in the North Central Division. There are three fish farming licences issued in FML 2, and all are located within the Northwest Fishing Division. Of the twenty-one total number of fishing lodges located within the FML, two are in the North Central Fishing Division and the remaining nineteen fishing lodges are located in the Northwest Fishing Division.



Map 5.6. Fishing divisions and lake stocking status on FML 2.

5.9.6 Recreational Trails

There are designated trails within FML 2 for numerous recreational activities including hiking, snowshoeing, cross country skiing, and snowmobiling. Trails listed in Table 5.8 below are within the licence area and can be found on www.trailsmanitoba.ca and/or www.alltrails.com.

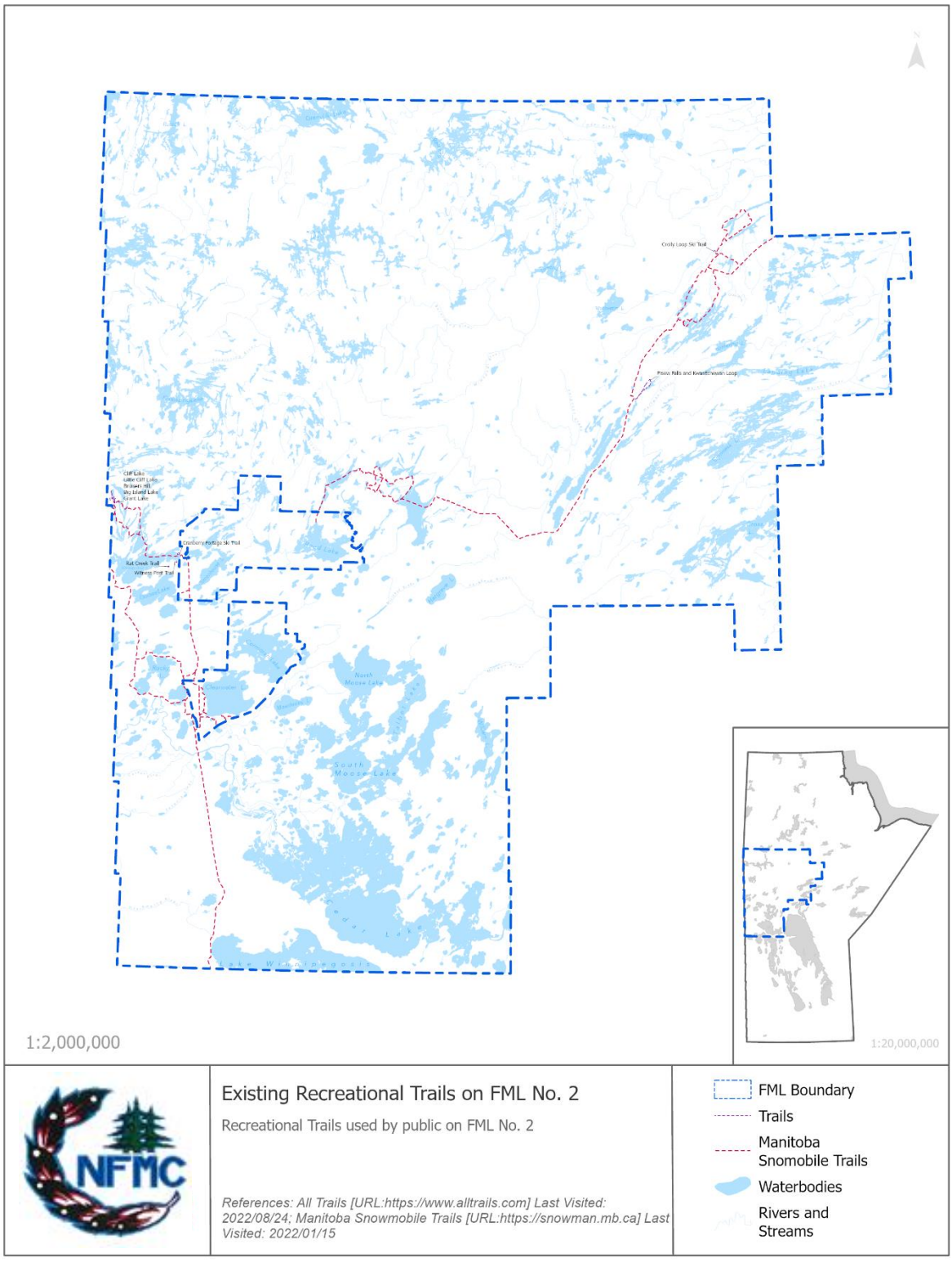
Table 5.8. Recreational trails across FML 2. Note that this is not an exhaustive list.

Designated Trail	Link
Pisew Falls and Kwasichewan Falls	**https://www.trailsmanitoba.ca/trail-info/hiking-trails-manitoba-maps/**
Cranberry Portage Ski Trail	**https://www.trailsmanitoba.ca/trail-info/hiking-trails-manitoba-maps/**
Witness Post Trail (Snowshoeing trail on the south west corner of Athapapuskow Lake)	**https://www.trailsmanitoba.ca/trail-info/hiking-trails-manitoba-maps/**
Crolly Loop Ski Trail Thompson, MB	**https://www.alltrails.com/explore/trail/canada/manitoba/crolly-loop-ski-trail**
Rat Creek Trail – Athapap Road	**https://www.alltrails.com/explore/trail/canada/manitoba/rat-creek-trail**
Little Cliff Lake Trail Cliff Lake Trail Bruisers Hill Trail Big Island Lake via Grant Lake Trail Grant Lake Trail	**https://www.alltrails.com/explore/trail/canada/manitoba/little-cliff-lake** **https://www.alltrails.com/explore/trail/canada/manitoba/cliff-lake** **https://www.alltrails.com/explore/trail/canada/manitoba/bruisers-hill** **https://www.alltrails.com/explore/trail/canada/manitoba/big-island-lake-via-grant-lake https://www.alltrails.com/explore/trail/canada/manitoba/grant-lake** **https://www.alltrails.com/explore/trail/canada/manitoba/grant-lake**

5.9.6.1 Snowmobiling

Snowmobiling in Manitoba is a popular winter sport, and a variety of trails exist within the FML. Designated snowmobiling trails are established and maintained throughout Manitoba through the non-profit provincial organization Snoman (Snowmobilers of Manitoba), more on which can be found at their website (www.snoman.mb.ca). There are 878 kilometres of Snoman trails within the FML (Map 5.7). Access to the trails are granted with the purchase of a Snowpass. Maintenance of the trails are dependent on the volunteers of local snowmobile clubs. Within the FML, there are a few snowmobile clubs including: Border Explorers Snowmobile Club Inc. out of Flin Flon; Kelsey Trail Sno-Riders out of The Pas, Clearwater Lake Park, and Wanless; Snow Lake Sno-Drifters out of Snow Lake; and Thompson Trailbreakers out of Thompson.

There are a number of trails, cut lines, old winter roads and waterways also used as undesignated snowmobiling trails.



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1921 *Map 5.7. Existing recreational and snowmobiling trails on FML 2.*

5.9.7 Provincial Parks

Information for this section was provided by the Parks Branch of the Manitoba Department of Environment, Climate, and Parks (Roberge, 2022).

Eleven provincial parks exist within the boundaries of FML 2 (Map 5.8). This count excludes Grass River and Clearwater Lake Provincial Parks, which are excluded from the FML. The majority of these parks are classified as recreation parks, the exceptions being Little Limestone Lake and Paint Lake, which are natural parks. Recreation parks provide outdoor recreation opportunities in a natural setting, while the main purpose of a natural park is to preserve areas of an ecoregion and to accommodate a diversity of recreational opportunities and resource uses. Details about specific parks within FML 2 are available in Appendix H.

Several parks in the region provide access to a lake or other body of water, and often serve as the only entry point available to the public. Water-based activities such as boating and angling are common in these parks. Notable water bodies in the licence area include one of Manitoba's top trophy fishing lakes, Lake Athapapuskow, located in Bakers Narrows Provincial Park. Boat launches or docks in these provincial parks are generally maintained by the Province – exceptions include Rocky Lake and Sasagiu Rapids, which have privately operated boat launches.

Overnight accommodations in the area's provincial parks are essential in providing multi-day recreation opportunities. All parks within FML 2, except for Grand Rapids, Twin Lakes, and Neso Lake, offer overnight accommodations such as campgrounds and rental cabins. Bakers Narrows contains a subdivision with approximately one hundred and fifty lots, which are a combination of primary residences and vacation homes. Rocky Lake contains a privately operated lodge and cabins. In some cases, such as with Grand Rapids, nearby privately operated campgrounds offer overnight accommodations.

Parks within FML 2 offer important beach and day-use opportunities for residents of nearby communities and visitors to the area. Wekusko Falls Provincial Park is used frequently by residents in the neighbouring community of Snow Lake, as well as travellers to northern Manitoba. Bakers Narrows Provincial Park borders Flin Flon municipal airport and has popular and well-used camping, beach, and day-use areas. Paint Lake Provincial Park is frequently used by Thompson residents, as well as visitors to northern Manitoba. In addition to serving nearby communities, these parks are visited by residents of urban areas seeking wilderness adventures, and these visits can generate associated economic benefits for local small businesses such as gas stations and restaurants. Pisew Falls Provincial Park, while only a day use park, is one of northern Manitoba's top tourism destinations and a significant attraction for both local area residents and visitors from other areas of Manitoba and beyond.

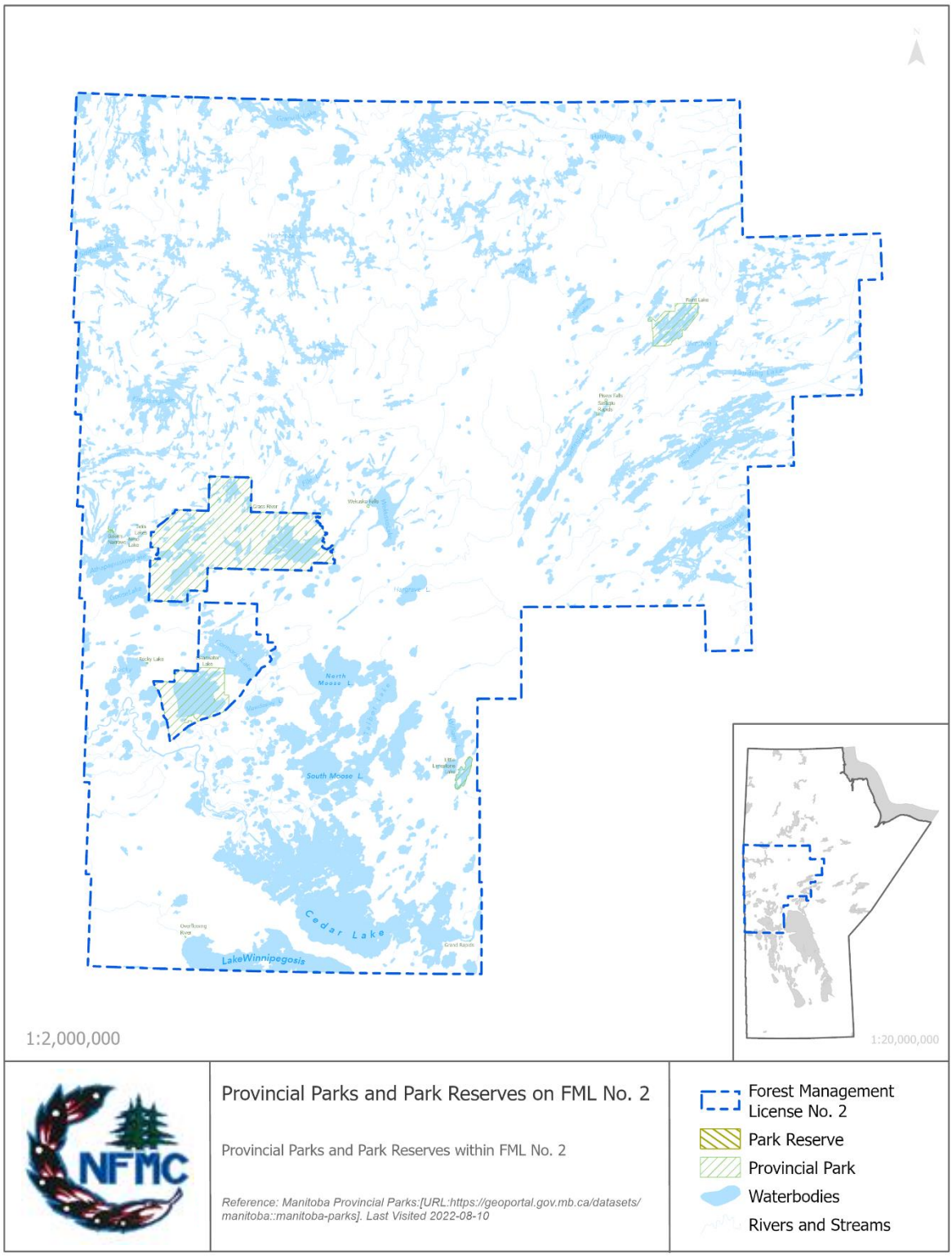
FML 2 overlaps with the Northern Special Trapping District, Open Trapping Area Zone 5, and multiple Registered Trap Line districts. The area also overlaps with several game hunting areas. The small size of the provincial parks within the FML generally limits the amount of hunting and trapping that occurs within park boundaries.

Mineral exploration and development is permitted in multiple parks within the FML, including Clearwater Lake, Grass River, and Paint Lake. Several exploration operations are being carried out in Grass River, employing local contractors from the town of Snow Lake for drilling and exploration. While there is currently no active mineral development activity in any parks in the area, Reed Lake Mine (also located in Grass River Provincial Park) was a large employer for citizens of Flin Flon prior to its closure in 2018.

5.9.8 Special Forest Products

Information for this section was provided by the Fish and Wildlife Branch of the Manitoba Department of Natural Resource and Northern Development (Bylo, 2022).

The province grants permits for the collection of certain non-timber forest products for commercial harvest such as boughs and tops, hardwood canoes and poles, fire weed, purple-leaved willow herb, Labrador tea leaf, beaked willow leaves, dandelion roots, mushrooms, maple sap, and birch sap.



Map 5.8. Provincial parks and park reserves on FML 2.

5.10 INDIGENOUS LAND USES

There are several Indigenous communities whose traditional territories fall within the FML. These communities have long histories on the land that predates colonization. Many ways Indigenous peoples use the land is protected federally in Section 35 of the *Constitution Act* (1982). This includes the rights to hunt and fish for sustenance. Collecting medicinal plants and berry picking is also integral to many Indigenous traditions.

NFMC recognizes that there is an opportunity to elaborate on Traditional land uses. Through on-going engagement and discussion with our Nekoté partners NFMC would like to enhance the 20-year forest management plan with additional information to provide an Indigenous perspective. We welcome feedback or additional sources and contacts on this section.

6 Forest Administration

Canadian Kraft Paper Industries Ltd (CKP) and Nisokapawino Forestry Management Corporation (NFMC) are the sole licence holder for Forest management Licence (FML) No. 2, in which the responsibilities for managing the forest resources are specified within the Forest Management Licence Agreement (FMLA). Within this agreement, CKP and NFMC are committed to undertaking sustainable forest management in accordance with the most current management practices. The softwood resources on the FML are managed by CKP and NFMC under this agreement. The hardwood resources are managed and allocated by the Province of Manitoba.

Key requirements of the FMLA include:

- Achievement of maximum growth potential of suitable species and efficient utilization of harvested timber;
- Maintenance of a standard of environmental qualities acceptable to Manitoba in accordance with provincial policies for sustainable development and the Acts and Regulations of the Province of Manitoba and the Parliament of Canada;
- Public access for recreational and other uses of forest areas;
- Conservation of other forest resources;
- Management at sustainable harvest levels as determined and approved by the Province of Manitoba;
- Submission and operation within forest management plans prepared to submission requirements of the Province of Manitoba;
- Planning and allocation of timber volumes harvested by quota holders and special allocation holders operating under the Manitoba Timber Sale System;
- Forest renewal to provincial standards of all areas harvested to supply CKP's pulp and paper mill.

Administration of forest and other natural resources is the responsibility of the Province of Manitoba. This includes the responsibilities for administration and regulation of forestry activities under the authority of both *The Forest Act* (1988) and *The Environment Act* (1988). NFMC works at a strategic level with representatives of the Province of Manitoba based at head offices in Winnipeg. In the development and approval of plans and permits NFMC works closely with the Northwest and Northeast regional offices who have local authority for the provincial administration of forestry activities on FML 2. The responsibilities of the regional offices are undertaken through the mechanism provided by the Integrated Resource Management Teams (IRMTs), including representation of the various Branches of the Province of Manitoba such as Forestry, Environment, Wildlife, Fisheries, Lands, Parks and Protected Spaces, and Regional Support Operations. This process ensures that the various values present on the landscape are incorporated into review and approval processes from a provincial perspective. All forest management plans, forest management operating plans, forest road development plans, and work permits pertaining to FML 2 must be approved by the Province of Manitoba.

The Company operates under Environment Act Licence (EAL) No. 2302 ER, which is administered by the Environmental Approvals Branch. This licence was obtained through the approval and licencing process associated with the development of the Forest Management Plan (1997 – 2009; Repap Manitoba Inc., 1996) and has subsequently been extended. For more information, visit the Manitoba Public Registry that hosts the official records for the FML 2 20-year Forest Management Plan under Project #3094.8: gov.mb.ca/sd/eal/registries/3094.8.

6.1 FOREST MANAGEMENT LICENCE BOUNDARIES

6.1.1 Forest Management Licence Area

The Forest Management Licence (FML) includes all lands designated as Provincial Open Crown land within the perimeter of FML 2, within the limitations and responsibilities as outlined in the FML Agreement (FMLA). FML 2 is comprised of approximately 8,777,264 hectares as of November 2022. The distribution of the Provincial Open Crown Land on which forest management operations can take place in terms of productive, non-productive, and non-forested land and water is indicated in Table 6.1. Of the 3.7 million hectares of productive forest on Open

Crown land, approximately 2.4 million hectares can be eligible for harvest. For more information area eligible for harvest, see Part 2 – Analysis and Modelling, Forest Modelling subsection 10.1.2 Spatial Data Preparation.

Table 6.1. Provincial Open Crown land within FML 2 by land cover category under licence jurisdiction.

Land Cover Category	Area (ha)
Productive Forest	3,713,701
Non-Productive Forest	2,038,719
Potentially Productive Forest	253,342
Non-Forested	999,660
Water	1,536,034
Total Open Provincial Crown Land	*8,541,455*

Exclusions to the FML include:

- Areas which are the subject of any timber disposition issued pursuant to The Forest Act (1988) and The Crown Lands Act (1988) prior to the date of the FML Agreement;
- Lands sold, patented, licenced, leased, or applied for in respect of which any disposition is pending;
- The beds and shores of all streams, rivers, and lakes extending up to the high water mark, and of all other bodies of water;
- Buffer zones as per The Forest Act (1988) and Regulations;
- Federal Crown lands;
- Indigenous Reserve lands;
- Provincial Closed/Restricted Crown lands;
- Local Government District (LGD) lands and private lands;
- Forest management unit (FMU) 57 of the Saskatchewan River Forest Section and FMU 60 of the Highrock Forest Section; and,
- Privately owned woodlots.

As per the FMLA, the Province of Manitoba "reserves the right to withdraw certain areas within the FML for hydro-electric development, recreation, roads, uses pursuant to the Northern Flood Agreement, Treaty Land Entitlement, and/or other uses which Manitoba deems to be in the public interest."

Effective January 1, 2003, FML 2, consists of the area described in Section 8 (A) (i) of the FMLA, as confirmed by correspondence received from the Deputy Minister, CWS, dated June 27, 2002. The decision by the province to remove the Grass River Provincial Park (FMU 60) from the FML became effective March 31, 2009.

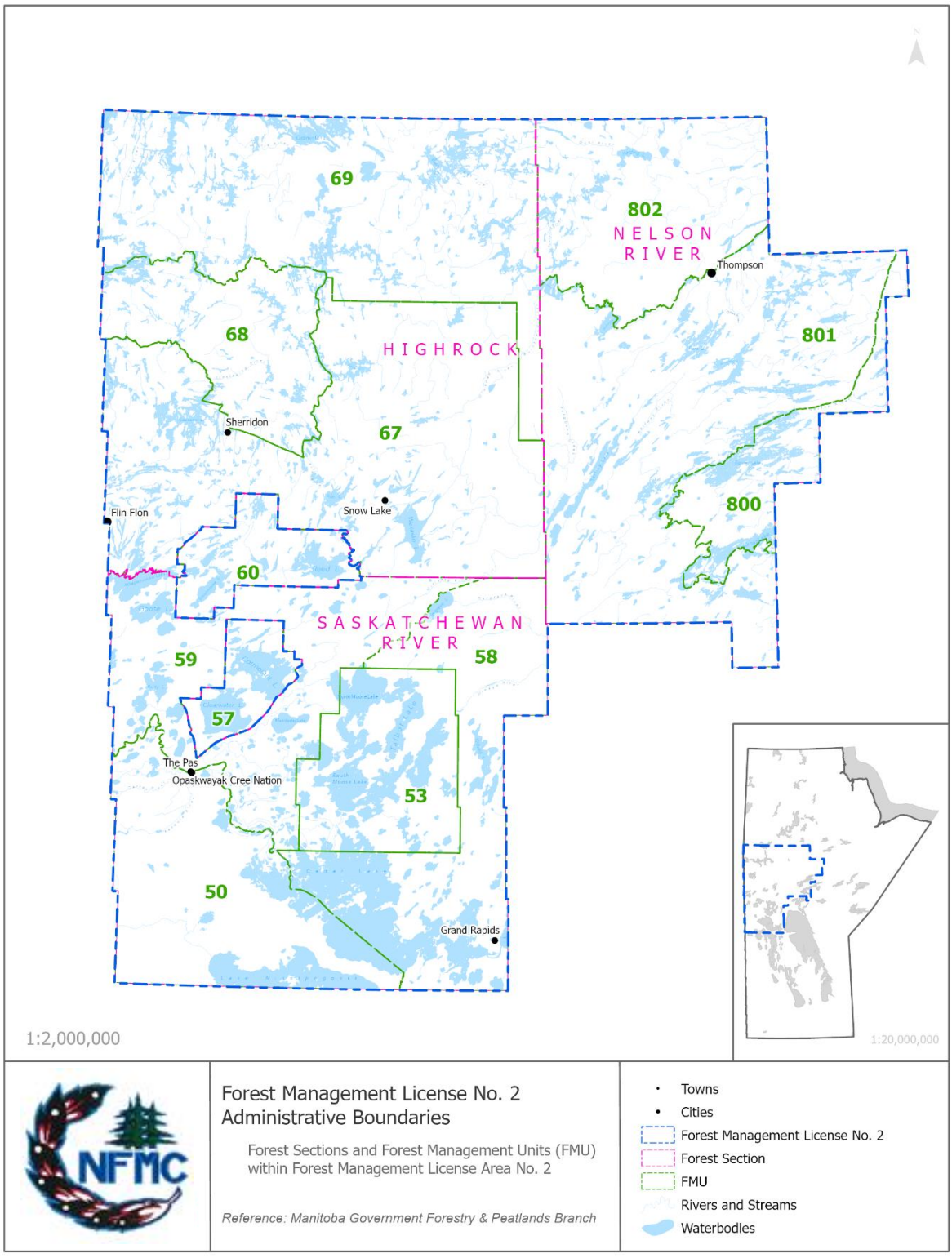
6.1.2 Forest Sections and Forest Management Units

FML 2 consists of ten forest management units (FMUs) within three forest sections: Saskatchewan River, Highrock, and Nelson River (Map 6.1).

Saskatchewan River Forest Section	FMU 50, 53, 58, & 59
Highrock Forest Section	FMU 67, 68, & 69
Nelson River Forest Section	FMU 800, 801, & 802

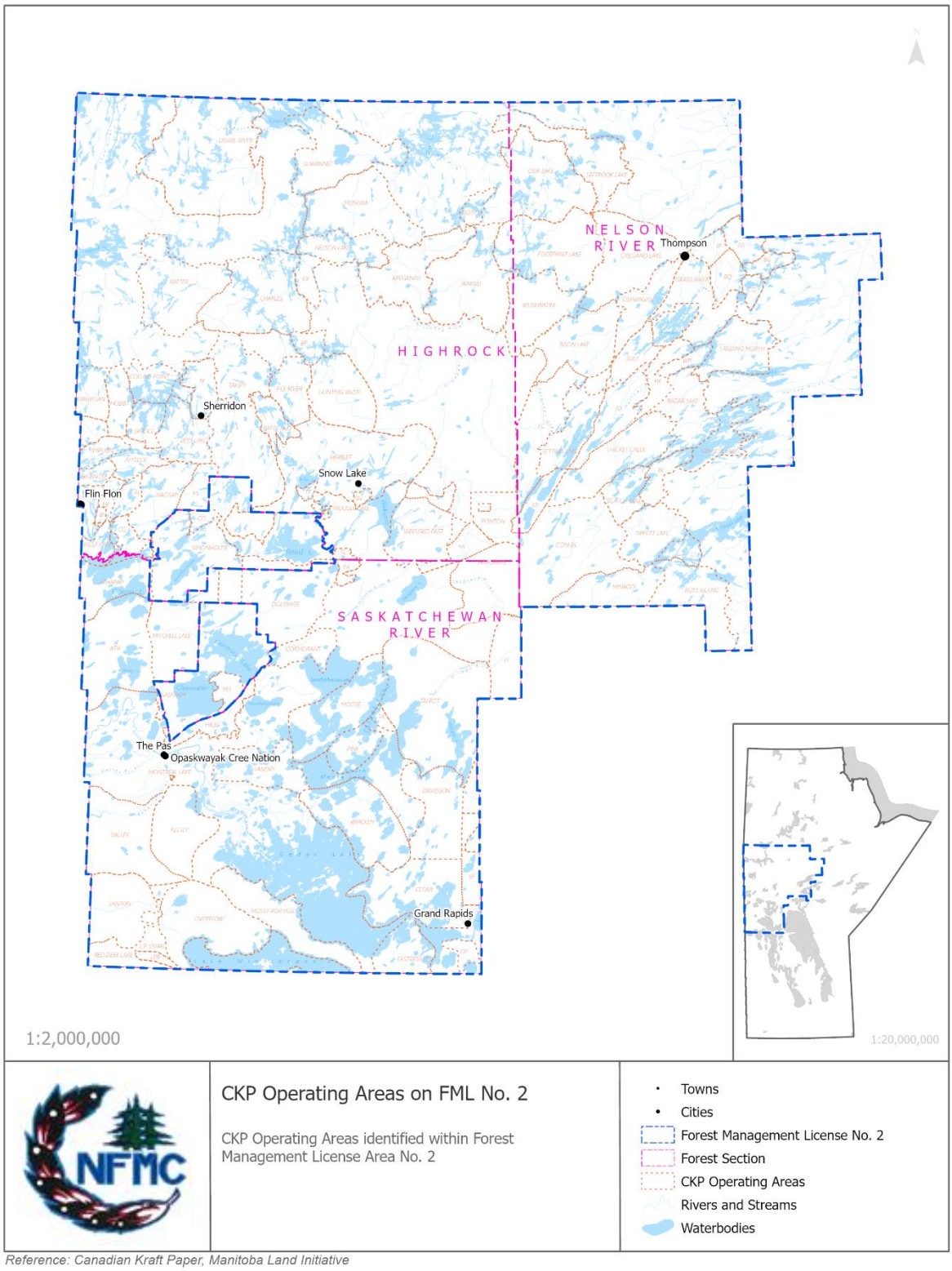
6.1.3 Operating Areas

Operating areas are smaller planning units, a contiguous geographic location with natural boundaries such as rivers, lakes, or wetlands, groups of stands with similar conditions, accessed by the same road, harvested during the same period (Map 6.2).



2045

2046 *Map 6.1. Forest sections and subsidiary forest management units (FMUs) within FML 2.*



Reference: Canadian Kraft Paper, Manitoba Land Initiative

2047

2048 *Map 6.2. Operating areas on FML 2.*

6.2 OWNERSHIP AND STATUS

Outside of Open Provincial Crown Land, there are four additional ownership designations within FML 2 – Closed Provincial Crown Land, Patented (Private) Land, Local Government District Land, and Indigenous Reserve Land (Table 6.2; Map 6.3). Provincial Crown Land is the largest ownership category across FML 2 at approximately 8.9 million hectares. The "Closed" Provincial Crown Land indicates provincial lands that are not under the administrative jurisdiction of the FML agreement. These lands are further categorized into several statuses. Relevant statuses are described in the following sections (Map 6.4).

Table 6.2. Land ownership on FML 2 as of the 2022 landbase provided by the Provionce.

Ownership	Area (ha)
Provincial Crown Land – Closed	384,664
Provincial Crown Land – Open	8,541,455
Patented Land	62,226
Local Government District Land	2,008
Indigenous Reserve Land	164,764

6.2.1 Indigenous Reserve Land

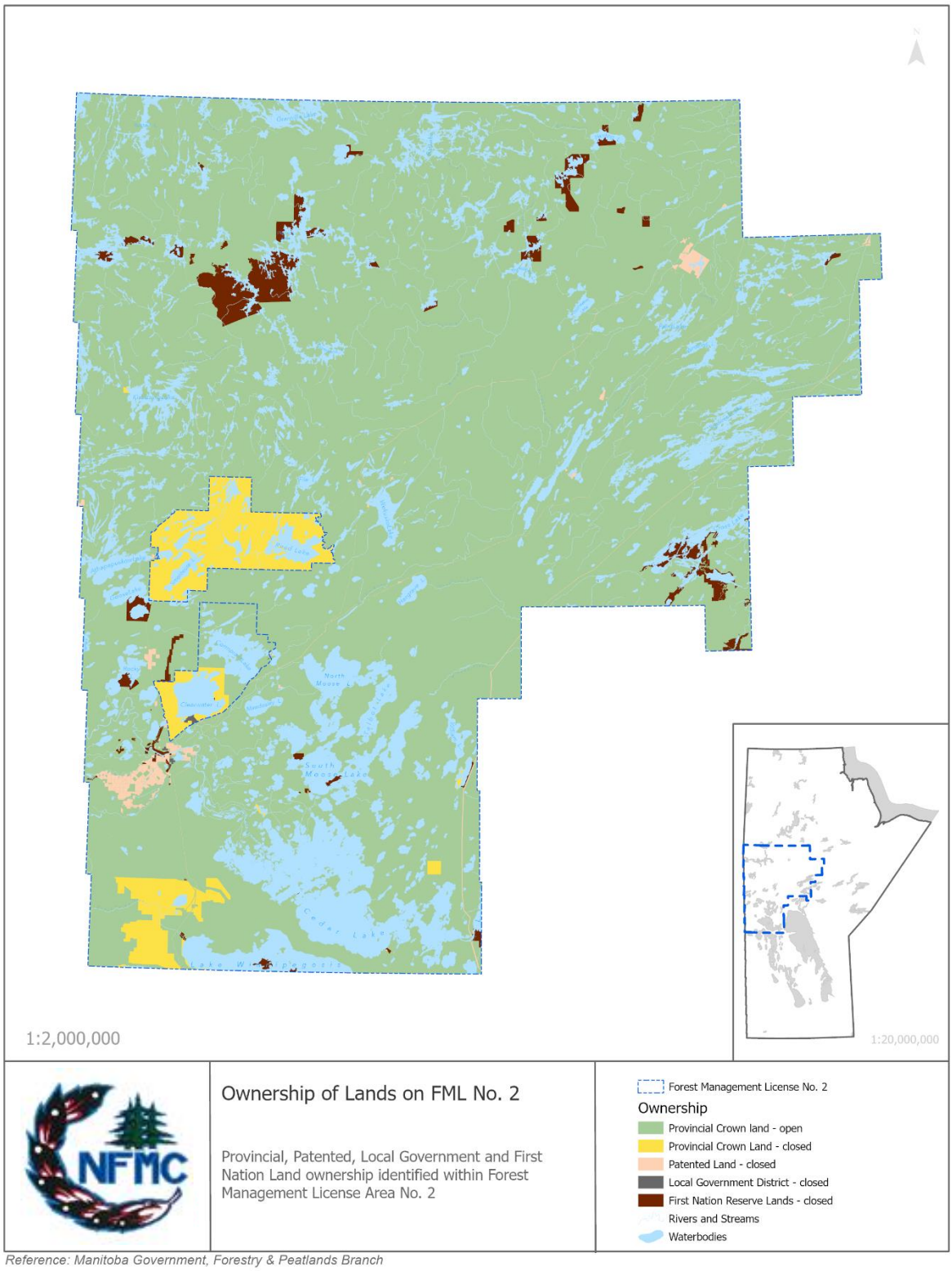
A number of First Nation communities on Indigenous Reserve Lands classified as Federal Crown Lands are present within the boundaries of the FML (Map 6.5). The Company is committed to work with First Nations, the Manitoba Métis community, and other Indigenous communities on the basis of mutual understanding, respect, trust and recognition of, and sensitivity to, the cultural values, rights and traditions of Indigenous communities.

6.2.2 Treaty Land Entitlement

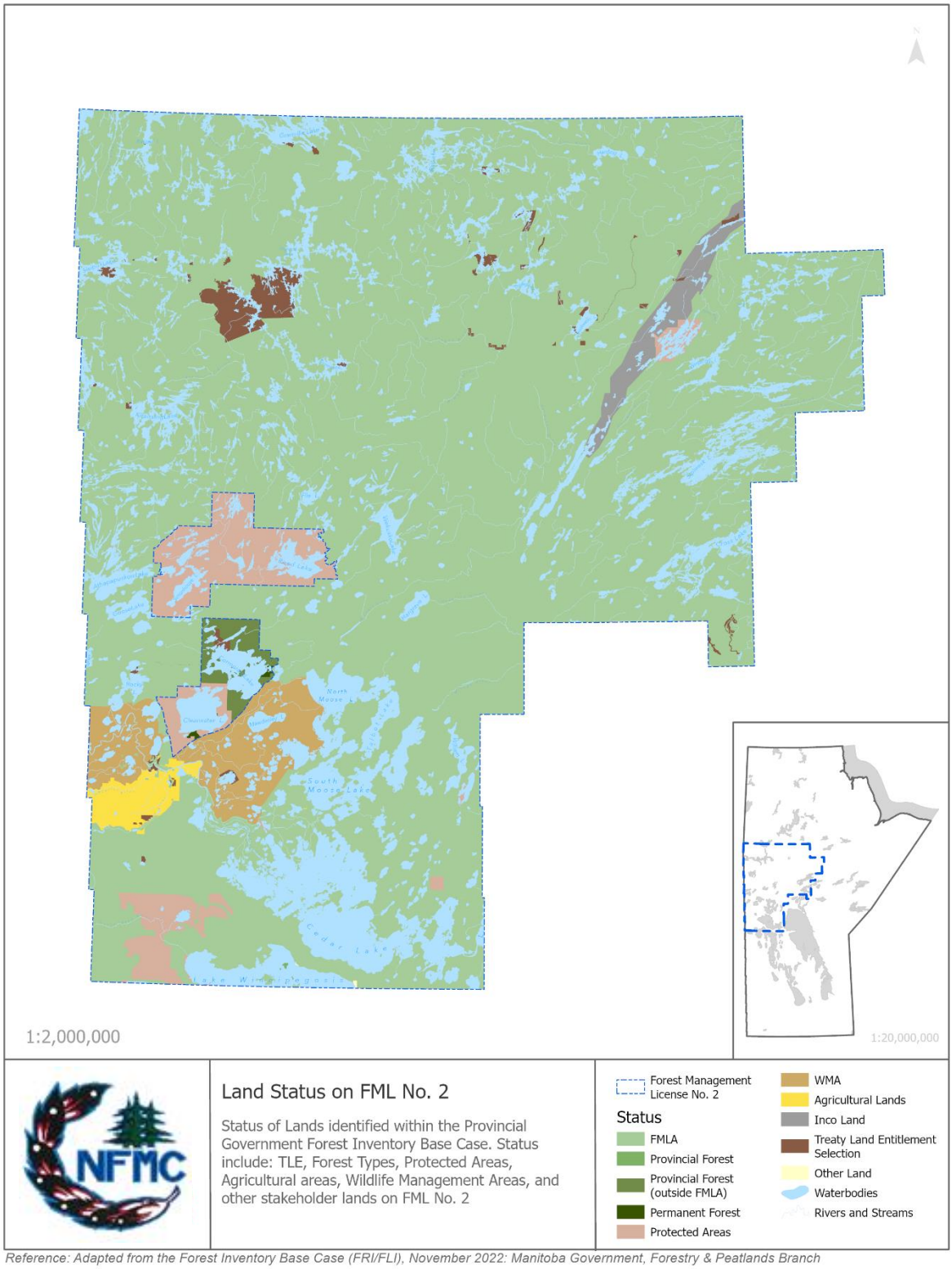
In addition to existing Reserve lands, several First Nations have outstanding Treaty Land Entitlement (TLE). As a result of these, Manitoba First Nations have not yet received the full amount of Reserve land promised under the Treaties made with Canada, as recognized and detailed in the Company's Forest Management Plan (1997-2009; Repap Manitoba Inc., 1996). It is also recognized that several additional First Nations in proximity to the FML also have outstanding TLE. The resolution of outstanding TLE is a matter between the governments of Canada, Manitoba and the relevant First Nations. The Company's licence under *The Environment Act* (1988; Environment Act Licence 2302 ER) indicates the licence shall be interpreted so as not to adversely affect any entitlement of a First Nation to lands under any Treaty or under any Treaty Entitlement Agreement. The FML Agreement between the Company and the Province of Manitoba makes provision for lands to be withdrawn from FML 2 for TLE. The Company has no direct treaty obligations with the First Nations or the Manitoba Métis community but as described in the Sustainable Forest Management (SFM) Policy, will continue to engage Indigenous peoples in communication processes and provide employment opportunities.

6.2.3 Northern Flood Agreement (NFA)

A Northern Flood Agreement (NFA), developed in 1977 among Canada, Manitoba, Manitoba Hydro and the First Nations of Nelson House and Cross Lake from within the FML and Norway House, Split Lake and York Factory in proximity to the FML, arose as a result of northern hydroelectric developments. Land transfers may occur as a result of settlements under this Agreement. The FML Agreement makes provisions for such withdrawals. Co-management agreements arising as part of the NFA settlements are in place for affected First Nation communities. These agreements have resulted in the formation of Resource Management Boards to enable joint review of proposed activities impacting resources and land-use in the vicinity of the community. The Company continues to utilize the ongoing relationship with the IRMT's to be kept abreast of activities undertaken through the co-management agreements with First Nations.



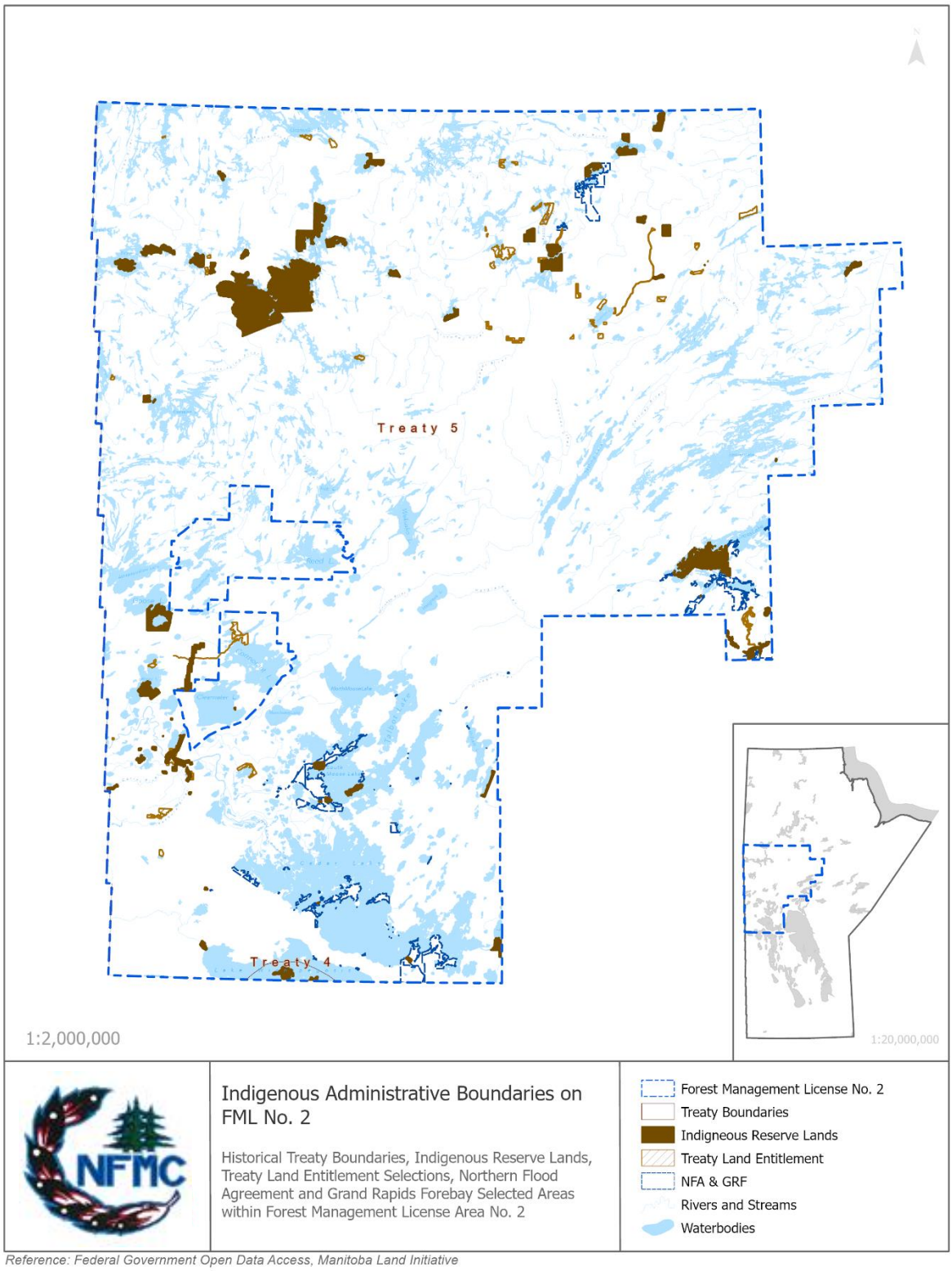
Map 6.3. Land ownership on FML 2.



Reference: Adapted from the Forest Inventory Base Case (FRI/FLI), November 2022: Manitoba Government, Forestry & Peatlands Branch

2087

2088 *Map 6.4. Land status on FML 2.*



2089

2090 *Map 6.5. Indigenous administrative boundaries on FML 2.*

6.2.4 Grand Rapids Forebay Agreement (GRFA)

The Chemawawin and Mosakahiken First Nations have agreements with the Province of Manitoba arising from the development of the Grand Rapids hydroelectric generating station in the 1960's known as the Grand Rapids Forebay Agreement. There is also a Mosakahiken First Nation land entitlement arising from this agreement for which the selection process is on-going.

6.2.5 Provincial, National, and Recreational Parks

Within the FML there are eleven Provincial Parks classified as either Natural Parks or Recreation Parks. There are two Natural Parks (Little Limestone Lake Provincial Park and Paint Lake Provincial Park), of which include areas for preservation of natural regions while also accommodating a diversity of recreational activities and resource uses. A third Natural Park, Clearwater Lake Provincial Park, borders a large area of the FML. In addition, there are eight smaller parks throughout the FML which are classified as Recreation Parks to accommodate a variety of recreational opportunities. The federal government is leading a study of an area for a potential National Park for the Manitoba Lowlands. Some portions of the study areas are within the FML.

6.2.6 Protected Areas, Areas of Special Interest, OECMs, and Wildlife Management Areas

A protected area is a clearly defined geographical space, recognized, dedicated, and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values. Indigenous rights are respected in protected areas which generally remain available for hunting, trapping, fishing, and other traditional practices.

Protected areas in Manitoba include land, freshwater, or marine areas where logging, mining, hydroelectric development, oil, and gas development, exploring for and harvesting peat, and other activities that significantly and adversely affect habitat are legally prohibited.

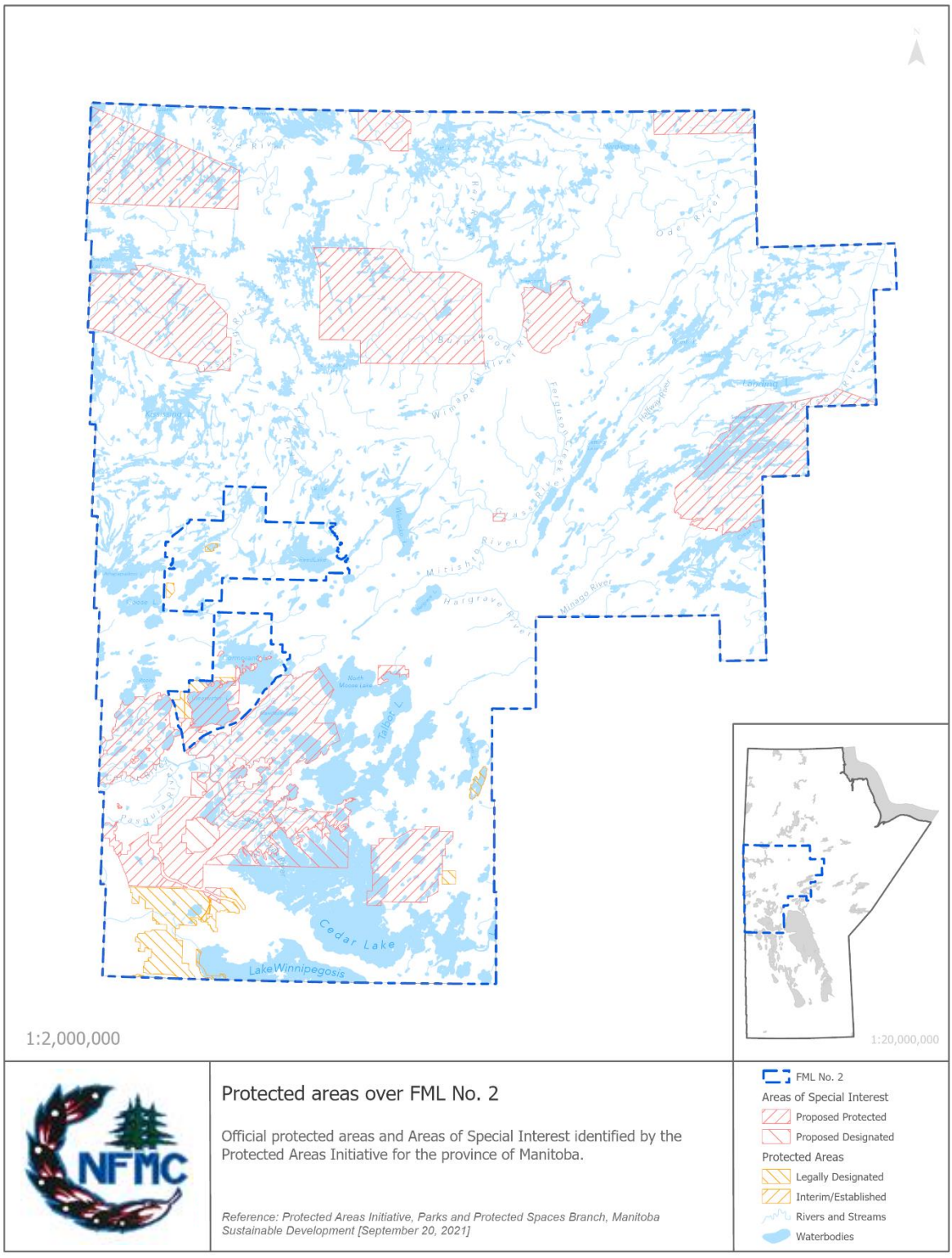
The Province of Manitoba, through its Protected Areas Initiative, is continuing to move towards the establishment of a series of Protected Areas across the province to contribute towards the goal of conserving a representative sample of biological diversity across the sixteen ecoregions in the province. To this point in time a series of Areas of Special Interest (ASI) have been established as interim units for continuing review. Several areas have been set aside within the FML in recognition of their unique features and are protected as Ecological Reserves under *The Ecological Reserves Act* (1988; Map 6.6).

ASIs are provincially-selected boundaries within a natural region that has been identified as representing an enduring natural feature. These areas are typically proposed ecological reserves, unprotected wildlife management areas, and other candidate protected areas. These boundaries do not carry legal definition and can often be modified as new information arises. ASI are classified as either Proposed Protected (being proposed as a Protected Areas) or Proposed Designated (being proposed as an area with designated limitations).

An "Other Effective Area-based Conservation Measure" (OECM) is a geographically defined area other than a protected area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the in-situ conservation of biodiversity, with associated ecosystem functions and services and where applicable, cultural, spiritual, socio-economic, and other locally relevant values. While protected areas have biodiversity conservation as a primary objective, OECMs result in biodiversity conservation regardless of the reason for its existence (Government of Canada, 2022). There are currently no OECMs in Manitoba's forests, however, if they are established, they would be areas protected from Company harvest.

The Walter Cook Caves Ecological Reserve is a 2,250-hectare protected area within the FML located north of Grand Rapids. It protects limestone and dolomite karsts, including six caves.

There are three Wildlife Management Areas (WMAs) within FML 2. Forestry activities are prohibited within the Red Deer WMA. A WMA Use Permit is needed to harvest within Saskeram and Tom Lamb WMAs.



Map 6.6. Protected Areas and Areas of Special Interest (ASI) on FML 2.

6.3 QUOTA HOLDERS, TIMBER SALES, SPECIAL ALLOCATIONS, AND THIRD-PARTY OPERATIONS

Under the FML Agreement, the responsibilities of NFMC include planning requirements for third party operators who have independent harvest allocations above and beyond those of the Company. These third parties operate within the Manitoba Timber Sale System which includes allocations for quota holders and special allocation holders. Under the authority of a Timber Sale Agreement with the Province of Manitoba, these operators hold specific harvest rights to an allocated volume. No specific area rights are entailed in these agreements. Harvest planning for these operators is incorporated into overall sustainable harvest levels in the development of plans by NFMC.

Each of the third-party operators must conduct their operations consistent with all applicable legislation and regulations and with the conditions of approval of their work permits. Manitoba undertakes on-going compliance inspections and follow-up processes for review of operator adherence to their applicable Timber Sale Agreement and to legislation and regulatory requirements and specific plan and work permit approval conditions applicable to their operations.

Timber sale operations are market driven. They produce mine timber, lumber and tongue and groove planks for flooring. Supervision of the timber sale operators falls to the Province. The actual volume harvested will be limited to the available Annual Allowable Cut (AAC) unless the Province has approved harvesting in excess of the AAC.

In compliance with the FML Agreement, reports detailing the volumes of wood delivered to the mill from each forest management unit are provided. The Province tracks the volume of wood used by third parties and supplies the information to NFMC for reporting. Total volumes of wood harvested and delivered are reported to the Province in 2-year Forest Management Reports. This information provides the data necessary to monitor the regulation of the AAC. For more information, see Part 3 – Implementation and Monitoring, Monitoring and Assessment subsection 17.1 Reporting.

6.4 FOREST CERTIFICATION SYSTEMS

6.4.1 Canadian Standards Association Sustainable Forest Management Standard Certification

Since 2004, FML 2 has held Canadian Standards Association (CSA) Sustainable Forest Management (SFM) standard certification. The SFM Plan was originally developed in 2012 by Tolko Industries Limited and has received several revisions since to comply with the most current CSA standards. In 2018, the SFM plan has been redeveloped to meet the revised standard of Z809-16 (2016). In 2020, the SFM plan was further updated to reflect the creation of NFMC.

The purpose of the SFM Plan is to document the processes and activities of forest management on FML 2 in order to demonstrate to the public and its customers its commitment to SFM and public participation in its planning processes as summarized in The Sustainable Forest Management Policy. The SFM Plan outlines the values, objectives, indicators, and targets (all together referred to as the performance framework) identified through the public participation process. The plan also identifies the strategies for the implementation, monitoring and public reporting of this performance framework.

The Company established a Forest Resource Advisory Committee (FRAC) in 1996, now known as the Sustainable Forest Management Committee (SFMC), to provide an additional opportunity for public participation to assist in carrying out its forest management responsibilities and has since adopted the role of the Public Advisory Group for the CSA SFM Plan. Committee members are provided with on-going regular opportunities to be informed of forestry plans and activities and provide input on proposals. The SFMC has played a crucial role in the development of SFM plan, particularly in the development of the performance framework for assessment of

progress towards SFM. The SFMC will continue to provide the long-term on-going review and public advisory role for the SFM Plan.

The SFM Plan includes thirty-eight performance indicators that cover harvesting, road development, forest renewal, public participation, safety, training, and more. Annual third-party audits are required to maintain this standard.

The most recent SFM Certificate, Indicators, SFM Annual Report, and audit findings are always publicly available and can be found on NFMC's website www.niso.ca . For more information on certification reporting, see Part 3 – Implementation and Monitoring, Monitoring and Assessment subsection 17.3 Standard Certification Monitoring and Assessment.

6.4.2 International Organization for Standardization Environmental Management System Standard Certification

The Company has also developed an International Organization for Standardization (ISO) 14001 registered Environmental Management System (EMS) to improve environmental performance. The EMS is part of an initiative to assure and demonstrate that an appropriate environmental management system is in place to meet the requirements of the CSA SFM certification. The EMS provides a framework for implementation of the Company's Environmental Policy from planning, implementation, and operation through to checking, corrective action, and management review. The follow-through of these processes lead to continual improvement for Woodlands operations.

In November 2002, an EMS for the FML was successfully certified to the ISO 14001 standard. To maintain this standard the operation is audited each year by an independent third party. The ISO 14001:2015 (third edition; ISO, 2015) standard is the current standard to which the Company is conforming to.

The EMS includes Standard Operating Procedures (SOPs) necessary to ensure conformance with the EMS and SFM objectives and targets. Standard Operating Procedures and other operational control mechanisms (inspection forms, etc.) have been implemented to make sure that activities are consistent with all applicable legal requirements for the FML and the requirements of SFM. In addition, on-going and newly developed programs such as training seminars, development of guidelines, development of new processes are undertaken within the EMS and SFM systems as part of the commitment to continual improvement.

For more information on certification reporting, see Part 3 – Implementation and Monitoring, Monitoring and Assessment subsection 17.3 Standard Certification Monitoring and Assessment.

7 Legislation and Policy

There are a number of pieces of legislation and policy that govern Nisokapawino Forestry Management Corporation's (NFMC) sustainable forest management practices. Most influential are Provincial and Federal Legislation, particularly *The Forest Act* (1988) and those pertaining to the environment and endangered species/species at risk. The Manitoba government has been prolific in providing guidance and reference documentation to assist in sustainable forest management and the forest management planning process. A more robust list of legislation, policy, and guidance relevant to NFMC's forest management can be found in Appendix I.

For more information on the Company's policies and operational best management practices (BMPs), see Part 3 – Implementation and Monitoring section 16 Implementation Strategies, and Appendix O – Operational Best Management Practices.

7.1 FEDERAL SPECIES AT RISK RECOVERY STRATEGY INTEGRATION

The Federal *Species At Risk Act* (2002) governs the treatment and consideration of at-risk species protected under Federal legislation and provides guidance through the Species at Risk Action Plan, Management Plan, and Recovery Strategy Series written by Environment and Climate Change Canada, formerly Environment Canada. Many parts of this 20-year forest management plan will address habitat concerns for species at risk, species of concern, and other wildlife species that exist throughout the FML area. The following sections focus on the acknowledgement and integration of the formal Federal Recovery Strategies of species at risk found within FML 2. Legislation, policy, and direction updates are on-going as new information and research becomes available; the Recovery Strategies discussed below represent the best available information during the development of the forest management plan.

Ecosystem Based Management (EBM) is an approach to management that is guided by natural patterns and processes. The goal of EBM is to reduce the differences between 'what is natural' and the 'managed landscapes' of a particular region in order to keep habitat conditions within the natural range that could be expected to occur. In Manitoba's boreal forest, wildfire is the dominant natural disturbance agent. The size and pattern of wildfire disturbance is variable and some large disturbance events are likely. Integration of analysis techniques to target to move towards (or maintain) more natural structure, composition, and pattern of the forest at the landscape level are an important strategic objective of this forest management plan. Integration of EBM approaches in this plan help to address many of the habitat management and protection concerns of the Recovery strategies discussed below, along with many other species of the region.

In addition to the Ecosystem Based Management direction, other important components help address habitat management and protection at the landscape level (Part 2 – Analysis and Modelling), as well as the more detailed forest stand level and operations level (Part 3 – Implementation and Monitoring). Some examples of these components that are discussed in later sections of the forest management plan:

Analysis and Modelling

- Maintaining old seral habitat elements and targeting a range of disturbance sizes that represent what currently exists on the landscape;
- Strategic watershed disturbance objectives (e.g., limiting disturbance at watershed levels);
- Landbase net down and description (e.g., riparian buffers);
- Modelling of wildlife habitat and habitat elements; and,
- Cumulative effects assessments (e.g., landscape biodiversity, wetlands and aquatic ecosystems, moose and caribou habitat).

Implementation and Monitoring

- Road development and access management;
- Silviculture practices (e.g., for vegetation management and tending activities); and,
- Research (e.g., on-going data collection and reporting).

The following available Recovery Strategies have been reviewed to integrate with strategic and operational objectives in this forest management plan.

7.1.1 Canada Warbler (*Cardellina canadensis*) Recovery Strategy Integration

Environment and Climate Change Canada's 2016 *Recovery Strategy for the Canada Warbler (Cardellina canadensis) in Canada* identifies the species breeding habitat as deciduous-coniferous mixed wood forest or deciduous forests with a dense, complex understory. Forest harvesting and removal of shrub layer are considered medium and high threats to breeding habitat, respectively.

The removal of shrub layer during silviculture practices with the use of herbicide is a practice implemented specifically to ensure that conifer forests are not converted to hardwood dominated forests. The report identifies hardwood forests, or hardwood dominated mixed woods as the preferred habitat type of the species. As the Company does not target hardwood dominated forests, its impact on this habitat type is very minimal. Furthermore, any harvest of hardwood dominated forests by quota holders would be managed to maintain a hardwood dominated cover type and the use of herbicide on those regenerating forests would not be necessary, preserving the regenerating shrub layer.

Forest harvesting can have negative effects on Canada Warbler, however, the closer that the harvest regime mimics natural disturbance, and the more dynamic a stand is throughout a renewal area, the greater the habitat quality for the species. Wildlife retention patches and residual trees are common operational practices implemented by the Company.

7.1.2 Common Nighthawk (*Chordeiles minor*) Recovery Strategy Integration

Environment Canada's 2016 *Recovery Strategy for the Common Nighthawk (Chordeiles minor) in Canada* identifies the species critical habitat as open land and forest clearings. Fire suppression and habitat succession are listed as medium threats to the species habitat. Logging and wood harvesting are listed as unknown threats. Logging can have short term negative effects on nesting birds; however, the species is known to use human altered landscapes and the impact of harvesting has not been assessed yet for this species.

7.1.3 Olive-sided Flycatcher (*Contopus cooperi*) Recovery Strategy Integration

Environment Canada's 2015 *Recovery Strategy for the Olive-sided Flycatcher (Contopus cooperi) in Canada* identifies the species breeding habitat as coniferous or mixed wood forests located near water or wetlands with the presence of tall snags.

Fire suppression is listed as a high threat to the species habitat and forest harvesting and silviculture is listed as a medium threat. Logging can have short-term negative effects on nesting birds, however, there are many studies that show the olive-sided flycatcher responds positively to harvest, especially when there are snags and residual trees left behind. Wildlife retention patches and residual trees are common operational practices implemented by the Company.

Forest harvesting can negatively impact olive-sided flycatcher habitat with a lack of riparian buffers and altering of water drainage patterns. The Company has many policies in place to protect riparian areas, wetlands, and the integrity of watersheds.

Other potential forestry related activities identified in the report that could cause negative impacts to the species habitat are single-species, even-aged plantings, short stand rotations, and herbicide use to reduce competing vegetation. The boreal forest is a disturbance-prone forest. Forest fires create large, even-aged forest patches which are mimicked during harvest and renewal. The Company has an obligation to return a conifer forest back to a conifer state which requires a certain level of vegetation management with the use of herbicides. These

practices, although may not be beneficial to one species, are critical for the preservation of habitat types of other species, and are undertaken with careful consideration.

Moving towards the Natural Range of Variation for forest composition, structure and pattern in the region will promote required habitat types at the landscape level for the Olive-sided Flycatcher. Smaller scale management practices and policies will help manage habitat requirements for riparian reserves, snags, retention patches and regenerating species.

7.1.4 Horned Grebe (*Podiceps auratus*) Proposed Management Plan Integration

Environment and Climate Change Canada's 2021 proposed management plan for the western population of the horned grebe (*Podiceps auritus*) identifies the species critical habitat as open land and forest clearings. Roads are listed as "not a threat" and logging and wood harvesting is listed as "negligible" threat for the species population. The report identifies the protection of wetlands as a key objective for the protection of the species. The Company has policies in place to protect wetlands during operations. For more information on Wetlands and Aquatic Ecosystems see Part 2 Cumulative Effects Assessment.

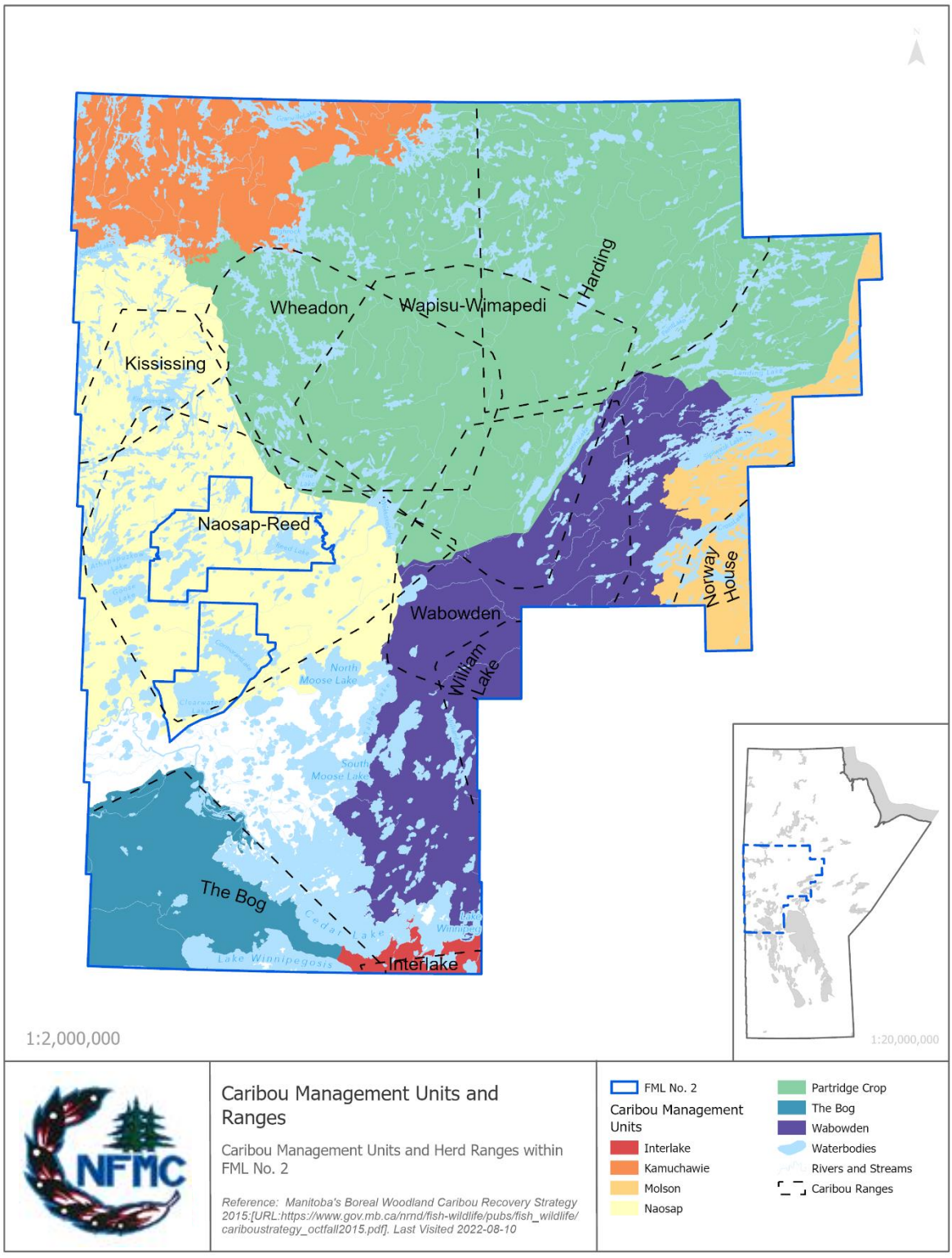
7.1.5 Woodland Caribou (*Rangifer tarandus caribou*) Action Plan Integration

Boreal woodland caribou are listed as a threatened species under the Federal *Species at Risk Act* and the provincial *Endangered Species and Ecosystems Act*. Across Canada's boreal forests government agencies, researchers, forest managers and Indigenous communities continue to work to promote and deliver on conservation and recovery measures for all boreal woodland populations. In Manitoba, the Provincial government is working closely with the Government of Canada to align a provincial *Recovery Strategy* (2015) that is consistent with the population and habitat objectives set out in the Federal *Recovery Strategy* and *Action Plan* (2018). A Section 11 Conservation Agreement for Boreal Woodland Caribou (2022) has been signed to define the actions that will be taken by both parties moving forward.

Several boreal woodland caribou ranges and seven of the nine management units defined within the Province overlap FML 2 (Map 7.1). As part of *Manitoba's Boreal Woodland Caribou Recovery Strategy* (Manitoba Boreal Woodland Caribou Management Committee, 2015), Action Plans were to be developed for all management units. The Province is continuing the development of *Management Unit Range Plans* alongside the development of this forest management plan. Due to the importance of boreal woodland caribou in the region, the risk to populations, and the large landscape level approach that is required for habitat and population management, NFMC is working collaborative with the Province to include strategic, landscape-level objectives in this forest management plan that will reflect the intent of the existing provincial *Recovery Strategy* and *Management Unit Range Plans* when they are completed in the future.

Boreal caribou have distinct habitat requirements at different scales. At a coarse scale, caribou seek peatland complexes intermixed with mature (60- to 80-year-old) pine, black spruce, and tamarack dominated upland. At a fine scale, habitat is selected to meet forage requirements and generally inhabit lichen-rich areas of the boreal forest (Manitoba Boreal Woodland Caribou Management Committee, 2015).

Due to the large landscape-level spatial arrangements that will need to be considered and that will be directly influenced by forestry and access, caribou will be addressed directly within the objectives and forest modelling exercise of this forest management plan. Emulating a pattern of harvest that resembles existing stand openings on the landscape will be a key driver towards the recovery of required amounts and arrangements of preferred habitat types. The amount and arrangement of boreal woodland caribou habitat will be assessed and reported on using the Habitat Suitability Index (HSI) model that includes the current disturbances on the landscape as of 2022 (Wood Environment and Infrastructure Solutions, 2021; for the full report, see Appendix S). Boreal woodland caribou habitat management has also formed a part of the forest management plan cumulative effects assessment (see Part 2 – Analysis and Modelling section 15 Cumulative Effects).



Map 7.1. Woodland caribou (Rangifer tarandus caribou) management units within FML 2.

NFMC will continue to work with the provincial government and Indigenous communities to integrate the Federal Action Plan as newer information becomes available. This forest management plan sets objectives for amounts and arrangements of forest types and structures, as well as objectives to reduce linear features from access development where possible. More information on strategic objectives and operational implementation approaches can be found in Part 2 – Analysis and Modelling and Part 3 – Implementation and Monitoring of this forest management plan.

7.1.6 Bank Swallow (*Riparia riparia*) Recovery Strategy integration

Environment and Climate Change Canada's 2022 *Recovery Strategy for the Bank Swallows (Riparia riparia) in Canada* identifies the species nesting habitat as steep bank facing along waterbodies and human-made habitats. Forestry is not listed as a threat to bank swallow populations. Forestry effluents in the form of insecticides are listed as a threat as it decreases the species food source; however, the Company currently does not use insecticides.

The use of aggregate pits is considered neutral or a potential benefit to bank swallow populations as it creates habitat for the species. The Company still implements a bird survey during nesting season prior to the use of aggregate pits. This survey is conducted as close to the time of operation as possible to capture the most up-to-date status of potential nesting sites and prevent their disturbance.

Riparian areas and wetlands are important roosting habitats for bank swallows. The Company has many policies in place to protect riparian areas, wetlands, and the integrity of watersheds.

7.2 FOREST MANAGEMENT LICENCE AGREEMENT

The following is a summary of FML 2's Forest Management Licence Agreement (FMLA) requirements and responsibilities as relates to planning and management obligations. Manitoba requires management of the forest resource located in and upon the FML to endure:

- Sustainable forest management incorporating sustained yield for each forest management unit in accordance with the most current management principles and practices;
- Achievement of the maximum growth potential of suitable species within the FML and the most efficient utilization of harvested timber for commercial purposes;
- Maintenance of a standard of environmental quality acceptable to Manitoba in accordance with the Province's policies for sustainable development, and the Acts and Regulations of the legislature of the Province of Manitoba and of the Parliament of Canada which are, from time to time, in effect in Manitoba and any agreements which may exist between Manitoba and the Company;
- Public access for recreational and other uses of the forest areas; and,
- Conservation of other forest resources.

7.2.1 Roads

The Company is responsible for the construction and maintenance of all its roads for accessing timber. As long as a road is primarily being used for Company operations, the Company will permit the public to use all weather roads and must maintain them to a standard necessary to carry out Company operations. The Company will use, where practical, all merchantable timber cut during road construction and other incidental operations.

7.2.2 Forest Management

The Company will:

- Follow sound forestry practices with the purpose of achieving and maintaining a perpetual sustained timber yield from the productive forest land, while not diminishing the productivity of the land;
- Harvest the AAC of merchantable tree species it utilizes from merchantable stands;

- Undertake the necessary steps to the satisfaction of Manitoba, for planning, allocating, and related supervision for all commercial timber harvesting activities; and,
- Follow and implement forest management strategies to meet all the requirements of fisheries, wildlife, timber harvesting, forest renewal and any other relevant current or new guidelines for forest operations.

Current Company plan submission to the Province has been updated since the signing of the FML agreement and are as follows:

- 2-year forest management operating plan submitted at least ninety days prior to June 1st of each calendar year;
- A twenty-year forest management plan every 20 years after the expiration of the 1997 13-year forest management plan and its extensions;
- Any other such forest management plans as may be required from time to time by Manitoba; and,
- All plans will include statements of the wood procurement program or the projected wood procurement program for the mill.

The Company is responsible for the planning, allocating and collection of Crown dues for Third Parties under the quota system. These quota holders will continue to enjoy security of tenure based on utilization performance standards set out in the Manitoba timber quota system. Any surplus of timber not harvested by the Company may be made available to Third Parties. Local community needs shall be considered as well, and timber will be made available to local residents for personal domestic use by Manitoba.

The Company will use all merchantable Spruce, Fir, and Pine timber on harvest areas subject to Plant requirements and commitments.

7.2.3 Forest Renewal and Stand Management

Forest renewal and stands management practices will be carried out to ensure the continuing forest growth with site suitable species as good as, or better than the present forest on the FML.

The Company will ensure that areas harvested on the FML to supply its mill are regenerated to approved provincial standards. All reforestation surveys must be performed according to approved Manitoba provincial methods and procedures in order to receive a Certificate of Reforestation. For sites declared Not Sufficiently Regenerated (NSR), the Company must undertake a reforestation treatment in the next year and the treatments must achieve satisfactory regeneration in three years or Manitoba may re-treat and charge the Company for the cost. Silviculture prescriptions for retreating NSR areas must be identified in the Company's Annual Report. Manitoba reserves the right to charge twice the average forest renewal cost per hectare for NSR sites deemed inappropriate to treat. If needed, the Company can give priority to the most productive and accessible sites, either newly cut or not satisfactorily regenerated (NSR) or restocked lands.

The Company must ensure that there is available trained personnel and equipment for the purpose of implementing and evaluating forest renewal and stand management practices. The Company must also ensure they have sufficient seeds and seedlings to carry out all renewal plans.

Manitoba is responsible for forest management and renewal of areas depleted by insects, disease, fire or natural disasters, except in the case where areas depleted by fire, insect or disease is caused by negligence of the Company and any of its operations.

7.2.4 Fire Protection

Prior to April 1st of each year, the Company submits a fire protection/suppression plan to the Province which details the Company's planned operations for the upcoming fire season including locations, equipment and personnel. The Company requires that contractors engaged in the work maintain the required fire suppression equipment in a functional condition at the worksite and have trained their employees in its' use. Additionally, a forest operation modification system has been developed that determines when different components of forest

operations need to be curtailed based on their risk level and the current and forecast fire hazard condition in the operating area. The Company will coordinate with Manitoba in all Company fire suppression activities.

In the event of significant insect or disease damage to forest growth, the Company will cooperate with Manitoba in managing the pest problem.

7.2.5 Record Keeping

The Company will keep books, records, and maps for its forest operations and renewal activities in the province. For more information, see Part 3 – Implementation and Monitoring section 17 Monitoring and Assessment.

7.3 POTENTIAL IMPACTS TO KNOWN AND UNKNOWN HERITAGE RESOURCES

In order to support and assist in the long-term management of Heritage Resources within FML 2, the Company maintains a list of heritage sites within its GIS systems as identified by the Historic Resources Branch of Manitoba's Department of Sport Culture, and Heritage and collaborates with the Historic Resources Branch to utilize the information as part of its forest management and planning activities.

The Company mitigates potential impacts to known and unknown Heritage Resources through a few different mechanisms including its Heritage Resource Action Plan. An EMS Guideline was developed from the Action Plan for contractor and employee training and field reference purposes.

The Company also has a requirement to perform a formal archeological evaluation for heritage resources on all newly proposed all weather roads. This requirement is embedded within the Company's indicator requirements for its Sustainable Forest Management (SFM) certification. The Company performs Pre-Harvest Forest Investigations on proposed harvest areas in which surveyors are trained to document any heritage resources found during the surveys.

The Historic Resources Branch reviews all Forest Management Plans, Forest Management Operating Plans, and Forest Road Development Plans submitted by the Company prior to their approval. The Company works closely with the Branch to address any concerns that may arise from the Historic Resources Branch review. The Company also presents these plans to communities within the FML and community members are given an opportunity to inform the Company of any known or potential Heritage Resources.

7.4 POTENTIAL IMPACTS TO KNOWN PROTECTED AND CONSERVED AREAS

Known protected and conserved areas are included on proposed forest management plan and forest management operating plan (FMOP) harvest maps to ensure that no harvest and forest management activities are proposed within these areas. The Company also measures and tracks its success within its Sustainable Forest Management (SFM) annual report. All harvest and silviculture activities are reviewed by the Integrated Resource Management Team (IRMT) at the work permit approval stage as well.

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