Assessment of High Conservation
Values in the Missinaibi Forest
Based on Principle 9 of the
Forest Stewardship Council
National Forest Stewardship Standard of Canada

Version 5.0 – July 2023

Prepared by GreenFirst Forest Products Inc.

For Missinaibi Forest Management Inc.

Assessment of High Conservation Values in the Martel Forest

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Version 4.0, October 2021.

Assessment of High Conservation Values in the Magpie Forest

Completed in 2020 by NorthWinds Environmental Services (Alex Campbell, Triin Hart, PhD, Jennifer Link, Zachary Long, MSc, and Rike Burkhardt, MFC, RPF).

Peer-reviewed by:
Christine Korol, M.F.C. (Forestry Consultant) and Dr. Stephen Hart (Stantec).

Assessment of High Conservation Values in the Missinaibi Forest

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Executive Summary

This report represents Missinaibi Forest Management Inc.'s (MFMI) dedication to environmentally and socially acceptable forestry through the integration of the Forest Stewardship Council (FSC) standards. Specifically, the results of the High Conservation Value Forests assessment for the Missinaibi Forest (MF) are organized according to Annex D: High Conservation Value Framework, in the FSC National Forest Stewardship Standard of Canada (Approved October 19, 2018; effective January 1, 2020). High Conservation Values (HCVs) are defined in Principle 9 of the FSC's Principles and Criteria as forest areas that contain outstanding or critical biological, environmental or social values; within six categories:

- HCV 1 – Species diversity
- HCV 2 – Landscape-level ecosystems and mosaics
- HCV 3 – Ecosystems and habitats
- HCV 4 – Critical*ecosystem services
- HCV 5 – Community needs; and
- HCV 6 – Cultural values.

Identification of HCVs is consistent with the requirements of FSC Criterion 9.1.

This assessment is intended to identify High Conservation Values (HCVs) and the forest areas required to support them as per criterion 9.1. Management strategies to maintain and enhance any identified HCVs and potential HCVs, and the related monitoring protocols, are identified per the requirements of criteria 9.2 and 9.3. Monitoring strategies and protocols are identified according to criterion 9.4. Members of the public may request copies of the report via the MFMI website: (under development as of July 2023 – see note above). Interested people are invited to provide comments or inputs concerning this report at any time throughout the year. Previous versions of this report have been peer-reviewed by several external organisations, including WWF Canada, Forestry Research Partnership, Mushkegowuk Environmental Research Centre, and MNRF.

Although the former Magpie Forest was not FSC-certified, a High Conservation Values Assessment was completed in 2020 by NorthWinds Environmental Services (Alex Campbell, Triin Hart, PhD, Jennifer Link, Zachary Long, MSc, and Rike Burkhardt, MFC, RPF). The report "Assessment of High Conservation Values in the Magpie Forest" was peer-reviewed by Christine Korol, M.F.C. (Forestry Consultant) and Dr. Stephen Hart (Stantec). The resulting comments and corrections were implemented in the final version of the Magpie HCV Assessment that was integrated with the Martel HCV Assessment to create this HCV Assessment for the Missinaibi Forest.

Annex D: High Conservation Value Framework provided the methodology for the assessment of Principle 9. This approach is consistent with the direction of current international efforts by ProForest (with funding from Ikea and FSC) to define HCV attributes and assessment methodologies. HCV assessment results are expected to change over time and evolve into a comprehensive analysis of these values for the MF.

Consultation efforts with local communities are ongoing. On September 2023, a virtual presentation was made to the Wawa-Chapleau Local Citizens' Committee (LCC). The presentation summarized the methods, sources of information, and results of the HCV assessment for the Missinaibi Forest HCV Assessment. Wahkohtowin Development GP Inc.

has been contracted by GreenFirst to assist in Indigenous engagement for the draft Missinaibi Forest High Conservation Value (HCV) report. The primary contact for the work is Isabelle Allen, R.P.F. A series of engagement activities with local First Nations are planned or in progress as part of this initiative. In-community workshops are planned for the period from October through December 2023 with a draft report of findings expected in early 2024.

The MF is centered around the communities of Chapleau, Missanabie and Dubreuilville and comprises 1,631,973 ha of land of which 1,401,267 hectares are productive forest. The Missinaibi Forest includes the former Superior Forest, the J.E. Martel Forest, and the Magpie Forest. The J.E. Martel Sustainable Forest License was acquired by Tembec Inc. from Domtar Inc. in early 2005. Prior to this the J.E. Martel management unit was adjoined to the Pineland management unit and was called the Pineland-Martel Forest (PMF). The Superior and J. E. Martel forests were amalgamated for production of the 2006-2026 Superior-Martel Forest Management Plan. Following amalgamation of the Martel Forest and Magpie Forest, the name of the forest was formally changed to the Missinaibi Forest (MF) in 2021. The forest is licensed to Missinaibi Forest Management Inc. (MFMI) under the terms and conditions of Sustainable Forest License #550390. MFMI and the MNRF are responsible for the operation and administration of the MF under the terms and conditions of the current Forest Management Plan (2021-2031).

The FSC certificate for the MF will apply to the Crown Land portion of the MF, a total of 1,520,921 ha. Of this total area, 132,844 ha is within regulated Provincial Parks and Conservation Reserves. An additional 52,813 ha are within long-term deferral areas including FSC candidate protected areas (derived from Gap Analyses) and Intact Forest Landscapes for a total protected area of 185,657 ha, which represents 12.2% of the total area of the Crown portion of the MF. Note that the total area of the MF is 1,631,921 ha, which includes patent and private lands and First Nations' reserve lands.

The MF has been subject to forestry activities since the turn of the century, and during that time forestry equipment and strategies have evolved significantly. The largest forest units on the MF are the White Birch (BW1, 14%) and Poplar (PO1, 12%) forest units, accounting for almost a third of the managed Crown productive forest, while Other Hardwoods (OH1, 0.2%), Red and White Pine (PRW, 0.1%) and BOG (2%) represent the smallest forest units.

The MF is a relatively young forest with only 16% of the forest area older than 100 years, however the largest proportion of forest area occurs with the 61-80 and 81-100 year age classes (247,708 and 251,458 hectares, respectively, or approximately 21% in each of the classes). Area in the 21-40 year age class is less (202,286 hectares, or 17%). Contributions to this age class included harvest depletions as well as natural disturbances from the recent past (i.e., the 1980s and 1990s).

The MF falls within three natural regions, Ecoregions 3E, 4E and 5E, according to the ecological land classification used by the Ministry of Natural Resources and Forestry (MNRF). Five natural Ecodistricts intersect the MF: 3E-2, 3E-5, 4E-1, 4E-3, and 5E-13. In the case of Ecodistricts 3E-2 and 5E-13, these areas occupy very small areas of the MF located in the northwest boundary and the southwest border of the MF respectively. Ecoregions and Ecodistricts are derived from Hills (1959) land classification system that groups land areas with similar potential biological productivity based on similarity of landforms, soils, topography, and climate. Ecodistricts are subdivisions of the larger Ecoregions based on physiographic patterns.

This report concludes that the MF contains HCVs in several different Categories, as listed below:

Category 1:
- Species at risk and their habitats, including Bald Eagle, Bank Swallow, Barn Swallow, Black Tern, Canada Warbler, Chimney Swift, Common Nighthawk, Evening Grosbeak, Eastern Whip-poor-will, Eastern Wood Pewee, Least Bittern, Olive-sided Flycatcher, Peregrine Falcon, Rusty Blackbird, Short-eared Owl, Yellow Rail, Wood Thrush; Snapping Turtle, Wood Turtle; Lake Sturgeon; Eastern Small-footed Myotis (Bat); Little Brown Myotis, Northern Long-eared Myotis; Eastern Cougar; Monarch Butterfly, Gypsy Cuckoo Bumblebee, Yellow-banded Bumblebee, and Black Ash.
- Four Regionally rare species, *Tetraplodon mnioides* (moss), Limestone Oak Fern (*Gymnocarpium tetraploides*), Auricled Twayblade (*Listera auriculata*), and New England Violet (*Viola novae-angliae*).
- Edge-of-range species, including Red Maple, Red Pine, and White Pine concentration areas located north of Highway 101; and Uncommon Hardwood Species, including Yellow Birch, Sugar Maple, and Red Oak;
- Eleven remote natural lake trout lakes;
- Regulated Provincial Parks, Conservation Reserves, and Forest Reserves.

Category 2:
- 2 Intact Forest Landscapes, and
- 9 FSC Candidate Protected Areas (i.e., Gap Analysis Areas).

Category 6:
- The Chapleau Crown Game Preserve.

A summary of the area associated with each HCV Category, and subgroups of values within each Category, is listed below in Table 1.

Table 1. Summary of HCVs in the Missinaibi Forest by HCV Categories.

HCV Category	HCV Category Description	Description of Value(s)	Total Area by Category (ha)	Area Excluding Overlap between Values (ha)
HCV 1	**Species diversity**. Concentrations of biological diversity including endemic species, and rare, threatened or endangered species that are significant at global, national or regional levels.	• SAR Species Observations with associated buffers; Regionally rare species	1,500	1,500
		• Wildlife values: Nests and associated AOC areas for Bald Eagle and other species	8,723	8,723
		• Remote natural lake trout lakes including 120 m reserves	3,414	3,414
		• Edge of range species: White Pine and Red Maple populations occurring north of Highway 101; Yellow Birch, Sugar Maple, and Red Oak populations located anywhere on the MF.	31,826	31,826
		• Provincial Parks and Conservation Reserves	132,844	132,844

HCV Category	HCV Category Description	Description of Value(s)	Total Area by Category (ha)	Area Excluding Overlap between Values (ha)
Subotal			**178,307**	**178,307**
HCV 2	**Landscape-level ecosystems and mosaics**. Intact Forest Landscapes and large landscape-level ecosystems and ecosystem mosaics that are significant at global, national or regional levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.	• 9 FSC Candidate Protected Areas • 2 Intact Forest Landscapes	26,377.7 26,435.2	25,545 15,322
Subtotal			**52,813**	**40,767**
HCV 3	**Ecosystems and habitats**. Rare, threatened, or endangered ecosystems, habitats or refugia.	No HCVs Identified		
HCV 4	**Critical ecosystem services**. Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.	No HCVs Identified		
HCV 5	**Community needs**. Sites and resources fundamental to satisfying the necessities of local communities or Indigenous Peoples (for livelihood, health, nutrition, water, etc.), identified through engagement with these communities or Indigenous Peoples.	No HCVs Identified		
HCV 6	**Cultural values**. Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or Indigenous Peoples, identified through engagement with these local communities or Indigenous Peoples. (C9.1 P&C V4 and Motion 2014#7).	Chapleau Crown Game Preserve	575,730	503,567
Subtotal			**575,730**	**503,567**

HCV Category	HCV Category Description	Description of Value(s)	Total Area by Category (ha)	Area Excluding Overlap between Values (ha)
Total Area, HCV Category 1-6 (ha)			-	**722,641**
Total Crown Managed Area of Missinaibi Forest (ha)				1,520,062
Percent of Total Crown Managed Area of Missinaibi Forest				**47.5%**

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1 Overview of the Missinaibi Forest

The Missinaibi Forest (MF) is a diverse unit characterized by an abundance of mixed stands, a distinct height of land physical feature, several First Nation communities, and a long history of forestry activity. The MF is located within the Missinaibi-Cabonga region of the boreal forest (Rowe 1972), however, Great Lakes–St. Lawrence species are found towards the southern sections. Such differences in plant associations are reflected in the ecological land classification of the forest. The northern section falls within Ecoregion 3E-5 while the southern part of the Forest is within Ecoregion 4E-3 (Figure 1). Hills (1959) designed a land classification system that groups areas of similar potential biological productivity into site regions. Modern Ecoregions are based on a refinement of Hill's original work. They were delineated based on abiotic characteristics such as climate, elevation, soil texture, and depth. Ecodistricts are subdivisions of the larger Ecoregions based on physiographic patterns. The MF occupies the height of land (watershed boundary) between the Great Lakes-St. Lawrence and Hudson Bay drainage basins. Lakes and rivers north of the boundary flow into the Arctic Ocean, whereas those south of the boundary flow towards the Great Lakes.

Forest management is limited to the Crown managed land base, although provincial parks and protected areas (i.e., Crown Other) may contribute to wildlife habitat and other non-timber objectives. Patent Crown Timber includes Patent land where the Crown has the rights to some or all of the timber. Forest management activities may occur in these areas or on First Nations Reserve Lands, however, activities on these areas are outside of the scope of the current 2021-2031 FMP and are not part of the land base for which the FSC Certificate is issued.

Figure 3 summarizes the managed Crown productive forest, by forest unit for the Martel-Magpie Forest. The largest forest units on the MMF are the BW1 (14 percent) and PO1 (12 percent) forest units, accounting for almost a third of the managed Crown productive forest, while OH1 (0.2 percent), PRW (0.1 percent) and BOG (2 percent) represent the smallest forest units.

The MF is a relatively young forest with only 16 percent of the forest area older than 100 years, however the largest proportion of forest area occurs with the 61-80 and 81-100 year age classes (247,708 and 251,458 ha respectively, or approximately 21 percent in each of the classes). The second largest proportion occurs in the 21-40 year age class (202,286 ha or 17 percent). Contributions to this age class included harvest depletions as well as natural disturbances from the recent past (i.e., the 1980s and 1990s)

The FSC certificate for the MF applies to the Crown Land portion of the MF, a total of 1,520,921 ha. Of this total area, 132,844 ha is within regulated Provincial Parks and Conservation Reserves. An additional 52,813 ha are within long-term deferral areas including FSC candidate protected areas (derived from Gap Analyses) and Intact Forest Landscapes for a total protected area of 185,657 ha, which represents 12.2% of the total area of the Crown portion of the MF. Note that the total area of the MF is 1,631,921 ha, which includes patent and private lands and First Nations' reserve lands.

From 1987 to 1997, J. E. Martel and Sons Lumber Ltd. was responsible for the management of the former Martel Forest. In 1997, E. B. Eddy purchased the J. E. Martel Lumber Corporation from the Martel family. E. B. Eddy was purchased by Domtar Inc. in July of 1998. Weyerhaeuser acquired the rights to the Superior Forest in 1999 as part of its purchase of MacMillan-Bloedel Ltd. In late 2003 Tembec Industries Inc. purchased the operation from Weyerhaeuser, at which

point the Sustainable Forest License was transferred. In March 2005, Domtar permanently closed its mill in Chapleau. An announcement was made that the J. E. Martel Forest SFL would be transferred to Tembec, and that there were plans to formally amalgamate the Superior and J. E. Martel forests and to administer a single SFL for the combined unit. On February 28th, 2008, a single SFL was issued for the newly amalgamated Martel Forest (SFL #550390 was amended to reflect the new management unit area).

In 2021, the former Magpie Forest was merged with the Martel Forest to form the Missinaibi Forest (MF) (see Figure 1). The forest is licensed to Missinaibi Forest Management Inc. (MFMI) under Sustainable Forest License #550390. The SFL holder assigns responsibility for planning the management of the Crown timber resource within the MF to MFMI and provides the parent company with tenure and security of wood supply as long as the terms and conditions of the SFL are upheld. MFMI and the Ontario Ministry of Natural Resources and Forestry (MNRF) are responsible for the operations and administration of the MF.

MFMI directs forest management planning in consultation with the MNRF, First Nations, Metis, aboriginal communities, and the public. GreenFirst is also responsible for conducting annual operations on the forest, including harvesting, renewal, and monitoring. Current forest management efforts comply with Ontario's regulatory framework but also focus on principles and criteria included in the Forest Stewardship Council (FSC) standard. In this report, MF attributes have been assessed for their potential to be classified as High Conservation Values (HCVs).
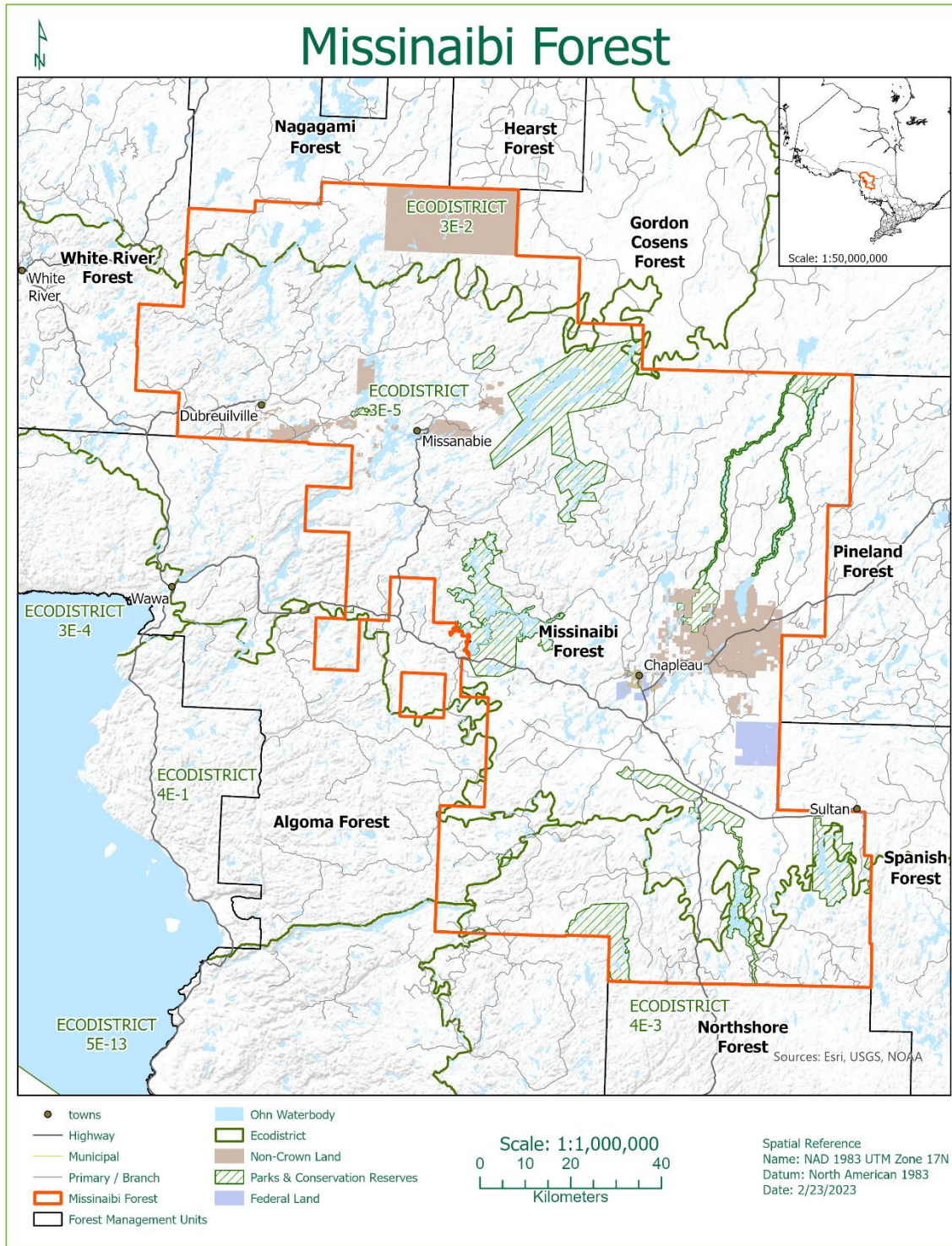
Figure 1. The Missinaibi Forest (MF) Sustainable Forest License in northeastern Ontario, showing adjacent Management Units and Ecodistrict boundaries.

2 Purpose

The Forest Stewardship Council (FSC) introduced the concept of High Conservation Value Forests (HCVFs) in 1999 when Principle 9 was revised. The concept focuses on the environmental, social and/or cultural values that make a particular forest area of outstanding significance. The intent of Principle 9 is to manage those forests to maintain or enhance the identified High Conservation Values. By focusing on maintaining or enhancing the environmental or social values that make the forest significant, it is possible to make management decisions consistent with the protection of such values.

Four criteria in Principle 9 of the FSC National Forest Stewardship Standard of Canada (FSC 2018) describe what must be done to identify HCVs and HCVFs and to manage and monitor these attributes. The four criteria are:
- 9.1 – assess and record the presence, status and likelihood of occurrence of High Conservation Values in the Management Unit, proportionate to the scale, intensity, and risk of impacts of management activities
- 9.2 – develop effective strategies that maintain and/or enhance the identified High Conservation Values, through engagement with affected stakeholders, interested stakeholders and experts
- 9.3 – implement strategies and actions that maintain and/or enhance the identified High Conservation Values. These strategies and actions shall implement the precautionary approach and be proportionate to the scale, intensity and risk of management activities
- 9.4 – demonstrate that periodic monitoring is carried out to assess changes in the status of High Conservation Values. Adapt management strategies as needed to ensure their effective protection. The monitoring shall be proportionate to the scale, intensity and risk of management activities, and shall include engagement with affected stakeholders, interested stakeholders and experts.

This report documents the High Conservation Value (HCV) assessment for the Missinaibi Forest, which was designed to address each of the four requirements listed above. HCV attributes are identified as required by FSC Criterion 9.1. According to the FSC definition, "management activities in high conservation value forests shall maintain or enhance the attributes which define such forests". As identified under FSC Principle 9, Criterion 9.1 requires an assessment, appropriate to the scale and intensity of forest management, to determine the presence of attributes consistent with High Conservation Value Forests. Potential attributes have accordingly been assessed for classification as one of the six categories of High Conservation Values Forests (HCVFs). High Conservation Value Forests (HCVFs) possess one or more of the following attributes:

- HCV 1 – Species diversity. Concentrations of biological diversity including endemic species, and rare, threatened or endangered species that are significant at global, national or regional levels.
- HCV 2 – Landscape-level ecosystems and mosaics. Intact Forest Landscapes and large landscape-level ecosystems and ecosystem mosaics that are significant at global, national or regional levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.
- HCV 3 – Ecosystems and habitats. Rare, threatened, or endangered ecosystems, habitats or refugia.

- HCV 4 – Critical ecosystem services. Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.
- HCV 5 – Community needs. Sites and resources fundamental to satisfying the necessities of local communities or Indigenous Peoples (for livelihood, health, nutrition, water, etc.), identified through engagement with these communities or Indigenous Peoples.
- HCV 6 – Cultural values. Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or Indigenous Peoples, identified through engagement with these local communities or Indigenous Peoples.

2.1 HCV Relationships with Other FSC Indicators

The assessment, monitoring and management of HCVs is closely related to a set of other indicators within the FSC National Standard, especially within Principle 6 - Environmental Values and Management. The following table provides cross-references to those indicators to facilitate the lookup of related information.

Table 2. Cross-references from the HCV Assessment to information for other FSC indicators.

FSC Indicator	Description	Location of Related Information in HCV Report
6.1.1	Best available information is used to identify the state and condition of: • % protected area by ecosystem classification unit • Rare ecosystems • Species at the edge of their natural ranges and outliers • Habitat for species at risk	Table 10 Section 5.1 Section 3.5 Section 3.1
6.1.2	Best available information is used to identify the state and condition of: • Wildlife and wildlife habitat values for species at risk • Sensitive sites due to slopes, soil types, wetlands.	Sections 3.1, 3.4 and 8.1 Section 6.2
6.2.2	Impacts on HCVs that occur at a local level are assessed prior to implementing management activities	Section 9
6.3.1 & 6.3.2	Means to protect soils from physical damage (rutting, compaction, erosion) and prevent negative impacts are identified and implemented	Section 6.2.4 to 6.2.6; Section 9
6.3.3 & 6.3.4	Means to protect soils from nutrient loss and prevent negative impacts are identified and implemented	Section 6.2.4 to 6.2.6; Section 9
6.4	Concerned with protection of rare and threatened species and their habitats:	Section 3.1

FSC Indicator	Description	Location of Related Information in HCV Report
6.4.1	• Develop a list of species	<mark>Table</mark> 3
6.4.2	• Develop plans with qualified specialists	Section 3.1 and 9.2
6.4.6	• Concerned with training forestry workers regarding species at risk	Section 9
6.4.7	• Protection measures are implemented when a SAR or sign of SAR is identified during field operations	Section 9
6.5	Concerned with protection of representative sample areas of native ecosystems	Section 3.6 (Parks & Conservation Areas), Section 4.1 (Intact Forest Landscapes), Section 5.3 (Large Unfragmented Forests, Gap Analysis)
6.7.1	Best management practices that identify measures to protect water bodies, riparian zones, and water quality	Sections 6.1, 6.2, and 6.4
6.8.4	Concerned with maintaining contiguous blocks of forest that are of natural disturbance origin, and minimizing the amount of roads and other linear disturbances within these blocks	Section 3.6 (Parks & Conservation Areas), Section 4.1 (Intact Forest Landscapes), Section 5.3 (Large Unfragmented Forests, Gap Analysis)
8.1.1	Concerned with development of a monitoring plan - includes related monitoring strategies and approaches for HCVs.	Section 9.1

3 Methodology

The HCV assessment is a documented description of HCVs that clearly reports on the presence of values, their location (if not confidential), status, and as much as possible, should provide information on habitat and other key resources that support the values. The assessment is a framework document that is to be used to develop management and monitoring strategies to maintain and/or enhance the values. The HCV Assessment:
- Addresses all six HCV categories;
- Uses best available information on the status and other attributes of the HCVs;
- Identifies possible risks and threats to HCV values and the forest areas that support them;
- Describes the current condition of the HCVs and whether they are declining, stable or increasing; and
- Uses results from culturally appropriate engagement with Indigenous Peoples, affected and interested stakeholders with an interest in the conservation and management of HCVs.

The first step in the assessment involved the identification of potential HCV attributes followed by the gathering of relevant information, including any data and information used in forest management planning. External data sources that could inform HCV identified were also included as part of the assessment and are listed in the applicable report sections.

A guidance document, jointly developed by Tembec and WWF Canada, provides the framework for the Principle 9 assessment (Annex D, High Conservation Value Framework, in the National Forest Stewardship Standard of Canada, October 2018). The guidance document is consistent

with the direction of international ProForest efforts (with funding from IKEA and FSC A.C.). Specific criteria for different classes of values are described in Annex D of the National Standard (FSC 2018). In most cases the nature of the value(s) determines the HCV designation, and then existing management measures are reviewed to determine their adequacy for maintaining or enhancing the value or group of values that constitutes the HCV.

The identification of HCV attributes and areas is based on a multi-scale, systematic approach of defining indicators and thresholds at global and regional scales. For example, "globally or nationally significant" may apply to ecoregional scale forests that are significant on a global, continental or Canadian level, while "regionally significant" may apply to a watershed significant on a provincial level. The HCV assessment was completed using the best available information of the status of HCV values at the time of the assessment, the HCV areas they rely on, and their condition.

The assessment and designation of HCV attributes is the focus of this report. The first step in the assessment involved the identification of potential HCV attributes followed by the gathering of relevant data. Spatial data layers were processed and corrected. Substantial effort was also invested in the acquisition of external data. Thresholds for attributes were determined and a preliminary assessment was conducted to verify the presence of an attribute. Preliminary assessments supportive of the possible presence of an HCV attribute led to the gathering of additional data for verification. The precautionary approach was applied towards suspected HCV attributes. Confirmed attributes were designated as HCVs.

Once the HCV status of a value was determined, current management practices and monitoring systems were examined to determine their adequacy. This examination included the identification of possible threats to HCV values and the forest areas that support them, using the most current and relevant information that is available. These potential risks can then be explicitly addressed. Values that are not negatively impacted by forest management or can be maintained by following standard forest management practices and government guidelines, in general do not require the development of additional management measures and were subject to monitoring of their status only.

MFMI FRL holders have operating procedures which formalize the reporting of any previously unmapped valued that are discovered in current harvest or silvicultural blocks during operations. The procedures prescribe work stoppages to allow for the development of appropriate prescriptions should values associated with HCVs (and any others) be discovered by forest workers during harvesting operations (including harvesting, silviculture, access construction, forest monitoring, etc.). Management strategies are outlined in this assessment for those values not associated with other FSC Principles. Explanations are provided for attributes that were assessed but not designated as HCVs. Management and monitoring methods for HCVs are described in Section 10.

During the assessment of HCVFs for the MF, MFMI contacted March and July the managers of adjacent Forests, including the Algoma, Gordon Cosens, Pineland, Spanish, and Northshore Forests to determine if there were any HCVs located on or near the borders with these management units necessitating cross-boundary consideration of management strategies. Consultation with adjacent Forests across these MU boundaries for other FSC planning requirements, including gap analyses and the assessment of landscape-level intact forests (IFL) is ongoing and was most recently conducted from February to July 2023.

This assessment should be interpreted as a dynamic work in progress. Research efforts, including First Nations and Metis relationship building and consultations, are expected to reveal significant information over time. The FSC standard acknowledges that forest managers must frequently make decisions with incomplete knowledge and offers the precautionary approach as well as adaptive management as solutions. The forest management planning process for the MF will facilitate the development and implementation of HCV management and monitoring strategies as required by criteria 9.2, 9.3, and 9.4.

MFMI will be taking the draft HCV report for review and discussion to local Indigenous communities to determine if there is any further information specific to the HCV context (e.g., area of overlapping values for local communities). It will also be presented to the Local Citizens Committee, who represent stakeholder groups as part of forest management planning, as well as other interested stakeholders identified by the forest manager and consistent with HCV consultation requirements as outlined in the National Standard. Both of these groups will be engaged in the development of management strategies and actions to maintain and/or enhance the identified HCVs and HCV areas.

Category 1 - Concentrations of Biodiversity Values That are Globally, Nationally or Regionally Significant

The assessment is divided into sections based on six categories derived from the HCV definition (Box 1). Each category is explored through a series of questions designed to provide practical guidance towards the identification of HCVs.

HCV 1: Species diversity. Concentrations of biological diversity including endemic species, and rare, threatened or endangered species that are significant at global, national or regional levels).

The following questions address criteria that are relevant at a global, national, or regional scale.

3.1 Question 1 - Species at Risk or Potential Habitat

Question 1) Does the Forest contain species at risk or potential habitat of species at risk as listed by international, national or territorial/provincial authorities?

Assessment criteria for the determination of HCV status are as follows:

Definitive criteria: Are any rare, threatened or endangered species in the forest?
Is there critical habitat for rare, threatened or endangered species in the forest?
Guidance criterion: Are there any ecological or taxonomic groups of rare species that would together constitute a HCV?

Any species at risk whose mapped range overlaps the boundaries of the MF and has a high probability of occurrence on the forest will be designated HCV and appropriate monitoring will be conducted. If sightings for any other species at risk are confirmed on the forest, then its status will be upgraded to HCV and appropriate management measures will be developed and incorporated into the FMP, unless they are already included.

3.1.1 Assessment Methods

Species at risk on the MF have been identified using the Species at Risk in Ontario (SARO) List. SARO provides a searchable table providing links to information on each species at risk in Ontario. The SARO list is the official list of endangered, threatened, special concern and extirpated animals and plants in Ontario. Refinements to the SARO list (updated May 23, 2023) have been made in consultation with MNRF biologists that have more specific local knowledge regarding the existence or likelihood of existence of SAR on the MF. Although the Chapleau District MNRF staff do not conduct any SAR-specific surveys, except for the confirmation of any SAR-related values that are discovered during forest management operations, occurrence data for SAR species is collected from incidental sightings during field work, reports from the public if evidence is provided and from less targeted studies such as stream assessments that are looking for fisheries community profiles. The MNRF maintains SAR species inventories and information including sites of occurrence of flora, fish and wildlife species, and known sites of occurrence of their habitat. This location data is considered to be sensitive and is not shown in the FMP.

Local MNRF biologists at Chapleau District and Wawa District were consulted during April through June 2023 to update information regarding any changes in the status of species at risk, recent confirmed sightings of listed species on the MF, and occurrences of rare species within areas of planned or current operations. MNRF biologists were also asked if they had knowledge of any values or groups of values that would in their opinion be considered to be exceptional. In this regard, MFMI also consults with District and Regional MNRF biologists every year during preparation of the Annual Work Schedule. MNRF District biologists have access to locational information and can verify if sightings of valued species occurred within areas of operations, so that appropriate management prescriptions can be determined and applied.

The Ontario Natural Heritage Information Centre (NHIC) database informs the SARO List and was used as the primary data source for the occurrence of globally and regionally rare species on the MF. The NHIC is an MNRF program that collects, reviews, manages and distributes information for species of conservation concern, rare and exemplary plant communities, and wildlife concentration areas. Policy requires MNRF staff to provide SAR Species Observation data to the NHIC. A large percentage of the data managed by the NHIC includes records shared from outside sources, including the public. NHIC has a vetting process for confirming the validity of these records. NHIC stores the evidence or source observation, but additional site-specific SAR habitat delineation is usually required for protection.

Records and maps from the Ontario Breeding Bird Atlas were also consulted to verify sightings of species at risk on the MF and to assess population trends. The Ontario Landbird Regional Conservation Plans that were prepared by the Ontario Section of Partners in Flight (PIF) were also reviewed. The 2014 Plan for the Boreal Softwood Shield area (ON BCR 8) and the Plan for the Ontario Hardwood Transition area (ON BCR 12) are both relevant to the MF (Figure 2).
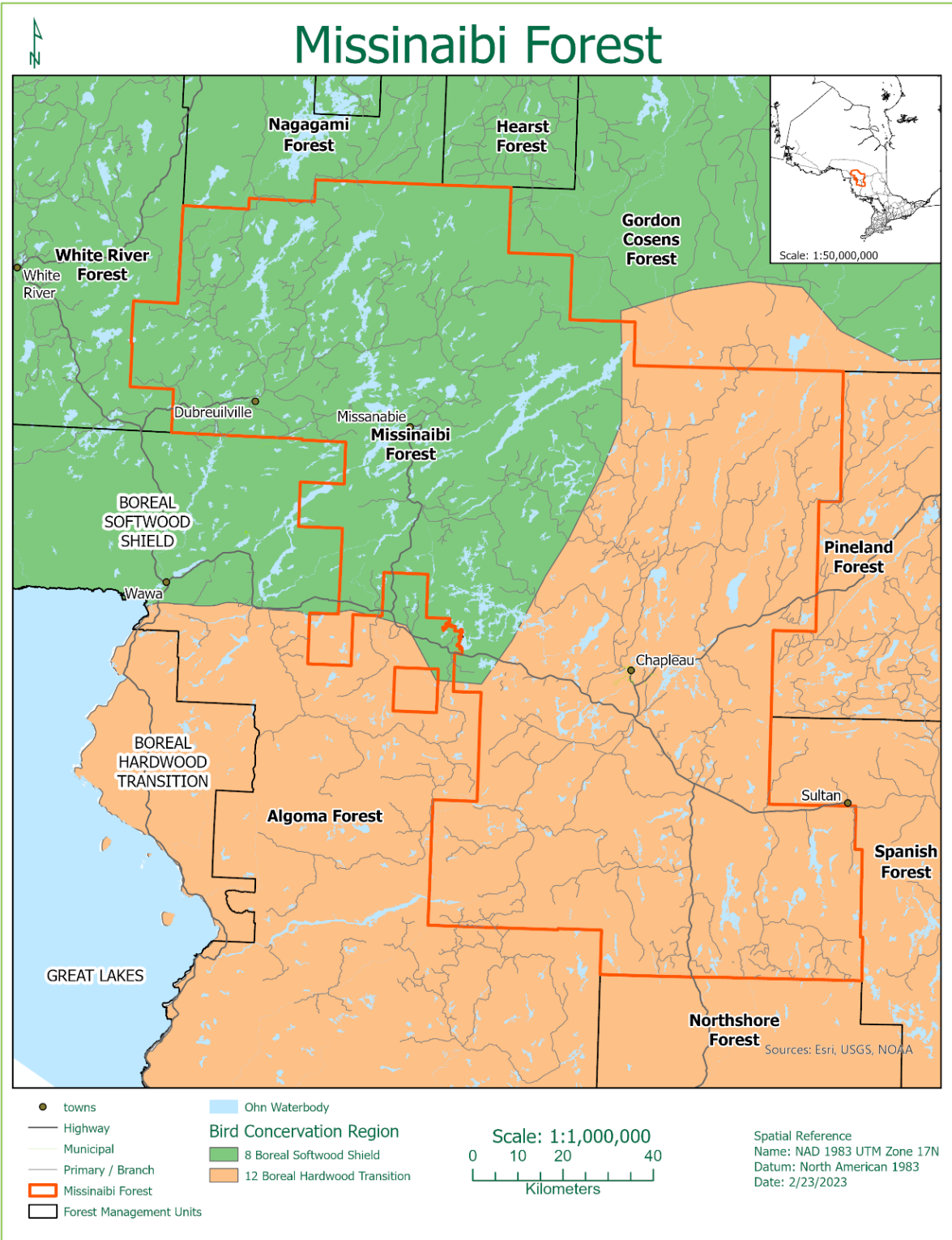
Figure 2. Map showing the extent of Bird Conservation Regions 8 and 12 within the MF.

Records from the Ontario Reptile and Amphibian Atlas were also used to determine if SAR have been observed within the MF. iNaturalist (www.inaturalist.org/home), a citizen science app for recording and identifying plant and animal observations, was also used. Only the observations rated as "research grade" were included in the query.

Traditional knowledge gathered from First Nation representatives may also be useful in determining whether species at risk are present, or have been in the past, on the management unit. In the past, GreenFirst has worked with the Mushkegowuk Environmental Research Centre (MERC), which was owned by First Nations and had a focus on Traditional Knowledge studies during its tenure. MERC no longer exists, so other sources of consultation are utilized now – see Sections 5 and 6.

3.1.2 Assessment Results - Ontario Species at Risk

The purpose of examining this attribute is to ensure the maintenance of vulnerable and/or irreplaceable elements of biodiversity. The presence of rare, threatened, or endangered species requires a commitment by the forest manager that forestry practices will not compromise the survival of these species. This indicator allows for a single species or a concentration of species to meet the HCV threshold. The assessment of whether a species is a HCV is not dependent on whether there is a risk from forest operations. Management and risk to a value is not relevant to the significance of the value. Once it is designated as an HCV, the specific management requirements are determined. In some cases, existing regulations and management prescriptions are sufficient to manage the values. In other cases, no management will be required because there is no risk from forestry activities.

Species that are legally designated as species at risk (by the Ontario MECP SARO) whose mapped range overlapped the MF boundaries and were either associated with confirmed sightings on the MF or had a high probability of occurrence on the MF were designated HCVs (Table 3). Designated HCV species are associated with specific management prescriptions that are included in the FMP and are associated with monitoring activities.

Table 4 provides definitions for the MNRF Status Categories. Detailed information on the habitat preferences for these species is contained in the 2021-2031 FMP for the MF (Section 2.1.4.1) and in the Forest Manager's List prepared by GreenFirst (June 2023 Version) to meet the requirements of FSC Criterion 6.4.

Table 3. Species at Risk Relevant to the Missinaibi Forest (Source – 2021-2031 FMP).

Taxonomy	Common Name	Scientific Name	MNRF Status
Birds	Bald eagle	*Haliaeetus leucocephalus*	Special Concern
Birds	Bank swallow	*Riparia riparia*	Threatened
Birds	Barn swallow	*Hirundo rustica*	Threatened
Birds	Black tern	*Chlidonias niger*	Special Concern
Birds	Canada warbler	*Cardellina Canadensis*	Special Concern
Birds	Chimney swift	*Chaetura pelagica*	Threatened
Birds	Common nighthawk	*Chordeiles minor*	Special Concern
Birds	Evening grosbeak	*Coccothraustes vespertinus*	Special Concern
Birds	Eastern whip-poor-will	*Antrostomus vociferus*	Threatened
Birds	Eastern wood-pewee	*Contopus virens*	Special Concern
Birds	Least bittern	*Ixobrychus exilis*	Threatened
Birds	Olive-sided flycatcher	*Contopus cooperi*	Special Concern
Birds	Peregrine falcon	*Falco peregrinus*	Special Concern
Birds	Rusty blackbird	*Euphagus carolinus*	Special Concern
Birds	Short-eared owl	*Asio flammeus*	Special Concern
Birds	Yellow Rail	*Coturnicops noveboracensis*	Special Concern
Birds	Wood Thrush	*Hylocichla mustelina*	Special Concern
Fish	Lake sturgeon (Southern Hudson Bay/James Bay populations)	*Acipenser fulvescens*	Special Concern
Insect	Monarch butterfly	*Danaus plexippus*	Special Concern
Insect	Gypsy cuckoo bumble bee	*Bombus bohemicus*	Endangered
Insect	Yellow-banded bumble bee	*Bombus terricola*	Special Concern

Taxonomy	Common Name	Scientific Name	MNRF Status
Mammal	Eastern small-footed myotis (bat)	*Myotis leibii*	Endangered
Mammal	Little brown myotis (bat)	*Myotis lucifugus*	Endangered
Mammal	Northern myotis (bat)	*Myotis septentrionalis*	Endangered
Mammals	Eastern cougar	*Puma concolor*	Endangered
Reptile	Snapping Turtle	*Chelydra serpentina*	Special Concern
Reptile	Wood Turtle	*Glyptemys insculpta*	Endangered
Tree	Black Ash	*Fraxinus nigra*	Endangered

Table 4. Classification definitions for species at risk in Ontario.

MNRF STATUS		DEFINITION
EXP	Extirpated	A species that no longer exists in the wild in Ontario but still occurs elsewhere.
END	Endangered	A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's ESA.
THR	Threatened	A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.
SC	**Special Concern** (formerly Vulnerable)	A species with characteristics that make it sensitive to human activities or natural events.

Note that the Great Gray Owl was formerly listed as Special Concern by COSSARO, thus was included in previous versions of the HCV Report (i.e. prior to August 2010). This species is now considered to be Not at Risk by both COSSARO and COSEWIC, therefore it is no longer considered to be an HCV.

Black Ash (*Fraxinus nigra*) has been added to the list of SAR species since the previous HCV Assessment. Although it is not particularly uncommon in the MF, it is considered at risk (endangered) due to the spread of the invasive Emerald Ash Borer, to which black ash is especially vulnerable.

3.1.3 Assessment Results - Globally and Regionally Rare Species (NHIC)

Several rare species occurrences have been reported in the Missinaibi Forest (MF) according to the NHIC database. Table 5 provides a general overview of the NHIC coding system and lists the number of reports within the MF. All known occurrences of these species are mapped through the NHIC and MNRF's LIO/NRIP database. They will be protected by means of appropriate management prescriptions should they be encountered during operations. As a precautionary measure, the four species listed as S2 or S3 are designated as HCVs. Moustached Clubtail (Category S4) is not included since it is not considered to be rare. Regarding potential threats to its habitat, the population of Moustached Clubtail is considered to be secure within the MF and greater Eco-region.

Table 5. Occurrences of rare species recorded in the NHIC database within the Missinaibi Forest, November 2020.

Rank	Description	Number of Reports for the MF	Species
G1 Extremely rare	Critically imperilled globally because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction. Typically, 5 or fewer occurrences or very few remaining individuals (<1,000) or acres (<2,000) or linear miles (<10).	0	

Rank	Description	Number of Reports for the MF	Species
G2 Very rare	Imperilled globally because of rarity or because of some factor(s) making it very vulnerable to extinction or elimination. Typically, 6 to 20 occurrences or few remaining individuals (1,000 to 3,000) or acres (2,000 to 10,000) or linear miles (10 to 50).	0	
G3 Rare to uncommon	Vulnerable globally either because very rare and local throughout its range, found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extinction or elimination. Typically, 21 to 100 occurrences or between 3,000 and 10,000 individuals.	0	
S1 - Critically Imperiled	Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.	0	
S2 - Imperiled	Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.	2	Tetraplodon mnioides (moss), Limestone Oak Fern (Gymnocarpium tetraploides)
S3 - Vulnerable	Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.	2	Auricled Twayblade (Listera auriculata), New England Violet (Viola novae-angliae)
S4 - Apparently Secure	Uncommon but not rare; some cause for long-term concern due to declines or other factors.	1	Moustached Clubtail (Gomphus adelphus)

The occurrences of these species were also checked for occurrences in the former Magpie Forest within the NHIC and using research grade observations criteria in the iNaturalist. None of these species were found in NHIC records located in the former Magpie Forest, with the exception of Auricled Twayblade.

The four Imperiled (S2) and Vulnerable (S3) species identified in Table 5 and their associated habitats have been designated as HCVs.

3.1.4 HCVF Designation Decision

The following SAR species and their associated habitats have been designated as HCVs for the MF:

<u>Birds:</u> Bald eagle, Bank swallow, Barn swallow, Black tern, Canada warbler, Chimney swift, Common nighthawk, Evening grosbeak, Eastern whip-poor-will, Eastern wood-pewee, Least bittern, Olive-sided flycatcher, Peregrine falcon, Rusty blackbird, Short-eared owl, Yellow Rail, Wood Thrush;
<u>Fish:</u> Lake sturgeon (Southern Hudson Bay/James Bay populations);
<u>Insects:</u> Monarch butterfly, Gypsy cuckoo bumble bee, Yellow-banded bumble bee;
<u>Mammals:</u> Eastern small-footed myotis (bat), Little brown myotis (bat), Northern myotis (bat), Eastern cougar;
<u>Reptiles:</u> Snapping Turtle, Wood Turtle; and
<u>Trees:</u> Black Ash.

Four regionally rare species, *Tetraplodon mnioides* (moss), Limestone Oak Fern (*Gymnocarpium tetraploides*), Auricled Twayblade (*Listera auriculata*), and New England Violet (*Viola novae-angliae*) and their associated habitats have also been designated as HCVs.

3.2 Question 2 - Significant concentration of endemic species

Question 2) Does the forest contain a globally, nationally or regionally significant concentration of endemic species?

The HCV Framework provides the following definitive criterion for this question: Does the forest contain an endemic species or concentration of endemic species?

3.2.1 Assessment Methods

Endemic species are defined as very localized species that are restricted to a relatively small area. The rationale for assessing this attribute is to ensure the maintenance of vulnerable and/or irreplaceable elements of biodiversity that are unique to the ecoregion. Endemic species are more likely to be addressed under Principle 6 due to the implied range constraints. Hence, meeting the threshold of "critical and/or outstanding" requires a concentration of endemic species.

The Terrestrial Ecosystems of North America (Ricketts *et al.* 1999) was used in previous versions of this assessment to identify concentrations of endemic species. Ricketts identified endemic species by ecoregion and provided geographic patterns of endemism and species richness. Provincial Data Centers (NHIC, LIO - NRIP) identify endemic species in Ontario, and these were examined for the presence of endemic species on the MF. The presence of any endemic species identified by an appropriate agency (e.g. Conservation Data Centre, COSEWIC) would also qualify as a HCV.

3.2.2 Assessment Results

The MF does not lie within any international hotspots. The MF is located within the Central Canadian Shield Forest ecoregion. Occurrences of plant or animal endemism were not identified within the Central Canadian Shield Forests (Ricketts et al. 1999).

Canada and other northern nations have fewer endemic species compared to unglaciated regions. The 2020 report on endemics (NatureServe Canada) is based on a comprehensive review of available data and information sources related to endemics. It includes a list of 308 plants, animals and fungi (species, subspecies and varieties) that are only found in Canada. The analysis also identified 27 concentrations of endemic species, many of which are associated with glacial refugia or unique habitats. Findings suggest that Ontario has a total of 28 nationally endemic species, of which most are vascular plants and invertebrates. One-third are subspecies or varieties, and three species have questionable taxonomy. Nine of Ontario's endemic species are entirely restricted to the province. As per the report descriptions, it is unlikely that any of these nine species are found on the MF.

There are no known endemic species within the MF.

3.2.3 HCVF Designation Decision

There is no HCV associated with endemic species for the MF.

3.3 Question 3 - Critical habitat containing significant seasonal concentration of species

Question 3) Does the forest include critical habitat containing globally, nationally or regionally significant seasonal concentration of species (one or several species, e.g. concentrations of wildlife in breeding sites, wintering sites, migration sites, migration routes or corridors-latitudinal as well as altitudinal)?

The HCV Framework provides the following definitive criterion for this question: Is there an IBA (Important Bird Area) in the forest?

A related guidance criterion is: Are there any landscape features or habitat characteristics that tend to correlate with significant temporal concentrations of a species or groups of species (e.g. where species occurrence data is limited)?

3.3.1 Assessment Methods

The rationale for assessing this attribute is to maintain population viability through the identification and protection of regional concentrations of species or "hot spots". The population viability of a species depends on reproductive success as well as survival. Habitat quantity and quality have a strong relationship with population persistence therefore examination of this attribute addresses wildlife sustainability.

Significant wildlife concentration areas may be identified using global sources such as Birdlife International as well as national, regional, and local sources. Potential regional and local areas were evaluated using the Ontario Ministry of Natural Resources and Forestry's NRIP (Natural Resource Information Portal) database, NHIC, information obtained from local representatives of Ducks Unlimited Canada, and MFMI's updated inventory of values information. The data includes fisheries values (spawning areas, migration routes), nesting sites (herons, waterfowl, hawks, and osprey), and moose habitat values (aquatic feeding areas, calving sites, and mineral licks). Information will also be sought through communication with local First Nations and Metis.

3.3.2 Assessment Results

According to Bird Studies Canada, an Important Bird Area (IBA) is a site providing essential habitat for one or more species of breeding or non-breeding birds. These sites may contain threatened species, endemic species, species representative of a biome, or highly exceptional concentrations of birds (see maps *in Bird Studies Canada (BSC)* www.ibacanada.ca *).* IBAs were not found on the MF (Figure 3).

Wetlands and agricultural areas provide important feeding and staging areas for continentally significant populations of Canada geese and other waterfowl species that migrate to and from James and Hudson Bay coastal marshes. The large river systems that flow south to north through the MF are used as migration corridors for populations of waterfowl and shorebirds.

Several areas have been seeded with wild rice to improve waterfowl feeding and staging areas (Anonymous 2001).

Figure 3. Distribution of Important Bird Areas in Ontario, 2020 (Bird Studies Canada).

The NRIP database identifies many values such as spawning areas and nesting sites, and provides some species-specific information, however, the MNRF does not conduct systematic surveys for each value across each wildlife management unit. Instead, surveys are usually conducted within and adjacent to planned harvest blocks where forestry activity is expected to occur. Although surveys are conducted annually based on harvest areas identified in Annual Work Schedules, more intensive surveys are conducted to update 10-year planning inventories in preparation for FMP production. These latter surveys involve the verification of existing mapped values within planned 10-year harvest areas, including stick nests, heron rookeries, spawning areas, moose aquatic feeding areas, SAR habitats, and other ecological values. The surveys are usually conducted visually from the air (by helicopter), but this may be supplemented with ground inspections where appropriate.

As a result of the emphasis of annual and FMP updating values surveys on areas allocated for operations, the true distribution of these values within the entire management unit is uncertain, depending on the stage of updating. The unbalanced observational effort should be considered in the determination of "hot spots". Identification of "hot spots" is further obscured by poorly understood forest interactions involving the dynamic boreal wildlife populations. Existing parks and protected areas, riparian reserves, area of concern (AOC) buffers around nests and other wildlife and cultural values, as well as ongoing harvest deferral processes, increases the total protected area across the forest and offers additional protection towards potential unidentified concentration areas.

Large lakes are sometimes associated with concentration of wildlife values such as heron and raptor nests, waterfowl staging areas, and aquatic feeding areas. Large lakes are managed through the forest management planning process. Large lakes attract a variety of users and therefore tend to be associated with relatively more observations than dense forest stands. Other wildlife values, such as moose wintering areas, however, are located throughout dense forest. Lakes and wildlife values are buffered according to regulated guidelines, and lakes and other water features located within large OLL sites provide further protection of these values.

Descriptions in the NRIP data related to heron nesting sites located in the MF indicate that these refer to individual nests or small groups of three families or less. There are no known occurrences of large or exceptional heron rookeries in the MF (Nick Orton, MNRF District Biologist, pers. comm. November 2020, May 2023).

Wildlife values located on the MF, along with other ecological values, are mapped in Figure 13. There are no obvious concentrations of ecological values within the MF visible on this map. Local biologists with MNRF were also not able to identify any wildlife concentration areas within the MF. According to local knowledge, wildlife concentration areas may be represented by values such as moose wintering areas. However, these areas are not static and tend to shift across the landscape depending on several environmental variables such as snow depth and browse availability. The 2021-2031 Draft FMP follows Boreal Landscape Guide direction related to forest texture requirements, including maintaining the diversity of forest types and the balance of young, mature and old forest areas.

GreenFirst is a member of the National Council for Air and Stream Improvement (NCASI). NCASI's Canadian Forestry Program is focused on research oriented towards addressing the environmental aspects of forest management in Canada. Given the Crown land ownership context, much of NCASI's research in this program area is publicly available, and NCASI

collaborates with government and other stakeholders on several initiatives to enhance the application of this research to the forested landscape.

3.3.3 HCVF Designation Decision

IBAs do not occur on the MF, based on data provided by Bird Studies Canada. There are no known areas where multiple wildlife values are concentrated.

No HCVs were identified for this question.

3.4 Question 4 - Critical habitat for regionally significant species

Question 4) Does the forest contain critical habitat for regionally significant species (e.g., species representative of habitat types naturally occurring in the management unit, focal species, species declining regionally)?

The HCV Framework provides the following definitive criterion for this question:
- Is there known critical habitat for a regionally significant species (including aquatic species)?

Guidance criteria include:
- Is the population of regionally significant species locally at risk (e.g. continuing trend is declining rather than stable or improving)?
- Does the forest contain limiting habitat for regionally significant species?

One reason for a species being regionally significant is that there has been a decline over time. This can include aquatic species that are within the forest. Some species may be declining but are still common. Beaver and deer in some areas can undergo steep declines for a period and may be identified as regionally significant.

3.4.1 Assessment Methods

A focal species management approach builds on the concept of umbrella species, i.e., species whose habitat requirements are believed to encapsulate the needs of other species (Lambeck 1997). The focal species approach assumes that meeting the requirements of the most demanding species will result in a landscape design encompassing the needs of a wider range of species. Where it can be proved that the selected species also encompass the habitat requirements of a functional group, then the focal species can also be considered to be an umbrella species.

Lists of species at risk, featured species, and focal species representative of ecological groups were used to determine if the forest contained limiting habitat for regionally significant species. The MNRF NHIC database was used to identify globally or regionally important species. Species with a ranking of G3 (vulnerable), S1 (regionally extremely rare), S2 (regionally very rare) or S3 (regionally rare to uncommon) were considered in relation to habitat supply.

Based on this review, habitat supply modeling for the MF in the 2021-2031 FMP (FMP Analysis Package Part 1), based on direction from the Boreal Landscape Guide (MNRF 2014) was deemed appropriate to identify the occurrence of critical habitat for regionally significant species. The intent of habitat supply modeling in the FMP process is to ensure the diverse array

of all wildlife habitat requirements are met by providing habitat for a broad range of species that are representative of different ecological groupings.

The Boreal Landscape Guide (BLG) provides much of the direction for wildlife habitat and forest cover for the 2021-2031 FMP. A series of BLG indicators were developed and directional statements (e.g., increase, decrease or maintain) for the short, medium and long-term were assigned for the MF. Ontario's Landscape Tool (or OLT) contains estimates of ranges of natural variation for each of the landscape guide indicators based on simulation runs from the Boreal Forest Landscape Disturbance Simulator (or BFOLDS). OLT enables the user to compare forest structure, composition and pattern relative to the simulated range of natural variation (SRNV) derived from BFOLDS.

A proposed Management Objective in the 2021-2031 FMP is: To develop, over time, a forest with an age class structure, composition and abundance that resembles that of a fire-driven boreal forest ecosystem that can support a broad range of wildlife species. The structure and composition targets for the 2021-2031 FMP were derived from information in the Boreal Landscape Guide. The indicators for this objective include landscape classes which are aggregates of selected forest units and development (or seral) stages and are meant to represent the broad range of habitat requirements for many species, including the BLG landscape classes, all ages conifer forest units and young forest. As well, the area of red and white pine forest units is a BLG indicator included to address the maintenance and restoration of red and white pine on the forest. Refer to the 2021-2031 FMP for further details regarding the BLG and how the benchmark conditions known as the Simulated Ranges of Natural Variation (SRNV) are determined and applied.

The spatial assessment of sustainability considers the management objectives and indicators affected by the location of harvest areas. In the context of the 2021-2031 FMP, these indicators include the Boreal Landscape Guide pattern indicators; mature and old forest texture and young forest patch size. These indicators were first assessed following the identification of preferred areas as part of the LTMD. Like the other plan objectives, the impact of the Planned Operations on landscape pattern has also been assessed. Following the Planned Operations verification run (1.3.9) in Patchworks, the plan end forest condition was exported and assessed in the Ontario Landscape Tool for mature and old forest texture (5,000 and 500 ha scales) and young forest patch size.

The results of wildlife habitat modelling were reviewed to determine if any habitat components were projected to decline beyond the target levels and ranges identified in the FMP, and whether these changes were significant.

Two fish species, Brook Trout and Lake Trout, were identified as species that have declined provincially and were assessed in the context of local populations and potential risks to their habitat or populations from forestry-related activities.

3.4.2 Assessment Results

In the 2021-2031 FMP, landscape classes which are aggregates of selected forest units and development (or seral) stages and are meant to represent the broad range of habitat requirements for many species; the Boreal Landscape Guide pattern indicators; mature and old forest texture and young forest patch size were used as measures of ecological sustainability.

There is continued interest from the LCC and local First Nation and Métis communities to provide or improve habitat for moose. Moose are habitat generalists and can use a broad range of forest conditions to meet their needs, though some habitats are preferred over others and habitat preferences change during the year. To support moose populations on the MF, it is desirable to achieve forest conditions in a managed forest that are similar to the conditions moose prefer and would encounter in a natural forest ecosystem. In the 2011 Martel FMP, Moose Emphasis Areas (MEAs) were developed. MEAs represent relatively large areas with patch size targets to encourage a finer-forest texture and targets for three broad habitat types applied in the first twenty years to create an arrangement of habitat suitable for moose. A primary objective of the MEA's is to limit sustained long-term access into these areas and maintain the area as "functionally roadless".

The endorsed Long-Term Management Direction for the 2021-2031 Missinaibi FMP includes only moose as a featured species. Regional direction has been provided for the 2022-2032 FMP to consider 10-15% of the productive forest land base managed in Moose Emphasis Areas (MEAs). Using Patchworks, the 2021 FMP has assessed the ability of candidate MEAs to meet the broad habitat targets at the strategic level. In addition to the area managed within MEAs, the LTMD included composition and structure indicators for the MEAs (browse producing habitat, mature confer habitat, hardwood-mixed wood dominated habitat). The analysis indicated that the habitat conditions listed above were not limiting on the MF, and that appropriate operational planning will continue to provide for suitable and abundant moose habitats. In the approved 2021-2031 FMP, twelve large landscape patches were identified as areas to implement the direction from the SSG as MEA's. The planning of winter and summer cover residual within MEA harvest blocks were completed in consultation with the Regional and District MNRF Biologists. Year-to-year operational planning will confirm the suitability of Selected MEAs from the LTMD. Considering the abundance of suitable habitat types on the MF, provision of moose habitat is not considered to be at risk from forestry operations.

Given the large area included in MEAs in the MF, their good spatial distribution across the MF, and the success in meeting planning targets related to MEAs within the MF, habitat for moose is not designated as HCV. However, we note the cultural importance of moose to local indigenous communities. Ongoing consultation efforts with local communities may identify specific HCVs related to moose habitat and related values.

Regarding other wildlife species, modelling conducted for the 2021-2031 FMP indicated that target levels for all modelled indicators were maintained within the desired ranges over the long term (see the FMP Analysis Package for the analysis results). These results were reviewed and endorsed by MNRF experts: these results indicate that critical habitats for any wildlife species will not experience significant declines within the term of the 2021-2031 FMP.

NHIC identifies a large number of fish spawning areas on the MF, including those for brook trout (for example, see Figure 13). There have been significant losses of brook trout populations province-wide both in lakes and streams/rivers and models predict further losses may occur in the future. A report on the status of brook trout in Ontario (Wood 2017) suggests that brook trout populations have declined on an increasing gradient from the Far North to the southern part of the province. The report provides an assessment of the vulnerability of each population by ecozone/Fisheries Management Zone (FMZ). On the MF (located in the Boreal Shield ecozone) the status of brook trout in FMZ 7 is average, compared to better status in the Far North and more significant declines in the southern parts of the province.

Within the MF, there are a large number of cold water lakes and streams that provide potential habitat for Brook Trout. These are especially abundant in the former Magpie Forest but occur throughout the MF. The current FMP provides strong protection for cold water bodies, including an AOC prescription that includes absolute no-cut reserves, and no cut-to-shore options as there are for cool and warm water bodies. There are also a number of other laws and regulations that protect water bodies and fish spawning areas. Given their abundance and strong protection within the MF, we assess the risk to brook trout habitat from forestry activities to be very low. For these reasons, brook trout habitat is not designated as HCV.

Lake trout is another species dependent on the habitats provided in cold water bodies. They can take significant time to recover from population declines due to the slow maturation and growth rates of the species. There are few remaining natural lake trout lakes in the MF that are considered to be remote (i.e. without road access). There is an AOC prescription for remote lake trout lakes within the MF. The AOC documentation list seven lakes; four more were identified within the former Magpie Forest for a total of eleven (Table 6).

Table 6. Area (ha) of Remote Natural Lake Trout lakes with the MF, including 120 m no-cut reserves.

Number	Lake Name	Area (ha)
1	Maconner Lake	226
2	Nushatogaini Lake	381
3	Mountain Lake	308
4	Lance Lake	175
5	Ninegee Lake	100
6	Kabiskagami Lake	245
7	Stranded Lake	168
8	Anahareo Lake	1,063
9	Troupe Lake	164
10	Pozzo Lake	419
11	Boulder Lake	165
Total		3,414

Due to the scarcity of remote lake trout lakes within the MF, and the susceptibility of lake trout populations to overfishing, these 11 lakes have been designated as HCVs.

3.4.3 HCVF Designation Decision

Given the scarcity of remote lake trout lakes within the MF, and the susceptibility of lake trout populations to overfishing, the 11 lakes listed in Table 6 are designated as HCVs.

3.5 Question 5 - Concentrations of species at the edge of their natural ranges or outlier populations

Question 5) Does the forest support concentrations of species at the edge of their natural ranges or outlier populations?

The HCV Framework provides the following definitive criteria for this question:
- Are any of the range edge or outlier species representative of habitat types naturally occurring in the Management Unit?
- Are there naturally occurring outlier populations of commercial tree species?

A guidance criterion is:
- Are there any ecological or taxonomic groups of range edge and/or outlier species/sub-species that would together constitute a globally, nationally or regionally significant concentration?

Commercial species are highlighted here because of their combined importance, biologically and economically.

3.5.1 Assessment Methods

Outlier populations are concentrations of species that occur at the edge of their natural range. Relevant conservation issues for outlier populations include species vulnerability against range contraction and potential genetic variation at range edge.

All tree species known to occur on the forest were compared to natural range descriptions according to Farrar (2017) to identify possible outlier populations. We defined trees at the edge of their natural range as species whose northern range edge is either intersecting the MF or follows the northern boundary of the unit. In contrast, those species whose northern range is beyond the northern unit boundary are considered to be within their natural range. Tree species were used as a surrogate for vegetation community occurrences as there is currently insufficient data on this variable.

An examination of potential regional focal wildlife species with known or probable occurrences on the MF were also compared to their natural range maps. Outlier animal species were discussed in Question #1.

Note that ongoing consultation with local indigenous communities may identify specific examples of culturally important trees or other plant species under HCV category 5.

3.5.2 Assessment Results

Concentrations of hardwood species and cedar were identified from the Missinaibi Forest, enhanced Forest Resources Inventory (eFRI). The hardwood species included Black Ash, Red Maple, Sugar Maple, Yellow Birch and Red Oak. There were previous reports of American Beech and Black Cherry occurrences on the MF, but when ground checked these occurrences were not confirmed, and these species do not occur in the updated eFRI used to prepare the 2021-2031 FMP. Many of these hardwoods grow best in deep, rich, moist to well-drained soils. White cedar typically grows on shallow soils and in forested swamps, but it can also occur on moist upland sites.

Yellow birch occurs across the unit, and the occurrence of this species approaches its northern limit. Others tree species occurring in the MF north of the edge of their natural ranges include Sugar Maple and Red Oak. The northern range of Red Maple corresponds very closely with Highway 101 (Farrar 2017; Hosie 1995), thus populations of Red Maple that occur north of Highway 101 are considered to be edge-of-range. The northern edge of the range of Black Cherry occurs in south-central Ontario. The range of White Cedar extends well beyond the northern edge of the MF up to the treeline in Ontario (see Farrar 2017). This is also the case for Black Ash. These latter two species were included in the assessment since they have cultural significance for local Indigenous communities. Black Ash is also a SAR species in Ontario.

Ontario white pine populations are considered to be nationally significant, since the province supports 95% of the total Canadian population, as well as globally significant, since the province supports 60% of the earth's population (Quinby 1993). White pine populations are potential outlier species on the MF as they approach their northern range limit within the MF boundary. White pine habitat includes a wide variety of site and soil conditions, compared to red pine's more common occurrence on sandy plains and rock outcrops (Farrar 2017).

Red pine is also nearing the edge of its range on the MF as per Farrar (2017) and relative occurrence maps developed by the MNRF (unpublished). For both species, Highway 101 (east-west) approximates the edge of range and was used as a break point since white pine and red pine stands and stands containing white pine and red pine components occur much less commonly north of the Highway.

Sugar maple, yellow birch, and red oak represent edge of range species and have been designated as HCVs (see Figure 4). White pine, red pine and red maple populations occurring north of Highway 101 are also identified as edge-of-range species and are designated as HCVs.

On the MF, white cedar and black ash stands occur within their respective natural ranges and do not qualify as an HCV under outlier/edge of range criteria. These species are representative of habitat types which occur naturally throughout the MF and are relatively common across the MF. However, Black Ash was previously designated as an HCV since it is a species at risk in Ontario (classified by SARO as Endangered).

Other potential HCV outlier tree species include American Beech and Black Cherry, which were listed in the planning inventory used to prepare the 2011-2021 FMP. However, these species do not occur in the updated eFRI used to prepare the 2021-2031 FMP. The occurrences of Black Cherry listed in historical FRIs were investigated in the field by Rob Arnup (pers. comm.) and proved to be stands of Pin Cherry. There may, however, be occurrences of small groups or individuals of black cherry or American beech within the MF that were not recorded on FRI.

There are no harvest allocations overlapping known occurrences of these species in the 2021-2031 FMP. Should any of these species be encountered during operations, the direction provided in MFMI FRL holders operating procedures related to the discovery of new values would be followed, and it would then be protected by developing and applying an appropriate management prescription, as per provisions in the applicable FMP. The 2021-2031 FMP includes a Condition on Regular Operations (CRO) developed by the planning team for unique or rare tree species.

3.5.3 HCVF Designation Decision

Within the MF the following five tree species have been identified as High Conservation Values, due to their rarity within the management unit and their edge-of-range status: White Pine occurring north of Highway 101, Red Pine occurring north of Highway 101, Red Maple occurring north of Highway 101; Yellow Birch, Sugar Maple, and Red Oak.
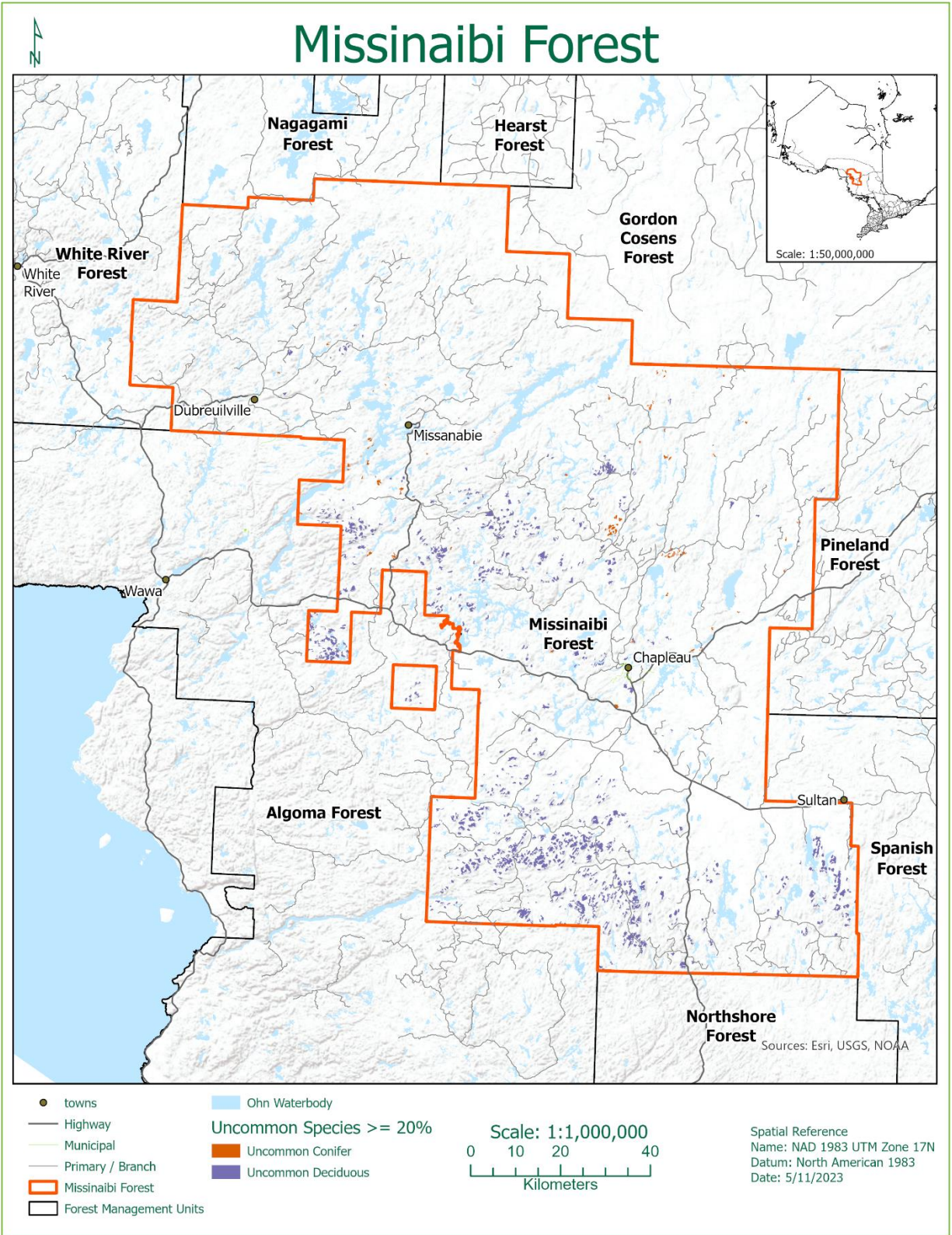
Figure 4. Distribution of edge-of-range and uncommon tree species across the MF (updated to May 2023).

3.6 Question 6 - Conservation Areas

> *Question 6) Does the forest lie within, adjacent to, or contain a conservation area: a) designated by an international authority, b) legally designated or proposed by relevant federal/ provincial/ territorial legislative body, or c) identified in regional land use plans or conservation plans.*

The HCV Framework provides the following definitive criterion for this question:
- Are the values for which the conservation area has been identified, consistent with the assessment of HCVs in this framework?

To illustrate, a park may not have any values that would qualify it as an HCV, as in a purely recreational park, although this would be unusual. If it is not designated as a conservation value, a park may have social or economic significance and be designated elsewhere in the HCV* framework.

Guidance criteria include:
- Are there forest areas important to connect conservation areas to maintain the values for which the conservation areas were identified?
- Are there forest areas important to safeguard conservation areas to maintain the values for which the conservation areas were identified?

Most parks or other areas legally protected from industrial use are not part of a forest license. In that case, the value in need of protection by forest companies could be the boundary line to ensure no trespassing occurs, or visual considerations. Whether a "buffer" is needed or important is a local decision depending on several factors. See Criterion 6.5 of the FSC Standard for further guidance.

3.6.1 Assessment Methods

Examination of this item ensures compliance with the conservation intent of a conservation area and that regionally significant forests are evaluated for consistency with the conservation intent. The presence of a protected area or candidate site proposed by a relevant legislative body for future protection constitutes a HCVF: completion of conservation plans implies a designation of HCVF for the associated land. Any core, corridor, or linkage zones identified in a conservation plan should be evaluated for inclusion in the HCVF designation.

The presence of this attribute was assessed through an examination of the Canadian Conservation Database. This information system identifies important areas designated through international conventions. Areas under deferral pending completion of land use planning and/ or completion of protected areas system were also assessed. A forest is assumed to contain HCVs where there is conflicting information involving the location and/or conservation status of protected areas or candidate sites. An on-line query of the MNRFs Natural Areas Database provided a list of International Biological Program (IBP) sites. This attribute was also assessed through the examination of available information from national and provincial government agencies responsible for protected areas planning. The Crown Land Use Atlas land use designations for the relevant area and the 2021-2031 FMP for the MF were also examined.

3.6.2 Assessment Results

a) International
Examination of the Canadian Conservation Database did not reveal protected or candidate UNESCO World Heritage Sites, Biosphere Reserves or RAMSAR Wetland Sites on the MF.

b) Federal/Provincial
National parks or park reserves are not present on the MF. Although there are legally regulated Provincial Parks and Conservation Reserves within the MF, national (i.e., under Federal jurisdiction) marine parks or park reserves, national wildlife areas or migratory bird sanctuaries are also not present on the MF (see Figure 5).
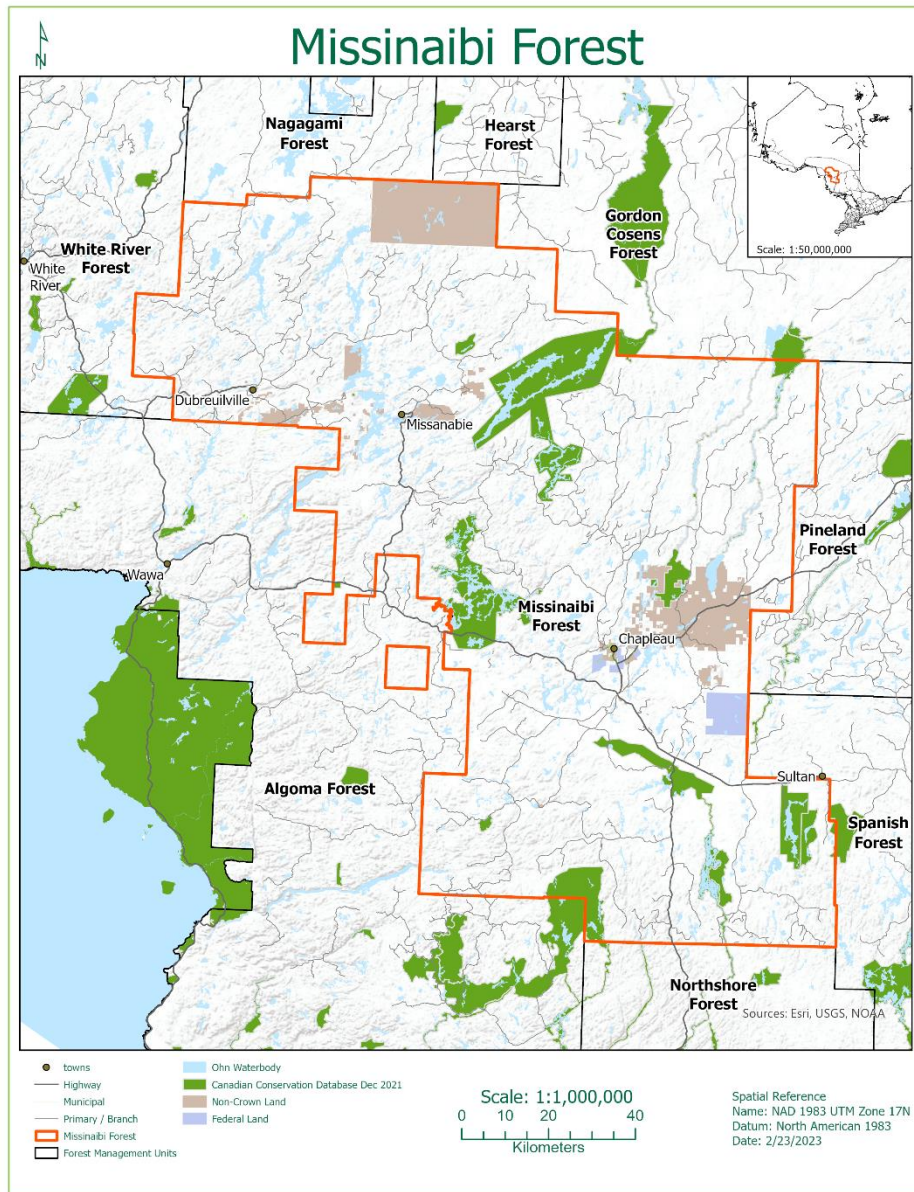
Figure 5. International and national conservation areas listed on the Canadian Conservation Database (updated May 2023).

Provincial parks, conservation reserves and forest reserves incorporate Crown land that is not available for commercial forest management activities. Conservation Reserves complement Provincial Parks in protecting representative natural area and special landscapes. Commercial timber harvest, mining and commercial hydroelectric power development is excluded from all Conservation Reserves. Many non-industrial uses (e.g. furbearer harvest, baitfish harvest, etc.) are permitted, if they are compatible with the values of the individual conservation reserve. Within a given Conservation Reserve, most recreational and non-commercial activities that have been traditionally enjoyed in an area can continue provided they pose minimal threat to the integrity of the natural ecosystems and features identified for protection in land use policy.

Forest Reserves are areas where protection of natural heritage and special landscapes is a priority, but where some resource use is conditional. The Forest Reserve land use designation has been applied to a relatively small number of areas. The designation will be applied to additional areas that have been initially identified for inclusion in Provincial Parks and Conservation Reserves, but where detailed examination has identified existing mining claims or leases. The intention is that these lands will be added to the park or Conservation Reserve areas if a claim or lease is retired through normal processes.

The MF either surrounds or encompasses a portion of 11 provincial parks, 6 conservation reserves and 1 forest reserve (Figure 6). There are no provincial parks located within the boundaries of the former Magpie Forest; however, Missinaibi Provincial Park lies adjacent to the eastern boundary of the forest. Two conservation reserves, Manitou Mountain (530 ha) and South Greenhill Lake Sand Delta (1,463 ha) are located within the former Magpie Forest. Adjacent to the Manitou Mountain Conservation Reserve is the Manitou Mountain Forest Reserve, with a total area of 210 hectares.

Provincial parks, conservation reserves and forest reserves that are located within the boundaries of the MF encompass a total of 132,844 ha. Approximately 8.74% of the total Crown land on the Missinaibi Forest (1,520,062 ha) is composed of these protected lands.

List of Provincial Parks, Conservation Reserves, and Forest Reserves wholly or partially within the Missinaibi Forest:
- Chapleau-Nemegosenda Waterway Provincial Park
- Chapleau-Nemegosenda Waterway Provincial Park Addition
- Missinaibi Provincial Park
- Potholes Provincial Park
- The Shoals Provincial Park
- Wakami Lake Provincial Park (recreational class)
- Wakami Lake Provincial Park (nature reserve class)
- Five-Mile Lake Provincial Park
- Algoma Headwaters Provincial Park
- Wenebegon River Provincial Park
- Woman River Forest Provincial Park (Natural Environment Class)
- Windermere Goldie Lake Complex Conservation Reserve
- Alm Lake Forest Conservation Reserve
- Windermere Goldie Lake Complex Conservation Reserve
- East Wenebegon Forest Conservation Reserve
- Manitou Mountain Conservation Reserve
- South Greenhill Lake Sand Delta Conservation Reserve
- Manitou Mountain Forest Reserve

Land use policy direction for each of the Provincial Parks, Conservation Reserves and Forest Reserve is outlined in Ontario's Crown Land Use Policy Atlas (CLUPA).
http://www.gisapplication.lrc.gov.on.ca/CLUPA/Index.html?site=CLUPA&viewer=CLUPA&locale=en-US.
Various policy reports in this atlas describe acceptable activities in specific land use zones.

3.6.3 HCVF Designation Decision

All existing regulated Provincial Parks, Conservation Reserves, and the Forest Reserve located within the MF have been designated as HCVs.

Current regulations provide adequate protection to ensure the integrity of these values, since no industrial activities, including logging, are permitted within these areas. In addition, the 2021-2031 FMP contains three AOCs related to Provincial Parks: PP1 (All Provincial Parks); PP2 (specific to Chapleau-Nemegosenda River Provincial Park); and PP3 (specific to Missinaibi Provincial Park). These AOCs are intended to maintain the integrity of the parks and values within the parks (e.g., seasonal timing restrictions on some parks to address social values such as canoeing within the park(s).

There are no protected or candidate UNESCO World Heritage Sites, Biosphere Reserves or RAMSAR Wetland Sites on the MF.
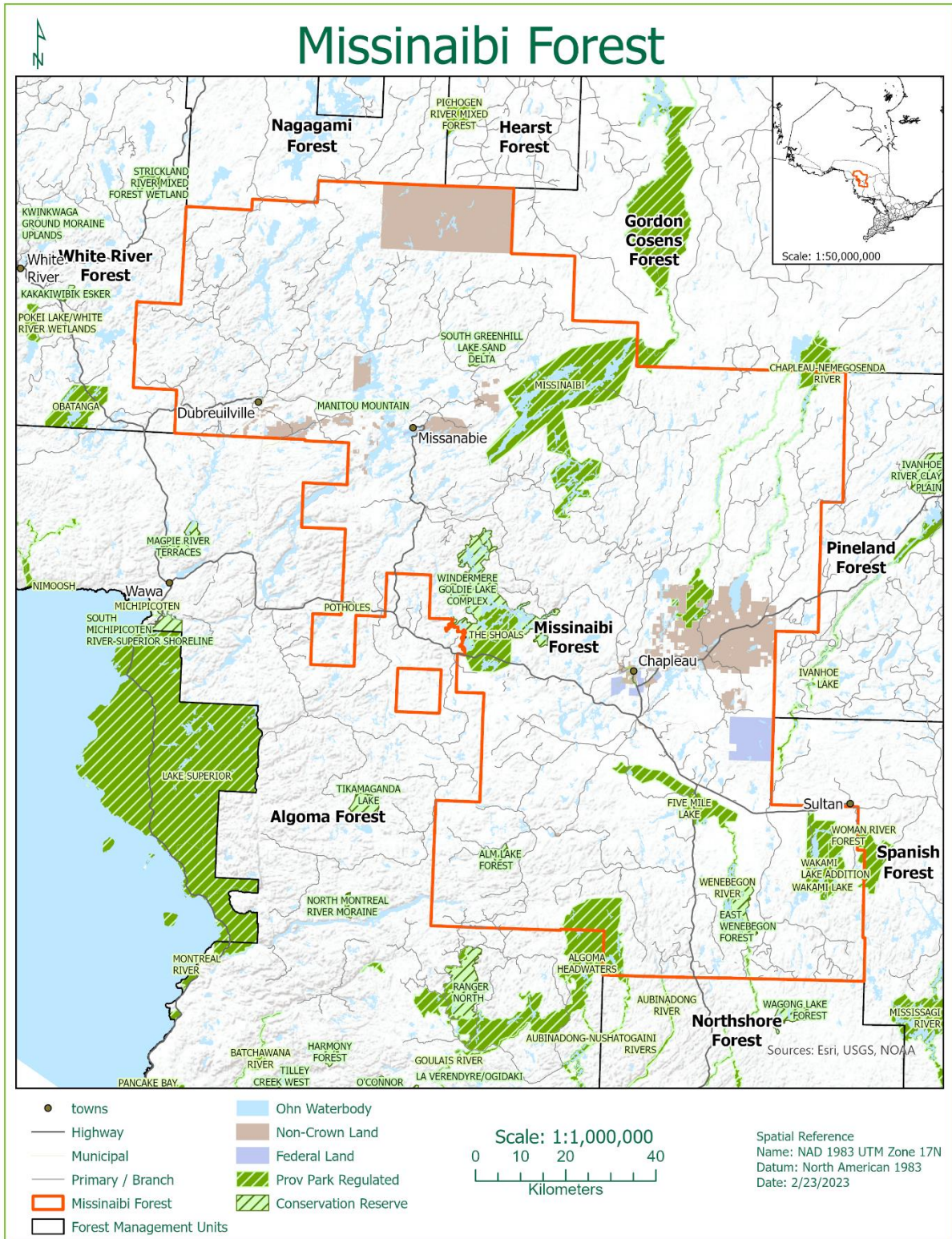
Figure 6. Map showing the locations of legally designated Provincial Parks and Conservation Reserves for the MF (Updated May 2023).

4   Category 2 - Landscape-level Ecosystems and Mosaics

> ***HCV 2 – Landscape-level ecosystems and mosaics.** Intact Forest Landscapes and large landscape-level ecosystems and ecosystem mosaics that are significant at global, national or regional levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.*

4.1   Questions 7: Nationally or Regionally Significant Intact Forest Landscapes

> *Question 7) Does the forest constitute or form part of a globally, nationally, or regionally significant forest landscape that includes populations of most native species?*

The HCV Framework provides the following definitive criterion for this question:
Are there contiguous forest landscapes that have the following characteristics?
- at least 50,000 ha in size;
- minimal width of 10 km;
- free of permanent infrastructure and less than 5% non-permanent anthropogenic disturbance;
- free of large-scale industrial resource extraction activities;
- dominated by forest, but inclusion of other ecosystems to a reasonable extent is permissible;
- dominated by native plants and communities;
- not necessarily dominated by old forest communities.

Note: If unfragmented forest landscapes exist that are larger than 5,000 ha but smaller than 50,000 ha, the area may be considered a landscape-level forest and addressed through Question 10 of HCV 3.

4.1.1   Assessment Methods

To address this question, MFMI identified Intact Forest Landscapes (IFL) that overlapped the area of the MF based on the GFW International IFL dataset. Intact forests were analyzed by Global Forest Watch Canada up to 2018. We chose to use the GFW International data because GFW Canada has ceased operations as of 2023, and updates to their dataset will no longer be available. The most recent version of GFW International's mapping of intact forest landscapes was released in 2020 and includes mapping updates to the Canadian portion of the data from 2013 to 2020. GFW's methodology for delineating large landscape level forests is described in their website's data warehouse metadata files (https://www.globalforestwatch.org).

MFMI updated the GFW International IFL mapping from 2020 to the start of the current 2021-2031 FMP for the MF (March 31, 2021) by following FSCs "Interim Guidance for the Delineation of Intact Forest Landscapes (IFL)" (published May 25, 2017). This permitted the calculation of the amount and percentage of IFL areas within the MF that were affected by forestry operations since the latest update to the GFW data. Finally, MFMI projected the area of IFLs that would

potentially be affected by forest management activities to the year 2031, assuming that the 2021-2031 FMP will be fully implemented as planned.

Because the economic skidding distance from operational roads is approximately 200m, the application of the 1000m buffer on roads resulted in buffers on harvest blocks that were wider than the prescribed 500m. The GreenFirst analysis is therefore believed to be conservative in comparison to the FSC Interim Guidance.

From 1960 to 1990, forest management practices evolved both technologically and conceptually. Timber management plans developed during the late 1980's were focused on managing the forest for the provision of moose habitat and the protection of the habitat of other species whose long-term survival was of concern (i.e. vulnerable, threatened and endangered species). This approach also had profound influence on how the current forest is spatially arranged in terms of patch size and distribution of disturbance polygons. While the moose guidelines tended to favor species that were reliant on edge, some area sensitive species were ignored. This created a pattern of very fragmented, and numerous, disturbance patches on the landscape. Analysis of historic disturbance patterns has shown that the natural pattern for Ecoregion 3E was dominated by very large disturbance patches. Application of the moose habitat guidelines on this forest increased the fragmentation of the forest, thus potentially negatively impacting biological diversity by altering the forest landscape in a manner inconsistent with the natural pattern.

Since the year 2000 there have been more evolutions in approaches to sustainable forest management in Ontario, including Natural Disturbance Pattern Emulation policies and the provisions of the Boreal Landscape Guide that are incorporated into the 2021-2031 FMP. It is likely that the implementation of the Boreal Landscape Guide will lead to reduced fragmentation of forests on the MF over time.

4.1.2 Assessment Results

According to the GFW International IFL data, in 2020 the MF contained part or all of two IFLs, Numbers 70_1 and 70_2 (see Figure 7). Since the Interim Guidance for delineating IFLs was approved for implementation in 2017, forest management activities (access construction, harvesting) within these four IFLs was initially updated by MFMI from 2020 to March 31, 2021, which corresponds to the start date for the 2021-2031 FMP for the MF. These updates included the impact of harvesting activity and access construction (including overlapping buffers for activities such as road construction that were conducted outside the IFLs). Harvest allocations contained in the 2021-2031 FMP for the MF were then used to forecast the potential maximum level of disturbance within the two IFLs to the end of the 2021-2031 FMP, assuming that the FMP will be fully implemented as planned during that time. The results are shown in Table 7 and Table 8 below. A map showing the current status of the two IFLs at March 31, 2021 is shown in Figure 7.

For the past 2 years, MFMI has been jointly monitoring and reviewing the status of the two IFLs (70_1 and 70_2) with the adjoining forest managers for the Spanish Forest (Interfor) and the Northshore Forest (Northshore Forest Inc.). The Northshore Forest is FSC certified. Although the Spanish Forest is not FSC certified, Interfor maintains an FSC Chain of Custody (CoC) certificate for wood delivered from Interfor license areas including the Spanish Forest. MFMI continues to exert its sphere of influence by encouraging Interfor and Northshore Forest Inc. to continue to maintain these IFL areas.

FSC's Advice Note for the interpretation of the default clause of Motion 65, related to IFLs, states that Forest Management operations, including harvesting and road building, may proceed in IFLs, if they:

- Do not impact more than 20% of Intact Forest Landscapes within the Management Unit (MU), and
- Do not reduce any IFLs below the 50,000ha threshold in the landscape.

The tables below address these two points. Table 7 shows the total areas of the potential IFLs at two benchmark dates: at March 31, 2021, the start date of the most recent FMP for the MF; and finally the projected area of each IFL assuming that the 2021-2031 FMP is fully implemented. As of the benchmark FMP start date of March 31, 2021, both IFLs remained above the threshold size of 50,000 ha when the total contiguous area across all adjacent management units was included.

Table 7. Area of Intact Forest Landscapes within the MF over the term of the 2021-2031 FMP, based on actual activities to March 31, 2021, and forecasts of planned activities to March 31, 2031.

Area within MF at Plan Start March 31, 2021		
IFL #	Area within MF (ha)	Total IFL Area Across All Management Units
70_1	2,509.7	68,540.8
70_2	23,925.5	53,339.9
Projected Area within MF at Plan End March 31, 2031		
IFL #	Area within MF (ha)	Total IFL Area Across All Management Units
70_1	1,522.8	67,223.4
70_2	23,711.2	53,125.6

Table 8 below addresses the first point. It shows the total area of all IFLs within the boundaries of the MF and calculates the impact of all forest management activities as a percentage of its initial area.

Table 8. Total area of IFLs (70_1 and 70_2) within the boundaries of the MF showing the potential impact of forest management activities over the term of the 2021-2031 FMP.

Benchmark Date	Total Area of IFLs Within the Missinaibi Forest (ha)	Percent Reduction of Area
March 31, 2021 (FMP start)	26,435.2	-
March 31, 2031 (projected to end of 2021-2031 FMP)	25,234.0	4.5 %

4.1.3 HCV Designation Decision

The two IFLs (#70_1 and #70_2) that overlap the area of the MF and that have total areas greater than 50,000 ha are designated as HCVs. Both areas will continue to meet the IFL criteria throughout the 2021-2031 FMP for the MF.
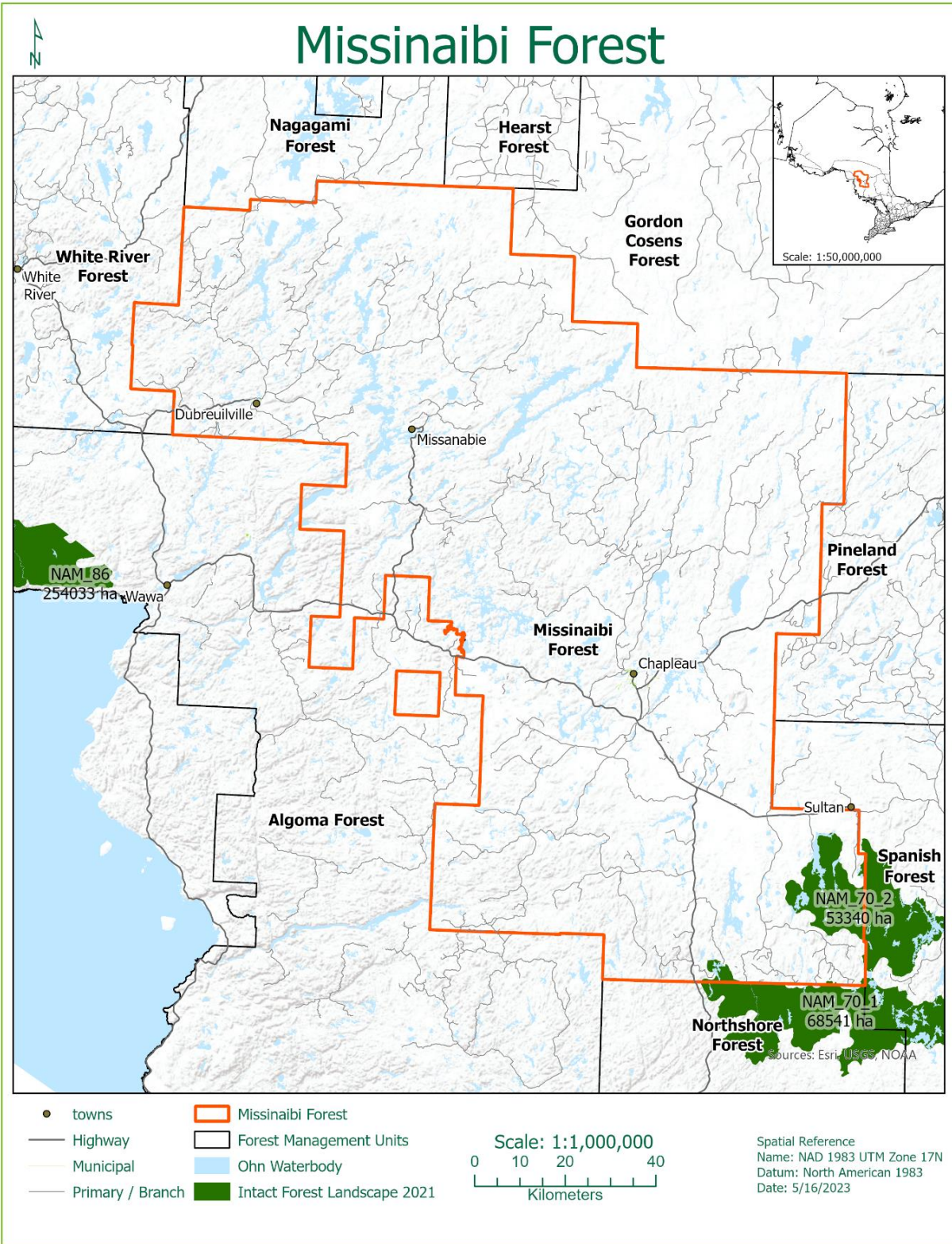
Figure 7. Status of Intact Forest Landscapes in the MF on March 31, 2021 (Source: Global Forest Watch International data, 2021 version; GreenFirst Forest Management GIS data).

5 Category 3 - Rare, Threatened or Endangered Ecosystems

> **HCV 3 – Ecosystems and habitats. Rare, threatened, or endangered ecosystems, habitats or refugia.**

This type of HCV attribute identifies forest ecosystems that occur in very limited amounts, either due to natural rarity, or due to past development having disturbed major portions of their former range. These may often overlap with those types defined above due to concentrations of endemic or endangered species and will vary widely with regard to the scale at which they are defined.

5.1 Question 8 - Naturally Rare Ecosystem Types

> *Question 8) Does the forest contain naturally rare ecosystem types?*

The HCV Framework provides the following definitive criterion for this question:
- Are there ecosystems that have been officially classified as being rare, threatened or endangered by a relevant national or international organization?

A related guidance criterion is:
- Is a significant amount of the global extent of these ecosystems present in the country and/or ecoregion?

5.1.1 Assessment Methods

Does the forest contain many unique species and communities that are only adapted to conditions that are found in these rare forest types?

The MF spans across the Central Canadian Shield Forests and the Eastern Forest/Boreal Transition. The conservation status of these Ecoregions is considered to be relatively stable (Ricketts et al. 1999). Conservation status is calculated using criteria related to rarity and uniqueness of individual habitats, habitat loss, size and number of habitat blocks, habitat fragmentation, and habitat protection.

A significant amount of the global boreal forest ecosystem occurs in Canada. Global Forest Watch estimates over a third of the world's boreal forests are Canadian. Black spruce, a coniferous climax species, has been demonstrated as a dominant tree species on the MF. Forest management is based on sustainability, consequently, the retention of climax species and forest integrity are management priorities. A provincial trend of declines in white pine family populations has also been observed across the MF and is addressed with management strategies described in the 2021-2031 FMP (see also Section 3.5).

The NHIC provides information on occurrences of rare terrestrial ecosystems. The NHIC database was examined for occurrences of uncommon ecosystems within the MF. The Canadian Conservation Database and the NatureServe Explorer tool was used to assess whether rare ecosystem types (in Classes G1 to G3) have a high probability of occurrence in the MF. The Conservation International data was also examined for the presence of any biodiversity hotspots within the MF.

5.1.2 Assessments Results

Ecosystems associated with uncommon / edge of range species in the MF were previously identified as HCVs in Section 3.5.

Conservation International does not identify any biodiversity hotspots within Canada. Examination of the MNRF NHIC database and NatureServe data did not reveal the presence of any other globally, nationally or provincially rare ecosystems.

5.1.3 HCV Designation Decision

Other than ecosystems associated with uncommon / edge of range species (which were previously designated as HCVs), naturally rare ecosystem types were not identified on the MF.

5.2 Question 9 - Ecosystem types that have significantly declined

Question 9) Are there forest ecosystem types within the management unit or ecoregion that have significantly declined?

The HCV Framework provides the following definitive criterion for this question:
- Does the forest consist of mature and/or old forest stands, where the amount of old forest remaining in that ecosystem type has been reduced to less than 50% of estimated natural occurrence of old forest*?

Guidance criteria include:
- Is the forest within an ecoregion with little remaining original forest type?
- Have these ecosystems significantly declined (e.g. less than 50% loss)? Application note: Targets for the previous two questions should be based on landscape dynamics (e.g. range of natural variation).
- Is there a significant proportion of the declining ecosystem type within the Management Unit in comparison to the broader ecoregion? Application note: If a type is abundant in adjacent protected area, there may be less need for HCV designation.
- Does potential vegetation mapping identify areas within the Management Unit that can support the declining ecosystem type (i.e., regeneration potential)?
- How well is each ecosystem effectively secured by the protected area network and the national/regional legislation?

Application note: This question is based on the premise that managers should maintain all forest types and ages within a reasonable balance considering natural conditions. Although this can be very difficult on some historically damaged forests, restoration should be the long-term goal. For example, the historic old white pine forests of central Ontario are often designated HCVs and are slowly recovering after many decades of high grading in the 19th and early 20th centuries.

5.2.1 Assessment Methods

This attribute is intended to assess whether or not the forest ecosystem types within the management unit or ecoregion have significantly declined.

For this attribute, both the COSEWIC data and the various maps provided by the World Wildlife Fund in conjunction with the Terrestrial Ecosystems of North America (Ricketts *et al.* 1999) were examined in previous versions of this HCV assessment. Historical and current information on stand type composition for the forest were also used to assess this indicator.

Compositional changes that have occurred over the ecoregions were examined using an MNRF analysis of the pre-settlement forest condition and a comparison to current FRI data sets. Information contained in the pre-industrial forest condition report for the MF also contributed to this assessment.

5.2.2 Assessment Results

The MF spans across the Central Canadian Shield Forests and the Eastern Forest / Boreal Transition (Ricketts et al. 1999). The Canadian Shield ecoregion is identified as bioregionally outstanding and relatively stable while the Eastern Forest/ Boreal Transition is nationally important with a conservation status of vulnerable. Ricketts has also estimated that 40% of the Central Canadian Shield Forest remains intact, while only 10% of the Eastern Forest / Transition Forest ecoregion remains intact. The Eastern Forest / Transition Forests has been identified as highly roaded by the Ricketts study with forestry, mining, and tourism as the main driving factors. Although the MF has multiple stakeholders, functional integrity appears stable as demonstrated through the maintenance of primary forests and spatial connectivity.

Estimates from a comprehensive white pine inventory suggests that approximately 0.4% of the original white pine forest remains intact across eastern North America (Quinby 1993). Conservative estimates, assuming the inventory was an over-estimation, do not exceed 1% and therefore indicate an anthropogenically rare forest ecosystem type.

The NHIC and NatureServe data do not identify the presence of rare ecosystem types within the MF.

5.2.3 HCV Designation Decision

White pine forests north of Highway 101 represent edge of range populations as well as an ecosystem type that has significantly declined. White pine and red pine forests were previously designated as HCVs on the MF (see Section 3.5) and a forest management strategy to not harvest white pine stands or individual trees, along with a tree planting program intended to maintain or increase the amount of red and white pine in the MF is included in the approved 2021-2031 FMP.

5.2.4 HCV Designation Decision

Other than white pine and red pine forests north of Highway 101 within the MF, which were previously designated as HCVs, there were no other HCVs identified in this category.

5.3 Question 10 – Large Unfragmented Forests

Question 10) Are large landscape level forests (i.e. large unfragmented forests) rare or absent in the forest or ecoregion?

The HCV Framework provides the following guidance criterion for this question:
- Are moderate to large remnant patches (thousands of hectares) the best examples of intact forest for their community and landform types?
- Does the Management Unit contain intact or undeveloped watersheds over 5,000 ha in size?
- Do the largest remnant forest patches include a significant proportion of climax species (i.e. not dominated by pioneer species)?

Application notes:
- 'Remnant', here describes the remaining patches of the natural forest that still contain the original ecosystem characteristic species and structure.
- In designating remnant landscape level forests, managers should consider structural features such as woody debris and standing dead trees (i.e. structurally complex), late seral stands, known populations of significant species, or species representative of habitat types naturally occurring in the Management Unit.

5.3.1 Assessment Methods

Intact forests were analyzed by Global Forest Watch (GFW) with the most recent update completed in 2018. A subsequent risk assessment of IFL areas was conducted in 2019. GFW's methodology for delineating large landscape level forests is described in their website's data warehouse metadata files (https://www.globalforestwatch.org/). In general, GFW used land cover data as base data to represent un-accessed forests. Next various modes of fragmentation or access corridors on the landscape were mapped. A 1 km^2 grid resolution was used in the assessment. Accessed corridors were buffered by 1 km to represent disturbed or fragmented lands. The remaining tracts of land were categorized into various sizes. The Land Cover of Canada data was obtained through the Canadian Center for Remote Sensing. Fragmentation (accessed lands) were assessed using various source data including Base Maps, logging roads from Landsat imagery, roads from Digital Topographic Database, and provincial snowmobile trails. The source date of accessed corridors ranges from the 1980s to 2000s.

Because the GFW data is dated, MFMI conducted a similar assessment of large landscape level forests in the MF. One methodology difference to note is that a 0.5 km^2 grid resolution was used rather than 1 km^2. The finer grid resolution of 0.5 km^2 is a more conservative approach that will detect more fragmentation. Congruent with GFW, accessed lands were buffered by 1 km.

The GFW land cover information was not used to assess intact forests inside the MF, rather, MFMI used the most recent update of the Forest Resource Inventory (FRI), and the updated roads and utility lines data from the 2021-2031 FMP planning inventory. The analysis was conducted using similar methods to GFW. In order to present recent harvesting as part of the accessed lands in the forest, our base data included all forest stands greater than approximately six years of age (the exact age depends on the Silvicultural Ground Rules used). Using this

approach, recently harvested stands were designated as accessed land. Conversely, any stands not harvested within 6 or more years were designated as unaccessed land.

Additional **<u>unaccessed</u>** land included:
- lakes and rivers
- rock outcrops
- naturally barren and scattered areas (due to environmental limitations)
- grassy areas and meadows.

Similar to GFW, other **<u>accessed</u>** corridors included:
- railways
- pipelines
- transmission lines
- roads (primary, branch, and operational)
- trails (includes snowmobile trails).

We recognize that many operational roads are currently unused and or grown-in and therefore may not be fragmenting the landscape. However, for this assessment all operational roads were assumed to fragment the landscape because we do not have information on the date of creation of the roads and cannot easily determine their status. Trails are also a debatable mode of fragmentation. Thresholds for assessing large landscape level forests at multiple scales include forest quantity and quality. We measured quantity in terms of area in hectares and quality in terms of proportion of climax species.

We assessed intact forests greater than 10,000 ha but less than 50,000 ha (including areas previously identified as potential IFLs – see Section 4.1) that were either partially or completely within the management unit. Forests may be fragmented by events such as road construction, logging, conversion to agriculture, or by natural disturbances. For this analysis only anthropogenic factors were used in assessing forest fragmentation. Areas were assessed for recent or permanent access and for old historical or abandoned access. A GIS exercise was applied to identify features that cause fragmentation. Recent or permanent access of roads was represented by a 500-metre corridor on highways; 200-metre corridor on all primary and municipal roads; and 100-metre corridor on branch roads. Other features causing linear fragmentation were railway lines (represented as 500-metre corridor) and utility lines (represented as 100-metre corridor). Government of Ontario information (databases within LIO including NRIP) was referenced to identify other areas accessed for cabins and residential areas, mines, pits, quarries, agriculture and private land. Operational roads and forestry strip roads were considered abandoned (or temporary) access and were represented by a 20-metre corridor.

Results of the gap analysis conducted by MFMI to meet FSC NFSSC Criterion 6.4 are also relevant to this question and were reviewed for this assessment.

5.3.2 Assessment Results

The FSC Standard HCVF National Framework (2018) indicates that intact forests dominated by climax species, as opposed to early successional species, contribute to significant intact forest landscapes. We considered conifer trees to be representatives of climax species. A 50% threshold for climax species was used. The best available coarse-scale roads and line data

(railways, pipelines, hydro lines, and other utility lines) were used to assess the extent of unaccessed forests across the landscape.

Populated areas surrounding the unit have made a significant contribution towards forest fragmentation. Highway 101 divides the unit into northern and southern sections while Highway 129 to Thessalon divides the unit into eastern and western sections. Most primary and branch roads extend from this intensively used network of highways, facilitating forest access for forest management activities, and for other industrial and recreational uses.

In Section 4.1, two areas identified as candidate IFLs within the MF were confirmed as IFLs by meeting the appropriate FSC criteria under Question 7 and were designated as HCVs. No other IFL areas occurred within the MF.

The gap analysis process conducted by GreenFirst to meet FSC NFSSC Criterion 6.4 identified nine candidate protected areas, based on ecosystem representation and the presence of enduring features (Figure 8). The total areas (ha) for the nine candidate protected areas identified by gap analysis ("Gap Sites") are listed in the table below.

Table 9. List of the nine candidate protected areas (Gap Sites) and the total area (ha) for each.

Name of Deferral Areas (Gap Sites)	Area (ha)
Nemegosenda Park Addition	639.8
Makonie Lake	4,180.2
Grenadier Lake	2,758.6
Trembley Lake	4,056.7
Murdock Lake	3,142.4
Boomerang Lake	5,088.3
Challener Lake	4,147.3
Wenebegon Addition	1,897.3
Whiskey Jack Lake	467.2
Total	26,377.7

Note that an update to the gap analysis is in process for the MF. Results from the updated gap analysis will be included in this HCV assessment when available.

The distribution of forested and non-forested Ecosites (Banton *et al*. 2009) within the protected areas in the MF, including the legally designated Parks and Conservation Reserves and the nine Gap Analysis areas is shown in Table 10 below. Note a cross-reference to the requirements of indicator 6.5.2 "representation of native ecosystems" in relation to this table.

Table 10. Area (ha) of forested and non-forested Ecosites within categories of protected areas in the MF.

Primary Ecosite	Ecosite Name	Deferred GAP Areas	Conservation Reserves	Provincial Parks	Grand Total
B007	Active Mineral Barren			6	6
B012	Very Shallow, Dry to Fresh: Pine- Black Spruce Conifer	14	38	97	149
B016	Very Shallow, Dry to Fresh: Aspen- Birch Hardwood			12	12

Primary Ecosite	Ecosite Name	Deferred GAP Areas	Conservation Reserves	Provincial Parks	Grand Total
B033	Dry, Sandy: Red Pine- White Pine Conifer	18	44	54	116
B034	Dry, Sandy: Jack Pine- Black Spruce Dominated	738	109	4,094	4,941
B035	Dry, Sandy: Pine- Black Spruce Conifer	1,475	459	2,069	4,003
B036	Dry, Sandy: Cedar- Hemlock Conifer	39		12	50
B037	Dry, Sandy: Spruce- Fir Conifer	266	160	949	1,375
B038	Dry, Sandy: Conifer	24		1	25
B039	Dry, Sandy: Red Pine- White Pine Mixedwood			24	24
B040	Dry, Sandy: Aspen- Birch Hardwood	755	694	2,642	4,090
B048	Dry to Fresh, Coarse: Red Pine- White Pine Conifer	105	125	477	708
B049	Dry to Fresh, Coarse: Jack Pine- Black Spruce Dominated	525	1,053	4,642	6,220
B050	Dry to Fresh, Coarse: Pine- Black Spruce Conifer	2,526	3,265	13,253	19,044
B051	Dry to Fresh, Coarse: Cedar- Hemlock Conifer	140	45	298	483
B052	Dry to Fresh, Coarse: Spruce- Fir Conifer	1,499	2,700	6,774	10,973
B053	Dry to Fresh, Coarse: Conifer	73	34	45	152
B054	Dry to Fresh, Coarse: Red Pine- White Pine Mixedwood	201	71	983	1,254
B055	Dry to Fresh, Coarse: Aspen- Birch Hardwood	8,525	4,108	28,649	41,282
B058	Dry to Fresh, Coarse: Maple Hardwood	363	108	887	1,358
B059	Dry to Fresh, Coarse: Mixedwood			1	1
B064	Moist, Coarse: Red Pine- White Pine Conifer	7		11	18
B065	Moist, Coarse: Pine- Black Spruce Conifer	1,370	511	3,288	5,168
B066	Moist, Coarse: Hemlock- Cedar Conifer	99	70	621	790
B067	Moist, Coarse: Spruce - Fir Conifer	155	40	386	581
B068	Moist, Coarse: Conifer	20		107	127
B069	Moist, Coarse: Red Pine- White Pine Mixedwood			47	47
B070	Moist, Coarse: Aspen- Birch Hardwood	172	127	1,926	2,224
B071	Moist, Coarse: Elm -Ash Hardwood		13	31	44
B099	Fresh, Silty to Fine Loamy: Pine- Black Spruce Conifer			15	15
B101	Fresh, Silty to Fine Loamy: Spruce- Fir Conifer			4	4
B114	Moist, Fine: Pine- Black Spruce Conifer			3	3
B115	Moist, Fine: Hemlock- Cedar Conifer			5	5
B119	Moist, Fine: Aspen- Birch Hardwood			18	18
B126	Treed Bog	29	58	155	242
B127	Poor Conifer Swamp	346	182	1,303	1,832
B128	Intermediate Conifer Swamp	3,203	823	6,683	10,709
B129	Rich Conifer Swamp	774	468	2,360	3,602
B130	Intolerant Hardwood Swamp			5	5
B133	Hardwood Swamp		4	47	50
B223	Mineral Intermediate Conifer Swamp	44			44

Primary Ecosite	Ecosite Name	Deferred GAP Areas	Conservation Reserves	Provincial Parks	Grand Total
B224	Mineral Rich Conifer Swamp	9			9
B134	Mineral Thicket Swamp		1	1	2
B135	Organic Thicket Swamp	162	27	862	1,052
B136	Sparse Treed Fen	105	66	3,764	3,935
B137	Sparse Treed Bog	1	49	15	65
B138	Open Bog	50		6	56
B139	Poor Fen	250	261	1,133	1,644
B140	Open Moderately Rich Fen	119	14	208	341
B141	Open Extremely Rich Fen			203	203
B142	Mineral Meadow Marsh	115	168	1,011	1,294
B146	Open Shore Fen	86	50	642	779
B149	Organic Shallow Marsh			3	3
B197	Pavement/Concrete	42	8	20	71
B198	Compact Gravelled Surface		0		0
B200	Other Materials			3	3
U999	Unclassified	0	2	56	59
ISL	Islands	20	138	201	359
WAT	Water	1,914	7,527	22,442	31,884
Grand Total Area (ha)		**26,378**	**23,622**	**113,577**	**163,576**

5.3.3 HCV Designation Decision

The nine areas identified by the Gap Analysis process have been designated as HCVs. These nine areas have been deferred from harvesting for the duration of the 2021-2031 FMP.
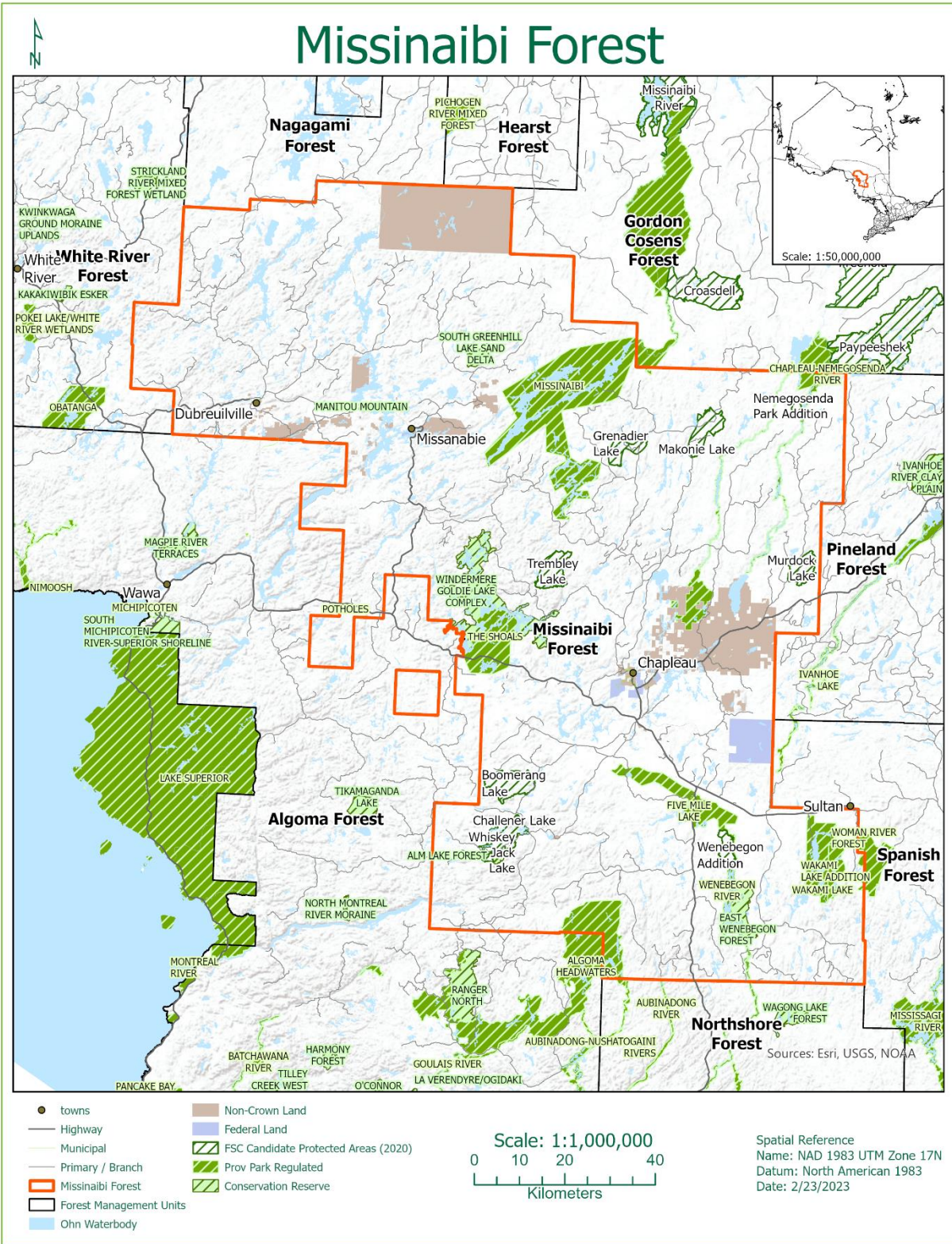
Figure 8. Map showing the locations of the nine candidate protected areas identified through GreenFirst's gap analysis for the Martel Forest.

5.4 Question 11 - Significant diverse or unique forest ecosystems

Question 11) Are there regionally/nationally significant diverse or unique forest ecosystems?

The HCV Framework provides the following guidance criteria for this question:
- Are there important and/or unique geological areas that strongly influence vegetation cover or wildlife features, such as serpentine soils, marble outcrops, karst hot springs for bat hibernacula?
- Are there important and/or unique microclimatic conditions that strongly influence vegetation cover, such as high rainfall, protected valleys?
- Do these ecosystems possess any exceptional characteristics, including exceptional species richness, critical species, etc.?

5.4.1 Assessment Methods

Searches of conservation databases, including the Canadian Conservation database, NatureServe (using the NatureServe Explorer tool), and the NHIC database were conducted. Interviews with local biologists were conducted to identify the occurrence of any exceptional ecosystem types within the MF.

World Wildlife Fund's Enduring Feature mapping exercise has identified a number of distinct areas on the landscape from analysis carried out on the Soil Landscapes of Canada (SLC) Database – Agriculture and Agri-Food Canada, 1996 (1:1,000,000). Data documentation for the Enduring Feature exercise can be described as combinations of topographic variation, surficial geology and soil texture. This exercise evaluates ecosystem representation with a focus on physical variability with the intent of predicting biological variability within ecosystem units.

5.4.2 Assessment Results

There are no known occurrences of serpentine soils, marble outcrops, or karst hot springs on the MF. Because of the generally level to moderate topography within the MF, there are no significant occurrences of areas with unique microclimates. Searches of various conservation databases (NatureServe, NHIC) and interviews with local biologists did not identify any documented or undocumented exceptional ecosystems within the MF.

Proposed FSC protected area candidate sites (deferrals) (see Figure 14) were selected based on (a) inclusion of conservation attributes compiled using the HCVF framework and (b) ability to fill gaps in ecological representation based on enduring features of the landscape. GreenFirst also completed an assessment of the representation of landform/vegetation associations (L/Vs) using the MNRF's GAP tool (now the responsibility of MECP). GreenFirst's GAP areas met the MNRF representation (Land Unit) for two critical land units and significantly improved representation for 3 others.

In total, nine deferrals were proposed. Three of these areas are extensions of existing Ontario Living Legacy Provincial Parks. Other cores were planned to incorporate multiple values, wildlife habitat, water values, tourism, etc. The changes to representation are shown in Table 11 below, with a bold value indicating an improved score with proposed deferrals. The rationale for assessing this attribute is to examine vulnerability, species diversity and significant ecological processes in terms of significant diverse or unique ecosystems. As per Question 4 (see Section

4.5), locally and regionally unique stands of white pine have been identified as HCV's. Regionally unique stands of Yellow Birch, Sugar Maple, Red Oak, and Red Maple have been identified as HCV attributes on the Missinaibi Forest as described in Section 4.5.

At present, all the Areas of Natural & Scientific Interest (ANSIs) in the region identified in the past by the OMNR have been included in the new OLL candidate and protected area sites and designated as HCVs.

World Wildlife Fund's Enduring Feature mapping exercise has identified a number of distinct areas on the landscape from analysis carried out on the Soil Landscapes of Canada (SLC) Database – Agriculture and Agri-Food Canada, 1996 (1:1,000,000). Data documentation for the Enduring Feature exercise can be described as combinations of topographic variation, surficial geology and soil texture. This exercise evaluates ecosystem representation with a focus on physical variability with the intent of predicting biological variability within ecosystem units. Representation codes consist of A, B, C and D. Adequately captured (A) features occur when a sufficient proportion of the enduring feature is included in existing protected areas that ecological processes and integrity are likely to be maintained. Partially captured (B) is when only minor parts of the enduring feature are included within the boundaries of existing protected areas, and natural disturbances can only be maintained at the scales of stands or patches. Moderately captured (C) features exist when a significant portion of the enduring feature is included within one or several protected areas in a manner such that disturbance-recovery cycles are maintained across a wide range of scales with the exception of landscape-scale disturbance events. Not captured (D) is when no part of the enduring feature is included within the boundaries of a protected area.

Table 11 shows the representation of enduring features on the MF identified by the WWF analysis. Figure 9 shows the location of enduring features of concern within the MF.

Table 11. Representation of enduring features across the MF (A=Adequate, B=Moderate, C=Partial, D=None).

Enduring Feature Code	Ecoregion	Total Area	Area within MF (ha)	% of Total Area on MF	Representation Pre-Deferral	Score Post Deferral
81480	3E-2	1,000,920	801	0.10%	C	**B**
81494	3E-2	159,935	56	0.00%	B	**A**
81536	3E-2	25,047	402	1.60%	C	**A**
81658	3E-5	396,814	270317	68.10%	C	**B**
81664	3E-5	93,045	394	0.40%	C	C
81674	3E-5	776,502	240,386	31.00%	C	**B**
81688	3E-5	767,957	233,819	30.40%	C	**B**
81714	3E-5	44,298	42,944	96.90%	D	**B**
81718	3E-5	121,778	17,065	14.00%	C	**B**
81728	3E-5	112,751	112,723	100.00%	C	**B**
81772	3E-5	244,040	2,654	1.10%	C	C
83160	4E-1	54,966	12,461	22.70%	D	D
83162	4E-1	384,333	7,688	2.00%	D	C

Enduring Feature Code	Ecoregion	Total Area	Area within MF (ha)	% of Total Area on MF	Representation Pre-Deferral	Score Post Deferral
83170	4E-1	40,782	21,659	53.10%	D	**B**
83184	4E-1	5,592	5,592	100.00%	D	**B**
83190	4E-3	578,042	155,415	26.90%	A	A
83198	4E-3	52,592	24,258	46.10%	B	B
83238	4E-3	22,457	1,467	6.50%	C	C
83242	4E-3	842,655	5,859	0.70%	B	B
84162	5E-13	40,632	2,742	6.70%	B	B
84164	5E-13	392,608	1,131	0.30%	B	B

Notes: High responsibility Enduring Features are highlighted in yellow.

These features have greater than 30% of their total area with the MF.

Bold text indicates improved score post-deferral.

Wetland Areas

Wetlands are lands that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface. In either case the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic plants or water tolerant plants. The four major types of wetlands are swamps, marshes, bogs and fens. Wetlands perform a number of important ecological and hydrological functions and provide an array of social and economic benefits that are valued by society.

A large number of wetland areas are found on the MF. Potential impacts to these wetlands are minimized through the implementation of the Stand and Site Guide (MNRF 2010), and the Environmental Guidelines for Access Roads and Water Crossings. Practices such as winter harvesting, and proper road and water crossing construction techniques should minimize site damage, and the disruption of water flows in these areas.

Provincially Significant Wetlands are those areas identified by the province as being the most valuable. They are determined and scored using a scientific point-based ranking system known as the Ontario Wetland Evaluation System. There are no known Provincially Significant Wetlands found within the MF.
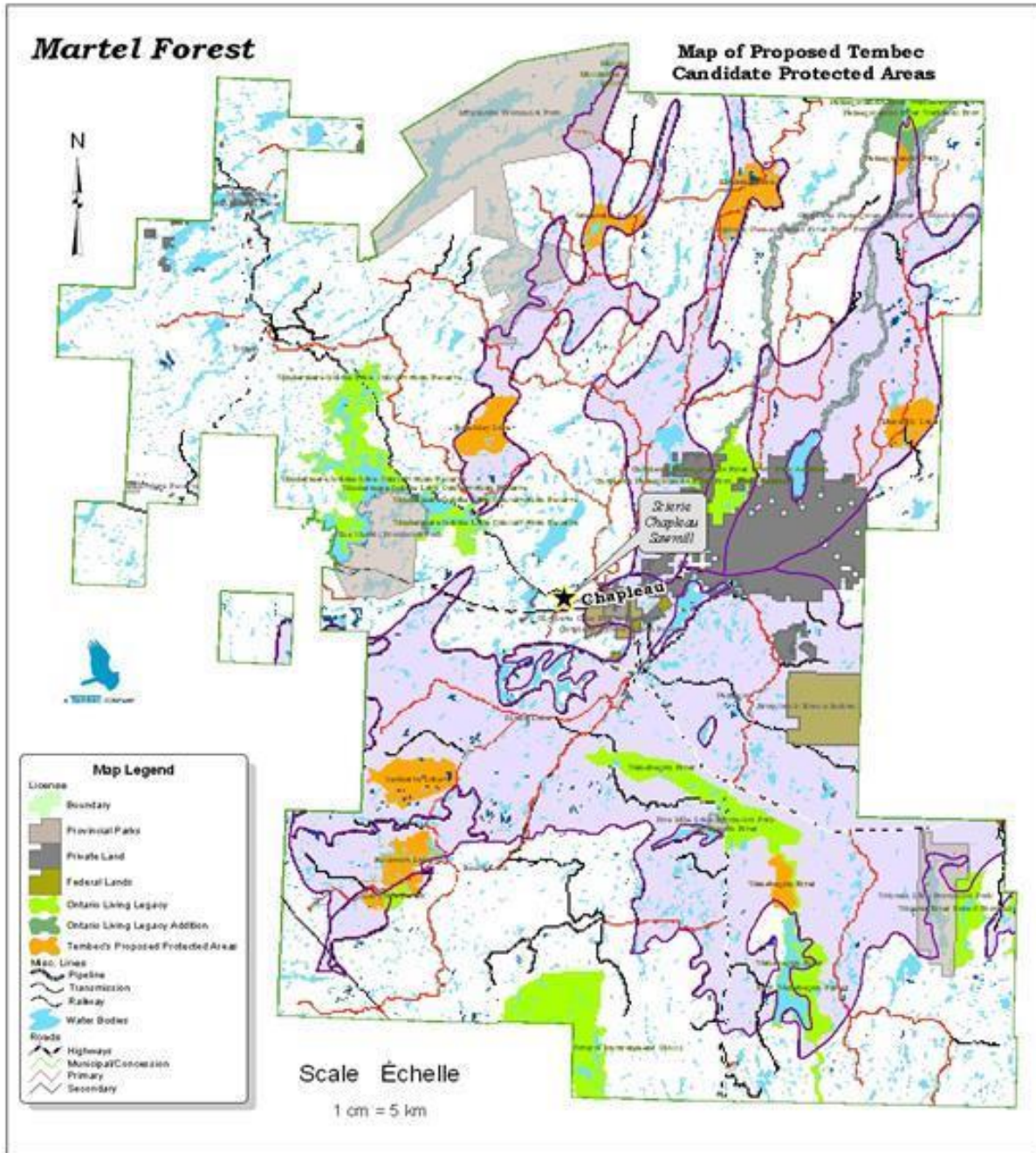
Figure 9. Enduring features of concern present on the MF.

5.4.3 HCVF Designation Decision

Evaluation of each enduring feature is based on the degree of ecological representation by protected areas. It is important to sustain key ecological processes and maintain viable populations of all native species that are the guiding principles for designing representative protected area networks. However, translating these broad conservation criteria is difficult when relating ecosystem integrity into a numeric or spatial set of standards. In order to do this, a common assessment of ecological representation based on a calculation of proportions, that is, what percentage of the spatial unit is protected is utilized.

According to the World Wildlife Fund's Enduring Feature mapping exercise, features # 81658, 81714, 81728, 83170 and 83184 have little to no representation in protected areas within the MF or regionally and are therefore designated as potential HCVs. WWF Canada and GreenFirst have developed a Gap Analysis process that addresses ecological representation, and a related deferral process for the identified Gap Sites that incorporates the Enduring Features exercise (see Figure 9). GreenFirst's commitment to the process ensures future improvements in ecosystem representation across all management units managed by GreenFirst. As Table 11 demonstrates, the representation of several land types has increased through consideration of these deferred areas on the MF. GreenFirst's Gap areas met the MNRF representation (Land Unit) for two critical land units and significantly improved representation for 3 others.

The nine Gap Areas listed in Section 5.3.2 were previously designated as HCVs. These areas have been deferred from harvesting for the duration of the 2021-2031 FMP.

The completion of an updated protected areas gap analysis for the MF may identify additional areas of interest.

6 Category 4 – Forest Areas that Provide Critical Ecosystem Services

> *HCV 4 – Critical ecosystem services. Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.*

This category of HCVF identifies forests that are critical in providing indirect ecological or environmental benefits. The following points address criteria that may be helpful in identifying the basic services of nature provided by the forest in critical situations.

6.1 Question 12- Significant source of drinking water

> *Question 12) Does the forest provide a significant source of drinking water?*

The HCV Framework provides the following definitive criterion for this question:
- Is the watershed or recharge area critical to maintaining the quality, quantity and seasonal flows of the primary drinking water source for a community or group of individuals?

A related guidance criterion is:
- Is the watershed or recharge area critical to maintaining the quality, quantity and seasonal flows of agricultural irrigation water sources, or water for other significant economic activities?

6.1.1 Assessment Methods

This attribute looks at the potential impact on human communities with respect to catastrophic impacts that may affect the basic services of nature with respect to water quality, soil/terrain stability, fire protection and wind control. Identification of an HCV for this criterion would be appropriate where the potential impact to human communities is significant and no alternative sources of drinking water are available.
Information was obtained from the relevant authorities - to determine if the wrong actions or management could cause serious cumulative or catastrophic impacts on these basic services.

Sources of information included:
- Ontario Ministry of Environment and Energy
- Ontario Public Health Agency
- Conservation Ontario
- Municipal website and drinking water system reports

For this question, watershed statistics compiled by Ontario Power Generation, the Ministry of Natural Resources & Forestry Surface Water Monitoring Centre, flow data and historical flood information compiled by Natural Resources Canada, past/current forest management plans, the Ontario Crown Land Use Atlas (OMNR 2012), anecdotal information and other local data where available.

6.1.2 Assessment Results

Residents of the Town of Chapleau rely on the Chapleau River, one of several water courses belonging to the Missinaibi River drainage basin, for their water supply. Brunswick House First Nation relies on Borden Lake for their drinking water, and a water treatment plant for the community (slow sand process) was built in 2001. Prior to the construction of the water treatment plant, water was hauled into the community from the Chapleau Cree community and the town of Chapleau. The Chapleau Cree First Nation people rely on wells that are influenced by the surface water of Fox Lake. The Chapleau Cree water treatment plant is approximately 18 years old and reaches a depth of 57 feet. Groundwater from several drilled wells provides drinking water to the surrounding communities of Dalton, Sultan, Pineal Lake, Missanabie, and the Chapleau Ojibwe First Nation Reserve. Locally, the Corporation of the Township of Dubreuilville gets its drinking water from a well system that was built in 1985. The system underwent significant upgrades to the treatment and pumphouse in 2005. The town of Dubreuville has two wells that supply drinking water. One is in regular use and one can be initiated by the operator as needed.

Source protection plans are in place to protect drinking water sources in some parts of Ontario. The MF does not fall within an area of the province under a source protection plan. Currently, there are no community boil water advisories on the MF. Wells may also provide a source of drinking water on the Forest – well records for Ontario can be seen at https://www.ontario.ca/environment-and-energy/map-well-records.

Riparian areas and wetlands provide critical services such as water filtration and river recharge for water supplies of local communities. Potential impacts on water quality due to siltation or other events are mitigated through several strategies. For example, reserves are established along steep riverbanks. The size of the reserve depends on the degree of slope thereby tailoring erosion control strategies to site specifications (Table 12).

Table 12. Slope dependent areas of concern.

Slope Gradient	Area of Concern prescription
0 - 15%	30m reserve
16 - 30%	50m reserve
31 - 45%	70m reserve
45% +	90m reserve

Potential effects of water crossings construction on water quality are mitigated using successful techniques described in the Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales (Stand and Site Guide, OMNR 2010) and the Ministry of Natural Resources and Forestry/Fisheries and Oceans Canada Protocol for the Review and Approval of Forestry Water Crossings (MNRF 2017).

Riparian areas represent transitional zones between water bodies and adjacent upland forests. Riparian areas provide critical ecological services such as the regulation of light penetration and water temperature, control of sedimentation, maintenance of ground water tables, and provision of food for aquatic fauna. During planning and operations, all other related legislation is followed and relevant guidelines are implemented, including requirements stated under the Fisheries Act. The Stand and Site Guide provides direction related to "Maintaining the Ecologicial Functions of Aquatic Ecosystems", which refers to Ministry of Environment, Conservation and Parks (MECP) guidelines related to herbicide tending buffers for significant or sensitive areas as appropriate.

Forestry activities per se are not identified as a threat to drinking water under the Ministry of Environment and Energy Table of Drinking Water Threats for Ontario, which is updated periodically. Two potential threat scenarios in the table that may be part of forestry operations include the application of pesticides and the handling and storage of fuel. Furthermore, forestry operations (if not properly implemented) could cause erosion and siltation into waterbodies, thereby affecting water quality. Recharge areas, such as wetlands and riparian areas, are distributed across the unit. MF management maintains water quality through several strategies and guidelines that have thoroughly assessed the potential impact on this basic service. Companies operating in Ontario are subject to laws and regulations to mitigate these potential threats to water quality. Mitigation strategies to address potential impacts to water quality from forestry operations include:

- Riparian reserves to protect waterbodies from siltation and erosion, and to retain cooling vegetation and structure. The size of the reserve depends on the degree of slope thereby tailoring erosion control strategies to site specifications.
- Adhering to all applicable legislation and guidelines related to water quality and the federal Fisheries Act.
- Taking special precautions to ensure that MOE Buffer Pesticide Zones are in place to protect aquatic habitat from aerial tending.
- Implementing proper fuel handling and storage procedures, with regular audits as part of Ontario Regulation 217/01 (Liquid Fuels).

- Mitigating potential effects of water crossings construction on water quality using techniques described in the Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales (OMNR 2010).

MFMI ensures continual improvement on a range of environmental quality issues through the setting of objectives and targets and implementing associated action plans on its own operations under its Environmental Management Systems. Harvest schedules are developed based on consideration of site information and current science that utilizes the most appropriate machinery to minimize impact on environmental quality.

Although the Mattagami Region Conservation Authority does not cover the Chapleau area, it is worth noting that the Mattagami Region Source Protection Committee (2014) does not regard forestry activities as a threat to drinking water sources, although specific practices, such as use, storage and handling of herbicides, and certain activities related to the maintenance of roads, such as use of road salt (MFMI FRL holders do not use road salt on access roads), are associated with mitigative policies.

The rationale for this question about drinking water suggests that for a source to be HCV, "*the potential impact to human communities is so significant as to be catastrophic, leading to significant loss of productivity, or sickness and death*". In addition to municipal drinking water sources, there is also an abundance of freshwater found in lakes and rivers on the Forest. For this reason, there is no critical source of drinking water designated as HCV on the MF.

6.1.3 HCVF Designation Decision

There are no HCVs designated for this category within the MF.

6.2 Question 13 - Mediating flooding, drought, stream flow, and water quality

Question 13) Are there forests that provide a significant ecological service in mediating flooding and/or drought, controlling stream flow regulation, and water quality?

The HCV Framework provides the following definitive criterion for this question:
- Are there high-risk areas for flooding or drought?

Related guidance criteria are:
- Are there particular forest areas that potentially affect a significant or major portion of the water flow? For example, 75% of water in a larger watershed is funneled through a specific catchment area, river channel, or other critical sub-watershed area.
- Does the forest occur within a sub-watershed that is critically important to the overall catchment basin?
- Are there particular forest areas that are critical subwatersheds that potentially affect water supplies for other services, such as reservoirs, irrigation, river recharge or hydroelectric schemes?

6.2.1 Assessment Methods

On a global scale, the MF represents a portion of the boreal forest that spans across most of Canada. This forest is considered ecologically intact and a significant contributor towards several ecological services such as watershed protection and climate stabilization. Forest areas play a critical role in maintaining water quantity and quality and the breakdown of this function could have catastrophic impacts. Hydrological maps were examined to identify the major drainage basins as well as sub-watersheds that comprise the MF.

6.2.2 Assessment Results

The MF spans across the Moose River Basin and the St. Lawrence Basin. The Moose River represents the major drainage basin while the Missinaibi and Mattagami River systems represent the sub-basins (Figure 10). North of the height of land, drainage is directed into the Hudson Bay (Arctic Ocean) while drainage to the south is directed to the Great Lakes-St. Lawrence (Atlantic Ocean).

Figure 10. Major Drainage Basins across Northeastern Ontario, Moose River Basin: Brown, Atlantic Ocean- St. Lawrence: Dark Blue.

The Moose River drainage basin covers a large area (108,500 km²) and encompasses several SFLs and operating areas including the MF. The Moose River, Abitibi River, and the St. Lawrence River basins are high order watersheds consisting of many large rivers and streams. Water is funnelled throughout the complex watershed, and flow is not restricted to a single critical course. River recharge and groundwater levels are maintained by several areas across the Moose River drainage basin. Discharge patterns have remained consistent, according to data records from Environment Canada spanning from 1920 to present day (recorded at Missinaibi River/ Mattice; Moose River basin).

The Moose and Mattagami Rivers are classified as sub-arctic waterways with nival regimes (Woo 2000). During the spring thaw, water levels rise dramatically, and the melting snow can produce localized flooding. Spillways that bypass hydroelectric dams have been implemented to accommodate spring floodwaters. Marshes and swamps also act as storage areas and control water levels. Forest management has not been identified to disrupt operations of the hydroelectric dams along the Abitibi River (Abitibi Canyon and Otter Rapids Generation Stations). The elevation is low throughout the western portions of the unit along with a high water table, both characteristic of lowland areas.

The Atlantic Basin spans across 1,800,000 km2 in eastern Canada with a discharge rate of 2,830 m3/s at the St. Lawrence River. This basin is the responsibility of 40 million residents, the federal governments of Canada and the U.S. A large number of watercourses contribute to the hydrology of the St. Lawrence basin, however the influence of the watercourses appears complex and is not completely understood. The height of land, which is oriented in an east-west direction, creates the divide between the Moose River and St. Lawrence drainage basins. Sandy soils, gravel, and certain types of rock encourage groundwater flows, while impermeable rock and clays facilitate surface runoff.

The MF FMP states that the MF falls within three major drainage systems. Southern portions of the forest drain into the Superior basin of the Great Lakes watershed. Most of the northern and eastern portions drain into the Moose River basin while the northwestern corner drains into the Albany River basin. The latter two are within the Arctic watershed. The major rivers flowing through the MF were assessed using data from LIO and were designated as permanent (not intermittent) and as having a primary flow class. There is no evidence from LIO or other hydrology sources that these major flows are significantly affected by portions of the forest.

Southern portions of the MF drain into the Great Lakes - St. Lawrence River Superior basin of the Great Lakes watershed through Lake Superior. Most of the northern and eastern portions of the MF drain into the Hudson Bay system through Albany River and Moose River watersheds. basin while the northwestern corner drains into the Albany River basin. The latter two are within the Arctic watershed. The Missinaibi River converges with the Mattagami River outside of the MF to form the head of the Moose River flowing north. Although these sub-watersheds in the MF contribute to the overall catchment basins, there have been no areas identified in the FMP or other documents that count as critical sub-watersheds. According to Environment Canada's analysis of water flows across the country, in 2015, most Canadian rivers (65%) had a normal water quantity and only 10% had a lower-than-normal quantity of water. Lower-than-normal water quantity was detected in only one drainage region: the Keewatin-South Baffin in the Hudson Bay watershed area.

On a regional scale, forest harvesting may alter several aspects of the basin hydrology. A generally proportional relationship exists between total water yield (runoff) and extent of forest

disturbance (Sahin and Hall 1996). The effect of harvest on a watershed is also influenced by the slope of the watershed and soil depth. The Missinaibi drainage basin includes one of the longest, free-flowing rivers in Ontario. The large size of the basin may facilitate peak water flow responses to relatively small areas of disturbance (e.g. cutovers) (Buttle and Metcalfe 2000). However, increases in moderate and low flows have been detected in northeastern Ontario as a result of forest harvesting activities (Buttle and Metcalfe 2000). Although there is currently no specific direction with regard to the amount of disturbance within individual watersheds, as a rule of thumb a good practice is to limit disturbances within watersheds to less than 50% of its area within a 20-year period. Analysis of planned and actual harvest activity on the MF between 2001 and 2011 revealed that less than one percent (0.46 %) of the MF second order watersheds experienced disturbances greater than 50%.

The lack of reports of chronic, large-scale erosion or large-scale damage to fish spawning areas suggest that long-term impacts of forest harvesting may be minimal. Algoma Headwaters Provincial Park is located across the southern portion of the MF. This park contains the headwaters of the Batchawana, Goulais, Mississagi, Aubinadong and Nushatongani Rivers. These headwaters provide habitat for several species, including brook trout, and also contain several stands of old growth red and white pine.

Large wetlands play a critical role in water filtration and river recharge for water supplies of local communities, therefore it is important that steps be taken to mitigate potential impacts on water quality due to siltation or other events. There are provisions in the FMP to mitigate disruption to hydrological function, including conditions on road and water crossing construction in wetlands. Furthermore, no harvest, renewal, or tending operations are permitted that will result in significant damage to wetland vegetation or disruption of hydrological function. Contamination of wetlands by foreign materials is not permitted. The use and storage of fuels is carried out in accordance with the Liquid Fuels 35 Handling Code. Wetlands are protected through area of concern prescriptions as outlined in the *Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales* and as documented in table FMP-10, FMP-19. There have been no provincially significant wetlands identified on the MF.

During operations adjacent to wetland areas, MFMI adheres to legislation and guidelines related to water quality and the federal Fisheries Act. With regard to aerial tending operations, special precautions are taken to ensure that MECP Buffer Pesticide Zones are in place to protect aquatic habitat. Potential effects of the construction of roads and water crossings on water quality are mitigated using techniques described in the Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales (OMNR 2010). Best practices related to soil conservation (OMNR 2010) are utilized during all operations (access-related, harvest, and renewal) adjacent to wetland areas.

There have been no reports of major flood activity within the boundaries of the MF, except for the year 1996, when heavy snow levels led to the Chapleau River overflowing its banks during the spring runoff, leading to minor property damage within the Town of Chapleau ("Flood Flow Statistics For The Great Lakes Watershed System", MNRF, December 2014; Environment Canada Water Office, Historical Hydrometric Data to 2019, www.wateroffice.ec.gc.ca).

In Ontario, the flood risk area is defined by the flooding hazard limit. Depending on location in the province, the flooding hazard limit is determined by the 100-year peak flow, a regional storm, or the highest observed flood. There have been no reports of major flood activity within the boundaries of the MF and no high-risk flood areas have been identified on the Magpie Forest. There are two dams on the MF; Esnagi Lake Dam and Wabatongushi Lake Dam. The

Wabatongushi Lake Dam is believed to have been put in place between 1929-1935 as a source for hydroelectric power. Neither dam currently generates power, therefore are unlikely to affect water levels and flows. Tactical flood maps were also examined for flood risk, with no identified flooding areas on the MF.

Hydrometric Monitoring Stations maintained by Environment Canada in northeastern Ontario in and around the Chapleau area are shown in Figure 11.

Map Legend

♀ Active Station   ♀ Discontinued Station

▲ Active Station (Seasonal)   ▲ Discontinued Station (Seasonal)
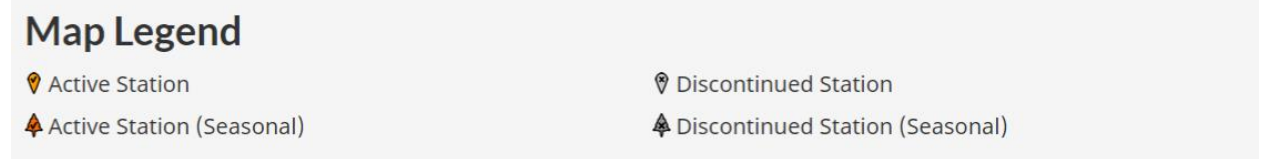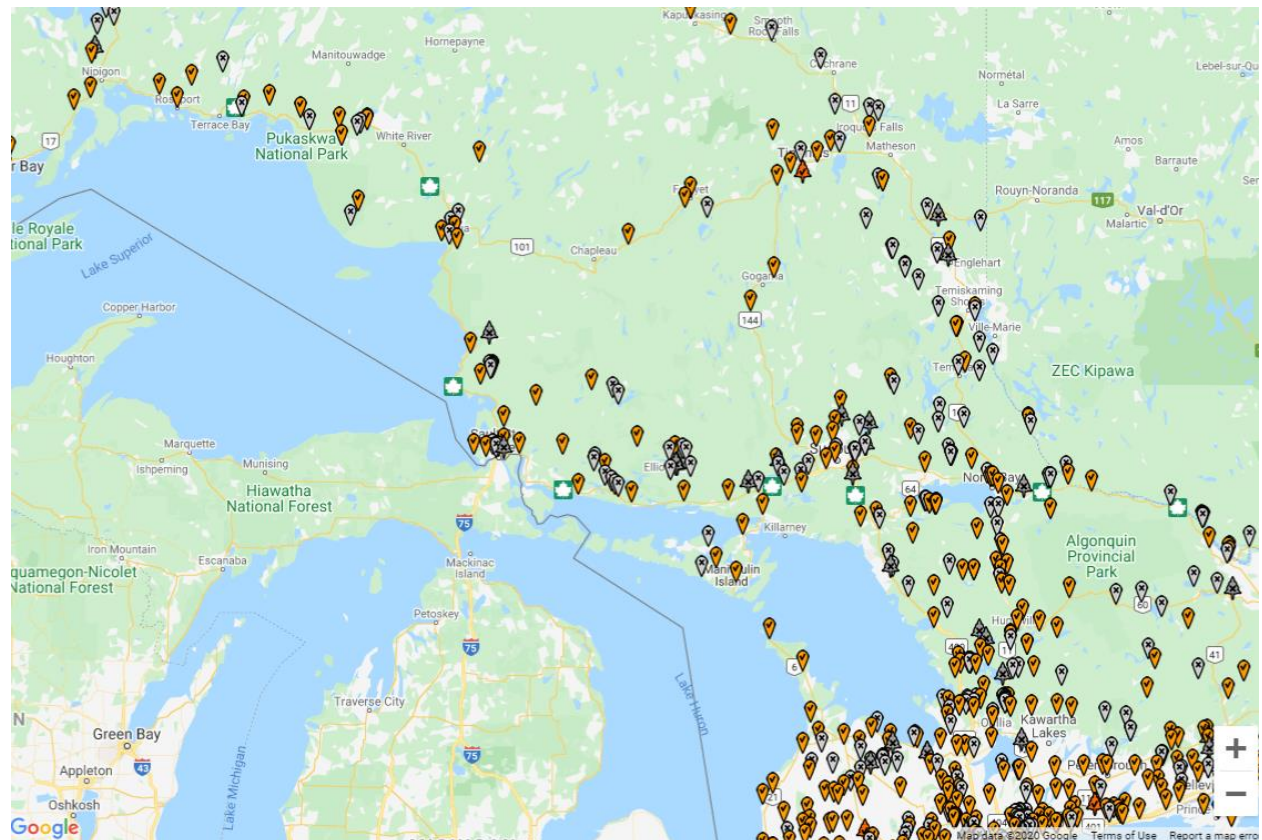
Figure 11. Map showing Hydrometric Monitoring Stations in northeastern Ontario, in and around the Chapleau area.

6.2.2 HCVF Designation Decision

The MF does not contain any high-risk flood areas. Due to the generally low or moderate terrain on the MF, and the protection measures in place to protect slopes and water features from erosion and siltation, forest management activities are not considered to be a significant factor influencing seasonal flooding in the river systems discussed above. The lack of reports of

chronic, large-scale flooding, erosion or large-scale damage to waterways within the MF supports this conclusion.

No HCVs were designated for this category.

Question 14 - Forests critical to erosion control

Question 14) Are there forests critical to erosion control?

The HCV Framework provides the following definitive criterion for this question:
- Are there forest areas where the degree of slope carries high risk of erosion, landslides and avalanches that affect human infrastructure?

A related guidance criterion is:
- Are there soil and geology site types that are particularly prone to erosion and terrain instability?
- Is the spatial extent of erosion-prone or unstable terrain such that the forest is at high risk of impact and of cumulative impacts?

6.2.3 Assessment Methods

This attribute examines the potential impact on soil, terrain or snow stability, including control of erosion, sedimentation, landslides, or avalanches. Areas with steep slopes (greater than 30%, OMNR 2010) pose a relatively high potential for the entry of eroded material into a water body if the surface organic layers are removed, which can occur during forest harvest. The OBM digital elevation model data was used to map slope gradients and evaluate the general terrain patterns within the MF. The 2021-2031 FMP provides information on guidelines and regulations related to the conservation of soil resources within the MF. Relevant operating procedures from the MFMI EMS systems and materials used to train machine operators were reviewed for insights into preventative and mitigative measures.

6.2.4 Assessment Results

The MF does not contain a surface geology prone to erosion or terrain instability. The topography across the northern portion of the MF is generally level or with moderate slopes, which limits the risk of erosion. On the southern portion of the forest, sites with sensitive soil textures such as silts and very fine sands occur more frequently. These soils may be more susceptible to erosion when on steep slope gradients, but on these sites, best management practices are designed to minimize site disturbance and in situ prescriptions are calibrated to the slope gradient. Areas of slope greater than 10% occur around rivers and associated with rocky outcrops in the southern portion of the MF (Figure 12). Alternative routes are designed to avoid crossing steep riverbanks to protect water quality and maintain soil stability. Operational forestry practices are designed to minimize damage to banks and prevent siltation and the introduction of woody debris to streams.

Excessive slopes restrict harvesting and reforestation methods in localized areas. Areas with steep slopes (greater than 30%, OMNR 2010) pose a relatively high potential for the entry of eroded material into a water body if the surface organic layers are removed, which can occur during forest harvest. MFMI's high resolution LIDAR-based digital elevation model was used to

map slope gradients and evaluate the general terrain patterns within the MF. The Stand and Site Guide (MNRF 2010) states that steep slopes should be considered inoperable due to hazards to workers and the environment; therefore, it can be assumed that no machinery will be operated on these slopes and erosion risk associated with forestry activities will be negligible.

Conditions on Regular Operations (CROs) described in the 2021-2031 FMP address the conservation of soil and shallow ground water resources during forest management activities, with a focus on site disturbance resulting from forest management operations. The intent is to reduce the probability of site disturbance occurring. Conditions on regular operations are presented under the categories of rutting and compaction, erosion, loss of productive land, and hydrological disruption. Mitigation measures include operator training, identification and avoidance of sensitive sites, control of harvest machine traffic, road and water crossing decommissioning and rehabilitation, and the proper design and construction of access roads and water crossings. Slope-dependant reserves are retained adjacent to water bodies as per the requirements of the Stand and Site Guide (OMNR 2010). Refer to the 2021-2031 FMP for further details.

Prior to forestry activities, operators are provided with maps that outline sensitive areas, such as slopes that are prone to erosion. Alternative routes are designed to avoid steep slopes and riverbanks to maintain soil stability and protect water quality. Forest operations are designed to minimize damage to banks and prevent introduction of woody debris to streams. Specifically:

> *"Harvest, renewal, and tending operations will follow appropriate operating practices to minimize rutting, compaction, and mineral soil exposure that could lead to erosion and subsequent transport and deposition of sediment in rivers and streams. Particularly, reasonable efforts will be made to ensure that extraction trails will not cross recognizable ephemeral streams, springs, seeps, and other areas of groundwater discharge when not solidly frozen. When these features are crossed, special care will be taken; temporary crossing structures that do not impede, accelerate, or divert water movement will be used when appropriate"* (OMNR 2010).

MFMI's FRL holders have operating procedures in place for the prevention of site disturbance. As part of MFMI's safety and environmental procedures sensitive sites are outlined on maps and provided to operators for cutting, skidding, road construction and site preparation. Protection forest classification in the forest inventory, including sites with steep slopes, rocky areas, and shallow or exposed soils, leads to designation as reserves and requires special management considerations.

6.2.5 HCVF Designation Decision

No HCV has been designated for this category since most of the topography and soil types within the MF are not at high risk for erosion. Where soil types and slopes exist that are potentially at risk of erosion, existing management guidelines, operational practices, and compliance monitoring are well-designed to identify sensitive areas and minimize the risk of erosion related to forestry activities on the MF.

Note that the means to protect soils from physical damage and prevent negative impacts, based on best management practices, as described above, are also relevant to FSC Indicator 6.3.1.

Best management practices that identify measures to protect water bodies, riparian zones, and water quality are also relevant to FSC Indicator 6.7.1.
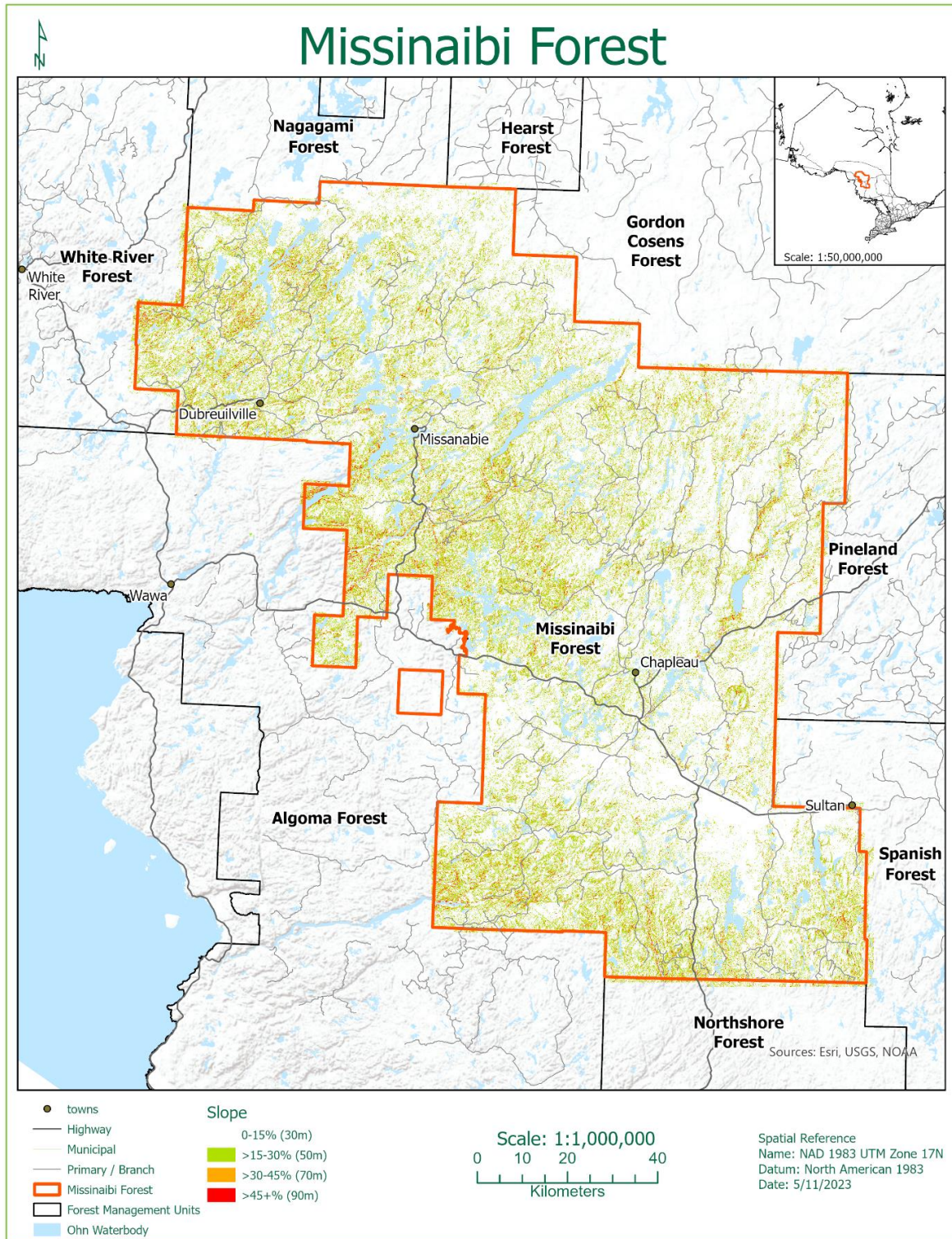
Figure 12. Map showing classes of slope gradient (percent) within the MF.

6.3 Question 15 - Forests providing a critical barrier to destructive fire

Question 15) Are there forests that provide a critical barrier to destructive fire (in areas where fire is not a common natural agent of disturbance?

Recent forest fire events in Canada have raised the level of interest in this concept. Guidance criteria provided by the HCV Framework include the following:

- Are there forest areas where there is a high risk of uncontrolled, destructive fire and in which forest areas or forest types can act as a barrier to the spread of fires?
- Do these forest areas contain or are they adjacent to human settlements or communities that would be at risk from uncontrolled, destructive forest fire?

Managers should accept HCV designations for forests adjacent to communities and manage using the precautionary principle in consideration of the safety of the inhabitants. How this is defined should be determined locally.

6.3.1 Assessment Methods

Provincial Fire Management Plans (MNRF 2019) and the 2021-2031 FMP for the MF were reviewed to assess fire risk, prevention and control strategies in relation to local communities. Relevant SOPs from MFMI's EMS systems, and materials used to train forest workers were also reviewed for insights into preventative and mitigative measures.

6.3.2 Assessment Results

Since the MF is located in the boreal forest, where fire is the most common natural agent of disturbance, local forests of all types are well adapted to periodic fires of varying intensity. Sites at higher risk of fires include older stands where tree mortality leading to higher levels of downed woody debris results in higher fuel loads. Insect infestations diseases resulting in significant amounts of tree mortality may lead to similar high-fuel conditions. Forest management reduces fire risk by maintaining the natural pattern of stand-type diversity on the landscape, by salvaging and rehabilitating insect or disease-damaged areas, and by maintaining an appropriate balance of age classes across the MF. This interspersion of stand types and age classes reduces the risk of fire since low-fuel forest types act as barriers to fire spread.

The forests adjacent to communities within the MF are typical of the unit as a whole and are not associated with higher fire risk relative to any other area in the MF. Fires in forests throughout the MF are monitored by MNRF Fire Services, and suppression measures are implemented as appropriate, with priority being given to controlling fires adjacent to local communities.

Any forest operation undertaken in Ontario must be done with careful consideration given to the prevention of forest fires. Accidental wildfire can have a large impact on annual operations or medium to longer term harvest levels. Operators must be prepared to safely take initial action to prevent fire spread, should a fire occur. The Company will ensure that it has trained fire-fighting crews and fire equipment available on its operating areas. In the event of a fire, the Company will cooperate fully in all phases of fire suppression with the Ministry of Natural

Resources and Forestry (MNRF). Under the authority of the Forest Management Planning Manual (2020) and the Crown Forest Sustainability Act (1994), conditions are placed on forest operations through the Forest Management Plan and the Annual Work Schedule that provide for forest fire prevention and preparedness.

The MF has a Fire Prevention and Preparedness plan in place for the promotion of fire prevention, reporting of fires, monitoring and compliance of the Forest Fires Prevention Act, fire suppression, and proper fire response. The plan is thorough and addresses numerous protocols, safety procedures, and guidelines for equipment and personnel to follow to avoid and stop destructive fire damaging people and property. Implementation of the precautionary principle will ensure that management of the forest ensures the safety of inhabitants.

Each of MFMI's FRL holders have in place an Emergency Response Plan (ERP) . Portable fire extinguishers are available in logging equipment, which are inspected monthly and are available for all forest workers. All workers review the ERP annually. All FRL holder operations supervisors are required to have a copy in their vehicles, and all contractor supervisors are required to have a copy accessible while in the field. During the forest fire season (April 1 to October 31) additional measures are required, including water backpack pumps and fire caches are maintained which include portable gas fire pumps and hoses. Fire training is provided to forest workers as described in the 2021-2031 FMP.

All contractors and/or licensees working on the MF will receive a copy of the ERP prior to the start of the fire season. It is also covered at each pre-operational meeting carried out during the fire season. Contractors and FRL holders will monitor the fire weather indices daily via the MNRF website. As the fire hazard increases in operating areas on the forest, fire prevention measures are intensified. The particular measures taken will depend on the type of work being performed and the conditions of the work site. The Company will maintain the status of a Trained and Capable Operator and will comply with the MNRF's Modifying Industrial Operations Protocol (MNRF 2008). Personnel involved in harvesting operations will be trained to the SP-102 standard. MFMI's FRL holders implement refresher training as needed to ensure that their staff and contractors are proficient with the material covered within the SP-102 course. Site preparation, planting and manual tending operations workers are trained by their respective contractors to a competent level of fire knowledge based on the fire equipment in their operations. Persons conducting industrial activities on the forest must also have available fire suppression equipment for suppressing wildfires that are started by the operation or are discovered in the course of daily operations.

The Wildland Fire Management Strategy (2014) provides direction for how the Ministry of Natural Resources and Forestry manages wildland fire across Ontario. The goals of the wildland fire management program are to prevent loss of human life and injury, prevent and mitigate losses alongside economic and social disruption, promote understanding of the ecological role of fire, and to use fire to benefit resource management.

In Ontario each wildland fire is assessed and receives an appropriate response based on the situation and condition of the fire. The ministry then responds as quickly as possible to fires posing an immediate threat to values, such as communities, important infrastructure (e.g. cottaging areas, tourist camps, major bridges etc.). The MNRF may also take a less active role in managing a fire when important values are not threatened, and the environment could benefit.

6.3.3 HCVF Designation Decision

No HCV has been designated for this category.

6.4 Question 16 - Critical impact on agriculture or fisheries

Question 16) Are there forest landscapes (or regional landscapes) that have a critical impact on agriculture or fisheries?

The HCV Framework provides the following guidance criteria for this question:
- Are there agricultural or fisheries production areas in the forest that are potentially severely negatively affected by changes in wind and microclimate and microhabitat, such as woody debris from riparian vegetation?
- Are there fisheries areas, spawning areas or other critical fish habitat, either commercial or tourism outfitters, dependent on the larger landscape condition?
- Are there other non-timber resources such as fur trap lines, wild rice production areas, mushroom harvest areas, berry harvest areas that are dependent on the larger landscape?

6.4.1 Assessment Methods

This attribute is directed towards mediating wind and microclimate at the scale of ecoregions, which will affect agricultural activities or fisheries. Riparian forests play a critical role in maintaining fisheries by providing bank stability, sediment control, nutrient inputs, and microhabitats.

The MNRF NRIP database, the 2021-2031 FMP for the MF, local Chapleau District Fisheries Management Plan (OMNR 1989) were examined for the assessment of this attribute. MNRF District Biologists were consulted regarding the presence of any high-value fisheries areas, and the approach to their management.

6.4.2 Assessment Results

A review of the most recent update of the eFRI for the MF indicated that there are no critical agricultural lands located within the MF.

There is presently no commercial fishing within the forest. The MF lacks areas of intensive fisheries productions, however, naturally occurring fish habitat is managed through provisions in the 2021-2031 FMP, which provides adequate fisheries protection, according to the MNRF District staff. Forest management strategies consider impacts on the ecological functions of lakes and other water bodies. Prescribed mitigative measures include prescriptions such as buffers that minimize changes in wind across bodies of water. Fish habitat is also maintained by the adherence to the requirements of the Stand and Site Guide (OMNR 2010). Spawning areas have been previously reviewed as part of Question 4 (seasonal concentrations of species).

All flowing waters are important components of fish habitat and receive consideration. Habitat suitability and productive capacity of rivers and permanent or intermittent streams with high or moderate potential sensitivity to forest management operations are maintained by prescriptions

for AOCs. Streams with low potential sensitivity to forest management operations are addressed through conditions on regular operations. Direction for maintaining habitat suitability and productive capacity of rivers, streams, and associated shoreline forest focuses on:

- Protecting beds, banks, and shorelines.
- Minimizing the risk of sedimentation.
- Mitigating the effects of harvesting on water temperature and inputs of fine organic material.
- Mitigating the effects of forest management operations on hydrological linkages between aquatic and terrestrial ecosystems.
- Providing future inputs of coarse woody material.
- Maintaining some shoreline forest as residual habitat and dispersal corridors.
- Managing some shoreline forest to create some early to mid-successional riparian habitat.

Standards, guidelines, and best management practices for rivers, streams, and associated shoreline forests are summarized in Table 4.1b of the Stand and Site Guide (OMNR 2010). These standards and guidelines identify the calculations necessary to determine appropriate water crossing specifications based on expected peak flows, slopes, etc.

Hydrological linkages (i.e., small permanent, intermittent, and ephemeral streams, springs, seeps, and other areas of groundwater discharge) also make an important contribution to the productive capacity of fish habitat. When working within shoreline AOCs during seasons when operations have the potential to adversely affect hydrological linkages, efforts are made to identify unmapped features in advance of operations. In the boreal forest, line markers are trained and instructed to: i) identify unmapped hydrological linkages encountered when marking AOC boundaries, and ii) check sites within the AOC that have a high potential for these features (based on terrain encountered in the field, aerial photographs, or hydrological models).

AOC prescriptions in the 2021-2031 FMP protect known non-timber values or were designed to accommodate the needs of other non-timber users (e.g., to protect trapper's cabins, trails and traps, and to avoid spraying blueberry sites when they are identified at the AWS stage). Mushroom harvest areas can be found anywhere across the forest and are not an important commercial activity on the MF. There are no known wild rice harvest areas on the MF.

There are a number of lakes partially or completely within the MF that are designated as remote tourism lakes in the Crown Land Use Policy Atlas. The primary purpose of the designation is to reduce the impacts of access on fish and game populations and to preserve the remote character of these lakes. None of the lakes identified are exceptional production areas that may be impacted by forestry activities. Forest managers use the FMP process to consult with tourism operators about developing appropriate protection for tourism values on the forest.

The MF FMP identifies registered trap lines located within or in part on the MF. Other non-timber values identified in the FMP include hunting and fishing, baitfish collection areas, bear management areas, and cultural heritage values.

A 2015 report by Ecotrust Canada completed prepared for the Northeast Superior Regional Chiefs' Forum described the results of a Critical Resource Inventory Mapping project for areas of potential opportunity within the Chapleau Crown Game Preserve (CCGP). About 50% of the MF landbase is covered by the CCGP, therefore these values have relevance to this project. Ecotrust identified the presence of 135 ha of suitable road-accessible suitable stands for maple

syrup production on the MF and another 135 ha of non-road accessible birch stands, based on mapping white birch stands, productivity, proximity to roads, etc. They also identified 307 ha of suitable blueberry picking areas, accessible by road, and another 97 ha of blueberry picking area with no road access. These were mapped based on habitat type, slope, time since disturbance, and accessibility. The Manitou Mountain CR has historically been utilized by the Missanabie Cree First Nation as an area in which to trap, hunt, fish, pick berries, and gather medicines. These areas are currently protected for these values. and the Manitou Mountain CR had been designated as a HCV previously.

Additionally, the Ecotrust Canada report synthesized information from a 2010 ABIR and mapping exercises completed with Northeast Superior Regional Chiefs' Forum Elders Council to show 68 areas of interest in the MF, including hunting and fishing sites, medicinal and food plant gathering sites, trapping, scared sites, trail and water routes, and burial sites. Values have been mapped as part of the ongoing forest management planning process with local communities.

We note that ongoing efforts to consult with Indigenous communities on these identified values will help determine if any the areas identified within reports developed by local First Nations should be designated HCV.

6.4.3 HCVF Designation Decision

No HCVs were identified for the MF in this category.

7 Category 5 - Meeting Fundamental Needs of Local Communities

> **HCV 5 – Community needs. Sites and resources fundamental to satisfying the necessities of local communities or Indigenous Peoples (for livelihood, health, nutrition, water, etc.), identified through engagement with these communities or Indigenous Peoples.**

7.1 Question 17 - Local communities making use of the forest for basic needs/livelihoods

> *Question 17) Are there local communities (includes people living inside the forest area and those living adjacent to it as well as any group that regularly visits the forest) making use of the forest for basic needs/livelihoods? (e.g. food, medicine, fodder, fuel, building and craft materials, water, income).*

Having established that the community uses the forest to fulfill some needs it is now necessary to assess whether it is fundamental to meeting any basic needs. This question applies to all livelihoods, not just subsistence. The way that this assessment can be done is variable, depending on the socio-economic context and the need. However, it will always involve engagement with the community itself. Engagement can be conducted by people other than the forest managers directly. Engagement should use locally appropriate language, and not FSC technical terminology, such as HCV, threshold, etc.).

The HCV Framework provides the following guidance criterion for this question:
- Is this the sole source of the value(s) for the local communities?
- Is there a significant impact to the local communities* because of a reduced supply of these values?

If community members make use of the forest for basic needs or livelihoods, such as food, medicine, fodder, fuel, building, craft materials, and income, it should be assumed that this is an important value and a possible HCV.

7.1.1 Assessment Methods

This attribute examines the level of dependence of local communities on the forest to meet basic needs. Basic needs include subsistence (food, shelter), health (recreational activities, herbal remedies), cultural (pre- and post-settlement sites, travel routes, gathering areas), ecological, economic (remote based tourism, forest industry, mining) and religious/spiritual (native burial grounds, religious sites).

Information about the use and value of the forest by of local communities is generally gathered through MNRF LIO/NRIP data sets, MFMI values information, local socio-economic studies and consultation with First Nations, Metis, and local residents. Information regarding these values and needs is gathered on a continual basis during and after the development of forest management plans to ensure that the basic needs of local communities are maintained. The current FMP for the Missinaibi Forest is for the 2021-2031 period; information in this section was updated from the 2021-2031 FMP.

On September 2023, a virtual presentation was made to the Wawa-Chapleau Local Citizens' Committee (LCC). The presentation summarized the methods, sources of information, and results of the HCV assessment for the Missinaibi Assessment, including how the HCV assessments for the former Martel and Magpie Forests were reconciled for the combined forest. The presentation described how the different types of HCVs are defined and asked LCC members for assistance in identifying potential new HCVs.

Present at the LCC meeting were Dany Vallieres, Claude Samson, Chris Lachance, Rick Dickson, David Jennings, Beverly Nantel (mayor of Dubreuilville), and Pat Dubreuil (LCC members); Kirk Ellis, Dan Szekely, Tim Mutter, Jeff Hamill, Waurner Adema, Tarryn Adams, and Danielle Doucette (MNRF); Don Bazeley, Larissa Hout, and Krista Mayrand (GreenFirst), and Rob Arnup (Rob Arnup Consulting, consultant to Green First).

Wahkohtowin Development GP Inc. has been contracted by GreenFirst to assist in Indigenous engagement for the draft Missinaibi Forest High Conservation Value (HCV) report. The primary contact for the work is Isabelle Allen, R.P.F. The following is a summary of HCV engagement efforts to date, as well as projected work for the remainder of 2023.

On August 1st, 2023, during a regularly scheduled bi-weekly meeting between Wahkohtowin and the Lands and Resources staff of three of its owner communities (Brunswick House First Nation, Chapleau Cree First Nation and Missanabie Cree First Nation), GreenFirst and Rob Arnup presented the draft HCV Assessment Report for the Missinaibi Forest. Representatives from Michipicoten were also invited to this meeting but were unable to attend. Immediately after the meeting the draft HCV report was distributed to all 4 communities for review and comment. In September 2023, Wahkohtowin staff began work on a review of existing values information from the communities. Maps showing existing conservation measures were generated to be used in community engagement. A preliminary meeting was held with the Lands and Resources departments as well as external partners (David Suzuki Foundation, EcoTrust, and Nature Conservancy of Canada) in Chapleau on September 26th – 28th to discuss the best ways to amalgamate data and engage with communities. In October 2023, dates for in-community engagements were scheduled, and work preparing resources for engagements and working with the Lands and Resources departments to reach out to community members for participation continued.

Full-day community engagement events with specific focus on the HCV report are scheduled to occur during November and December 2023 for the Missanabie Cree and Brunswick House First Nations. Portions of the sessions will be recorded and sent out to community members who were unable to attend for further feedback. Similar events are planned for the Chapleau Cree and Michipicoten First Nations. A report with relevant findings is expected to be written by Wahkohtowin and delivered to GreenFirst early in 2024.

7.1.2 Assessment Results

This attribute examines the level of dependence of local communities on the forest to meet basic needs. Basic needs include subsistence (food, shelter), health (recreational activities, herbal remedies), cultural (pre- and post-settlement sites, travel routes, gathering areas), ecological, economic (remote based tourism, forest industry, mining) and religious/spiritual (native burial grounds, religious sites).

A First Nation or Metis Background Information Report, prepared by a community, includes information pertaining to a community's:
   a) use of natural resources on the management unit, particularly with respect to hunting, fishing, trapping, harvesting of wood for domestic purposes, and gathering;
   b) forest management-related concerns;
   c) involvement in the preparation of the report,
   d) a community values map; and may also include
   e) other information the community wishes to share with MNRF and the planning team regarding forestry.

Background information reports are generally considered to be 'living documents' that can be periodically updated by each community as they gather new information to include in the report. Eleven First Nation and five Metis communities were invited to prepare or update a background information report for the 2021-2031 FMP for the Missinaibi Forest. In response, five First Nation and four Metis communities elected to develop or update existing background information reports for their communities. The following is a listing of these communities:

Name of Community	Year of Background Information Report
Brunswick House First Nation	2018
Chapleau Ojibwe First Nation	2018
Michipicoten First Nation	2018
Mississauga First Nation	2019
Pic Mobert First Nation (Netmizaaggamig Nishnaabeg)	2017
Metis Nation of Ontario – Region 2	2020
Metis Nation of Ontario – Region 3	2019
Metis Nation of Ontario – Region 4	2019
Red Sky Metis Independent Nation	2020

Two communities did not provide updated background information reports. To help inform themselves of the community forestry interests and concerns, the planning team referred to the most recent background information report that was submitted by these communities for the 2016 Phase 2 Martel Forest Management Plan. These two communities are:

Name of Community	Year of Background Information Report
Chapleau Cree First Nation	2015
Missanabie Cree First Nation	2015

The following communities elected to not provide background information reports to the MNRF or the planning team:
   • Batchewana First Nation
   • Biigtigong Nishnaabeg
   • Garden River First Nation
   • Thessalon First Nation
   • Bar River Metis.

It must be noted that part way through development of this forest management plan, Biigtigong Nishnaabeg indicated that they no longer felt they needed to be consulted on the development of the Missinaibi forest management plan.

None of the above communities have indicated to MNRF that they are comfortable having their reports included in the public version of the 2021-2031 Missinaibi Forest Management Plan. As

a result, the above-mentioned background information reports will be held at the Chapleau District Office and do not accompany the public version of the forest management plan supplementary documentation.

Traplines

There are 71 trapline areas that are located largely within the Missinaibi Forest. In addition, there are 38 trapline areas which overlap minimally into the Missinaibi Forest. These trapline areas are managed by local trappers licensed to harvest furbearers, generally for commercial purposes.   Each trapline may have one registered head ('01') trapper but may also have several helper ('02', '03') trappers to assist the head trapper. The species commonly trapped in the Missinaibi region include beaver, marten, mink, otter, fisher, lynx, muskrat, raccoon, red squirrel, coloured fox, weasel, coyote, skunk, timber wolf, and grey fox.

Recreation/Small Commercial Operations

The MF is used for trapping, commercial baitfish harvest, berry picking, tourism operations that offer hunting and fishing, and recreation such as skiing, canoeing, cottaging, camping, snowmobiling, hunting, and fishing. Outdoor activities contribute significantly to the quality of life in Northern Ontario, and forest operations are designed to ensure that these uses continue.

There are 51 registered Bait Harvest Areas located in the Missinaibi Forest. There are some vacancies in the Bait Harvest Areas, but the areas within an economical commuting distance from a community are filled. In July 2018, a survey was sent out to all registered baitfish harvesters and dealers within the Missinaibi Forest. Only two operators responded to the survey. The respondents indicated that they employ 2 to 5 seasonal employees and harvest an average of 350 dozen baitfish annually.

There are over 24 registered tourist operators within the Missinaibi Forest and 20 tourist operators within the Magpie Forest. Activities offered by the tourist operators in the area include hunting, angling, hiking, snowmobiling, snowshoeing, canoeing/kayaking, and wildlife viewing. A variety of tourist accommodation type is available, including tents, trailers, cabins and lodges with varying decrees of amenities. The tourism facilities also range from road based, to semi-remote to remote fly-in only locations. Most of these tourist operators operate in the spring, summer, and fall seasons. In general, the majority of clients accessing the various tourist lodge/camp facilities are from outside northern Ontario.

A common tourism related issue revolves around the impact of new forest access roads on the lakes used for remote tourism as well as the aesthetic impact of harvest allocation on their clients. MFMI is committed to maintaining the viability of the tourism industry by protecting tourism values in the forest management planning process through the application of the Timber Management Guidelines for the Protection of Tourism Values and the use of Resource Stewardship Agreements, (RSAs), as one method of protecting and sustaining these values. The terms of any RSA do not bind or limit the Minister's right to make land use decisions for Crown land in Ontario. Although no RSAs were developed for the 2021-2031 FMP, discussions are ongoing. MFMI has proactively contacted tourism operators whenever proposed harvest allocations have occurred near their operations and has worked with the individual operators to develop appropriate management prescriptions relative to their situation.

Ontario Ministry of Natural Resources' LIO/NRIP datasets and MFMI values information are the initial sources of information regarding other uses and users of the forest. These values

databases are examined during forest management planning and prescriptions, where required, are developed to maintain or protect these values.

Outdoor activity-based tourism makes a significant contribution to the local economy and representatives are consulted throughout the planning process. Prescriptions and road use strategies are developed to alleviate any conflicts between forestry and the tourism industry.

Forest Industry

A socioeconomic profile, describing the social and economic context within which forest management decisions are made, provides a comprehensive understanding of the effects of operations on surrounding communities. The socioeconomic profile will focus on the overall resource dependency of these communities as well as their dependency on the forest resources of the management unit, employment, and more general demographic characteristics. Several communities are directly affected by the wood flow from the Missinaibi Forest. Table 13 details the flow of harvested timber from the Missinaibi Forest (Source: 2021-2031 FMP). It identifies the major mills receiving timber, how much they are receiving, and the location of the mill (the community). The information on roundwood volume and destinations was obtained from the Provincial Timber Scaling and Billings System data. The chip exchange volume is not available since TSBS does not track chip volumes.

Table 13. Harvested volume by receiving mill from the Missinaibi Forest between 2010 and 2017.

Receiving Mill	Total Volume of Wood Harvested (m3)							
	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	Total
AV Terrace Bay Inc.	95.39	0	0	0	0	0	0	95.39
Rayonier Advanced Materials (*Tembec*) (Chapleau)	221,341	370,905	335,690	426,806	410,207	406,455	472,699	2,644,103
Devon Mills Ltd.	0	43	0	0	0	0	0	43
Niska North Inc.	4,561	0	0	0	0	0	0	4,561
Rayonier Advanced Materials (*Tembec*) (Cochrane)	0	3,485	0	0	0	0	346	3,831
EACOM Timber Corporation (Ostrom)	0	0	2,807	0	0	0	0	2,807
Levesque Plywood Limited	6,894	10,459	16,226	9,669	9,064	7,096	8,313	67,721
Rayonier Advanced Materials (*Tembec*) (Kapuskasing)	3,087	2,470	0	0	0	0	0	5,557

Receiving Mill	Total Volume of Wood Harvested (m3)							
	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	Total
Georgia Pacific North Woods L.P.	20,500	4,253	22,422	17,928	0	0	875	65,978
Midway Lumber Mills Limited	0	463	234	766	233	0	0	1,696
Domtar Inc.	25,923	7,812	1,378	12,087	3,446	649	0	51,295
Columbia Forest Products Ltd.	205	0	0	0	0	63	295	563
St. Mary's Paper	1,433	0	0	0	0	0	0	1,433
High Falls Lumber Co. Ltd.	0	49	0	0	0	0	0	49
RTK WP Canada, ULC	0	0	0	1,646	113,873	116,345	76,107	307,971
Tembec (Huntsville)	1.64	0	0	0	0	0	0	1.64

Mining and Exploration Activity

Historically, there has been some localized mineral exploration and mining activities within the Missinaibi Forest. The Renabie Mine, located west of Missinaibi Lake in Leeson Township produced over 1 million ounces of gold from 1947 to 1991. Near Dubreuilville, in the western part of the Michipicoten greenstone belt, Alamos Gold is currently producing gold at the Island Gold Mine at a rate of about 40,000 ounces per year. Since start up in 2007, the mine has yielded over 75,000 ounces of gold. The mine has a workforce of 159 people. Total historic production of gold from the Wawa area is about 2.5 million ounces from 22 mines.

Borden Gold mine is located approximately 11 km northeast of Chapleau, Ontario in Cochrane Township. The mine operates year-round on a continuous (24-hour) basis, at a rate of up to approximately 3,500 tons ore and mine rock per day when averaged over the year. Ore will be temporarily stockpiled on surface prior to transporting to an existing offsite processing facility in Timmins. Mine rock will be stored on surface and eventually returned underground as backfill as required to sequentially support the underground working as ore is extracted.

The Borden Gold Mine is situated primarily on private lands held as patent mining claims. The unpatented mining claims surrounding the site remain provincial Crown land. The area immediately surrounding the active portions of the Borden Gold site, is predominantly forested and undeveloped.

In July 2018, a survey had been sent out to mining claim holders that are operating within the Missinaibi Forest. None of the claim holders responded to the survey.

Aggregates

There are several aggregate permit holders within the Missinaibi Forest. While no revenue or employment information was provided regarding aggregate permits, many aggregate permit holders directly benefit from roads which are built for forestry operations and provide access. There are 10 active aggregate permits held by private individuals within the Missinaibi Forest.

<u>Hydro</u>

The Wakami River Hydroelectric Generating Station (Mini Hydel) is located on the Wakami River approximately 1 km northeast of the community of Sultan, Ontario. The Mini Hydel is a run of river facility, adjacent to the Wakami River Dam and downstream of the Wakami Lake Provincial Park Dam. The Wakami River drains a number of small, medium and large sized lakes and wetland areas.

Brookfield Power, Wawa Hydro Operations, manages two remote storage dam sites at the south extremities of Esnagi and Wabatongushi Lakes. A third, extending into an adjacent SFL, is at the south extremity of Dog Lake. The operation, inspection, and maintenance of these sites are completed by the maintenance staff at Wawa Hydro Operations. Access to these sites is primarily achieved through the periodic hiring of local aviation services.

7.1.3 HCVF Designation Decision

The district and management unit demographic profiles clearly demonstrate the importance of forestry activities to the overall economic and social well-being of local communities. A sustainable forest management approach should maintain these economic activities that rely on local forests. Because the sustainable forest management approach is covered by Principle 6 of the FSC standard, the area of the forests as a whole is not considered as an HCV.

Identified recreation or small commercial operation values are documented in the FMP for the MF and are protected by using Area of Concern (AOC) prescriptions such as canoe routes, trapper's cabins and remote tourism lakes. For this reason, they are not considered to be HCV. These values are also gathered on a continual basis (during and after the development of forest management plans).

This report identifies that continued consultation with native communities is required to determine their dependency on the forests in meeting basic needs, as well as the potential for forest management to negatively impact this relationship. Prior to the development of management and monitoring strategies for HCVs, the values first need to be identified through the forest management planning process as well as through partnerships with First Nation and Metis organizations. First Nation and Metis values not only include cultural values such as traditional medicine areas but also economic opportunities such as ecotourism, harvesting and sawmill operations, and non- timber forest products.

As the relationship between First Nations, Metis and MFMI develops, values will be articulated at which point the critical threshold for HCV designation can be determined. MFMI will work with respective First Nation communities and Metis organizations to identify and develop management strategies for each HCV and will ensure that these values are given appropriate consideration during forest management planning.

There has been no HCV designated at this time. Further discussion with local First Nations and local stakeholders (e.g., through the Local Citizens Committee) about the identification of HCV values is ongoing and may lead to the identification of values requiring further assessment.

8   Category 6 - Forest Areas of Critical Importance for the Traditional Cultures of Local Communities or Indigenous

Peoples

HCV 6 – Cultural values. Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or Indigenous Peoples, identified through engagement with these local communities or Indigenous Peoples).

8.1 Question 18- Traditional cultural identity of the local community

Question 18) Is the traditional cultural identity of the local community particularly tied to a specific forest area?

Assessors will be presented with a wide range of HCVs as culturally significant. The practice in Canada is acceptance of this range of values as HCVs. Some forest inhabitants consider the entire forest to be of significant value, while others have a small area with a local well-known value. There are several examples of values that may not meet the threshold (or significance level) for FSC definition but which functionally must use precautionary management.

The HCV Framework provides the following guidance criterion for this question:
Do the communities consider the forest to be culturally significant? Possible indications for cultural importance include:
- Names for landscape features;
- Stories about the forest;
- Sacred or religious sites;
- Historical associations; and,
- Amenity or aesthetic value.

8.1.1 Assessment Methods

In the context of the FSC National Forest Stewardship Standard for Canada, local communities are:
> *"Communities that are in or adjacent to the Management Unit, and also those that are close enough to have a significant impact on the economy or the environmental values of the Management Unit or to have their economies, collective rights or environments values significantly affected by the forest management activities on the Management Unit".*

Consultation with local communities, including First Nations and Metis whose lands are contained within or overlap the management unit, as well as meetings with knowledgeable people provided valuable information. Information regarding these values is continually sought and documented to ensure the identification of traditional forest areas.

The Forest Management Guide for Cultural Heritage Values (OMNR 2007) outlines the methodology to be followed to identify and protect cultural heritage values in the forest management planning process. Included in the process to identify values is the requirement to identify archaeological potential areas (APA's) using the MNRF's Heritage Assessment Tool (HAT) for a given forest management unit. The HAT model assembles relevant environmental and cultural data necessary to translate the model inputs into planning maps

showing APA's. As per the requirements of the cultural heritage guide, a variable width area of concern (AOC) is mapped for all APA's in the FMP. In addition, the FMP includes an AOC prescription for APA's which ensures that APA's receive minimal soil disturbance thereby protecting any historical aboriginal values or artifacts. This process was followed during the development of MFMI's current forest management plan for the MF.

Cultural heritage values (native and non-native) can be organized into five categories including cultural heritage landscapes, archaeological sites, archaeological potential areas, historic aboriginal values and cemeteries. The focus is on cultural heritage resources associated with human activities, endeavours, or historic events (subsequent to contact with Europeans in the area) or pre-historic periods in Ontario. The cultural heritage values provided through the MNRF are considered sensitive data. Where these values exist on the forest, a site specific AOC is developed by the planning team that provides for protection of values, however, due to their sensitive nature, no unique identifiers exist on operations maps that would draw attention to the values being protected.

During the development of forest management plans, First Nations cultural heritage values are protected and maintained through consultation with interested communities that MFMI knows have traditionally used the forest (e.g. values overlay exercise completed with Mushkegowuk communities in 2015). Mapping exercises have tended to examine and consider broad traditional homeland areas and areas associated with Treaty Land Entitlement (TLE) negotiations with the Crown. More dialogue is needed with local community members to continue to identify more site-specific culturally significant areas or components within the MF.

Background information in this section was condensed from the 2021-2031 FMP for the MF. Meetings with local Indigenous Communities have not yet taken place but will be scheduled as soon as possible, depending on the public health situation. On April 13, 2021, a (virtual) presentation was made to the Local Citizen's Committee for the Martel Forest. The presentation described the HCV assessment process, summarized the results of this HCV assessment, and requested assistance from LCC members with identifying additional values for consideration as HCVs. Consultations with local communities about this question are ongoing.

8.1.2 Assessment Results

First Nations in Northeastern Ontario are Ojibwe (generally located in the mixed forest along the north shore of the Great Lakes, Cree (generally located in the spruce forests of the Hudson Bay lowlands) and Oji-Cree (generally located on the height of land between the Cree and Ojibwe who were brought together mainly as a result of the fur trade).

Ancestors of members of the northeast Ontario First Nations played an important role in fur trading. Aboriginal people trapped beaver, marten, muskrat, and otter and brought these furs to trading posts maintained by the Hudson Bay Company and the Northwest Company. In addition, Aboriginal peoples acted as a 'home-guard' for the trading posts and provided services to the companies such as canoe building, game hunting, fishing, crop tending, cattle herding, as well as acting as voyagers and guides.

There have been a variety of concerns that have been compiled and identified throughout the forest management planning process and through the documentation as described within the Aboriginal Background Information Reports (ABIRs) which are referenced within section 2.3 of

the Missinaibi 2021-2031 FMP. The communities have requested that the ABIRs are not included in the public version of the FMP. Copies of the reports are held by the Chapleau District MNRF. Forest management related issues/concerns are described within section 2.3.1.3 of the 2021-31 FMP.

Cultural Heritage Values

The Forest Management Guide for Cultural Heritage Values (OMNR 2007) outlines the methodology to be followed to identify and protect cultural heritage values in the forest management planning process. Included in the process to identify values is the requirement to identify archaeological potential areas (APA's) using the MNRF's Heritage Assessment Tool (HAT) for a given forest management unit (or parts thereof). The HAT model assembles relevant environmental and cultural data necessary to translate the model inputs into planning maps showing APA's. This process was followed during the development of MFMI's current 2021-2031 FMP.

Cultural heritage values (native and non-native) can be organized into five categories including cultural heritage landscapes, archaeological sites, archaeological potential areas, historic aboriginal values and cemeteries. The focus is on cultural heritage resources associated with human activities, endeavours, or historic events (subsequent to contact with Europeans in the area) or pre-historic periods in Ontario. Cultural heritage resources may be positively or negatively affected through the identification of values and the implementation of forest management operations. Beneficial effects of implementing the Forest Management Guide for Cultural Heritage Values include increasing the knowledge/data base of heritage resources and protection of known resources. Negative effects can include destruction or degradation of heritage values by activities that disturb surface soil layers and/or provision of unintended access to the values. The most recent version of the Archaeological Potential Areas map is included in the 2021-2031 FMP for the Missinaibi Management Unit, in Section 6.1.13 of the Supplementary Documentation.

Cultural heritage values are documented in MNRF's LIO/NRIP databases. Although specifics of these values are not generally publicly available due to confidentially concerns, this data provides the basis for the location, protection and management of these values during forest operations.

Chapleau Crown Game Preserve

The MF includes a large portion of the 722,200-hectare Chapleau Crown Game Preserve (CCGP). More than half of the total area of the CCGP falls within the MF. Other parts of the CCGP overlap into the adjacent Gordon Cosens Forest, Hearst and the Nagagami Forests. The CCGP was originally designated as an HCV as part of Domtar's HCVF assessment for the Pineland-Martel Forest (Clark and Szuba 2004). The CCGP is the largest game preserve in the northern hemisphere (7,222 sq km). The following paragraph provides a summary (taken from Clark and Szuba 2004) of the importance of the CCGP:

> *"All species native to this area are expected to occur on the preserve. Forest management occurs to the same extent and follows the same rules and regulations in the CCGP as outside of it. However, fur trapping and hunting are not permitted within CCGP. It contains a high density of black bears, and an average to low density of moose. Because hunting and trapping do not occur there, this enhances the long-term viability of fur- bearers and game. It also represents a control area for research on*

the impacts of forestry on the environment. The abundance of wildlife also facilitates recreational wildlife viewing opportunities. One challenge posed to forestry by this unique environment is the abundance of beavers creating difficulties with stream crossings, access roads, and water quality. The CCGP therefore harbours significant socio-economic, aesthetic, and research value."

It should be noted that since the Clark and Szuba report was written, hunting by members of First Nations has been permitted within the CCGP, and as a result, its value as a control area for research on the impacts of forestry on large mammal populations may have been reduced. Nonetheless, MFMI believes that the uniqueness and the range of opportunities provided by the CCGP warrants HCV designation.

8.1.3 HCVF Designation Decision

Due to its uniqueness and the range of opportunities that it provides, the Chapleau Crown Game Preserve is designated as an HCV.

Known cultural heritage values are well-mapped and documented, and AOC prescriptions within the 2021-2031 FMP provide adequate protection for these values. For these reasons these values are not designated as HCVs. However, this report identifies that continued consultation with native communities is required to identify cultural and spiritual sites that may qualify as high conservation values. In all cases it is important to maintain confidentiality to protect the integrity of these values. Additional traditional land use areas and management strategies may emerge as part of this on-going consultation effort.

MFMI is hopeful that through consultation with local community members, important traditional areas will be identified and protected on the MF. MFMI recognizes that additional HCVs may exist on the MF and will support First Nation land use planning initiatives that will provide the necessary information to protect such values.

Traditional activities such as hunting, fishing, and trapping are critical to the cultural identity of local First Nations and Metis people, however, these activities are not tied to a specific forest area. As land use plans emerge, concentrated areas supportive of traditional land use activities may be identified and described.

MFMI is committed to continue to work with interested First Nations and Metis to identify values that may be designated as HCVs.

8.2 Question 19 - Significant overlap of values

Question 19) Is there a significant overlap of values (ecological and/or cultural) that individually did not meet HCV thresholds, but collectively constitute HCVs?

The HCV Framework provides the following definitive criterion for this question:
- Are there several overlapping conservation values?
- Do the overlapping values represent multiple themes, as species distribution, significant habitat, concentration area, relatively unfragmented landscape, for example?
- Are the overlapping values within, adjacent to, or near an identified HCV or existing designated conservation lands or secondary conservation lands?

- Are the overlapping values adjacent or near an existing protected area?
- Do the overlapping values provide an option to meet protected areas representation requirements, that is, can one overlap an under-represented landscape as assessed using a protected areas gap analysis?

Application note: When there are two or more events or values that may not meet an HCV threshold individually, managers should use their discretion in assessing the combined value as HCV.

8.2.1 Assessment Methods

Consideration of spatially overlapping values is important in optimizing conservation management. Individual values that did not meet the threshold for critical and/or outstanding may collectively meet the threshold when considered together.

The High Conservation Value (HCV) Framework (FSC National Forest Stewardship Standard of Canada, Annex D) suggests that "Neighbour analysis can be used to summarize point values (e.g. species occurrences, feeding areas, mineral licks, spawning areas) within a spatial window of a size that is relevant for the ecosystem type and values under consideration." However, point values associated with the MNRF Natural Resource Values Information System (NRIP) database, including values such as mineral licks and spawning areas, are not suitable for neighbour analysis. Many of these values are not maintained within the NRIP database in a systematic fashion which would ensure an even sampling of the entire forest. Therefore, use of NRIP data to conduct a hotspot or concentration assessment would be inaccurate. Discussions with WWF-Canada have led to the agreement that NRIP information is not suitable for neighbour analysis. Despite this limitation, values attributes were mapped to facilitate the visual identification of any concentration areas of values across the MF. The HCV Checklist indicates that "overlays of multiple values … [can be conducted] … to assess spatial coincidence".

In the MF, all items that were considered as HCV's were included in the overlay exercise and visual analysis, provided that the items were mapped. In some cases, items considered as HCV's, such as wildlife species or their habitats, had no recorded occurrences on the MF and could therefore not be included. Items mapped included ecological values such as moose aquatic feeding areas, fish spawning areas, nests and their associated absolute buffers, SAR species occurrences and protective buffers associated with these, occurrences of edge-of-range species, Provincial Parks and Conservation Reserves, Forest Areas associated with Gap Analysis, and Intact Forest Landscapes. These items were mapped by MFMI for the purpose of addressing Question 19 in the form of a map overlay for visual analysis.

8.2.2 Assessment Results

Figure 13 is a map showing the geographic distribution of the HCVs, potential HCVs, ecological and conservation values. Note that a larger version of this map can be made available for viewing in GreenFirst's offices. Visual assessment of this map does not identify any notable areas containing an unusually high concentration of diverse values within the MF. Further, the distribution of these values within the existing protected area network is similar to that on the

managed landscape, suggesting that the protected areas contain a good representation of these values for the MF.

While HCVs have been individually identified in this report, there remain outstanding requirements to complete consultation about the HCV process with local communities. These consultations may provide more information to identify any additional values that are important to local communities, and to assess whether additional management strategies are required to protect any identified areas of significance where values are concentrated.

8.2.3 HCVF Designation Decision

The mapped values are spread relatively evenly throughout the MF, and do not appear to be overlapped with each other in any consistent pattern. High concentrations of values were not identified on the MF through this process.

No HCVs were identified for the MF in this category.

Figure 13. Map created to assess potential overlap of ecological and conservation values for the MF (updated to November 2020).

9 Management and Monitoring

9.1 Process for Monitoring

The monitoring processes for designated HCV attributes are described below. The information provided covers only who is responsible and basic information regarding the monitoring process. It is beyond the scope of this report to review all the monitoring procedures in detail. Refer to the 2021-2031 FMP for the MF for further information.

MFM's monitoring approach for potential HCV's is to assess potential values in the High Conservation Value reports for each FSC certified forest license and review their status during the annual updating of each report. For any potential values that become newly classified as HCV's, a management strategy will be developed by MFMI and described in future versions of these reports.

Provincial-Level Monitoring

At the provincial level, there are a number of MNRF processes that contribute to the high-level monitoring of HCVs. For all the wildlife values identified, MNRF has the principal responsibility for the monitoring of wildlife populations and species at risk and has several monitoring programs and numerous research studies in place for both these areas of study. Because the MNRF is responsible to set the guidelines and give directives to the forest industry, they must ensure that the guidelines developed are efficient. In order to do this, the MNRF reviews the guidelines every ten years, reviews the science, and monitors population trends. If the guidelines were not efficient or too restrictive, a modification will be applied following MNRF recommendations. Effectiveness monitoring thus occurs through MNRF's Wildlife Assessment Program and the regular review of Forest Management Guidelines.

For more information about the Provincial Wildlife Population Monitoring Program, contact any of the following sources.
- Director, Science and Information Branch, 70 Foster Drive, Sault Ste. Marie, Ontario, P6A 6V5
- Manager, Inventory, Monitoring, and Assessment Section, 300 Water Street, Peterborough, Ontario, K9J 8M5
- Co-ordinator, Ontario Terrestrial Assessment Program, 1235 Queen Street East, Sault Ste. Marie, Ontario, P6A 2E5
- Forest Management Branch internet site; https://www.ontario.ca/page/provincial-wildlife-population-monitoring-program-plan.

Independent Forest Audits, which are conducted on a schedule intended to assess a full planning cycle (7-10 years), provide the opportunity to assess MFMI's compliance with and the effectiveness of the management strategies and prescriptions for HCVs that are included in the FMP. The results of these audits identify any deficiencies and are also used to monitor changes to values identified as HCVs.

Monitoring at the Management Unit Level

MFMI monitors changes in values during the planning process, during the implementation of the Annual Work Schedule (AWS). For example, MFMI's FRL holders undertake compliance monitoring on their operations to make sure that the FMP and forest management guidelines/direction have been followed. During the planning process, MFMI uses the most recent forest inventory to monitor and track changes in forest condition. eFRI update and makes sure that the forest composition is maintained. Also, for FSC certification, the HCV report is updated as required to reflect new HCV's such as newly identified SAR. MFMI ensures that the values identified on the certified units are maintained and updates any newly identified values using the NHIC and NRIP databases. MFMI works closely with biologists and foresters of other companies and government agencies to stay up to date on new science related to the identified HCVs. In addition, MFMI has a strong partnership with CPAWS for designation and maintenance of the unregulated candidate sites.

Information on values designated as HCVs (as well as other non-HCV values) originates from many sources:
- Monitoring occurs through the normal FMP compliance monitoring process and MNRF/Company values data collection and mapping.
- MNRF conducts directed surveys of forest values, including SAR species and habitats within harvest areas submitted each year in Annual Work Schedules.
- MNRF provides an online form for the general public to report SAR sightings at: https://www.ontario.ca/page/natural-heritage-information-centre.
- MFMI and MFMI's FRL holders conduct training with staff and contractors which includes material on the recognition and reporting of SAR's. The presentations used for training are available from MFMI upon request. Staff training in stick nest and species identification is also provided to facilitate the identification of nests by field workers and ensure the protection of nests that were not previously identified but were discovered after operations commenced. MFMI's forest workers are required to report any new nests found to the MNRF and apply the appropriate AOC prescription.
- MFMI has procedures in place which formalizes the reporting of any previously unmapped values that are discovered in current harvest or silvicultural blocks during operations. The procedures may prescribe work stoppages to allow for the development of appropriate prescriptions should values associated with HCVs (and any others) be discovered by forest workers during harvesting operations.
- The Natural Heritage Information Centre (NHIC) is an MNRF program that collects, reviews, manages and distributes information for species of conservation concern, rare and exemplary plant communities, and wildlife concentration areas. Policy requires MNRF staff to provide SAR Species Observation data to the NHIC. A large percentage of the data managed by the NHIC includes records shared from outside sources, including the public. NHIC has a vetting process for confirming the validity of these records. NHIC stores the evidence or source observation, but additional site-specific SAR habitat delineation is usually required for protection.
- MFMI and MNRF District staff are in regular communication on forest values data. District collected forest values are only a subset of the data Districts need to consider for SAR habitat delineation. The Species Observation data in the NHIC has many records from other sources that are updated frequently.
- MNRF District staff have a significant role in the interpretation and use of SAR and wildlife data for AOC mapping. District staff review Provincially tracked species observations and occurrences and other NHIC layers annually, and notify the SFL if any of these SAR observations require an AOC, and then provide a spatial file, through the

FI Portal, for any additional SAR Habitat that requires delineation and is not captured in existing values layers. Forest Value data in LIO is exported and delivered to SFLs through NRIP on October 1st each year to support AWS and planning. District staff also review the AWS to ensure that the correct AOCs are applied.

- The forest inventory updating process provides a means for monitoring the occurrence and distribution of uncommon tree species on the MF.
- FMP mid-term and end-of-term reporting includes an assessment of objective achievement, which provides an opportunity to make recommendations for improvements for those objectives identified as HCVs.

9.2 Development of Management Strategies and Prescriptions for HCVs

Section 9.3 of the Forest Stewardship Council *National Boreal Standard* states that: "*The Organization shall implement strategies and actions that maintain and/or enhance the identified High Conservation Values. These strategies and actions shall implement the precautionary approach and be proportionate to the scale, intensity and risk of management activities*".

The 2021-2031 Forest Management Plan for the MF (Bazeley *et al.* 2021) provides the direction for HCV management. Specific and detailed prescriptions are written for the associated values during the planning process. The precautionary approach sets a high standard for management because it requires a demonstration that no impact is occurring. Monitoring of HCVs addresses the recognition and reporting of values, compliance with management prescriptions, and the effectiveness of management techniques in meeting objectives for the values.

This section describes the management strategies to be employed by MFMI for the protection of HCVs identified on the MF. MFMI's general approach to HCV management is to use current guideline direction required by government to conduct sustainable forest management. Where applicable, the management strategy for these HCV's will be contained in the government approved Forest Management Plan (FMP) and referenced in this document. This will typically involve the development of an Area of Concern (AOC) prescription, but may include the development of other management approaches, such as Conditions on Regular Operations (CROs), or other strategies or prescriptions as deemed appropriate. In the case that government direction does not exist for HCVs, or is deemed inadequate to protect values, a management strategy will be developed by MFMI, in consultation with stakeholders as appropriate, and described in this document.

MFMI works with MNRF staff during forest management planning to ensure known values are identified and an appropriate prescription is employed prior to operational activity. See the descriptions in the 2021-2031 FMP, Table FMP-11 "Operational Prescriptions for Areas of Concern". Many of the AOC prescriptions and conditions developed for the protection of fish and wildlife values are based on the direction provided in the Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales, aka Stand and Site Guide (SSG) (MNRF 2010). Other prescriptions and conditions have been developed by the planning team based on AOCs included in the 2021-2031 FMP (canoe routes, trap cabins, etc.). Prescriptions and conditions related to Archaeological Potential Areas (APAs) and other confidential cultural heritage values are based on direction in the Forest Management Guide for Cultural Heritage Values (2006).

There are other values which may exist on the management unit, for which no known locations have been identified. Generally, AOCs have not been developed for values with no known locations adjacent to operations.   If such values are identified in areas selected for operations during plan implementation procedures to protect these previously unidentified values which includes the development and application of appropriate protection (usually an AOC prescription) which may include input from MNRF subject matter experts. If required, MFMI will prepare an amendment to the FMP to include this new direction.

Table 14 provides an overview of the monitoring methods for HCVs that are identified in this report. At present MNRF has the principal responsibility for inventory and monitoring of wildlife and other forest values. MFMI is responsible for implementation of the management prescriptions. There is a shared responsibility between MNRF and MFMI for evaluating the effectiveness of management prescriptions. With the transfer of responsibilities for parks from MNRF to the Ontario Ministry of Environment, Conservation and Parks (MECP), it is expected that MECP will take a more active role in monitoring related to Provincial Parks, Conservation Reserves, and SAR.

The Ontario Breeding Bird Atlas periodically collects data related to sightings and breeding evidence for bird species. Table 15 summarizes data for surveys conducted between 1981-85 and 2001-05 related to recorded instances of breeding evidence for bird species (SAR) within Cochrane Region, from the Ontario Breeding Bird Atlas datasets. Note that Cochrane region encompasses an area larger than the MF. Local results in the MF may be different than the regional results presented here, but nonetheless, the overall trends provide useful context.

Only monitoring for designated HCV attributes are listed in Table 14. The information in the table indicates who has primary responsibility for different aspects of monitoring and provides basic information regarding the monitoring process. Refer to the 2021-2031 FMP for the MF for further details.

Table 14 provides an overview of the management methods for HCV values that are identified in this report. MFMI is responsible for implementation of the management prescriptions. There is a shared responsibility between MNRF and MFMI for planning and for evaluating the effectiveness of management prescriptions.

9.3 Species at Risk

MNRF District staff have a significant role in the interpretation and use of SAR and wildlife data for AOC mapping. District staff review Provincially tracked species observations and occurrences and other NHIC layers annually and notify the SFL if any of these SAR observations require an AOC, and then provide a spatial file, through the FI Portal, for any additional SAR Habitat that requires delineation and is not captured in existing values layers. The values updating process may also include removals of AOC's where the value is no longer present or where, for example, a nest has been vacant for an extended period of time. Forest Value data in LIO is exported and delivered to SFLs through the FI Portal on October 1st each year to support AWS planning. District staff also review the AWS to ensure that the correct AOCs are applied. Any SAR values discovered during forest operations are dealt with as described above.

Table 14 provides an overview of the monitoring methods for HCVs that are identified in this report. At present MNRF has the principal responsibility for inventory and monitoring of wildlife and other forest values. MFMI is responsible for implementation of the management prescriptions. There is a shared responsibility between MNRF and MFMI for evaluating the effectiveness of management prescriptions. With the transfer of responsibilities for parks from MNRF to the Ontario Ministry of Environment, Conservation and Parks (MECP), it is expected that MECP will take a more active role in monitoring related to Provincial Parks, Conservation Reserves, and SAR.

The Ontario Breeding Bird Atlas periodically collects data related to sightings and breeding evidence for bird species. Table 15 summarizes data for surveys conducted between 1981-85 and 2001-05 related to recorded instances of breeding evidence for bird species (SAR) within Cochrane Region, from the Ontario Breeding Bird Atlas datasets. Note that Cochrane region encompasses an area larger than the MF. Local results in the MF may be different than the regional results presented here, but nonetheless, the overall trends provide useful context.

Only monitoring for designated HCV attributes are listed in Table 14. The information in the table indicates who has primary responsibility for different aspects of monitoring and provides basic information regarding the monitoring process. Refer to the 2021-2031 FMP for the MF for further details.

Table 14. Summary of management and monitoring strategies and techniques for identified High Conservation Values on the MF.

Value	Current Management Strategies and Techniques	Summary of Compliance and Effectiveness Monitoring
Species at Risk: Birds Bald Eagle, Bank Swallow, Barn Swallow, Black Tern, Canada Warbler, Chimney Swift, Common Nighthawk, Evening Grosbeak, Eastern Whip-poor-will, Eastern Wood Pewee, Least Bittern, Olive-sided Flycatcher, Peregrine Falcon, Rusty Blackbird, Short-eared Owl, Yellow Rail, Wood Thrush	MFMI will work with MNRF staff during forest management planning to ensure known values are identified and an appropriate prescription is employed prior to operational activity. MFMI conducts training with staff and contractors which includes material on the recognition and reporting of SARs, and on stick nest and bird species identification. The materials used for training are available from MFMI upon request. Protection of SAR species during forest management and their critical habitats, including nests is prescribed in the "Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales" (OMNR 2010). The 2021-2031 FMP for the MF includes AOC prescriptions for active colonies of bank swallow, barn swallow nests, common nighthawk ground nest (occupied), cavity nests/ communal roosts known or suspected to be occupied by chimney swift, bald eagle nests, ground nests known or suspected to be occupied by short-eared owl or whip-poor-will, and wetland habitat occupied by black tern and yellow rail (refer to FMP text Section 4.2.1 and Table 21). Conditions on regular operations (CROs) in the 2021-2031 FMP (refer to FMP Text section 4.2.2.2.6 and Table 25) address other general habitat features, including many that are associated with SAR species). With regard to the peregrine falcon, AOC and management prescriptions to protect nesting sites or habitat will be developed and implemented, following recommendations in the "Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales"	Monitoring occurs through the normal FMP compliance monitoring process and MNRF/MFMI values data collection and mapping. MFMI FRL holders have operating procedures which formalize the reporting of any previously unmapped valued that are discovered in current harvest or silvicultural blocks during operations. The procedures prescribe work stoppages to allow for the development of appropriate prescriptions should values associated with HCVs (and any others) be discovered by forest workers during harvesting operations. Effectiveness monitoring occurs through MNRF's Wildlife Assessment Program and the periodic review of MNRF Forest Management Guidelines. Results of research to determine the effectiveness of MNRF guidelines was summarized in the document "Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales – Background and Rationale for Direction" (OMNR 2010b). MNRF research investigates the effectiveness of forest management guidelines on SAR. The stand and site guide was reviewed in 2015/16. Based on recommendations from the review, the guide is being revised to ensure its direction is based on the most current scientific, community and Indigenous knowledge. Results from surveys conducted over time for the Ontario Breeding Bird Atlas indicate that within Cochrane Region, sightings of the bald eagle, Canada warbler and olive-sided flycatcher have increased between the 1981-1985 and 2001-2005 surveys, whereas sightings for the bank swallow and barn swallow have decreased (Table 15). District MNRF investigates any reported sightings of Species at Risk within the MF, maps and documents them,

Value	Current Management Strategies and Techniques	Summary of Compliance and Effectiveness Monitoring
	(OMNR 2010) or based on new direction from the MNRF. A coarse filter landscape approach will be used to manage Canada Warbler habitat on the MF by maintaining natural amounts of deciduous (i.e., BW1, PO1) and lowland conifer (i.e., LC1 and SB1) areas in a mature and old forest condition. Known nests, or those encountered during operations, will be protected using conditions on regular operations. Targets for mature and older conifer and mixedwoods contained in the 2021-2031 FMP should provide for habitat for the rusty blackbird at the landscape level. Similar approaches will be used to manage habitat for evening grosbeak, eastern wood pewee, wood thrush, and olive-sided flycatcher at the landscape level. Site-level values (such as nests) for these species are protected by the SOPs, AOC prescriptions, and CROs described above. Nests and habitat for the rusty blackbird (which generally occur in non-forest areas, such as agricultural lands, wetlands and marshes) are thought to be at low risk from forestry. In most cases, no special prescription is required since normal operations conducted under the direction of the Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales (OMNR 2010) should provide for a variety of habitats and protect nesting sites.	and submits them to LIO/NRIP if appropriate. MNRF also provides an online form for the general public to report SAR sightings at: https://www.ontario.ca/page/report-rare-species-animals-and-plants
Snapping Turtle, Wood Turtle	Normal operations conducted under the direction of the Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales (OMNR 2010) will provide for the protection of water bodies and riparian zones and should be sufficient to protect turtle habitat. This can be assessed on a case-by-case basis should occurrences of this species within current operating areas in the MF be confirmed. Guidance is provided in the above-mentioned guide (SSG) for the development of	MFMI staff will document and report to the MNRF any sightings of Snapping Turtle or Wood Turtle on the MF. FMP values mapping programs will identify any known critical habitats (nesting areas, etc.) within current harvest areas (MFMI/MNRF). MFMI FRL holders have operating procedures which formalize the reporting of any previously unmapped valued

Value	Current Management Strategies and Techniques	Summary of Compliance and Effectiveness Monitoring
	management prescriptions should that become necessary. Staff training in species at risk identification is conducted as required to facilitate the identification of SAR and to and ensure the subsequent protection of species or habitat identified after operations have commenced (MFMI).	that are discovered in current harvest or silvicultural blocks during operations. The procedures prescribe work stoppages to allow for the development of appropriate prescriptions should values associated with HCVs (and any others) be discovered by forest workers during harvesting operations. MFMI FRL holders monitor the compliance of forest operations adjacent to water bodies and AOCs to ensure that the appropriate prescriptions have been properly applied. District MNRF investigates any reported sightings of Species at Risk within the MF, maps and documents them, and submits them to LIO/NRIP if appropriate.
Lake Sturgeon	Lake Sturgeon is classified as special concern. Unless approved by MNRF, construction and maintenance operations that may enter a water feature (i.e., in-water work) or that may potentially cause sediment to enter a water feature, are not to occur in shoreline AOCs during periods of fish spawning, incubation, and fry emergence.	FMP values mapping programs will identify any known critical habitats (spawning areas, etc.) within current harvest areas. MFMI FRL holders have operating procedures which formalize the reporting of any previously unmapped valued that are discovered in current harvest or silvicultural blocks during operations. The procedures prescribe work stoppages to allow for the development of appropriate prescriptions should values associated with HCVs (and any others) be discovered by forest workers during harvesting operations. MFMI FRL holders monitor the compliance of forest operations adjacent to water bodies and AOCs to ensure that the appropriate prescriptions have been properly applied. District MNRF investigates any reported sightings of Species at Risk within the MF, maps and documents them, and submits them to LIO/NRIP if appropriate.

Value	Current Management Strategies and Techniques	Summary of Compliance and Effectiveness Monitoring
Eastern Small-footed Myotis, Little Brown Myotis, Northern Long-eared Myotis	Little brown bats and northern long-eared bats (*Myotis* spp.) are threatened by a disease known as white nose syndrome, caused by a fungus which is believed to have been inadvertently brought from Europe to North America. The fungus grows in humid cold environments, such as the caves and mines where the bats hibernate and is a major source of mortality in these species. The Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales (OMNR 2010) includes a prescription to protect hibernation sites, but it does not provide direction for protecting known roosting habitats. Operation standards and practices will maintain roosting habitat on the landscape, but should a roosting site be discovered, a management prescription will be developed in consultation with MNRF biologist(s). There are AOC prescriptions for bat hibernacula and CRO's for bat maternity roosts contained in the 2021-2031 FMP (FMP Table 11 and FMP text section 4.2.2.2.12). Staff/contractor training material about SARs instructs operators to recognize and report occurrences of this species, and to avoid non-commercial caves, abandoned mines, and other sites where bats may be present.	MFMI FRL holders have operating procedures which formalize the reporting of any previously unmapped valued that are discovered in current harvest or silvicultural blocks during operations. The procedures prescribe work stoppages to allow for the development of appropriate prescriptions should values associated with HCVs (and any others) be discovered by forest workers during harvesting operations. Monitoring of AOCs occurs through the normal FMP compliance monitoring process and values data collection and mapping (MFMI/MNRF). Effectiveness monitoring occurs through MNRF's Wildlife Assessment Program and the regular review of Forest Management Guidelines. District MNRF investigates any reported sightings of Species at Risk or their critical habitats (e.g., bat hibernacula) within the MF, documents them, and submits them to LIO for inclusion in NRIP if appropriate.
Eastern Cougar	Guidance is provided in the current 2021-2031 FMP for the development of management techniques should that become necessary. In general, application of the Boreal Landscape Guide (MNRF 2014) in the 2021-2031 FMP will accommodate the habitat needs of the eastern cougar, which is a wide-ranging generalist species that utilizes a range of different forest types and age classes. Staff training in species at risk identification is conducted as required and will facilitate the identification and ensure the subsequent protection of any species occurrences or habitats identified after operations have commenced.	MFMI FRL holders' staff will document and report to the MNRF any sightings of Eastern Cougar on the MF. MFMI FRL holders have operating procedures which formalize the reporting of any previously unmapped valued that are discovered in current harvest or silvicultural blocks during operations. The procedures prescribe work stoppages to allow for the development of appropriate prescriptions should values associated with HCVs (and any others) be discovered by forest workers during harvesting operations. District MNRF investigates any reported sightings or signs (e.g., scat, tracks) of Species at Risk within the MF,

Value	Current Management Strategies and Techniques	Summary of Compliance and Effectiveness Monitoring
		documents them, and submits them to LIO for inclusion in NRIP if appropriate.
Monarch Butterfly, Gypsy Cuckoo Bumblebee, Yellow-banded Bumblebee	Habitats are mainly associated with open fields, and these areas are generally at low risk from forestry activities. Should any of these insects be sighted within or adjacent to current operating areas, appropriate prescriptions will be developed on a case-by-case basis.

Staff training in species at risk identification is conducted as required by MFMI to facilitate the identification and ensure the subsequent protection of species identified after operations have commenced. | District MNRF investigates any reported sightings of Species at Risk within the MF, documents them, and submits them to LIO for inclusion in NRIP if appropriate. |
| Regionally rare species, *Tetraplodon mnioides* (moss), Limestone Oak Fern (*Gymnocarpium tetraploides*), Auricled Twayblade (*Listera auriculata*), and New England Violet (*Viola novae-angliae*). | MNRF's LIO/NRIP and NHIC databases will be used identify any known occurrences of these species that occur within harvest allocations during AWS planning; appropriate AOC prescriptions will then be developed and applied. | MFMI FRL holders have operating procedures which formalize the reporting of any previously unmapped valued that are discovered in current harvest or silvicultural blocks during operations. The procedures prescribe work stoppages to allow for the development of appropriate prescriptions should values associated with HCVs (and any others) be discovered by forest workers during harvesting operations.

Monitoring of AOCs occurs through the normal FMP compliance monitoring process and values data collection and mapping (MFMI/MNRF). |
| Remote Lake Trout Lakes | AOC "LTL" in the 2021-2031 MF FMP provides a number of measures to protect these lakes, including a 120 m reserve within which no operations are permitted, a 400 m no-road zone, and a 400-1000 m modified zone. No new primary or branch roads or landings are permitted within the AOC and decommissioning of operational roads within the modified zone (400-1000 m) is required. | Monitoring of AOCs occurs through the normal FMP compliance monitoring process and values data collection and mapping (MFMI/MNRF). |
| SAR Species: Black Ash and White Pine concentration areas located north of Highway 101; Uncommon Hardwoods (Yellow Birch, Sugar Maple, and Red Oak), and Red Maple | The current Forest Resource Inventory (FRI) identifies concentrations of these species (refer to Section 3.5 in this report) throughout Northeastern Ontario. Through the Forest Management Planning process each forest will utilize the FRI to identify the presence of these species on the forest. Depending on the amount and concentrations of these species, each forest will develop a stand-by-stand strategy that reflects the uniqueness | The normal compliance and silvicultural effectiveness monitoring programs (implemented by MFMI & MNRF) will verify the appropriate treatment of these areas and its effectiveness. |

Value	Current Management Strategies and Techniques	Summary of Compliance and Effectiveness Monitoring
occurring north of Highway 101.	and significance of these species on the forest and within Northeastern Ontario. In general, harvesting of these species will be avoided. Efforts will be made to minimize damage to the stems (i.e., during skidding/forwarding operations) of these species left standing within harvest areas. Roads will be located to minimize the removal or damage to these species except where no other alternative exists. Silviculture activities will be conducted to promote the regeneration of these species in harvest areas where they occur. These activities may include but are not limited to the following: • Conduct site preparation operations to coincide with good seed crops for these species, and • Plan for natural or artificial regeneration in harvested areas that have an abundance of these species. In addition, efforts are made to educate the public to prevent harvesting of these trees for other purposes (e.g., for fuelwood). The 2021-2031 FMP contains a strategy to maintain or enhance the presence of the white pine forest unit on the MF. Seedlings will be planted over the life of the plan to support this goal and to establish these species as a minor component of white spruce or jack pine planted areas. Continued efforts will be made to maintain an inventory of white pine seed that was collected from suitable seed zones.	Periodic updates to the forest inventory will indicate any changes in the abundance and distribution of these species in the MF at the forest stand level (MFMI/MNRF).
Regulated Parks and Protected Areas	Regulated parks and conservation areas are protected by Ontario laws and regulations, and industrial forestry activities are not permitted. In the 2021-2031 FMP, designated conservation areas (e.g. existing regulated parks and protected areas) do not form part of the land base that is available for forest management activities.	The normal compliance monitoring program (MFMI/MNRF) will verify the integrity of these areas. Monitoring of values within regulated parks and conservation reserves is conducted by the Ministry and Environment, Conservation and Parks (MECP).

Value	Current Management Strategies and Techniques	Summary of Compliance and Effectiveness Monitoring
	The 2021-2031 FMP for the MF contains AOC prescriptions for regulated parks and conservation reserves, which ensures that boundaries will be accurately located and that appropriate no-cut reserves are implemented adjacent to boundaries.	
Candidate Protected Areas (Gap Analysis)	Planned deferral process: Nine candidate protected areas (GAP areas) identified through the gap analysis have been deferred from harvesting through the duration of the 2021-2031 FMP. GreenFirst has made considerable efforts to avoid forest operations in those potential candidate sites and has submitted them to the government for consideration of formal regulation as protected areas. An updated gap analysis process for the MF is underway.	The normal compliance monitoring program (MFMI/MNRF) will verify the integrity of these areas. MFMI will monitor the status of the formal approval process through periodic contact with the regulatory agency (MECP).
Chapleau Crown Game Preserve	Hunting and trapping within the Chapleau Crown Game Preserve (CCGP) is not permitted for non-native persons. Because hunting and trapping within the CCGP occur at reduced levels compared with the surrounding landscapes, the long-term viability of furbearers and game is enhanced. The CCGP also represents a control area for research on the impacts of these activities on the environment. Local First Nations have an interest in maintaining traditional trapping and hunting activities within the CCGP.	Monitoring of the CCGP occurs through the regular compliance program (District MNRF / MFMI) and through ongoing wildlife population monitoring programs.
Intact Forest Landscapes (IFLs)	There are two IFLs that overlap the boundaries of the MF, based on analyses of the 2020 Global Forest Watch International mapping update. MFMI updated the IFL mapping to the start of the current FMP (March 31, 2021) by following FSCs Interim Guidance for the Delineation of Intact Forest Landscapes (IFL) (May 25, 2017). MFMI is implementing the requirements of FSC's Advice Note of the Implementation of Motion 65 (Appendix A), which states	The normal compliance monitoring program (implemented by MFMI and MNRF) will verify the integrity of these areas.

Value	Current Management Strategies and Techniques	Summary of Compliance and Effectiveness Monitoring
	that Forest Management operations, including harvesting and road building, may proceed in IFLs, if they: • Do not impact more than 20% of Intact Forest Landscapes within the Management Unit (MU), and • Do not reduce any IFLs below the 50,000 ha threshold in the landscape. MFMI is in compliance with these two requirements on the MF. The Interim Guidance was provided by FSC Canada following the approval of Canada's National Forest Stewardship Standard in October 2018 and its implementation in January 2020. Additional Phase II work by FSC Canada in developing an integrated approach for intact forests and Indigenous Cultural landscapes is continuing. In addition, GreenFirst has developed an access strategy for operations that occur within IFLs to minimize the impact of forest operations and the duration of activity within HCV areas. Continued application of government guidelines, such as the SSG and BLG will be used to minimize soil and site disturbance and ensure appropriate abandonment of access roads. Unregulated portions of the IFLs have been deferred from harvesting for the duration of the current 2021-2031 FMP.	
Values critical to communities, Traditional trapping / hunting areas, Cultural values	HCVs will be identified and appropriate management strategies will be developed through discussion with Indigenous communities including First Nations and Metis and other local community members. For context, current prescriptions and conditions for Archaeological Potential Areas and other confidential cultural heritage values are based on direction in the Forest Management Guide for Cultural Heritage Values (2006). The 2020-2030 FMP contains AOC prescriptions for Archaeological Potential Areas, Cultural Heritage Sites, and Indigenous Concern	MFMI / Indigenous Communities – monitoring methods will depend on the nature of the values identified. If values are identified and prescriptions are developed, consultation will be required to determine how effectiveness monitoring will be conducted.

Value	Current Management Strategies and Techniques	Summary of Compliance and Effectiveness Monitoring
	values (Coded APA, CHS and IC respectively). There is also provision for confidential values in the form of an AOC prescription for those values deemed to be locationally sensitive, hence their confidentiality must be maintained (e.g., AOC prescriptions coded CV1 or CV2). These existing mechanisms will provide a starting point for the future development of management strategies and site-specific prescriptions should HCVs be identified in this category.	

Table 15. Changes in recorded instances of breeding evidence for bird species (SAR) within Cochrane Region, from the Ontario Breeding Bird Atlas data for surveys conducted between 1981-85 and 2001-05.

Species	#Squares 1981-1985	#Squares 2001-2005	Change from 1981-85 to 2001-05	Increase/ Decrease
Bald Eagle	7	14	7	increase
Bank Swallow	23	7	-16	decrease
Barn Swallow	35	23	-12	decrease
Black Tern	3	5	2	increase
Bobolink	11	3	-8	decrease
Canada Warbler	27	53	26	increase
Chimney Swift	0	1	1	increase
Common Nighthawk	37	26	-11	decrease
Olive-sided Flycatcher	24	41	17	increase
Rusty Blackbird	33	16	-17	decrease
Short-eared Owl	2	5	3	increase
Whip-poor-will	0	1	1	increase

10 Conclusion

Understanding and fulfilling the requirements of documenting, assessing, managing and monitoring High Conservation Value Forest is an ongoing effort, and therefore this report can be considered a living document. We encourage comments, reviews, reports of the occurrences of new values, or inquiries of general interest. Interested people are invited to provide comments or inputs concerning this report at any time throughout the year. Please direct any comments or questions to Don Bazeley, General Manager, Missinaibi Forest Management Inc., Timmins.

This report is publicly available and can be requested from MFMI. Electronic copies will be provided free of charge.

Previous versions of the HCVF report and findings have been made available to interested Indigenous communities and the LCC for review and comment.

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