

Eastern Region, Chippewa National Forest

January 2025

Chippewa National Forest

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Monitoring and Evaluation Report Fiscal Years 2018-2023

January 2025



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Fiscal Years 2018-2023 Monitoring and Evaluation Report Approval and Declaration of Intent

I have reviewed the Fiscal Years 2018-2023 Monitoring and Evaluation Report for the Chippewa National Forest that was prepared by forest employees. I am satisfied with the findings and intend to consider recommendations made during project development and plan revision. The Monitoring and Evaluation Report meets the intent of both the Forest Plan (Chapter 4) as well as the 36 CFR 219.

This report is approved:

Michael Stansberry Forest Supervisor Date

Executive Summary

The following information consists of key points from resource areas included in this Monitoring and Evaluation Report for fiscal years 2018-2023. More detail that supports these statements can be found in the document.

1. Multiple Uses

Beginning in fiscal year (FY; runs October 1 to September 30) 2018 through 2023, the Forest's **target** for annual timber volume sold has averaged 43.58 million board feet (MMBF). The actual **volume sold** has been slightly below the target during this time with **sales averaging 41.58 MMBF**. Volume sold has fluctuated from a high of 46.2 MMBF in 2018, in part due to blowdown events, to a low of 34.7 MMBF in 2023. The Allowable Sale Quantity for Decade 2 of the Forest Plan (2014 to 2024) is 60 MMBF, a bit higher than in the first decade where it was 58 MMBF (see 7 Social and Economic Stability).

The Forest accomplished restoration work through an **expanded use of Stewardship** contracting and the introduction of **Good Neighbor Authority** (GNA) as a new tool in 2016. The Forest continues to enhance the use of Stewardship and Good Neighbor Authorities as tools to improve efficiencies and accomplish Forest priorities. The values in the table below include stewardship and GNA work.

Stewardship by Fiscal Year	Acres Sold	MMBF Sold	Percent of Total Sold Volume
FY 18	1,317	12.9	28%
FY 19	994	12.4	28%
FY 20	526	8	19%
FY 21	3,011	18.4	43%
FY 22	1,891	13.4	33%
FY 23	732	9.5	27%

Over the past fifteen years our surveys show a slight decrease in recreation use, with use remaining relatively steady in recent years. The Chippewa National Forest has been meeting basic health and safety and accessibility standards, managing within budget, and responding with appropriate management options to reduce maintenance costs. The range and scope of recreation opportunities has decreased. Given a continued reduction in recreation budgets, additional facility decommissioning may occur.

The Chippewa National Forest improved terrestrial wildlife habitat, aquatic lakes and streams annually from 2018 to 2023. Starting in 2020, the regional office no longer assigned program targets. Program targets are now accomplishments determined by the Forest based on capacity, partnerships and funding. The Chippewa National Forest uses an integrated approach to meet these outputs through partnerships and other Chippewa National Forest resource outputs that benefit wildlife. Table 72 displays actual wildlife and aquatic outputs.

2. Climate Change

On January 9th, 2023, the Council on Environmental Quality (CEQ) published the National Environmental Policy Act (NEPA) Guidance on Consideration of Greenhouse Gas (GHG) Emissions and Climate Change. The guidance provides numerous recommendations that pertain to land and resource management projects. These include the recommendation that agencies consider the projected GHG emissions or reductions for proposed actions and their reasonable alternatives (Section IV) and use this information to assess potential climate change effects (Section V). The CEQ guidance also advises agencies to assess the potential future

state of the affected environment in NEPA analyses (Section VI), including considering the impacts of climate change on project actions and alternatives.

There is a distinct increasing trend showing that in general the growing season appears to be getting longer. Within the range of the data, time between the last frost of spring and the first frost of fall has gone from approximately 110 days to almost 130 days.

In 2023, the Chippewa National Forest (CPF) assessed forest carbon pools. The assessment describes how fluctuations of carbon on the unit-level relate to environmental factors and past human and natural disturbances. Also considered in the assessment are carbon trends in the context of climate change and disturbance.

Because the Chippewa National Forest currently functions as a sink for above-ground carbon, it is crucial the forest continues to implement management practices that ensure the forest remains forested and carbon stocks are managed within a multiple use framework and with a holistic management perspective. This includes safeguarding soil carbon found in peatlands, wetlands, and soils, as well as engaging in activities such as prescribed burns for ecological restoration, which may emit carbon in the short term.

3. Cooperation

The Forest has continued to expand the growing number of partnerships and agreements with the Leech Lake Band of Ojibwe, state and counties and non-government organizations.

The Forest has seen an increase in the number of partnerships that benefit natural resource management on lands within the Forest and the Leech Lake Reservation. The use of stewardship agreements and increased funding has allowed the Forest to expand collaboration with the Leech Lake Band of Ojibwe (LLBO) and numerous other partners. Grants and agreements make an important contribution to provide work opportunities and to achieve resource accomplishments.

4. Insects and Disease

Tamarack continues to be heavily impacted by the larch casebearer and Eastern larch beetle. During the timeframe of this report (2018-2023) damage of the larch from the larch casebearer has significantly reduced from 8,965 acres in 2017 to 1,181 acres in 2018. In 2021-2022 there were no reports of larch casebearer. In 2023, there were reported 2,886 acres

Eastern larch beetle is a native bark beetle that attacks only larch species. In 2017 the affected acres on the Forest totaled 2,267, and in 2018 there were 2,678 acres affected. Then in 2019 that number jumped to 10,489 newly affected acres and the number of acres has consistently remained in the mid to upper teens of thousands with a high of 18,463 acres in 2022. In 2022, Eastern larch beetle infested more acres than ever before across the state, exceeding 300,000 acres. Since the beginning of the Eastern larch beetle outbreak in 2001, nearly 972,000 acres of tamarack has been impacted around the State. This equates to 69 percent of the State's tamarack.

Other insect and disease agents that have impacted the Forest during this period include tent caterpillar, arborvitae leafminer, and spruce budworm. In October 2023, emerald ash borer (EAB) was discovered on the Chippewa National Forest just south of Remer along Big Rice Lake on the Walker Ranger District. A decision memo for a small project (500 acres) surrounding the identified site has been signed, and a timber harvest along with diversified regeneration for the area is included in the project.

5. Landscape Ecosystems and Ecological Conditions and Vegetation

During the 2018 to 2023 monitoring period, the Chippewa National Forest (CPF) incorporated new management objectives, which has led to changes in vegetation management and will continue to lead toward changes in vegetation composition and structure, as well as spatial patterns on the landscape. In 2019, the CPF began managing the forest in shared stewardship with the Leech Lake Band of Ojibwe (LLBO) through a memorandum of understanding (MOU). In addition, per Secretarial Order 3403, there has been renewed focus on federal agencies fulfilling Trust Responsibilities. There has also been more of an emphasis by the Forest Service to manage forests for ecological integrity and resilience, to manage proactively for climate change, and to consider carbon sequestration and storage in management actions and decisions.

All landscape ecosystems on the Forest are below the Decade 2 objectives for the 0-9 age class. There is a trend to increase acres in 0-9 age class overall across all Landscape Ecosystems into 2029 which takes into consideration treatments that are planned and under decision but have yet to be harvested. This trend of increase in acres holds true for the following landscape ecosystems (LEs): Dry Mesic Pine, Boreal Hardwood/Conifer, Mesic Northern Hardwood, and White Cedar Swamp. The trend, however, of decrease or maintain in acres holds true for the following LEs: Dry Pine, Dry Mesic Pine Oak, and Tamarack Swamp. The focus on commercial thinning of red pine stands contributes in part to these trending to decrease in 0-9 age class.

The amount of mature/older forest on the landscape has increased since 2003. However, results vary by LE is to whether management indicator habitats (MIH) objectives to increase, maintain, or decrease mature and older forest are being met. The trend is for mature/older forest acres to increase into 2029 for all LEs except the following: Mesic Northern Hardwood, Tamarack Swamp, and White Cedar Swamp.

Jack pine, red and white pine, and spruce-fir forest types are well below decadal objectives and contribute to an overall decline in the amount of conifer on the landscape.

Amount of aspen on the landscape has declined since 2004. Additional decreases in aspen are desired especially where it is "off-site" aspen.

Northern hardwoods exceed objectives. Further increases in this forest type are expected due to regeneration treatments, particularly in aspen stands, that tend to promote the release of young hardwoods in stands.

6. Recreation

The Chippewa National Forest has been meeting basic health and safety and accessibility standards, managing within budget, and responding with appropriate management options to reduce maintenance costs. The range and scope of recreational opportunities has slightly decreased and has remained relatively steady in recent years. Given a continued reduction in recreation budgets, additional facility decommissioning may occur.

Participation in recreational activities is the way that most of us come to our National Forests and Grasslands, making it an important portal for understanding their meaning, history, and relevance, and that of public lands.

Recreation opportunities on the Chippewa National Forest directly provide benefits to citizens. Many mental, spiritual, and physical benefits are gained while making connections with the land through recreational activities associated with recreation facilities.

7. Social and Economic Stability

National Forests provide multiple benefits to the American people and to local communities. They provide clean air and water, preserve cultural resources, and conserve lands for the enjoyment of present and future generations. They also support local economies through recreation, timber, energy, minerals, and livestock grazing. In addition, counties with national forests or grasslands receive funds to support schools, road maintenance, and stewardship projects. The Forest Service also invests in such things as the construction and maintenance of infrastructure, environmental restoration, and forest health. In 2019, the sum of these activities on the Chippewa National Forest supported approximately 1,020 local jobs and \$42,379,000 in local labor income within a 24-county area of influence.

8. Soils

Overall, past soil disturbance monitoring indicates harvest activities alone have resulted in little soil disturbance and Forest Plan desired conditions and objectives are generally being met.

Although the general level of soil disturbance is low for post-harvest evaluations, some of the pre-harvest evaluations had some soil disturbance. Further evaluation of this monitoring question and indicator, described in the Soils Section 8, is necessary to ensure forest management activities are not affecting long-term soil productivity and viability of natural ecosystems.

9. Special Uses

The Special Uses program provides services supporting our national policy and federal land laws by authorizing uses on National Forest System lands. With the Chippewa National Forest's checkerboard ownership, there are many opportunities and needs to cross National Forest System lands to reach other ownerships. In addition, due to the location of lakes on the Forest, several recreational opportunities were provided such as private resorts, recreation residences, and organizational camps.

The Forest works with a diverse pool of customers including private citizens, utility companies, oil and gas companies, resorts businesses, non-profit agencies, tribal governments, state and local governments as well as other federal agencies. The number of special uses and the amount of generated revenue for the years 2018-2023 is shown in the table below.

Year	Number of special use permits	Generated Revenue
2018	708	\$1,289,220
2019	706	\$1,355,279
2020	707	\$1,289,223
2021	729	\$1,440,523
2022	720	\$1,437,206
2023	722	\$1,473,307

The Chippewa National Forest offers a variety of special forest products to the public for personal and commercial uses. Many of the special forest products including balsam boughs and firewood are economically and culturally significant to the public.

10. Timber

The Forest Service harvests timber form National Forest System lands only where there is assurance that such lands can be adequately restocked within five years after harvest (National Forest Management Act (NFMA) (1976)). The table below shows the regeneration harvest acres and percent certified stocked within five years.

Success was greatest on coppice cut sites with natural regeneration of hardwood/aspen from suckers and sprouts.

Stocking surveys are the mechanism by which certifications of regeneration are based on. In fiscal years (FY) FY18 to FY23 the forest conducted an average of 499 stocking surveys a year covering 8,412 acres a year. Sites not certified within the 5-year period are still in a stage of regeneration, just not yet certified. Factors which impede regeneration include predation by deer and rabbits, as well as competition from woody and herbaceous vegetation. Success was greatest on coppice cuts (aspen regeneration) sites with natural regeneration of hardwood/aspen from suckers and sprouts.

Harvest Type	Average FY13- FY18 Regen Harvests	Average of FY13-FY18 Regen Harvest Acres	Average a year (FY18- FY23) Regen Harvest Acres Certified by FY End	Percent Certified Stocked Within 5 Years
Coppice Cuts	59	969	962	99%
Clearcuts	56	988	887	90%
Selection Cuts	35	851	726	85%
Seed Tree Cuts	12	633	583	92%
All Regeneration Harvests	162	3,440	3,158	92%

Regeneration harvest and certification averages a year (FY18-FY23)

11. Transportation System

Each National Forest Service System Road has an assigned objective maintenance level and an operational maintenance level. Objective maintenance levels refer to the planned or target level of maintenance for a road, while operational maintenance levels reflect the actual physical condition of the road, regardless of the target maintenance goals. There are significantly more roads operating at a Level 2 than any other maintenance level, as displayed in table 69. Only 3 percent of these maintenance Level 2 roads receive routine maintenance. Few of the passenger-car designated roads (maintenance Level 3, 4, and 5) are functioning at a level lower than their objective maintenance level due to lack of maintenance. There are 238.01 miles of roads with previous management decisions on file to decommission which, once completed, will further reduce system mileages. This is a backlog that is dealt with as time and funding permits.

12. Tribal Rights and Interests

The Forest has a legal obligation to uphold its Federal Trust responsibility to the Leech Lake Band of Ojibwe. A memorandum of understanding (MOU) signed by the Leech Lake Band of Ojibwe and the Chippewa National Forest in 2019 expresses the will of each party to work together to conserve resources significant to the Band's way of life and cultural identity. Pursuant to recommendations identified in a letter from the Chief of the Forest Service to the Band's Chair, the MOU includes provisions for achieving the Band's desired vegetation conditions on National Forest System lands by developing a shared decision making model for commercial timber harvesting and other natural resource considerations, using traditional ecological knowledge offered by the Band, and expanding the use of the Tribal Forest Protection Act to give voice to the Band's desired land management objectives.

The Forest and the Band agree that they will coordinate on a government-to-government basis to seek agreement regarding the Band's role during the planning phase of land management projects that occur within or overlap the Leech Lake Indian Reservation. This coordination will, as appropriate, include providing for the role of the Band as a "Cooperating Agency" for environmental project review and analysis consistent with 40 Code of Federal Regulations (CFR) 1501.6.

13. Watershed Health and Riparian

Relevant Best Management Practices were implemented and successful at all monitored sites. No current issues were affecting watershed health at any of the sites.

Forest management does not appear to affect water quality, quantity, flow timing and the physical features of aquatic, riparian, or wetland ecosystems. Legacy impacts from roads and dams are still affecting the Forests watershed. However, the decommissioning of impoundments (Bowstring 2019, East Pike Bay 2021, Sugar Lake 2021, Wabana 2023) and the Knutson Dam removal has improved the Chippewa National Forest watershed conditions.

14. Wildlife and Plants

All management activities were completed within 2004 Forest Plan direction for endangered, threatened and Regional Forester Sensitive Species. Forest Plan standards and guidelines are being met

The Forest contributed toward the conservation and recovery of the Canada lynx, gray wolf, northern longeared bat and rusty patched bumble bee through habitat and access management practices, collaboration with other federal and state agencies, as well as researchers, tribal bands and non-governmental partners.

The Forest will continue to plan on accomplishing annual wildlife outputs consistent with Forest Plan goals and objectives.

There has not been an increase in the snowmobile routes across the Forest.

15. Fire and Fuels

Current Forest Service policies and the National Cohesive Wildland Fire Management Strategy stress the importance of creating resilient landscapes and restoring healthy, resilient, fire-adapted ecosystems, in addition to protecting communities from wildland fire (United States Department of Agriculture (USDA) 2016, U.S. Department of Interior (US DOI) 2014, 2023). During 2018 to 2023, the Chippewa National Forest continued work on hazardous fuel treatments and prescribed burning in an effort to reduce hazardous fuels, improve the health and resilience of fire adapted ecosystems, and suppress unplanned wildfires.

During this period there have been management changes and an increased focus on restoring fire dependent systems on the Forest. In 2019, the Chippewa National Forest began managing the forest in shared stewardship with the LLBO through an MOU and a renewed focus on fulfilling Trust Responsibilities. In 2020, the LLBO submitted the Tribal Forest Protection Act (TFPA) Proposal Regarding Fire Dependent Stands and Climate Change. This TFPA requested an increase in pace and scale of prescribed fire, build collaborative efforts to manage projects, and continue to discuss collaborative projects that support fire dependent communities for both cultural and natural values, among others.

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Chapter 1.

1. Introduction

This report is compiled under the 2004 Chippewa National Forest Plan signed by Regional Forester, Randy Moore, on July 30, 2004, as amended and updated. The Monitoring and Evaluation Report covers the monitoring activities, results and recommendations for fiscal years 2018 through 2023.

This report uses Chapter 4 of the 2004 Forest Plan (Monitoring and Evaluation) as its framework, updated in 2016. That chapter provides a list of monitoring questions to evaluate resource areas. There are also legally required monitoring items that include specific compliance requirements. Reference Chapter 4 of the <u>Forest</u> <u>Plan</u> for a more complete overview and details.

Effective Forest Plan monitoring and evaluation fosters improved management and more informed planning decisions. It helps identify the need to adjust management direction, such as desired conditions, goals, objectives, standards and guidelines, as conditions change. Monitoring and evaluation helps the Agency and the public determine how a Forest Plan is being implemented, whether plan implementation is achieving desired outcomes, and whether assumptions made in the planning process are valid.

Monitoring and evaluation are learning tools that form the backbone of adaptive management. With these tools, information is collected and compiled to serve as reference points for the future; new scientific understanding and technology; changes in law, policy and resource conditions; growing concerns; trends and changing societal values are incorporated into land management planning; and the scientific validity and appropriateness of assumptions used in the development of the Forest Plan is evaluated. In short, they breathe life into a static document—the Forest Plan—to make it dynamic, relevant, and useful.

Several kinds of activities can be referred to as "monitoring." Programmatic monitoring tracks and evaluates trends of ecological, social, or economic outcomes. Project implementation monitoring monitors compliance with Forest Plan standards and guidelines. Effectiveness monitoring evaluates how effective our management actions are at achieving desired outcomes. Validation monitoring verifies assumptions and models used in Forest Plan implementation. Monitoring may also address issues for large geographic areas of which the Forest is a part.

The Monitoring and Evaluation Report is of value to Forest Service leadership, managers and employees, as well as to the public. The information gained from monitoring is used to determine how well the desired conditions, goals, objectives, and outcomes of the Forest Plan have been met. The Monitoring and Evaluation Report provides a readily available reference document for Forest Service managers as they plan, evaluate the effects of actions on resources, and implement future projects. This information can illuminate changes needed in project planning and implementation, or changes needed in Forest Plan direction. This report also describes to the public how their public lands are being managed and how effectively the commitments made to them within the Forest Plan are being met.

In addition to the information summarized and presented in this report, the data compiled, methodologies used, and supporting documents are part of the project file and are available upon request at the Supervisor's Office in Cass Lake, Minnesota.

Chapter 2 of this report consists of a report summary for the resource areas. Each resource section has the following discussion:

• Monitoring Question. This question is the same as identified in Chapter 4 of the Forest Plan. The questions are tied to monitoring drivers consisting of the desired conditions, objectives, standards

and guidelines specified in the Forest Plan for that resource. The monitoring drivers are not included in this report but can be found in the project file. Similarly, the monitoring methods are in the project file. They consist of methods used, locations, timing, and processes of monitoring data collection.

- Results. This section captures the progress in implementing Forest Plan direction, reaching objectives, goals, desired conditions and producing goods and services. This section may also address the effectiveness of standards and guidelines, specific management practices, design features, or mitigation measures.
- Implications. This section discusses the interpretation of the data and describes what the results mean.
- Recommendations. Identifies recommendations for ongoing or future projects, particularly if there is a shift or adjustment in direction. Included are any potential changes to existing Forest Plan direction.

Chapter 3 addresses amendments and corrections to the Forest Plan. A complete listing of all the changes made since 2004 are provided. In fiscal year 2016, the Forest Plan Chapter 4 Monitoring and Evaluation was updated, this report responds to those updates. For the period from 2018-2023, no amendments or corrections were proposed for the Forest Plan.

Chapter 4 is a list of the Forest Service employees that provided information contained in this report. The report incorporates information gathered by resource specialists for the most part from the Chippewa National Forest.

This report and past reports are posted on our Forest website:

https://www.fs.usda.gov/main/chippewa/landmanagement/planning

2. Monitoring and Evaluation Requirements

Minimum monitoring and evaluation requirements have been established through the National Forest Management Act (NFMA) at 36 Code of Federal Regulations (CFR) 219. Some requirements provide guidance for the development of a monitoring program, while others include specific compliance requirements.

Monitoring and evaluation are separate, sequential activities required by NFMA regulations. Monitoring involves the repeated collecting of data by observation or measurement. Evaluation involves analyzing and interpreting monitoring data. The information gained from monitoring and evaluation is used to determine how well the desired conditions, goals, objectives, and outcomes of the Forest Plan are being met. Monitoring and evaluation are critical steps in the process of keeping the Forest Plan responsive to changing conditions, thereby providing the feedback mechanism for an adaptive management framework. The results are used to identify when changes are needed to the Forest Plan or the way it is implemented.

Forest Plan monitoring on the Chippewa National Forest has three major components: the Monitoring Program (contained within the Forest Plan), the Monitoring Guide, and the Monitoring and Evaluation Report. Each are described below.

2.1 Monitoring Program

The monitoring program contained within the Forest Plan is strategic in nature and provides programmatic direction for monitoring and evaluating Forest Plan implementation. The monitoring program addresses several types of monitoring. These requirements fall into four broad categories:

- Category 1: Required monitoring items (NFMA and 36 CFR 219 regulations)
- Category 2: Attainment of goals and objectives
- Category 3: Implementation of standards and guidelines and
- Category 4: Effects of prescriptions, management practices, and off-road vehicles

Required Category 1 monitoring items are mandatory components of every Forest Plan, whereas Category (2) through (4) monitoring items are more flexible and tailored to address issues raised through public scoping and interdisciplinary team review. A more complete description of Category 1 through 4 monitoring items can be found in Chapter 4 of the 2004 Forest Plan.

Budgetary constraints may affect the level of monitoring that can be done in a particular fiscal year. If budget levels limit the Forest's ability to perform all monitoring tasks, then those items specifically required by law are given the highest priority.

2.2 Monitoring and Evaluation Implementation Guide (Monitoring Guide)

The Monitoring and Evaluation Implementation Guide (Monitoring Guide) is part of the overall monitoring framework for the Chippewa National Forest. While Chapter 4 (Monitoring and Evaluation) of the Forest Plan is strategic in nature and provides programmatic direction for monitoring and evaluating Forest Plan implementation, the Monitoring Guide provides direction that is more specific to implement the monitoring strategy outlined in the Forest Plan. The Monitoring Guide details the methodologies and protocols used to conduct monitoring and evaluation tasks identified in the 2004 Forest Plan for the Chippewa National Forest. The Monitoring Guide also assigns responsibilities for monitoring and evaluation tasks and defines where monitoring data is to be stored.

The guide is flexible and may be changed as new methodologies and techniques are developed. It allows the principles of adaptive management to be applied so that as monitoring techniques are implemented, they can be evaluated for their effectiveness and efficiency (and revised as appropriate).

2.3 Monitoring and Evaluation Report

Providing timely, accurate monitoring information to the decision makers and the public is a key requirement of the monitoring and evaluation strategy. The monitoring and evaluation report, which provides the analysis and summary of the monitoring results, is the vehicle for disseminating this information. This report provides an opportunity to track progress towards the implementation of Forest Plan decisions and the effectiveness of specific management practices. The focus of the evaluation is in providing short and long-term guidance to ongoing management."

Evaluation is the process of transforming data into information—a value-added process. It is a process of synthesis that brings together value, judgment and reason with monitoring information to answer the question, "So what?" and perhaps, "Why?" Evaluation requires context. A sense of the history of the place or the circumstances (temporal and spatial context) are important to the evaluation of management activities. Evaluation describes movement from a known point (base line or reference condition) either toward or away from a desired condition. The desired conditions may or may not ever be fully achieved, but it is important to know if management activities are heading in the right direction. Evaluation produces information that is used to infer outcomes and trends. Conclusions will be drawn from an interpretation of evidence. These conclusions are documented in the monitoring and evaluation report.

The monitoring and evaluation report is intended to be a comprehensive compilation of all the monitoring and evaluation described in the plan. This report provides summaries of data collected, and evaluations of the data. The evaluation process determines whether the observed changes are consistent with Forest Plan desired conditions, goals, and objectives and identifies adjustments that may be needed. Continuous updating and evaluation of monitoring data provides a means to track management effectiveness from year to year and to show the changes that have been made or are still needed.

Key information displayed in the biennial monitoring and evaluation report includes:

- Forest accomplishments toward achieving multiple use objectives for providing goods and services.
- The degree to which on-the-ground management is maintaining or making progress toward the desired conditions and objectives for the plan
- The effects of the various resource management activities within the plan area on the productivity of the land
- Conclusions and recommendations regarding the need to adjust monitoring or change the Forest Plan
- Status of other agency/institution cooperative monitoring
- Update of research needs
- Documentation of any monitoring that has not been completed and the reasons and rationale (budget or staffing limitations or unexpected conditions, such as a severe fire season)

Chapter 2. Resource Reports

1. Multiple Uses

Key Points

The annual target for timber volume sold is negotiated between the Forest and the Region. Beginning in fiscal year 2018 through 2023, the Forest's **target** for annual timber volume sold has averaged 43.58 million board feet (MMBF). The actual **volume sold** has been slightly below the target during this time with **sales averaging 41.58 MMBF**. Volume sold has fluctuated from a high of 46.2 MMBF in 2018, in part due to blowdown events, to a low of 34.7 MMBF in 2023. The Allowable Sale Quantity for Decade 2 of the Forest Plan (2014 to 2024) is 60 MMBF, a bit higher than in the first decade where it was 58 MMBF (see 7 Social and Economic Stability). Acres harvested have fluctuated from 6,262 acres in fiscal year 2018 to 2,682 acres in fiscal year 2022, with an average of 3,963 harvested acres during this period.

The ratio of sawtimber to pulpwood is lower than what was predicted in the Forest Plan for both Decade 1 and for the years 2018-2023 of Decade 2.

The Forest accomplished restoration work through an **expanded use of Stewardship** contracting and the introduction of **Good Neighbor Authority** (GNA) as a new tool in 2016. The Forest continues to enhance the use of Stewardship and Good Neighbor Authorities as tools to improve efficiencies and accomplish Forest priorities. See table 1 for stewardship and GNA work.

Stewardship	Acres Sold	MMBF Sold	Percent of Total Sold Volume
FY 18	1,317	12.9	28%
FY 19	994	12.4	28%
FY 20	526	8	19%
FY 21	3,011	18.4	43%
FY 22	1,891	13.4	33%
FY 23	732	9.5	27%

Table 1. Stewardship and Good Neighbor Authority

Over the past fifteen years our surveys show a slight decrease in recreation use, with use remaining relatively steady in recent years. The Chippewa National Forest has been meeting basic health and safety and accessibility standards, managing within budget, and responding with appropriate management options to reduce maintenance costs. The range and scope of recreational opportunities has decreased. Given a continued reduction in recreation budgets, additional facility decommissioning may occur.

The Chippewa National Forest improved terrestrial wildlife acres, aquatic lake acres and stream miles annually from 2018-2023. Starting in 2020, the regional office no longer assigned program targets. Program targets are now accomplishments determined by the Forest based on capacity, partnerships and funding. The Chippewa National Forest uses an integrated approach to meet these outputs through partnerships and other Chippewa National Forest resource outputs that benefit wildlife. Table 72 displays actual wildlife and aquatic outputs.

Monitoring Question

How close are projected timber outputs and services to actual?

Indicators:

Forest Plan Table APP-D2: Acres of timber harvest by treatment method comparing estimated to actual.

Volume sold and harvested annually compared to the Forest Plan.

Acres sold and harvested annually compared to the Forest Plan.

Results

The data from Decade 1 and Decade 2 indicate thinning treatments were over prescribed and even-aged treatments such as clearcut and shelterwood were under prescribed. These management choices have direct impacts on the ability of the Forest to meet age class objectives in the Forest Plan. (See section 7. Social and Economic Stability table 48 and table 49.

Beginning in fiscal year 2018 through 2023, the Forest's **target** for annual timber volume sold has averaged 43.58 million board feet (MMBF). The actual **volume sold** has been slightly below the target during this time with **sales averaging 41.58 MMBF**. Volume sold has fluctuated from a high of 46.2 MMBF in 2018, in part due to blowdown events, to a low of 34.7 MMBF in 2023. The Allowable Sale Quantity for Decade 2 of the Forest Plan (2014 to 2024) is 60 MMBF, a bit higher than in the first decade where it was 58 MMBF (see 7 Social and Economic Stability). Acres harvested have fluctuated from 6,262 acres in fiscal year 2018 to 2,682 acres in fiscal year 2022, with an average of 3,963 harvested acres during this period. (See section 7. Social and Economic Stability, table 51.

The allowable sale quantity (ASQ) is the maximum amount of chargeable timber volume that can be sold from a plan area over a ten-year planning period. The ASQ for Decade 2 is 600 million board feet (MMBF). On average, 60 MMBF is anticipated for harvest in any given year of Decade 2. The average volume sold annually for the period 2017-2023 of Decade 2 was 41.58 MMBF, which is 70 percent of the average annual ASQ. At this rate, harvested timber would remain within the maximum amount of volume that may be offered and sold for Decade 2.

The probable area of timber harvest in Decade 2 was estimated to be 82,222 acres. The annual average harvested during 2018-2023 of Decade 2 was 3,963 acres, which is about 48 percent of the annual average anticipated.

The ratio of sawtimber to pulpwood is lower than what was predicted in the Forest Plan for both Decade 1 and for the 2018-2023 years of Decade 2. (See 7. Social and Economic Stability section, table 53).

See section 7. Social and Economic Stability for further discussions.

Monitoring Question

To what extent do Forest recreation facilities and opportunities achieve resource and social objectives?

Indicator:

Recreation partner projects, dispersed recreation inventories, significant recreation events and developed recreation improvements and projects.

Results

Over the past ten years our surveys show a significant decrease in use. This could, in part, be attributed to the recession which began in 2008 as well as the decrease in outdoor users. Additionally, the Forest believes the formula used to determine visitation in 2006 was likely flawed and believe the numbers represented in years 2011 and 2016 are reflective of the actual average visitation.

The Chippewa National Forest has been meeting basic health and safety and accessibility standards, managing within budget, and responding with appropriate management options to reduce maintenance costs. The range and scope of opportunities has decreased. Given a continued reduction in recreation budgets, additional facility decommissioning will occur.

Participation in recreational activities is the way that most of us come to our National Forests and Grasslands, making it an important portal for understanding their meaning, history, and relevance, and that of public lands.

Recreation opportunities on the Chippewa National Forest directly provide benefits to citizens. Many mental, spiritual, and physical benefits are gained while making connections with the land through recreational activities associated with recreation facilities. (See section 6. Recreation table 39 and table 46.)

See section 6. Recreation for further discussions.

Monitoring Question

To what extent is Forest management improving aquatic and terrestrial wildlife habitat?

Indicators:

- Acres of terrestrial wildlife habitat treated.
- Acres of lake habitat treated.
- Miles of stream habitat treated.

Results

The Chippewa National Forest improved terrestrial wildlife acres, aquatic lake acres and stream miles annually from 2018-2023. Starting in 2020, the regional office no longer assigned program targets. Program targets are now accomplishments determined by the Forest based on capacity, partnerships and funding. The Chippewa National Forest uses an integrated approach to meet these outputs through partnerships and other Chippewa National Forest resource outputs that benefit wildlife. Table 72 displays planned and actual wildlife, and aquatic outputs.

See section 13. Wildlife and Plants for further discussion.

2. Climate Change

Climate change was not addressed during the development of the 2004 Forest Plan. This monitoring element was added in 2016 during the transition to the 2012 Planning Rule for monitoring. A variety of options were considered to assess climate change. The option we selected was to evaluate long term trends in growing season as the dates between the last frost in the spring and the first frost in the fall. This data has been collected continuously since 1961 on the Marcel Experimental Forest which is located on the Chippewa National Forest.

Key Points

There is a distinct increasing trend showing in general the growing season appears to be getting longer. Within the range of the data, time between the last frost of spring and the first frost of fall has gone from approximately 110 days to almost 130 days.

Monitoring Question

How is the frost-free season changing across the plan area on an annual basis?

Last Updated

This question was added to our monitoring indicators when we updated the monitoring section of the Forest Plan in 2016 to comply with the 2012 Planning Rule.

Monitoring Indicator

The period of time between the last frost of spring and the first frost of fall when the air temperature drops below the freezing point of 32 degrees Fahrenheit.

Monitoring Frequency

Data is collected continuously (once an hour) at the Marcel Experimental Forest. Data will be processed and reported out every two years.

Background and Drivers

This monitoring question is one of the eight monitoring pillars described in 36 CFR 210.12. Specifically, the element says, "Measurable changes on the plan area related to climate change and other stressors that may be affecting the plan area." We focused specifically on long term climate change since it tends to be a force multiplier for a variety of other stressors including insects and diseases, drought, and species composition changes.

We used data collected at the Marcel Experimental Forest which is on the Chippewa National Forest. Since we are concerned about long term change, this data set provides a continuously collected data source since 1961. Although annual weather variations of the last frost in the spring and first frost in the fall may not show a trend, over more than 63 years of data, trends can be observed.

Results

Monitoring Indicator: the period of time between the last frost of spring and the first frost of fall. The data on growing season length is plotted in figure 1.



Figure 1. Day of last frost figure: This increase in growing season length is approximately evenly split between earlier dates of last frost in spring and later dates of last frost in fall. The last day the air temperature drops below the freezing point of 0 degrees Celsius in spring has become earlier by 16 days, on average, since 1961.



Figure 2, Growing season length figure: Annual number of days between last frost in spring and first frost in fall when the air temperature drops below the freezing point of 0 degrees Celsius. Even though there is high inter-annual variation in the length of the growing season at the Marcell Experimental Forest (range = 90 - 150 days), the growing season has increased by 32.6 days over the 63-year record (1961 - 2023).



Figure 3. Mean annual air temp figure: Air temperature has increased by 2.2 degrees Celsius since 1961 (a rate of 0.35 degrees Celsius per decade) at the Marcell Experimental Forest.

Discussion

The provided figures illustrate key trends in air temperature and growing season dynamics at the Marcell Experimental Forest (MEF) based on data from the South Unit meteorological station. These trends offer valuable insights into climate patterns over the 63-year monitoring period (1961–2023).

The growing season length figure 2 reveals a significant increase in the frost-free period, defined as the number of days between the last frost in spring and the first frost in fall. Despite high inter-annual variation (ranging from 90 to 150 days), the growing season has lengthened by 32.6 days over the observed record. This extension is attributed to earlier occurrences of the last frost in spring and later occurrences of the first frost in fall. Specifically, the day of last frost figure 1 shows that the last frost in spring has shifted earlier by an average of 16 days since 1961, demonstrating a clear trend toward milder and earlier spring conditions.

The mean annual air temperature figure 3 further supports these observations, indicating a consistent warming trend at MEF. Since 1961, the mean annual air temperature has risen by 2.2 degrees Celsius, equating to a rate of 0.35 degrees Celsius per decade. This increase aligns with regional and global climate warming patterns, contributing to the extended growing season and shifting frost dates.

As was discussed earlier there are no specific goals in the Forest Plan regarding responding to climate change. However, considerable literature has been produced in the last decade regarding how to prepare forested ecosystems to the anticipated climate changes. The data collected at the Marcel Experimental Forest indicate many of the predicted changes are occurring. Since trees planted today will likely be growing in 100 years, it is appropriate to consider climate change as part of our on-going management activities.

Recommendations

The Forest Plan does not address climate change directly. Since we are already incorporating some of the best available science into our analyses, and the current 2012 Planning Rule requires additional consideration of this topic, there is not a driving need to revise the Forest Plan at this time based on this topic. This topic will be added to a future revision effort which is scheduled to begin in October 2024.

Evaluation of Monitoring Question and Indicator(s)

The monitoring question and indicator are appropriate for climate change.

Reference

Sebestyen, S.D., E.S. Verry, A.E. Elling, R.L. Kyllander, D.T. Roman, J.M. Burdick, N.K. Lany, and R.K. Kolka. 2020. Marcell Experimental Forest daily maximum and minimum air temperature, 1961 - ongoing ver. 1. Environmental Data Initiative. https://doi.org/10.6073/pasta/288f5cd32d34aeea9e80799e99867b53 (Accessed December 10, 2024).

3. Cooperation

The Forest has continued to expand the number of partnerships and agreements with the Leech Lake Band of Ojibwe, state and counties and non-government organization.

Key Points

Grants and agreements make an important contribution to provide work opportunities, improve relationships with partners, and to achieve resource accomplishments.

Monitoring Question

To what extent does the Forest emphasize agency, tribal, and public involvement and inter-governmental coordination with federal, state, county governments and agencies?

Last Updated

2017.

Monitoring Indicator

Number or partnerships and agreements; Stewardship contracts, and Good Neighbor Authority projects.

Monitoring Frequency

2 years

Background and Driver(s)

This monitoring question stems from the Forest Plan desired conditions:

D-CM-1	D-SE-4	D-REC-6

Results

Forest collaboration with external partners has been on the rise since 2009. The Grants and Agreements program on the Forest has seen an increase in the number of new partnership agreements. New partnerships are being created annually with an emphasis on cultural and natural resource management. Table 2 presents the number of new agreements issued between 2005 and 2023 as well as the number of modifications to existing agreements. There were no partner in-kind or non-cash contributions agreements during this time.

Table 2.	New	Aareements	between	2005	through	2023
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Year	Number of New Agreements	Number of Modifications to Existing Agreements	Total Value of Agreements
2005	19	11	\$331,148
2006	32	11	\$611,830
2007	37	20	\$663,887
2008	37	23	\$549,769
2009	51	44	\$3,254,482 ¹
2010	34	43	\$2,926,967 ¹
2011	38	45	\$2,249,482
2012	36	42	\$2,551,755
2013	38	39	\$1,904,806
2014	40	56	\$2,493,773

Year	Number of New Agreements	Number of Modifications to Existing Agreements	Total Value of Agreements
2015	36	42	\$1,830,881
2016	30	32	\$2,268,439
2017	31	54	\$1,971,632
2018	35	37	\$1,595,249
2019	25	39	\$3,545,882
2020	35	37	\$2,103,148
2021	29	26	\$1,879,887
2022	26	50	\$4,602,334
2023	25	52	\$6,194,695 ²

1.-Includes American Recovery and Reinvestment Act of 2009 Agreements

2.-includes Bipartisan Infrastructure Law and Great American Outdoor Act Funds

Discussion

The Forest has seen an increase in the number of partnerships that benefit natural resource management on lands within the Forest and the Leech Lake Reservation. The use of stewardship agreements and increased funding has allowed the Forest to expand collaboration with the LLBO and numerous other partners. The list below includes the various partners the Chippewa National Forest is partnering to improve cultural and natural resources.

Chippewa National Forest Partners

- Leech Lake Band of Ojibwe (LLBO)
- Leech Lake Tribal College
- Cass, Itasca and Beltrami Counties
- The Ruffed Grouse Society,
- American Bird Conservancy
- The Nature Conservancy
- Wildlife Forever
- University of Minnesota Duluth
- Minnesota Department of Natural Resources
- Bureau of Indian Affairs, Ottertail Power
- USDA Animal and Plan Inspection Service (APHIS)
- Wilderness Riders ATV Club
- Inger Local Indian Community
- Minnesota Forest Resource Partnership
- Conservation Corps Minnesota and Iowa, Northern Bedrock Conservation Corp
- Northern Lights Ski Club

The Forest continues to expand the stewardship authority by increasing the number of stewardship agreements. Timber removal stewardship agreements were signed with The Nature Conservancy, and Ruffed Grouse Society that elevated the use of partners in timber and natural resource management. Numerous other stewardship agreements are being implemented using both retained receipts and appropriated funding to

achieve both partner and Forest goals. See table 3 for stewardship agreement acres and volume for 2018-2023.

Starting in 2016, the Forest developed of a Good Neighbor Agreement with the State of Minnesota. The Regional Office signed a master agreement, and the Forest implemented a supplemental project agreement which includes timber removal. Work has been ongoing and the outcomes from timber sales are displayed in table 51.

Stewardship	Stewardship Agreement Partnership Acres Sold	Stewardship Agreement Partnership Volume (CCF) ¹ Sold	Good Neighbor Authority Acres Sold Via MN DNR	Good Neighbor Authority Volume (CCF) Sold Via MN DNR		
FY 2018	129	1092	75	5221		
FY 2019	None	None	307	5030		
FY 2020	333	4212	429	8202		
FY 2021	None	None	371	6875		
FY 2022	78	2228	197	2512		
FY 2023	None	None	499	10659		

 Table 3. Stewardship and Good Neighbor Authority contracting for fiscal years 2018-2023

1.-CCF is one hundred cubic feet.

Recommendations

The Forest should continue to work cooperatively with external partners for the improvement of the natural resources within the forest.

Evaluation of Monitoring Question and Indicator(s)

The monitoring question and indicator are appropriate for cooperation.

References

Data reports were pulled from Natural Resource Manager (NRM) to provide information regarding number of agreements, dollar amounts and cooperators. Reports used were the GARP010L and GARP006L.

4. Insects and Diseases

Since the early 1950's, aerial surveys have been a valuable tool for monitoring the status of forest insects and pathogens across the 16 million acres of forest land in Minnesota. For the past fifteen years, these surveys have been accomplished through the partnership of the Minnesota Department of Natural Resources (DNR) Forest Health and Resource Assessment Unit and the Forest Service State and Private Forestry. Aerial sketch maps are digitized, ground-truthed, and made available as a State-wide shapefile. The purpose of this survey is to indicate where significant and highly noticeable tree damage occurred. A second purpose is to monitor general trends in forest health conditions. These data are obtained by the Forest Silviculturist, clipped to the Forest's boundary and summarized for the Forest. In 2020 the survey was incomplete due to the COVID pandemic. This is reflected in no acres recorded of insect and disease activity for 2020.

Key Points

Tamarack continues to be heavily impacted by the larch casebearer and Eastern larch beetle. During the timeframe of this report (2018-2023) damage of the larch from the larch casebearer has significantly reduced from 8,965 acres in 2017 to 1,181 acres in 2018. In 2021-2022 there were no reports of larch casebearer. In 2023, there were reported 2,886 acres.

Monitoring Question

Are insects and diseases populations compatible with objectives for restoring or maintaining healthy forest conditions?

Last Updated

The monitoring question is analyzed annually. The analysis is reported biennially.

Monitoring Indicator(s)

Acres of damage by agent; acres of damage by forest type; acres of damage by severity rating. Host, agent and severity.

Monitoring Frequency

Annually.

Monitoring Driver—Desired Condition and Objectives:

This monitoring question stems from 36 CFR 219.12(k)[5][iv]. Destructive insects and disease organisms do not increase to potentially damaging levels following management activities.

The Forest Plan includes desired conditions and objectives related to insects and disease at:

D-ID-3	D-VG-8	O-VG-13
O-ID-1	O-VG-11	
D-VG-5	O-VG-12	

Results

The Chippewa National Forest's forest health survey results are displayed in table 4 for damage by causal agent, table 5 for damage by forest type, and table 6 and table 7 for severity ratings. There were some changes in the data around 2016 to 2017. For example, "decline" was not reported on the national forest in 2017, but two new categories ("Blights" and "Hail") may have been counted as "decline" in the past. Some of the increase in "Abiotic" may have also been reported as "decline" in the past. Also in 2016, the number of Severity Ratings increased from a previous 4 in 2015 to 5 levels in 2016 to current.

Larch Casebearer

During the timeframe of this report (2018-2023) damage of the larch from the larch casebearer has significantly reduced from 8,965 acres in 2017 to 1,181 acres in 2018. In 2021-2022 there were no reports of larch casebearer. In 2023, there were reported 2,886 acres. Larch casebearer is a non-native caterpillar that feeds on tamarack. It first began causing noticeable defoliation on the Forest in 2005. Factors contributing to larch casebearer outbreaks are unknown, though effects from this insect have continually spread state-wide for several years.

Larch casebearers defoliate trees. Though defoliation is stressful, tamarack can usually tolerate this process for several years before dieback begins to occur. This is because, unlike most conifers, tamarack continue to grow new needles throughout the growing season (indeterminate growth).

Table 4. Damage by causal agent

Agent name	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Aspen defoliation	133	2,865	821	0	929	1,108	0	0	0	0	0	0	0	0
Forest tent caterpillar	457	147	547	0	0	3,031	2,220	394	8,638	34,064	207,001	39,053	2,382	399
Unknown	0	0	0	0	0	0	0	2,406	0	48	137	67	520	10
Spruce Budworm	3,524	1,614	0	0	531	263	137	936	1,110	263	0	2	339	73
Larch casebearer	2,886	0	0	0	1,145	1,181	8,965	820	1,291	1,314	512	667	749	2,787
Arborvitae leafminer (N white cedar)	0	0	0	0	0	888	0	0	0	0	0	0	0	0
Eastern larch beetle	13,340	18,463	16,121	0	10,489	2,678	2,267	1,332	136	1,430	447	39	266	12
Ash decline	0	0	0	0	0	0	0	0	0	0	519	0	0	593
Flooding/ Beaver	522	541	205	0	122	105	198	184	64	144	278	301	147	11
Bark beetles	184	129	110	0	107	107	0	0	92	216	2	1	2	30
Armillaria Root Rot	0	0	88	0	0	0	0	0	0	0	0	0	0	0
Two-lined chestnut borer	0	0	96	0	0	0	0	0	8	0	0	0	0	2
Abiotic	0	0	0	0	0	0	982	0	0	28	0	0	912	0
Rx Fire & Wildfire	0	0	49	0	131	276	114	0	54	0	0	0	91	117
Wind Damage	286	1,486	0	0	0	37	2,202	1,383	0	1	0	4,603	0	0
Decline	0	0	0	0	0	0	0	0	883	4,787	942	1,702	351	0
Basswood leafminer	840	0	163	0	0	0	0	0	0	0	0	0	0	0
Hail	0	0	0	0	0	0	764	0	0	0	0	0	0	0
Blights (<i>Phomopsis,</i> Sclerophoma, Kabaiana)	0	0	0	0	0	0	1,378	0	0	0	0	0	0	0
Dutch elm disease	0	0	0	0	0	0	0	0	0	0	0	0	0	11
Total acres	22,172	25,245	18,200	0	13,454	9,673	19,227	7,455	17,644	38,210	209,838	46,435	4,847	4,045

1.-In 2020 there was no data collected due to the pandemic.

Eastern Larch Beetle

Eastern larch beetle is a native bark beetle that attacks only larch species. In 2017 the affected acres on the Forest totaled 2,267, and in 2018 there were 2,678 acres affected. Then in 2019 that number jumped to 10,489 newly affected acres and the number of acres has consistently remained in the mid to upper teens of thousands with a high of 18,463 acres in 2022. In 2022, Eastern larch beetle infested more acres than ever before across the state, exceeding 300,000 acres. Since the beginning of the Eastern larch beetle outbreak in 2001, nearly 972,000 acres of tamarack has been impacted around the State. This equates to 69 percent of the State's tamarack. It is thought that the warming climate has changed the Eastern larch beetle life cycle by reducing its time span thus aiding in a higher beetle population.

Eastern larch beetles prefer large mature trees. Damage usually starts out light, with less than 30 percent of the trees in a stand impacted. Eastern larch beetle will continue to work in a stand over several years until mortality of all large trees is complete. Current recommendations by the Minnesota Department of Natural Resources are to manage tamarack stands to establish the next generation of trees; "Our best advice for forestland owners who wish to manage their tamarack for timber is to regenerate mature or almost-mature tamarack stands before they are infested by eastern larch beetle. Encourage tree diversity, and don't shy away from promoting tamarack. Larch beetles will generally not attack young tamarack seedlings and saplings." (Minnesota Department of Natural Resources (MN DNR) East Larch Beetle Management). Figure 4 is an aerial view of forests heavily impacted by eastern larch beetle.



Figure 4. Eastern larch beetle caused mortality

Wind Damage

In the timeframe of this report 2018-2023, there was only significant wind damage observed in 2022 with 1,486 acres and in 2023 with 286 acres within the Chippewa National Forest.

On the Forest most of the wind damage was in the southern portion of the Deer River District. Forty percent of the damage was moderate, while 52 percent was severe. All species of trees were involved.

Arborvitae Leafminer (Argyresthia Thuiella) on Northern White-Cedar

Northern white-cedar has relatively few disease and insect pests, however browsing by white-tailed deer and snowshoe hares can prevent the reestablishment of the type (Johnston 1977, Fowells 1965), and may be the greatest problem for this species on the Forest. Even so, Arborvitae leafminer can cause premature leaf browning and shedding. Nearly 888 acres of blight was found on Northern white cedar (*Thuja occidentalis*) on the Forest in 2018. Because the species of blight was not confirmed it's not possible to predict what will happen with these infections. The species of blight that was thought to have affected Northern white-cedar in 2017 was not confirmed. However, in 2018 thanks to the University of Minnesota Plant Disease clinic and several Minnesota DNR foresters it was determined that the damage from 2017 was not a leaf blight as originally thought but instead Arborvitae leafminer.

Arborvitae leafminer is a small (up to one-fourth inch long) green or brownish caterpillar with a dark brown or black head and a dark spot just behind the head. Nearly full grown leafminers overwinter in foliage that has been mined by the larvae that hatch the previous summer. The arborvitae leafminer attacks all varieties of arborvitae. The mined leaves turn yellowish or whitish and detract from the appearance of infested arborvitae. Tips may die completely, and sometimes whole plants may turn brown from their feeding.6

Forest Tent Caterpillar

Around 3,031 acres of forest tent caterpillar damage were observed on the Forest in 2018, up from 2,220 acres in 2017. There were no recorded acres on the Forest in 2019, and when surveying resumed in 2021 there were approximately 550 acres. The acres dropped to approximately 150 in 2022, but then increased to 450 in 2023. Most of the damage in 2018 (86 percent) was "moderate"; 300 acres were "severe" or "very severe". Approximately 70 percent of the acres affected were in the Walker Ranger District. The largest block, however, was located on the Deer River District.

Forest tent caterpillar is a native insect that primarily feeds on the leaves of aspen, oak, birch, and basswood. Health trees can typically withstand forest tent caterpillar damage, but if attacked multiple years it could lead to mortality and/or reductions in growth. Aspen that is defoliated by forest tent caterpillar can re- foliate. This process uses energy resources. Multiple defoliations can kill trees. The Minnesota Department of Natural Resources recommends, in areas with repeated

Spruce Budworm

Spruce budworm damaged acres in 2023 were the most acres mapped in a single year since 1961. Across the Chippewa there were over 3,500 acres detected. That is more than twice the acres from the 1,614 acres in 2022. The vast majority of this activity is on the Blackduck Ranger District. There was a notable increase in activity in 2023, of which much occurred on the Deer River Ranger District. Of the acres affected in 2022, 90% was either severe or very severe, and in 2023, 89% was either severe or very severe. Much of the affected spruce budworm acreage is currently included in planned salvage timber harvests.

Spruce budworm prefers to feed on balsam fir then white spruce. Typically, in Minnesota, spruce budworm feeds in an area for 6-10 years. It is this timeframe that balsam fir and white spruce can, on average, withstand defoliation before they die. However, in some parts of the state budworm has been active for 10+ years leading to this outbreak of mortality.
Fire

Two hundred seventy-six acres were damaged by fire in the 2018 survey. Of these acres approximately 206 were in one location just east of Cass Lake and south of Highway 2 with light mortality recorded in a mixed pine hardwood stand. There was only one other fire damaged stand in 2018 that was approximately 75 acres and suffered moderate defoliation in the red pine type. In 2019 there was only one fire damaged stand of approximately 131 acres that suffered moderate crown discoloration in the red pine type. Unobserved fire damage occurring after aerial survey is complete usually leads to an underestimate of damaged acres each year.

The tables on the following pages display summaries of damage and severity. Table 5 displays the damage by forest type. Tamarack was the forest type most affected, representing 74 percent of newly affected acres, by insect and disease damage in the 2018-2023 timeframe, due to eastern larch beetle and larch casebearer. The next highest percentage of species affected were the three categories of balsam fir and white spruce, aspen, and hardwoods which each had approximately 6%. These groups of species damage was due to spruce budworm, abiotic problems, and forest tent caterpillar.

Host Forest Type	2023	2022	2021	2020 ¹	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Aspen	133	2865	807	0	929	1,108	982	593	3,246	274	942	1,641	646	0
Balsam Fir/white spruce	3524	1639	0	0	531	263	137	936	1,260	389	149	7	352	85
Birch	0	63	0	0	0	0	0	0	0	0	0	0	0	0
Black Ash	0	0	0	0	0	0	0	0	688	550	519	154	225	593
Black Spruce	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	0	0	0	0	0	0	0	0	0	0	0	0	0	11
Hardwoods	1397	0	848	0	7	3,031	2,220	578	9,520	34,064	207,012	39,785	2,382	399
Jack Pine	0	0	0	0	0	0	0	0	0	0	1	0	1	14
Oaks	0	0	57	0	0	0	0	0	0	0	0	0	0	2
Red Pine	470	103	247	0	238	144	877	0	37	510	2	317	91	125
Softwoods	0	0	39	0	0	0	0	0	174	2	249	521	134	12
Tamarack	16,226	18,463	16,202	0	11,633	3,859	11,232	2,152	2,722	2,423	959	706	1.02	2,805
Unknown		236		0	115	381	181	1,813	0	0	0	0	0	0
White pine	0	0	0	0	0	0	0	0	0	0	0	50	0	0
Both Hardwoods & Softwoods	875	1876	0	0	0	0	2,220 ²	1,383	0	0	5	3,254	0	0
Northern white- cedar	0	0	0	0	0	888	1,378	0	0	0	0	0	0	0
Total	22,625	25,245	18,200	Covid	13,453	9,673	19,227	7,455	17,647	38,212	209,838	46,435	4,847	4,045

Table 5. Damage by forest type (newly affected acres) for all ownerships within the Forest boundary

1.-In 2020 there was no data collected due to the pandemic.

2. -Mostly wind damaged.

In 2016 the severity ratings for damage changed from four to five categories. Table 6 displays the five categories of severity ratings for 2016 through 2023, and table 7 displays the four categories of severity ratings from 2004 - 2015.

The years of 2016 through 2023, two-thirds of the severity ratings were in the "Moderate" to "Very Severe" classes, meaning where disease or damage to trees was being seen, 11 percent to >50 percent of a stand was affected by the problem.

Severity	2023	2022	2021	2020 ¹	2019	2018	2017	2016
Very Light (1%-3% affected)	0	4,923 20%	1,070 6%	0	0	0	1,080 6%	338 5%
Light (4%-10% affected)	1,526 6%	10,959 43%	8,034 44%	0	1,592 12%	2,532 26%	4,820 25%	825 11%
Moderate (11%-29% affected)	7,633 34%	5,965 24%	7,796 43%	0	8,291 62%	4,749 49%	9,572 50%	2,838 38%
Severe (30%-50% affected)	12,151 54%	1,988 8%	1,198 6%	0	2,505 19%	1,937 20%	32 <1%	2,153 29%
Very Severe (>50% affected)	1,314 6%	1,410 5%	100 1%	0	1,065 7%	456 5%	563 3%	1,250 17%
Total	22,624 100%	25,245 100%	18,199 100%	0	13,453 100%	9,674 100%	19,227 100%	7,454 100%

Table 6. Forest damage by severity rating 2016-2023 for all ownerships within the Forest boundary

1.-In 2020 there was no data collected due to the pandemic.

Severity	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
Trace	2,932	20,250	187,155	23,383	937	1,862	171	663	2,152	673	257	2,339
(5%-25% affected)	16%	53%	89%	50%	19%	46%	6%	25%	25%	19%	7%	51%
Light	1,424	630	1,529	1,313	673	1,095	95	1,299	6,328	541	3,133	1,994
(26%-50% affected)	8%	2%	3%	3%	14%	27%	4%	48%	74%	16%	91%	44%
Moderate	11,205	17,307	20,990	16,419	1,893	383	1,382	511	39	2,246	12	46
(51%-75% affected)	64%	45%	10%	35%	39%	9%	52%	19%	<1%	64%	<1%	1%
Heavy	2,085	25	164	5,320	1,344	705	1,019	207	0	29	30	167
(>75% affected)	12%	<1%	<1%	11%	28%	17%	38%	8%	0%	1%	1%	4%
Total	17,646 100%	38,212 100%	209,838 100%	46,435 100%	4,847 100%	4,045 100%	2,667 100%	2,680 100%	8,519 100%	3,489 100%	3,432 100%	4,546 100%

 Table 7. Forest damage by severity rating 2004-2015 for all ownerships within the Forest boundary

Discussion

Over 14 years of monitoring (2010-2023) there was one year (2013) that was an anomaly due to a large area (207,012 acres) of damage by forest tent caterpillar. Removing 2013 as well as 2020 where COVID did not allow any surveying to be done from the data, the mean area with new damage since 2010 is 18,922 acres. The minimum was 4,045 acres and the maximum was 38,212 acres. The17,839 of new damage in the timeframe of 2018-2023 is within the "normal" range for the past 14 years.

What is happening is a shift in the species affected, or agents involved. Most notably, damage and mortality has increased for the tamarack forest type. In 2022, 18,463 acres of tamarack were damaged and dying. In fact, from 2023 to 2017 (minus 2020) the average acres affected of tamarack was 12,936; however, from 2016 to 2010 the average was 1,696 – approximately 1/10th the average from 2023 to 2017.

Whatever the cause the eastern larch beetle is behaving differently than historically. Throughout the range of tamarack eastern larch beetle is now attacking health trees, where in the past it was more opportunistic, attacking trees that were stressed.

What was thought at the time to be Shoot blight on northern white-cedar (*Thuja occidentalis*) first appeared in 2017 in forest health surveys. With additional research and information, the actual cause of northern white cedar damage in 2017 as well as 2018 has been confirmed to be Arborvitae leafminer. "The outbreak has been widespread and severe with 75 percent of the affected acreage statewide having more than a third of the canopy impacted" (MN DNR Annual Health Report 2017). Statewide 11,752 acres were affected. Most of these are in proximity to the north side of the Chippewa National Forest. Approximately 1,378 acres were located on National Forest System lands in 2017 and approximately 888 acres in 2018. This appears to be a new issue for northern white-cedar. This species is already in jeopardy because the Forest is unable to regenerate it due to high deer densities and browsing impacts.

Regarding the Monitoring Question: "Are insects and diseases populations compatible with objectives for restoring or maintaining healthy forest conditions?"

What constitutes a "healthy forest" has not been quantified. Regarding native insects and diseases things are likely to change. The eastern larch beetle is a current example. If the growing season continues to extend, it gives insects opportunity to produce additional generations in a year. Two generations may become common in a season where one generation used to be the norm. Thus, populations will build.

Non-native species is another variable presenting greater risks to forest health. The emerald ash borer was, for the first time, recently detected on the Chippewa in October 2023. Thus far, the spongy moth (previously named gypsy moth) not been detected on the Forest through 2024, but is at the "doorstep." Oak wilt is approaching from the south. None of these are native to North American and can cause great disruption in forest systems.

Coupled with these, the Forest is short on young age classes on its landscape. Young trees are more vigorous and resilient.

Recommendations

The Forest Service should implement strategies that allow for rapid response to forest health issues as they occur. Eastern larch beetle may quickly remove the options for natural regeneration of tamarack if the infestation becomes forest-wide. Therefore, it is recommended to begin regeneration harvests as soon as eastern larch beetle is detected in an area to take advantage of living trees as seed sources. Though seed trees may not stand long, it may be long enough to cast seed.

With emerald ash borer (EAB) having recently been confirmed on the Chippewa, there is ongoing discussions about how to best combat it. We know that once EAB is on-site, it is there to stay, for there is no known remedy. There is a little further explanation of the current plan to combat EAB directly below under the Awareness section, but we will see how well it is implemented.

Awareness:

Emarald Ash Borer: In the fall of 2023, the invasive emerald ash borer (EAB) was discovered on the Chippewa National Forest (CPF) near the western Big Rice Lake Boat Access. The discovery of EAB on the CPF causes significant concern due to the prevalence of ash in the forest, whether in ash dominated swamps or as a component in mixed hardwood stands. As a response, the CPF is taking an integrated approach to EAB, such as using harvest methods to slow the spread of EAB and to salvage infested timber, along with a collaborative effort with Minnesota Department of Agriculture of releasing EAB parasitoids. Through multiple studies, all the utilized biocontrol parasitoids are confirmed specialized predators. Essentially, the parasitoids will not parasitize any other insect than EAB. The release of the specialized parasitoids (*Tetrastichus planipennisi, Spathius galinae* and *Oobius agrili*) started in late spring of 2024 and continued throughout the summer, which is the typical release window of the parasitoids. The CPF implemented the Ash Diversification Project in 2012 and has treated 2,051 acres using a variety of treatments including group selection harvest; single tree selection; planting or seeding of 498 acres with a variety or species; and tending of the planted species.

Forest Health Workshops: Every winter the Forest Service hosts and coordinates an interagency Forest Health Workshop. Attendance is free and has grown each year. The fourteenth annual workshop was held in February, 2018, with over 170 resource managers attending from the Forest Service (Superior and Chippewa National Forests and Northern Research Service Center); Minnesota Department of Natural Resources (forestry, recreation and wildlife); Bureau of Indian Affairs; Red Lake Forestry; Fond du Lac Forestry; Minnesota Department of Agriculture; University of Minnesota; Aitkin, Beltrami, Carlton, Cass, Clearwater, Crow Wing, Hubbard, Itasca, Kanabec, Sherburne Counties; Greg Cook Logging; Potlatch; UPM-Blandin; Minnesota Forestry Association; and several private forestry consultants.

Forest health specialists from USDA State and Private Forestry, the Minnesota Department of Natural Resources, Minnesota Department of Agriculture, and the University of Minnesota made up the cadre. Four Category 1 Continuing Forestry Education credits were given to attendees by the Society of American Foresters. Forest Stewardship Plan writers were also given Continuing Education Credits by the University of Minnesota.

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5. Landscape Ecosystems and Ecological Conditions and Vegetation

The Landscape Ecosystems and Ecological Conditions and the various vegetation monitoring questions focus on the vegetative conditions within the National Forest System lands. These are addressed together since they share many of the same indicators.

From 2018 to 2023, the Chippewa National Forest incorporated new management objectives, which has led to changes in vegetation management and will continue to lead toward changes in vegetation composition and structure, as well as spatial patterns on the landscape. In 2019, the Chippewa National Forest began managing the forest in shared stewardship with the Leech Lake Band of Ojibwe (LLBO) through a memorandum of understanding (MOU), in addition to a renewed focus on federal agencies fulfilling Trust Responsibilities. There has also been more of an emphasis by the Forest Service to manage forests for ecological integrity and resilience, to manage proactively for climate change, and to consider carbon sequestration and storage in management actions and decisions.

As part of the signed MOU, LLBO shared their desired vegetation conditions (DVCs) for the forest and requested increased opportunities for gathering and hunting. In addition, the LLBO has submitted several Tribal Forest Protection Act proposals to the forest, including a Fire Tribal Forest Protection Act (TFPA) and Aspen TFPA. These TFPAs requested an increase in pace and scale of prescribed fire and restoration of fire dependent ecosystems; a reduction in the amount of aspen acreage with restoration of ecologically functioning conifer systems; increased availability of food and medicinal plants related to usufructuary rights; and to improve resilience related to climate change. The LLBO also has requested improvements to snowshoe hare habitat on the forest.

Forest Service management has also continued to evolve during this time, following the best available science, which has also resulted in shifts in management focus. This includes a stronger focus on the benefits of ecological integrity for ecosystem health and resilience as well as sustainability (USDA 2016), a better understanding of the negative impacts of decades of fire suppression and the need to restore these fire dependent systems for both ecological and human health and the safety of our communities (USDI 2014, USDI 2023). In addition, managing for the predicted effects of climate change has been emphasized to managers, as is the desire to proactively manage forests for resilience in the event of climate change (Handler 2014, MN DNR 2014, U.S. Global Change Research Program (USGCRP) 2023). Managing carbon sequestration and storage as an ecosystem service is also growing in importance within the agency (USDA 2016).

In addition to these new management focal areas, other direction, such as the Multiple Use -Sustained Yield requirements for National Forests (our responsibility as a Public Lands Management Agency to provide public services and needs, in part thorough wood products) remain in place (USDA 2016). The ability to manage our Forests is made possible by support from local wood products industries. Incorporating these different management objectives can be challenging at times. However, the integration of these different objectives will synergistically lead to healthier, more resilient forests and ecosystems, ultimately improving the sustainability of ecosystem services in the future, while making local communities safer and healthier.

National Forest System lands and Leech Lake Reservation

- All Landscape Ecosystems on the Forest are below the Decade 2 objectives for the 0-9 age class. There is a trend to increase acres in 0-9 age class overall across all Landscape Ecosystems into 2029 which takes into consideration treatments that are planned and under decision but have yet to be harvested. This trend of increase in acres holds true for the following landscape ecosystems (LEs): Dry Mesic Pine, Boreal Hardwood/Conifer, Mesic Northern Hardwood, and White Cedar Swamp. The trend, however, of decrease or maintain in acres holds true for the following: Dry Pine, Dry Mesic Pine Oak, and Tamarack Swamp. The focus on commercial thinning of red pine stands contributes in part to these trending to decrease in 0-9 age class.
- The amount of mature/older forest on the landscape has increased since 2003. However, results vary by LE as to whether management indicator habitats (MIH) objectives to increase, maintain, or decrease mature and older forest are being met. The trend is for mature/older forest acres to increase into 2029 for all LEs except the following: Mesic Northern Hardwood, Tamarack Swamp, and White Cedar Swamp.
- Jack pine red and white pine, and spruce-fir forest types are well below decadal objectives and contribute to an overall decline in the amount of conifer on the landscape.
- Amount of aspen on the landscape has declined since 2004. Additional decreases in aspen are desired, especially where it is "off-site" aspen.
- Northern hardwoods exceed objectives. Further increases in this forest type are expected due to regeneration treatments, particularly in aspen stands, that promote the release of young hardwoods in stands.

Monitoring Questions

Landscape Ecosystems and Ecological Conditions:

1. To what extent is the Forest meeting vegetation composition and age class objectives for each of the Landscape Ecosystems?

Vegetation

2. To what extent is the Forest providing a full range of vegetative communities that address diverse public interests and needs while contributing to ecosystem sustainability and biological diversity?

Vegetation Composition and Structure

3. To what extent are conditions moving toward short-term (1-20 years) and long-term (100 years) objectives at Landscape Ecosystem, Management Area, and other appropriate landscape scales?

Vegetation Ecological Conditions

4. To what extent is Forest management contributing to the maintenance and establishment of white pine in appropriate landscape ecosystems?

Vegetation Spatial Patterns

5. To what extent is Forest management, natural disturbances, and subsequent recovery restoring vegetation spatial landscape patterns and moving conditions toward both short-term (1-15 years) and long-term (100 years) objectives at Landscape Ecosystem, Management Area, and other appropriate landscape scales?

Monitoring Indicators

Landscape Ecosystems and Ecological Conditions:

1. Current species composition and age class by landscape ecosystems (LE) compared to objectives.

Vegetation

2. Current vegetation composition, age class and management indicator habitats (MIH) by LE compared to objectives.

Vegetation Composition and Structure

3. Species composition, age class, and MIH objectives by LE compared to forest plan objectives. Analysis by management area (MA). May include discussion of patch quality.

Vegetation Ecological Conditions

4. .1 - Acres and percent of white pine forest type by landscape ecosystem
.2 - Amount of white pine as a component of other forest types based on frequency in regeneration and non-regeneration plots

Vegetation Spatial Patterns

5. Acres and number of temporary openings greater than 40 acres, greater than 300 acres, created by even-aged harvest. May also include openings created by natural events such as wind or fire.

Monitoring Frequency

Annually for the Vegetation Ecological Conditions question pertaining to white pine; every 2 years for the remaining questions.

Background Drivers

These monitoring questions stem from 36 CFR 219.12 (a)(5)(ii). The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.

The Forest Plan provides desired conditions, objectives, standards and guidelines pertaining to landscape ecosystems and ecological conditions and vegetation direction:

D-VG-1 through 6	S-VG-2
O-VG-1 through 24	G-VG-1

Results

Section A presents summaries of Forest-wide figures for the 0-9 and mature /older age classes. Section B. presents a summary of forest types and trends. More detailed information on species composition and age classes for each of the landscape ecosystems (LEs) is contained in Section C.

Numbers were calculated in July 2024 based on data in FACTS (corporate database) and stand data that were "pulled" in May 2024. Decade 1 ended in 2014, 10 years after signing of the 2004 Forest Plan Revision. Decade 2 spans 2015-2024.

A. Summary of Young (0-9) and Mature/Older Age Classes

Numbers for young (0-9) were calculated based on harvest activities recorded in our database. In instances where the harvest was clearcut or coppice, age class is set back to "0" and these acres then contribute to the 0-9 age class. Stands with a basal area of 50 square feet or greater did not contribute to the 0-9 age class.

All planned but unaccomplished harvests were assumed to be completed in 5 years - by 2029.

Acres of mature and older trees have increased since 2003. Age class tables for each LE, presented later in Section C, provide more detail on LEs with shortages and surpluses.

Acres and percentages may not be accurate if databases are not up to date and reflect the amount of even-aged regeneration harvest completed.

The following data and discussion are for uplands because there has been minimal harvest activity in lowlands.

Landscape Ecosystem Uplands ¹	LE Total (acres)	LE LLR (acres)	0-9 Age Class in 2003 NFS (acres)	0-9 % NFS 2003	0-9 Age Class in 2003 LLR (acres)	0-9 % LLR 2003	0-9 Age Class NFS 2024 (acres)	0-9 % NFS	0-9 Age Class LLR 2024 (acres)	0-9 % LLR	NEPA Decisions Through 2029 (NFS acres)	0-9 % NFS	Objective Decade 2 %
Dry Pine	12,306	9428	1,800	14	1,568	16	443	4	303	3	197	2	10
Dry Mesic Pine	82,434	29,676	6,800	8	3,271	11	1,801	2	486	2	2,304	3	9
Dry Mesic Pine Oak	158,584	10,3033	12,700	8	9,467	9	4,066	3	2,222	2	5,293	3	9
Boreal Hardwood Conifer	99,630	25,723	8,900	9	2,355	9	3,648	4	840	3	6,015	6	10
Mesic Northern Hardwood	65,169	22,334	5,300	8	2,039	9	1,485	2	32	0	4,757	7	6
Tamarack Swamp	19,258	10,398	1,200	7	94	1	869	5	152	1	1,163	4	8
White Cedar Swamp	12,924	229	1,400	11	168	75	306	2	0	0	641	5	6
Total	450,305	200,821	38,000	8	18,962	9	12,618	3	4035	1	20,370	5	8

Table 8. Summary of 0-9 age class objectives for uplands landscape ecosystems (LEs) for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

1.-Objectives taken from the forest plan, pp. 2-59 through 2-79.

Results

- The 2017 report showed that the amount of 0-9 decreased for all landscape ecosystems (LEs) since 2003; this trend has continued during 2018 to 2024.
- In 2024, the total of 0-9 is three percent of the total forest upland acres compared to the Forest Plan projected amount of 8 percent.
- All seven LEs are currently below the Forest Plan Decade 2 Objectives. For 2029, the percent of 0-9 age class acreage is projected to increase or stay the same as compared to the 2024 numbers in all LEs except Dry Pine and Tamarack Swamp, but they remain below the Decade 2 Objectives except Mesic Northern Hardwood which is just 1 percent above the Decade 2 Objectives.

Landscape Ecosystem Uplands ¹	LE Total acres	2003 Upland Mature/Old NFS (acres)	2003 Upland Mature/Old LLR (acres)	2024 Upland Mature/Old NFS (acres)	2024 Upland Mature/Old LLR (acres)	2029 Anticipated Upland Mature/Old (acres)
Dry Pine	12,306	4,400	3,282	5,825	4,372	6,162
Dry Mesic Pine	82,434	43,000	14,683	52,277	18,147	54,544
Dry Mesic Pine Oak	158,584	82,600	57,083	97,127	66,470	101,863
Boreal Hardwood Conifer	99,630	40,600	11,820	50,264	14,865	51,419
Mesic Northern Hardwood	65,169	35,300	14,423	41,921	16,193	41,831
Tamarack Swamp	19,258	8,200	4,572	11,193	6,554	11,023
White Cedar Swamp	12,924	2,900	40	3,490	187	3,164
Total	450,305	217,000	110,475	262,097	126,788	270,006

Table 9. Summary for upland forest for mature and older forest by landscape ecosystem (LE) for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

1.-Numbers were from management indicator habitat (MIH) summaries by LE for young, sapling, mature and old.

Results

- For mature and older (table 9), acres were taken from management indicator habitat (MIH) outputs for each of the LEs. Generally, for upland conifers (red, white, spruce/fir) and aspen, mature and older stands are 50 years or older. The exception is jack pine which is mature at age 40. Upland northern hardwood stands are mature at age 60. (Forest Plan, Table APP-C2, pg. C-2). Age class tables for each LE presented later provide more detail.
- Mature and older has increased by 45,097 acres since 2003 and is expected to increase by another 7,909 acres in the next five years.
- Results vary by LE as to whether MIH objectives to increase, maintain, or decrease mature and older forest are being met for each of the Management Indicator Habitats.

B. Summary of Forest types

Table 10 provides a summary for each of the major forest types. It includes a summary of the acres in the 0-9 and the mature and older age classes, and the total forest type acres in 2004, 2024, and projected decadal acres. Some key points are highlighted in the "Trends for Forest Type" column.

- Overall upland conifer which is comprised of jack pine, red and white pine, and spruce -fir has decreased on the Forest landscape. Decreases in jack pine and spruce-fir are opposite the objectives to increase acres. Acres of red and white pine (combined) have been consistent, but a greater increase is desired. The amount of young conifer in each of these forest types has declined since revision.
- The number of aspen acres is slightly less than the number of acres that occurred in 2004. A decrease in acres of aspen is desired by some Chippewa National Forest partners.
- Northern hardwood acres have increased substantially and exceed decadal objectives due, in part, to succession.

Numbers in the following table 10 are based on 2016 Management Indicator Habitat tables by Landscape Ecosystem for young, sapling, mature, and older acres. Decade 2 objectives were calculated based on Table DLP-2 (Forest Plan (FP), p. 2-57).

Forest type	Age	2004 NFS acres	2004 LLR acres	2024 NFS acres	2024 LLR acres	Decade 2 objective acres	Trends for forest type		
Jack pine	0-9	5,100	3,521	152	63	N/A	Downward trend in acres since 2004 Approximately 36% of decadal objectives for acres		
Jack pine	Mature/older	7,700	5,155	2,854	1,529	N/A	Downward trend in acres since 2004 Approximately 36% of decadal objectives for acres		
Jack pine	Age groups combined	14,500	10,231	8,463	5,757	23,300	Downward trend in acres since 2004 Approximately 36% of decadal objectives for acres		
Red and white pine	0-9	3,800	2,508	811	540	N/A	0-9 acres well below 2004 levels Total acres fairly consistent with 2004 level, but below decadal objectives (87% of Decade 2 Objective)		
Red and white pine	Mature/older	41,000	30,945	50,152	43,735	N/A	0-9 acres well below 2004 levels Total acres fairly consistent with 2004 level, but below decadal objectives (87% of Decade 2 Objective)		
Red and white pine	Age groups combined	77,200	56,508	78,291	56,039	90,000	0-9 acres well below 2004 levels Total acres fairly consistent with 2004 level, but below decadal objectives (87% of Decade 2 Objective)		
Upland spruce-fir	0-9	3,400	859	274	54	N/A	Downward trend in acres since 2004 & well below decadal objectives (48% of Decade 2 Objective)		
Upland spruce-fir	Mature/older	12,000	4,721	8,609	2,254	N/A	Downward trend in acres since 2004 & well below decadal objectives (48% of Decade 2 Objective)		
Upland spruce-fir	Age groups combined	22,300	10,609	17,670	4,777	37,100	Downward trend in acres since 2004 & well below decadal objectives (48% of Decade 2 Objective)		
Aspen- birch	0-9	38,600	11,612	10,176	3,106	N/A	Decrease in 0-9 since 2004 as desired, but currently exceeds decadal objectives by 12%		
Aspen- birch	Mature/older	101,000	33,639	100,131	35,819	N/A	Decrease in 0-9 since 2004 as desired, but currently exceeds decadal objectives by 12%		
Aspen- birch	Age groups combined	264,700	90,870	240,635	84,580	214,700	Decrease in 0-9 since 2004 as desired, but currently exceeds decadal objectives by 12%		
Northern hardwoods	0-9	1500	980	1,201	273	N/A	Currently exceeds decadal objectives by 45%. Expect future increases due to aspen conversion to hardwoods.		
Northern hardwoods	Mature/older	55,000	31,442	88,399	43,436	N/A	Currently exceeds decadal objectives by 45%. Expect future increases due to aspen conversion to hardwoods		
Northern hardwoods	Age groups combined	60,000	34,652	100,209	49,284	69,000	Currently exceeds decadal objectives by 45%. Expect future increases due to aspen conversion to hardwoods		

Table 10. Summary of forest type acres and trends for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

Forest		2004 NFS	2004 LLR	2024 NFS	2024 LLR	Decade 2	
type	Age	acres	acres	acres	acres	objective acres	Trends for forest type
Upland conifer	0-9	N/A	6,888	1,239	658	N/A	The 0-9 upland conifer makes up 1.2% of upland forest acres in 0-9. At the time of FP revision, 0-9 upland conifer was approximately 2.1% of all upland forest on the Chippewa NF (Final Environmental Impact Statement (FEIS), 3-3.1-10). Mature/old upland conifer is 70% of upland forest, an increase from 13.9% at the time of revision (FEIS, 3-3.1-10).
Upland conifer	Mature/older	N/A	40,819	73,000	47,518	N/A	The 0-9 upland conifer makes up 1.2% of upland forest acres in 0-9. At the time of FP revision, 0-9 upland conifer was approximately 2.1% of all upland forest on the Chippewa NF (FEIS, 3-3.1-10). Mature/old upland conifer is 70% of upland forest, an increase from 13.9% at the time of revision (FEIS, 3-3.1-10).
Total age groups	Age groups combined	N/A	77,347	104,576	66,574	N/A	The 0-9 upland conifer makes up 1.2% of upland forest acres in 0-9. At the time of FP revision, 0-9 upland conifer was approximately 2.1% of all upland forest on the Chippewa NF (FEIS, 3-3.1-10). Mature/old upland conifer is 70% of upland forest, an increase from 13.9% at the time of revision (FEIS, 3-3.1-10).
Upland forest	0-9	N/A	19,479	12,618	4,035	N/A	About 3% in 0-9 age class. Approx. 59% of upland forest acres are in the mature and older age class.
Upland forest	Mature/older	N/A	105,903	262,097	126,788	N/A	About 3% in 0-9 age class. Approx. 59% of upland forest acres are in the mature and older age class.
Upland forest	Age groups combined	N/A	202,868	445,999	200,449	N/A	About 3% in 0-9 age class. Approx. 59% of upland forest acres are in the mature and older age class.

Species Composition and Age Class objectives by Landscape Ecosystem

Species composition and age class acres and percentages for 2024 are compared to Decade 2 objectives for each Landscape Ecosystem (LE). The 2004 numbers are taken from tables in the Forest Plan on pages 2-60 through 2-74 and are included to provide a context for the shift and trends since the 2004 Forest Plan went into effect. The 2024 acres reflect what is accomplished and on the ground. Shifts in all forest types except aspen tend to be, primarily, a function of succession rather than active management.

Dry Pine Landscape Ecosystem

The Dry Pine LE is the smallest LE on the Forest containing the smallest number of upland acres of any of the LEs.

Table 11. Dry Pin	e Species a	cres and per	cent, May 2	2024 for the N	ational Forest	System (NFS	and the Le	ech Lake Re	servation (LLR)
Uplands									

Forest type	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS Objective Decade 2 (%)
Jack Pine	3,300	27	3119	33	1,925	16	1,771	19	41
Red Pine	4,900	41	4498	48	5,160	43	4,731	52	37
White Pine	200	1	78	1	224	2	134	1	2
Spruce-fir	200	1	94	1	129	1	51	1	2
Oak	400	3	120	1	451	4	205	2	3
Northern hardwoods	100	1	34	0	585	5	221	2	1
Aspen	2,700	23	1162	12	3,042	26	1,754	19	12
Paper Birch	300	2	213	2	402	3	215	2	2
Total	12,100	100	9317	100	11,918	100	9,083	100	100

Lowlands

Forest type	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS Objective Decade 2 (%)
Black Spruce	300	71	301	78	47	12	45	13	71
Tamarack	100	13	31	8	71	18	63	18	13
Lowland hardwoods	100	13	45	12	25	6	25	7	13
White Cedar	<100	3	7	2	245	63	212	61	3
Total	400	100	384	100	388	100	345	100	100

Cover	Age Class	NFS 2003 acres	NFS 2003 %	LLR 2003	NFS 2024 Acres	NFS DP %	LLR 2024 Acres	LLR DP %	NFS NEPA Decisions 2029 Acres	NFS 2029 %	NFS Objective Decade 2 (%)
Uplands- Lowlands	0-9	1,800	14	1,568	443	4	303	3	197	2	10
Uplands- Lowlands	10-39	5,000	40	3,846	4,298	35	3,388	36	3891	32	45
Uplands- Lowlands	40-79	4,700	37	3,643	4,494	37	3,584	38	4919	40	28
Uplands- Lowlands	80-179	1,100	8	644	3,065	25	2,150	23	3292	27	17
Uplands- Lowlands	180+	0	0	N/A	6	0	3	0	6	0	0
Total	N/A	12,500	100	9701	12,306	100	9,454	100	12,306	100	100

Table 12. Dry Pine (DP) landscape ecosystem (LE) age class composition in acres and percentages May 2024 for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

Compared To Decade 2 Objectives:

- Jack pine is below the Decade 2 Objective. To increase jack pine acres, conversions of red pine, paper birch and aspen to jack pine would need to happen.
- Aspen is higher than the Decade 2 Objective. Converting these acres to jack pine would be ideal but this is economically and technically difficult to accomplish.
- The 0-9 age class is lower than the Decade 2 Objective.
- The 40-79 and 80-179 age classes are higher than the Decade 2 Objective.

Table 13. Dry pine LE management indicator habitat (MIH) age classes 2003 for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

Dry pine MIH	NFS young	LLR young	NFS ¹ sapling	LLR sapling	NFS mature	LLR mature	NFS old	LLR old	NFS total all ages	LLR total all ages
Upland Forest	2,200	1568	N/A	4468	2,700	1691	1,700	1591	N/A	9,318
Upland Deciduous	500	122	N/A	896	1,300	476	100	35	N/A	1,529
Northern Hardwood	0	0	N/A	56	100	93	0	5	N/A	154
Aspen-Birch	500	122	N/A	840	900	383	100	29	N/A	1,374

Dry pine MIH	NFS young	LLR young	NFS ¹ sapling	LLR sapling	NFS mature	LLR mature	NFS old	LLR old	NFS total all ages	LLR total all ages
Upland Conifer	1,700	1445	N/A	3572	1,400	1215	1,600	1556	N/A	7,788
Upland Spruce-Fir	0	0	N/A	82	0	12	0	0	N/A	948
Red and White Pine	300	151	N/A	3278	1,200	1117	100	29	N/A	4,575
Jack Pine	1,400	1294	N/A	211	200	86	1,500	1528	N/A	3,119
Lowland Black Spruce- Tamarack	0	0	N/A	53	200	202	100	77	N/A	332

1.-The 2004 forest plan did not include sapling information.

Table 14. Dry Pine L	E management indicator h	nabitat (MIH) age classe	s 2024 for the National	Forest System (NFS) a	nd Leech Lake
Reservation (LLR)					

Dry pine MIH	NFS young	LLR young	NFS sapling	LLR sapling	NFS mature	LLR mature	NFS old	LLR old	NFS total all ages	LLR total all ages
Upland Forest	443	303	5,650	4,408	4,827	3,797	998	575	11,918	9,083
Upland Deciduous	301	161	2,035	1,010	1,570	951	573	274	4,479	2,396
Northern Hardwood	29	2	276	166	662	259	68	0	1,035	427
Aspen-Birch	272	159	1,759	845	908	692	504	274	3,443	1,970
Upland Conifer	142	142	3,614	3,398	3,257	2,846	426	301	7,439	6,687
Upland Spruce-Fir	0	0	52	28	29	10	48	13	129	51
Red and White Pine	92	92	2,088	1,969	3,128	2,757	77	47	5,385	4,865
Jack Pine	50	50	1,474	1,401	100	78	301	241	1,925	1,770
Lowland Black Spruce- Tamarack	0	0	22	22	89	81	6	5	117	108

Dry-Mesic Pine Landscape Ecosystem

Table 15. Dry Mesic Pine species acres and percent, May 2024 for the National Forest System (NFS) and Leech Lake Reservation (LLR)Uplands

Forest type	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS Objective Decade 2 (%)
Jack Pine	1,200	1	256	1	594	1	183	1	1
Red Pine	13,000	15	5,644	19	12,244	15	5,136	17	16
White Pine	800	1	405	1	994	1	531	2	6

Forest type	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS Objective Decade 2 (%)
Spruce-fir	4,000	5	1,445	5	2,579	3	781	3	9
Oak	5,100	6	2,551	8	3,666	4	1,516	5	6
Northern					19,846	24	7,583	26	
hardwoods	12,300	15	4,403	15					15
Aspen	38,800	46	12,206	40	36,564	44	11,741	40	37
Paper Birch	9,100	11	3339	11	5,947	7	2,205	7	10
Total	84,300	100	30,249	100	82,434	100	29,676	100	100

Lowlands

Forest type	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS Objective Decade 2 (%)
Black Spruce	3,600	53	843	44	2,142	30	458	22	53
Tamarack	600	9	206	11	812	11	189	9	9
Lowland hardwoods	1,600	24	529	27	2,350	33	868	42	24
White Cedar	900	13	356	18	1,881	26	534	26	13
Total	6,700	100	1,935	100	7,186	100	2,050	100	100

Table 16. Dry Mesic Pine Age class composition in acres and percentages, May 2024 for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

Uplands

Age class	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS NEPA decision 2029	NFS 2029 %	NFS Objective Decade 2 %
0-9	6,800	8	3,271	11	1,801	2	486	2	2,304	3	9
10-39	29,900	36	10,282	34	20,678	25	8,544	29	17,442	21	40
40-79	29,700	35	10,230	34	23,510	29	9,771	33	24,879	30	22
80-179	17,800	21	6,451	21	36,398	44	10,850	37	37,776	46	29
180+	<100	0	13	0	47	0	25	0	50	0	0
Total	84,300	100	30,249	100	82,434	100	29,676	100	82,450	100	100

Age class	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS NEPA decision 2029	NFS 2029 %	NFS Objective Decade 2 %
0-9	<100	0	4	0	2	0	2	0	181	3	4
10-39	300	4	49	3	318	4	93	5	262	4	5
40-79	1,200	18	365	19	953	13	338	16	735	10	5
80-119	3,800	57	1,109	57	3456	48	1,044	51	3,105	43	45
120-179	1,300	19	375	19	2296	32	502	24	2,715	38	38
180+	100	1	34	2	161	2	71	3	188	3	2
Total	6,700	100	1,935	100	7,186	100	2,050	100	7,186	100	100

Lowlands

Compared To Decade 2 Objectives:

- Increases in spruce-fir, white pine, and paper birch acres are needed because they are below Decade 2 Objectives.
- Both the northern hardwoods and aspen acres exceeded Decade 2 Objectives.
- Both the uplands and lowlands 0-9 and 10-39 age classes are below Decade 2 Objectives. Increases in the 0-9 age class are accomplished through even-aged harvest.
- The upland 80-179 age class increased substantially, doubling in acres, and is over the Decade 2 Objectives.
- Acres also exceed objectives in the 40-79 age group for both the uplands and lowlands.

Table 17. Dry Mesic Pine LE MIH age classe	s 2003 for the National Forest Syste	em (NFS) and the Leech Lake Reservation	(LLR)
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Dry mesic pine MIH	NFS young	LLR young	NFS sapling	LLR sapling	NFS mature	LLR mature	NFS old	LLR old	NFS total all ages	LLR total all ages
Upland Forest	9,500	3,271	N/A	12,294	35,200	12,181	7,800	2,502	N/A	30,248
Upland Deciduous	8,200	2,908	N/A	7,277	28,300	9,937	6,800	2,377	N/A	22,499
Northern Hardwood	600	474	N/A	236	10,500	5,694	800	549	N/A	6,953
Aspen-Birch	7,200	2,433	N/A	7,041	13,700	4,243	5,600	1,828	N/A	15,545
Upland Conifer	1,200	364	N/A	5,018	6,900	2,244	1,000	125	N/A	7,751
Upland Spruce-Fir	500	153	N/A	1,039	1,200	240	200	13	N/A	1,445
Red and White Pine	400	117	N/A	3,894	5,600	1,992	100	45	N/A	6,048
Jack Pine	300	93	N/A	85	200	11	700	68	N/A	257
Lowland Black Spruce- Tamarack	100	27	N/A	60	3,000	726	800	237	N/A	1,050

Dry mesic pine MIH	NFS young	LLR young	NFS sapling	LLR sapling	NFS mature	LLR mature	NFS old	LLR old	NFS total all ages	LLR total all ages
Upland Forest	1,801	486	28,357	11,042	36,161	13,906	16,116	4,241	82,435	29,675
Upland Deciduous	1,738	477	24,615	9,469	25,858	9,721	13,813	3,379	66,024	23,046
Northern Hardwood	438	44	2,560	1,454	18,814	6,825	1,701	776	23,513	9,099
Aspen-Birch	1,300	433	22,055	8,015	7,044	2,896	12,112	2,603	42,511	13,947
Upland Conifer	62	9	3,742	1,573	10,303	4,186	2,303	863	16,410	6,631
Upland Spruce-Fir	54	9	1,104	349	852	280	569	143	2579	781
Red and White Pine	8	0	2,381	1,103	9,389	3,906	1,460	657	13,238	5,666
Jack Pine	0	0	258	121	62	0	274	62	594	183
Lowland Black Spruce- Tamarack	0	0	354	85	1,744	444	856	118	2,954	647

Table 18. Dry Mesic Pine LE MIH age classes, May 2024 for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

Dry-Mesic- Pine/Oak Landscape Ecosystem

Table 19. Dry-Mesic- Pine/Oak (MPO) species acres and percent, May 2024 for the National Forest System (NFS) and Leech Lake Reservation (LLR)

Uplands

Forest type	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS Objective Decade 2 (%)
Jack Pine	9,200	6	6,618	6	5,554	4	3,607	4	11
Red Pine	48,900	30	40,563	38	48,609	31	40,100	39	33
White Pine	2,500	2	2,226	2	2,965	2	2,454	2	2
Spruce-fir	7,000	4	3,903	4	4,492	3	1,956	2	4
Oak	2,900	2	2,266	2	5,051	3	3,709	4	2
Northern hardwood	13,300	8	8,135	8	19,845	13	11,486	11	11
Aspen	65,700	40	32,876	31	62,188	39	33,502	33	30
Paper Birch	13,700	8	9,199	9	9,880	6	6,219	6	7
Total	163,200	100	105,786	100	158,584	100	103,033	100	100

Forest type	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS Objective Decade 2 (%)
Black Spruce	10,100	52	5,537	47	6,467	33	3,871	33	52
Tamarack	2,800	15	1,990	17	3,482	18	2,458	21	15
Lowland hardwood	3,500	18	2,377	20	3,791	19	2,346	20	18
White Cedar	2,900	15	1,791	15	6,054	31	3,205	27	15
Total	19,200	100	11,695	100	19,795	100	11,881	100	100

Table 20. Dry-Mesic- Pine/Oak Age class composition in acres and percentages, May 2024 for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

Uplands											
Age class	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS NEPA decision 2029	NFS 2029 %	NFS Objective Decade 2 (%)
0-9	12,700	8	9,467	9	4,066	3	2,222	2	5,293	3	9
10-39	58,400	36	34,152	32	39,222	25	23,813	23	33,235	21	34
40-79	45,600	28	28,191	27	55,657	35	34,648	34	57,060	36	25
80-119	41,500	25	29,737	28	46,997	30	31,642	31	47,671	30	24
120-179	4,400	3	3,896	4	11,730	7	9,951	10	14,328	9	8
180+	700	0	341	0	913	1	756	1	996	1	1
Total	163,200	100	105,786	100	158,584	100	103,033	100	158,584	100	100

Lowlands

Age class	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS NEPA decision 2029	NFS 2029 %	NFS Objective Decade 2 %
0-9	100	1	70	1	75	0	17	0	921	5	3
10-39	800	4	497	4	707	4	361	3	456	2	5
40-79	3,300	17	2,050	18	3,820	19	2,053	17	3,176	16	6
80-119	11,200	58	7,015	60	8,052	41	4,339	37	7,416	37	38
120-179	3,600	19	2,030	17	6,975	35	4,994	42	7,448	38	46
180+	100	1	34	0	166	1	117	1	379	2	2
Total	19,200	100	11,695	100	19,795	100	11,881	100	19,795	100	100

Compared To Decade 2 Objectives:

- Jack pine is notably below Decade 2 Objectives. To increase upland jack pine acres is difficult and expensive to accomplish given that surpluses are primarily in aspen.
- Increase upland red pine and spruce-fir, which are slightly below Decade 2 Objectives.
- Aspen is above the Decade 2 objective.
- The upland 0-9 and 10-39 age class are lower than the Decade 2 Objective.
- The upland 40-79 and 80-119 age classes were over Decade 2 Objectives.
- Though the upland 120-179 age class is below the Decade 2 Objective, acres have increased since 2003.

DMPO MIH	NFS young	LLR young	NFS sapling	LLR sapling	NFS mature	LLR mature	NFS old	LLR old	NFS total all ages	LLR total all ages
Upland Forest	17,500	9,467	N/A	39,235	63,000	42,980	19,600	14,103	N/A	105,785
Upland Deciduous	11,200	4,738	N/A	21,922	32,800	18,159	11,500	7,657	N/A	52,476
Northern Hardwood	300	165	N/A	925	10,800	7,959	1,100	1,352	N/A	10401
Aspen-Birch	10,800	4,574	N/A	20,997	19,700	10,200	9,900	6,305	N/A	42,076
Upland Conifer	6,300	4,729	N/A	17,314	30,200	24,821	8,100	6,446	N/A	53,310
Upland Spruce-Fir	700	503	N/A	1,966	2,300	1,236	300	199	N/A	3,904
Red and White Pine	2,600	2,173	N/A	14,112	27,300	2,3253	3,500	3,252	N/A	42,790
Jack Pine	3,000	2,054	N/A	1,236	600	333	4,300	2,995	N/A	6,618
Lowland Black Spruce- Tamarack	300	116	N/A	758	9,500	5,712	1,800	940	N/A	7,526

Table 21. Dry-Mesic- Pine/Oak MIH, May 2003 for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

Table 22. Dry-Mesic- Pine/Oak (DMPO) MIH, May 2024

DMPO MIH	NFS young	LLR young	NFS sapling	LLR sapling	NFS mature	LLR mature	NFS old	LLR old	NFS total all ages	LLR total all ages
Upland Forest	4,066	2,222	57,392	34,340	67,644	46,739	29,483	19,731	158,585	103,032
Upland Deciduous	3,461	1,804	41,995	23,150	33,873	19,578	17,635	10,384	96,964	54,916
Northern Hardwood	342	221	4,159	2,220	17,286	10,262	3,109	2,492	24,896	15,195
Aspen-Birch	3,119	1,583	37,836	20,930	16,587	9,316	14,526	7,892	72,068	39,721
Upland Conifer	605	419	15,397	11,190	33,770	27,162	11,847	9,347	61,619	48,118

DMPO MIH	NFS young	LLR young	NFS sapling	LLR sapling	NFS mature	LLR mature	NFS old	LLR old	NFS total all ages	LLR total all ages
Upland Spruce-Fir	14	12	2,253	954	1,278	553	946	437	4,491	1,956
Red and White Pine	489	394	9,667	7,729	32,148	26,351	9,270	8,081	51,574	42,555
Jack Pine	102	13	3,477	2,508	344	258	1,632	829	5,555	3,608
Lowland Black Spruce- Tamarack	46	21	1,416	723	5,197	3,187	3,292	2,398	9,951	6,329

Boreal Hardwood/Conifer Landscape Ecosystem

Table 23. Boreal Hardwood/Conifer Species acres and percent, May 2024 for the National Forest System (NFS) and Leech Lake Reservation (LLR)

Uplands

Forest type	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS Objective Decade 2 (%)
Jack Pine	500	0	79	0	349	0	48	0	0
Red Pine	3,700	4	680	3	3,650	4	709	3	4
White Pine	600	1	370	1	548	1	226	1	4
Spruce-fir	11,000	11	3,031	12	6,533	7	940	4	13
Oak	100	0	54	0	596	1	255	1	0
Northern hardwoods	11,800	11	5,267	20	18,798	19	8,491	33	13
Aspen	68,400	66	14,711	57	64,224	64	13,861	54	60
Paper Birch	6,900	7	1,762	7	4,933	5	1,193	5	6
Total	102,900	100	25,954	100	99,630	100	25,723	100	100

Lowlands

Forest type	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS Objective Decade 2 (%)
Black Spruce	14,800	49	2,136	33	11,301	36	1,412	23	49
Tamarack	2,400	8	481	7	2,840	9	362	6	8
Lowland hardwoods	9,800	32	2,841	44	11,751	38	3,052	50	32
White Cedar	3,300	11	966	15	5,268	17	1,264	21	11
Total	30,300	100	6,423	100	31,159	100	6,090	100	100

Uplands

Table 24. Boreal Hardwood/Conifer Age class composition in acres and percentages, May 2024 for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

Age class	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS NEPA decision 2029	NFS 2029 %	NFS Objective Decade 2 %
0-9	8,900	9	2,355	9	3,648	4	840	3	6,015	6	10
10-39	48,700	47	10,795	42	33,203	33	6,568	26	26,964	27	45
40-79	28,800	28	7,024	27	30,797	31	8,268	32	34,355	34	23
80-179	16,500	16	5,781	22	31,875	32	9,993	39	32,183	32	22
180+	0	0	N/A	N/A	101	0	55	0	109	0	0
Total	102,900	100	25,954	100	99,630	100	25,723	100	99,632	100	100
Lowlands											
Age class	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS NEPA decision 2029	NFS 2029 %	NFS Objective Decade 2 %
0-9	200	1	31	٥	005			0			
10_30			01	0	265	1	30	0	545	2	4
10-00	1,400	5	287	4	1,532	1 5	30 253	4	545 1,380	2	8
40-79	1,400 5,100	5 17	287 1,270	4	1,532 2,998	1 5 10	30 253 540	0 4 9	545 1,380 2,645	2 4 8	4 8 4
40-79 80-119	1,400 5,100 16,800	5 17 56	287 1,270 3,339	4 20 52	1,532 2,998 13,161	1 5 10 42	30 253 540 2,866	0 4 9 47	545 1,380 2,645 11,997	2 4 8 38	4 8 4 40
40-79 80-119 120-179	1,400 5,100 16,800 6,500	5 17 56 22	287 1,270 3,339 1,433	4 20 52 22	265 1,532 2,998 13,161 12,663	1 5 10 42 41	30 253 540 2,866 2,173	0 4 9 47 36	545 1,380 2,645 11,997 14,042	2 4 8 38 45	4 8 4 40 42
40-79 80-119 120-179 180+	1,400 5,100 16,800 6,500 200	5 17 56 22 1	287 1,270 3,339 1,433 62	4 20 52 22 1	265 1,532 2,998 13,161 12,663 540	1 5 10 42 41 2	30 253 540 2,866 2,173 227	0 4 9 47 36 4	545 1,380 2,645 11,997 14,042 554	2 4 8 38 45 2	4 8 4 40 42 2

Compared To Decade 2 Objectives:

- Jack pine is notably below Decade 2 Objectives. To increase upland jack pine acres is difficult and expensive to accomplish given that surpluses are primarily in aspen.
- Increase upland red pine and spruce-fir, which are slightly below Decade 2 Objectives.
- Aspen is above the Decade 2 objective.
- The upland 0-9 and 10-39 age class are lower than the Decade 2 Objective.
- The upland 40-79 and 80-119 age classes were over Decade 2 Objectives.
- Though the upland 120-179 age class is below the Decade 2 Objective, acres have increased since 2003.

BHC MIH	NFS young	LLR young	NFS sapling	LLR sapling	NFS mature	LLR mature	NFS old	LLR old	NFS total all ages	LLR total all ages
Upland Forest	12,000	2,355	N/A	11,780	33,000	9,445	7,600	2,375	N/A	25,955
Upland Deciduous	10,600	2,151	N/A	10,073	26,800	7,651	6,700	1,918	N/A	21,793
Northern Hardwood	200	110	N/A	206	10,200	4,468	900	538	N/A	5322
Aspen-Birch	10,400	2,042	N/A	9,867	16,600	3,184	5,700	1,381	N/A	16,474
Upland Conifer	1,400	204	N/A	1,707	6,200	1,793	900	456	N/A	4,160
Upland Spruce-Fir	1,000	130	N/A	1,051	4,600	1,543	500	307	N/A	3,031
Red and White Pine	100	19	N/A	652	1,600	250	200	129	N/A	1,050
Jack Pine	300	55	N/A	4	0	0	200	20	N/A	79
Lowland Black Spruce- Tamarack	900	62	N/A	180	12,200	1,849	3,100	526	N/A	2,617

Table 25. Boreal Hardwood/Conifer (BHC) MIH, 2003 for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

Table 26. Boreal Hardwood/Conifer (BHC) MIH, May 2024

BCH MIH	NFS young	LLR young	NFS sapling	LLR sapling	NFS mature	LLR mature	NFS old	LLR old	NFS total all ages	LLR total all ages
Upland Forest	3,648	840	45,712	10,019	32,339	10,271	17,925	4,594	99,624	25,724
Upland Deciduous	3,399	758	40,753	9,042	27,466	9,629	16,933	4,373	88,551	23,802
Northern Hardwood	142	0	1,527	565	14,176	6,571	3,548	1,610	19,393	8,746
Aspen-Birch	3,256	758	39,226	8,477	13,289	3,057	13,386	2,763	69,157	15,055
Upland Conifer	249	82	4,959	977	4,874	643	991	221	11,073	1,923
Upland Spruce-Fir	102	33	3,590	538	2,103	218	731	151	6,526	940
Red and White Pine	146	49	1,076	399	2,767	421	209	66	4,198	935
Jack Pine	0	0	293	40	4	4	52	5	349	49
Lowland Black Spruce- Tamarack	3,648	41	45,712	69	6,324	997	6,162	666	14,140	1,773

Mesic Northern Hardwood Landscape Ecosystem

Table 27. Mesic Northern Hardwood Species acres and percent, May 2024 for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

Uplands

Forest type	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS Objective Decade 2 (%)
Jack Pine	100	0	3		36	0	22	0	0
Red Pine	2,100	3	673	3	1,990	3	497	2	3
White Pine	500	1	296	1	399	1	267	1	1
Spruce-fir	4,000	6	1,516	7	2,180	3	560	3	7
Oak	800	1	324	1	761	1	216	1	1
Northern hardwoods	20,300	31	9,997	44	27,201	42	13,049	58	37
Aspen	32,000	48	7,924	35	28,531	44	6,439	29	43
Paper Birch	6,800	10	1,844	8	4,071	6	1284	6	8
Total	66,400	100	22,577		65,169	100	22,334	100	100

Lowlands

Forest type	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS Objective Decade 2 (%)
Black Spruce	3,100	52	425	34	2,183	36	326	25	25
Tamarack	500	8	148	12	594	10	140	11	11
Lowland hardwoods	1,900	31	455	36	2,196	36	433	33	33
White Cedar	500	9	239	19	1,049	17	397	31	31
Total	6,000	100	1,267	100	6,023	100	1,296	100	100

 Table 28. Mesic Northern Hardwood Age class composition in acres and percentages, May 2024 for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

Age class	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS NEPA decision 2029	NFS 2029 %	NFS Objective Decade 2 (%)
0-9	5,300	8	2,039	9	1,485	2	32	0	4,757	7	6
10-39	2,200	33	5,079	22	14,665	23	3,899	17	12,177	19	28
40-79	24,300	37	8,457	37	17,050	26	5,342	24	16,636	26	26
80-119	12,800	19	5,838	26	27,280	42	10,147	45	26,320	40	33
120-189	2,000	3	1,072	5	4,535	7	2,776	12	5,172	8	8
190+	100	0	91	0	155	0	138	1	155	0	0
Total	66,400	100	22,577	100	65,169	100	22,334	100	65,217	100	100
Lowlands											
											NFS

Age class	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS NEPA decision 2029	NFS 2029 %	NFS Objective Decade 2 (%)
0-9	<100	13	14	1	13	0	0	0	164	3	2
10-39	100	143	263	21	143	2	79	6	115	2	2
40-79	1,400	717	530	42	717	12	70	5	601	10	6
80-119	3,300	3220	453	36	3,220	53	700	54	2,943	49	51
120-179	1,200	1858	7	1	1,858	31	435	34	2,116	35	39
180+	<100	72	14	1	72	1	13	1	85	1	1
Total	6,100	100	1,267	100	6,023	100	1,296	100	6,009	100	100

Compared To Decade 2 Objectives:

Uplands

- Spruce-fir is below the Decade 2 Objective, while northern hardwoods is above.
- Aspen was slightly above Decade 2 Objectives.
- The 0-9 for both uplands and lowlands and 10-39 age classes for uplands are below decadal objectives.
- The 80-119 age class for the uplands and 40-79 for the lowlands is significantly over Decade 2 objectives, but acres from these age classes are needed to meet the 120-189 age class and 120-179 age class objectives respectively in the future.

MNH MIH	NFS young	LLR young	NFS sapling	LLR sapling	NFS mature	LLR mature	NFS old	LLR old	NFS total all ages	LLR total all ages
Upland Forest	7,200	2,039	N/A	6,115	30,500	12,221	4,800	2,202	N/A	22,577
Upland Deciduous	6,800	1,989	N/A	4,693	29,100	11,558	4,300	1,848	N/A	20,088
Northern Hardwood	300	149	N/A	494	17,300	8,649	1,700	1,029	N/A	10,321
Aspen-Birch	6,500	1,840	N/A	4,200	11,100	2,909	2,600	819	N/A	9,768
Upland Conifer	300	50	N/A	1,421	1,400	663	500	354	N/A	2,488
Upland Spruce-Fir	200	11	N/A	766	1,000	514	300	225	N/A	1,516
Red and White Pine	200	39	N/A	655	400	146	200	129	N/A	969
Jack Pine	0	0	N/A	0	0	3	0	0	N/A	3
Lowland Black Spruce- Tamarack	0	0	N/A	44	2,600	320	700	209	N/A	573

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Table 30. Mesic Northern Hardwood (MNH) MIH ages, May 2024 for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

BCH MIH	NFS young	LLR young	NFS sapling	LLR sapling	NFS mature	LLR mature	NFS old	LLR old	NFS total all ages	LLR total all ages
Upland Forest	1,485	32	21,763	6,108	29,687	11,780	12,234	4,413	65,169	22,333
Upland Deciduous	1,386	32	20,037	5,321	27,240	11,342	11,902	4,293	60,565	20,988
Northern Hardwood	240	1	1,852	1,002	21,602	9,738	4,269	2,524	27,963	13,265
Aspen-Birch	1,146	32	18,185	4,319	5,638	1,604	7,633	1,768	32,602	7,723
Upland Conifer	99	0	1,726	787	2,447	438	332	120	4,604	1,345
Upland Spruce-Fir	28	0	1,240	430	707	43	204	86	2,179	559
Red and White Pine	71	0	466	338	1,740	395	113	30	2,390	763
Jack Pine	0	0	20	18	0	0	15	4	35	22
Lowland Black Spruce- Tamarack	47	34	154	14	1,756	306	820	113	2,777	467

Tamarack Swamp Landscape Ecosystem

Forest type	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS Objective Decade 2 (%)
Jack Pine	200	1	155	1	136	1	125	1	1
Red Pine	1,300	7	1,062	7	1,375	7	1,162	11	9
White Pine	<100	0	14	1	120	1	92	1	1
Spruce-fir	1,900	11	619	8	1,483	8	490	5	21
Oak	200	1	105	1	242	1	209	2	0
Northern hardwood	2,000	11	1,381	16	3,167	16	2,343	23	11
Aspen	10,800	61	4,222	59	11,380	59	4,876	47	49
Paper Birch	1,400	8	1,219	7	1354	7	1,101	11	5
Total	17,800	100	8,777	100	19,258	100	10,398	100	100

Table 31. Tamarack Swamp Species acres and percent, May 2024 for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

Lowlands

Forest type	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	Objective Decade 2 (%)
Tamarack	8,400	27	4,878	38	8,956	29	5,206	41	27
Black spruce	14,400	47	4,595	36	10,743	35	3,337	26	47
White cedar	4,800	15	2,030	16	7,035	22	2,717	21	15
Lowland	3 200	11	1,240	10	4,316	11	1,443	11	11
Total	30,800	100	12,744	100	31,050	100	12,703	100	100

Very little harvest has occurred or is planned in this LE. Shifts have occurred in age class as a result of ingrowth into the next older age class.

Table 32. Tamarack Swamp Age class composition in acres and percentages, May 2024 for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

Uplands											
Age class	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS NEPA decision 2029	NFS 2029 %	NFS Objective Decade 2
0-9	1,200	7	779	9	869	5	152	1	1,459	8	8
10-39	6,500	36	2,846	32	4,518	23	2,216	21	4,149	22	41
40-79	6,400	36	2,481	28	6,358	33	3,364	32	6,295	33	25
80-119	3,400	19	2,267	26	5,579	29	3,099	30	5,216	27	19
120-189	400	2	404	5	1,888	10	1521	15	2,070	11	6
190+	<100	0			46	0	46	0	70	0	0
Total	17,800	100	8,777	100	19,258	100	10,398	100	19,258	100	100

Lowlands

Age class	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS NEPA decision 2029	NFS 2029 %	NFS Objective Decade 2
0-9	300	1	94	1	261	1	20	0	1,163	4	4
10-39	1,300	4	687	5	895	3	349	3	904	3	6
40-79	5,600	18	1,820	14	3,642	12	1,537	12	2,618	8	8
80-119	17,300	56	7,790	61	12,890	42	5,562	44	11,283	36	35
120-179	6,100	20	2,270	18	13,056	42	5,129	40	14,604	47	46
180+	200	1	83	1	306	1	106	1	479	2	1
Total	30,800	100	12,744	100	31,050	100	12,703	100	31,050	100	100

Table 33. Tamarack Swamp (TS) management indicator species (MI	H), 2003 for the National Forest System (NFS) and the Leech Lake
Reservation (LLR)	

TS MIH	NFS young	LLR young	NFS sapling	LLR sapling	NFS mature	LLR mature	NFS old	LLR old	NFS total all ages	LLR total all ages
Upland Forest	1,700	779	N/A	3,426	6,200	2,943	2,000	1,629	N/A	8,777
Upland Deciduous	1,500	683	N/A	2,819	4,700	2,253	1,400	1,173	N/A	6,928
Northern Hardwood	100	82	N/A	313	1,300	935	100	156	N/A	1,486
Aspen-Birch	1,400	601	N/A	2,506	3,300	1,317	1,300	1,017	N/A	5,441

TS MIH	NFS young	LLR young	NFS sapling	LLR sapling	NFS mature	LLR mature	NFS old	LLR old	NFS total all ages	LLR total all ages
Upland Conifer	200	96	N/A	608	1,500	690	500	456	N/A	1,850
Upland Spruce-Fir	100	62	N/A	125	1,200	367	100	65	N/A	619
Red and White Pine	200	9	N/A	464	300	324	300	279	N/A	1,076
Jack Pine	100	25	N/A	19	0	0	0	111	N/A	155
Lowland Black Spruce- Tamarack	700	189	N/A	1,181	15,700	6,803	4,100	1,301	N/A	9,474

Table 34.	Tamarack Swamp (TS)	management indicator	species (MIH), M	lay 2024 for the	National Forest Syster	n (NFS) and the Leech
Lake Res	ervation (LLR)					

TS MIH	NFS young	LLR young	NFS sapling	LLR sapling	NFS mature	LLR mature	NFS old	LLR old	NFS total all ages	LLR total all ages
Upland Forest	869	152	7,195	3,692	5,851	3,216	5,342	3,338	19,257	10,398
Upland Deciduous	800	147	6,443	3,219	4,400	2,301	4,501	2,862	16,144	8,529
Northern Hardwood	10	5	235	168	1,913	1,243	1,251	1,136	3,409	2,552
Aspen-Birch	790	141	6,208	3,052	2,487	1,058	3,249	1,726	12,734	5,977
Upland Conifer	69	6	752	473	1,451	915	842	476	3,114	1,870
Upland Spruce-Fir	63	0	401	170	476	140	543	180	1,483	490
Red and White Pine	5	5	264	226	968	768	257	256	1,494	1,255
Jack Pine	0	0	87	77	7	7	41	41	135	125
Lowland Black Spruce- Tamarack	274	97	1,790	691	9,897	4,816	7,739	2,939	19,700	8,543

White Cedar Swamp Landscape Ecosystem

Table 35. White Cedar Swamp Species acres and percent by landscape ecosystem (LE)	, May 2024, Uplands and Lowlands combined; for
the National Forest System (NFS) and the Leech Lake Reservation (LLR)	

Forest type	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS Objective Decade 2 (%)
Jack pine	N/A	N/A	N/A	N/A	22	0	N/A	N/A	N/A
Red pine	0	0	N/A	N/A	12	0	N/A	N/A	0
Spruce-fir	500	3	N/A	N/A	283	2	N/A	N/A	8
Oak	0	0	N/A	N/A	16	0	N/A	N/A	0
No. Hardwoods	200	1	15	7	558	4	17	7	2
Aspen	8,100	62	178	79	7901	61	178	78	52
Paper birch	0	0	14	6	219	2	9	4	0
Black spruce	1,100	8	5	2	853	7	3	1	8
Tamarack	100	1	N/A	N/A	109	1	N/A	N/A	1
Lowland hardwood	2,300	18	13	7	2003	15	22	10	18
White cedar	800	6	N/A	N/A	948	7	N/A	N/A	11
Total	13,900	100	225	100	12,924	100	229	100	100

Very little harvest has occurred or is planned in this LE. Shifts have occurred in age class as a result of ingrowth into the next older age class.

Table 36. White Cedar Swamp	Age class composition in acre	s and percentages, May	2024 for the National	Forest System (NFS) and th	ie
Leech Lake Reservation (LLR)					

Age class	NFS 2003 acres	NFS 2003 %	LLR 2003 acres	LLR 2003 %	NFS 2024 acres	NFS 2024 %	LLR 2024 acres	LLR 2024 %	NFS NEPA decision 2029	NFS 2029 %	NFS Objective Decade 2 (%)
0-9	1,400	11	N/A	N/A	306	2	0	0	641	5	6
10-49	4,400	34	168	75	5,309	41	17	7	5,369	42	49
50-79	2,900	22	24	11	1,308	10	147	64	1,120	9	6
80-109	2,500	19	20	9	2,738	21	23	10	2,391	18	12
110-139	1,300	10	13	6	2,249	17	42	18	2,317	18	18
140+	600	4	N/A	N/A	1,014	8	0	0	1,094	8	9
Total	13,100	100	225	100	12,924	100	229	100	12,924	100	100

WCS MIH	NFS young	LLR young	NFS sapling	LLR sapling	NFS mature	LLR mature	NFS old	LLR old	NFS total all ages	LLR total all ages
Upland Forest	1,800	0	N/A	168	2,500	40	400	0	N/A	N/A
Upland Deciduous	1,800	0	N/A	168	2,300	40	300	0	N/A	N/A
Northern Hardwood	0	0	N/A	0	200	15	0	0	N/A	N/A
Aspen-Birch	1,800	0	N/A	168	2,100	24	300	0	N/A	N/A
Upland Conifer	0	N/A	N/A	N/A	300	N/A	0	N/A	N/A	N/A
Upland Spruce-Fir	0	N/A	N/A	N/A	300	N/A	0	N/A	N/A	N/A
Red and White Pine	0	N/A	N/A	N/A	0	N/A	0	N/A	N/A	N/A
Jack Pine	0	N/A	N/A	N/A	0	N/A	0	N/A	N/A	N/A
Lowland Black Spruce-Tamarack	0	0	N/A	0	900	5	200	0	N/A	N/A

Table 37. White Cedar Swamp (WCS) management indicator habitats (MIH), 2003 for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

Table 38. White Cedar Swamp (WCS) management indicator habitats MIH) age classes, May 2024 for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

WCS MIH	NFS young	LLR young	NFS sapling	LLR sapling	NFS mature	LLR mature	NFS old	LLR old	NFS total all ages	LLR total all ages
Upland Forest	306	0	5,215	17	1,375	164	2,115	23	9,011	204
Upland Deciduous	293	0	5,068	17	1,282	164	2,051	23	8,694	204
Northern Hardwood	0	0	9	0	208	17	356	0	573	17
Aspen-Birch	293	0	5,059	17	1,073	147	1,695	23	8,120	187
Upland Conifer	13	N/A	147	N/A	93	N/A	64	N/A	317	N/A
Upland Spruce-Fir	13	N/A	147	N/A	81	N/A	42	N/A	283	N/A
Red and White Pine	0	N/A	0	N/A	12	N/A	0	N/A	12	N/A
Jack Pine	0	N/A	0	N/A	0	N/A	22	N/A	22	N/A
Lowland Black Spruce-Tamarack	5	0	58	0	429	3	470	0	962	3

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6. Recreation

Key Points

Participation in recreational activities is the way most of the public sees the Chippewa National Forest, making it an important gateway for understanding the meaning, history, and relevance of public lands.

Recreation opportunities on the Chippewa National Forest provide direct benefits to citizens. Many mental, spiritual, and physical benefits are gained while making connections with the land and with friends and family through participation in recreational activities on the Forest.

The Chippewa National Forest Recreation program works to meet basic health and safety and accessibility standards, manage within budget, and respond to issues and change with appropriate management options to make sound management decisions.

Since 2017, several recreation sites have closed, and some trails need attention. While the Forest works to be strategic on where to invest appropriated recreation funds, decreasing budgets have continued to challenge the ability to maintain existing recreation facilities to appropriate standards.

Monitoring Question 1

To what extent do Forest recreation facilities and opportunities meet accessibility, health, safety, cost, and maintenance requirements and achieve resource and social objectives?

Last Updated 2017.

Monitoring Indicator(s)

Recreation Site Analysis inventory results, partner projects, dispersed recreation inventories, significant recreation events.

Accessibility standards including the Architectural Barriers Act (ABA), and Forest Service Outdoor Recreation Accessibility Guidelines (FSORAG) require any newly constructed facility to be accessible.

Deferred maintenance projects completed, that were identified through the Recreation Facility Analysis and condition Use Surveys, to reduce or improve site service and facilities.

Monitoring Frequency

Measure and report 2 years.

Background and Drivers

The Forest Plan provides desired conditions and objectives pertaining to recreation resources at:

D-REC-3, 4, 8 D-RLT-1, 2, 3 D-RWA-1 O-REC-4 O-RWA-1

Public visitation of the Chippewa National Forest has remained stable for many activities to slightly decreased for others over the past decade. Recreation personnel has increased significantly in the last year to perform recreation project work, while funding for projects and equipment has decreased. Special authorities, such as Great American Outdoor Act (GAOA), associated with large-scale recreation projects been very helpful over the last several years, but that authority will soon expire.

Managing for recreational opportunities results in a number of economic and social benefits to the surrounding communities, the regional area and nationally. Research has demonstrated that visitors to the Chippewa National Forest participate in a number of different activities, including fishing, viewing natural features, hiking, relaxing, hunting, motorized water activities, viewing wildlife, pleasure driving and camping (National Visitor Use Monitoring Program (NVUM) Survey 2021). The Forest Service is responsible for identifying an appropriate mix of recreational opportunities for National Forest System lands and the settings needed to provide quality recreational opportunities.

The Forest Service is responsible for identifying an appropriate mix of recreational opportunities for National Forest System lands and the settings needed to provide quality recreational opportunities.

The indicator demonstrates the importance of recreation facilities and opportunities

Monitoring Indicator #1

Accessibility

Accessibility expectations require any newly construction to be accessible. The following projects which were identified through Recreation Facility Analysis (2019) and/or Condition Use Surveys enhanced accessibility for visitors and were tracked in the Infrastructure Forest Service database (INFRA):

- North Star Lake Campground vault toilet replacements (2019). Accessibility improvements include wider doors and handrails.
- Replacement and installation of accessible fire rings (74) and picnic tables (80). (2021-2024)

Monitoring Indicator #2

Deferred Maintenance

Several deferred maintenance projects identified through Recreation Facility Analysis (2017) and Condition Use Surveys have been implemented in the last five years to reduce services at some locations and improve services at other locations. The following projects and partnerships were completed during the last five years:

- Replaced the pond sewer system with septic systems in Wanaki, Chippewa, and Norway Beach Campgrounds in the Norway Beach Recreation Area.
- Replaced two vault toilets at North Star Campground.
- Closed Tamarack Campground and converted West Seelye Campground to overflow use. Converted Webster Lake Campground to dispersed use and Cass Lake Campground to walk-in camping use.
- Replaced 74 old or non-accessible fire rings and 80 older style picnic tables with accessible fire rings and tables.
- Managed a stewardship agreement with the MN Department of Natural Resources to share in the maintenance of many of the water access locations.
- Continued a Special Use Permit with Edge of the Wilderness Joint Powers Board to maintain and promote visitor services at the Edge of the Wilderness Discovery Center.
- Renewed an agreement with the Northern Lights Ski Club in grooming Suomi Hills and Trout Lake Trails.
- The Rice Lake Outlet Snowmobile Trail Bridge was replaced in Summer 2024.
- Renewed agreements with Cass County and Itasca County for management of snowmobile trails.
- Formalized an agreement with Cass County Sentence to Serve to mow and clean several Recreation sites.
- Changed the name of Knutson Dam Campground to Bimijiwan. All signing, flyers, and website info has been changed to this.


Figure 5. Onegume fishing pier



Figure 6. Mary Louis Cabin at Joyce Estate

Discussion Summary of Monitoring Indicators #1 and #2

There are less developed recreational facility opportunities available now than in 2017. The reduction in recreation facilities reduced some annual and deferred maintenance costs. Forest recreation facility costs have increased due to inflation and if recent trends continue, budgets will likely continue to decrease. Additional recreation facility changes will be done as we work to balance public demand and cost considerations. These changes may include campground fee increases, facility upgrades or downgrades, and increased or reduced services.

Economically, resorts and outfitters and guide services benefit directly from National Forest System lands, while other local businesses benefit from indirect spending by Forest visitors. The economic contribution of recreation, fish, and wildlife-related jobs is 155, while 285 additional jobs are created from all other recreation-related opportunities. Total spending by visitors to the Chippewa National Forest for is approximately \$40.48 million annually (Regional Economic Report, April 2024).

Recreation opportunities on the Chippewa National Forest directly provide benefits to citizens. Many mental, spiritual, and physical benefits are gained while making connections with the land through recreational activities associated with recreation facilities. These opportunities play an important role in how communities come to gather for physical and mental health, family and to connect with the land.

Recreation facilities include the built landscape. This includes the fire rings, toilets, water pumps, parking, swimming beaches, and camping spurs in the campgrounds. For dispersed campsites, it includes amenities such as fire rings and wilderness toilets. Recreation facilities also include trailheads with informational entrance boards, boat landings with docks and concrete ramps, and picnic areas with tables and barbeque grills.

In 2019, the Forest completed the most recent Recreation Site Analysis (RSA) for all recreation sites on the Forest. The goal of the RSA is to provide a blueprint for operating and maintaining sites to standard and reducing deferred maintain costs. The RSA includes a five-year Recreation Facility Strategy (RFS) for recreation sites on the Forest to contribute to sustainability. Recreation Facility Strategy broadens these goals to consider how recreation sites contribute to social stability, environmental integrity, and economic vitality for the forest and its communities.

This 5-year Recreation Facility Strategy serves as a framework from which the Chippewa National Forest will prioritize investments, as well as pursue changes in operations or maintenance of developed recreation sites and facilities. Proposals are consistent with the Framework for Sustainable Recreation and the 2004 Chippewa Land and Resource Management Plan.

The Chippewa National Forest began inventorying all dispersed recreation sites with the intention to reduce managed dispersed sites from over 350 to less than 100 in 2017. The project was completed in 2018. The Forest now provides information on these sites through printed handouts and electronic site data for campers seeking this type of recreation opportunity.

Recommendations

With budget shortfalls occurring, Chippewa recreation managers should look to increasing partnerships and volunteers to enhance and improve recreation management. The Chippewa National Forest must continually evaluate recreation facilities and determine the cost effectiveness of maintaining them or improving them in the future.

Evaluation of Monitoring Question and Indicator(s)

Future monitoring questions should be designed to refer to the changes that have been implemented based on the Recreation Site Analysis finalized in 2019 and the Dispersed Recreation Site Project finalized in 2018.

Monitoring Question 2

To what extent is the Forest providing a range of motorized and non-motorized recreation opportunities that incorporate diverse public interests yet achievable management area (MA) and landscape ecology (LE) objectives?

Last Updated 2004.

Monitoring Indicator(s)

Miles of trails, opportunities for new trails, partnership opportunities, public meetings, road closure monitoring, track decisions on designation or closure, track citations for unauthorized use, monitor closures (winter and summer).

Monitoring Frequency

Measure and report every 5 years (cycle for the National Visitor Use Monitoring Program (NVUM) surveys)

Background and Drivers

The Forest Plan provides desired conditions and objectives regarding recreation resources at:

D-REC-8 D-RLT-1 O-REC-4



Figure 7. Visitor fishing

Managing for recreational opportunities results in a number of economic and social benefits to the surrounding communities, the regional area and nationally. Research has demonstrated that visitors to the Chippewa National Forest participate in a number of different activities, including fishing, viewing natural features, hiking, relaxing, hunting, motorized water activities, viewing wildlife, pleasure driving and camping (NVUM Survey 2021).

Many projects from the 5-Year Recreation Facility Strategy have been done including the change to septic systems at Norway Beach Recreation Area and new toilet buildings at North Star Campground. Several campgrounds were closed or converted to a lower standard including Tamarack (closed), West Seelye (overflow only), Cass Lake (changed from a full-service campground with a shower building to a walk-in campground), and Webster (half of sites removed and changed to dispersed sites).

Further consideration has led to modify some of the planning that was to be done. As an example, South Pike Bay Campground was planned for closure and decommissioning. This has changed and South Pike will continue to be open.

The National Visitor Use Monitoring (NVUM) program provides statistically reliable information about recreation visitors to national forest system managed lands at the national, regional, and forest level. NVUM information assists Congress, Forest Service leaders, and program managers in making sound decisions that

best serve the public and protect valuable natural resources by providing science based, reliable information about the type, quantity, quality and location of recreation use on public lands. The information collected is also important to external customers including state agencies and private industry. The survey is voluntary – participation is wholly dependent on the individual willing to stop at the survey location and spend up to 15 minutes answering questions.

The indicator demonstrates the trends in visitor uses on the Forest in 2011, 2016, and 2021.

Monitoring Indicator #1

National Visitor Use Monitoring (NVUM) data reports.

The NVUM program has two goals: 1) To provide estimates of the volume of recreation visitation to National Forests and Grasslands, and 2) To provide descriptive information about that visitation, including activity participation, demographics, visit duration, measures of satisfaction, and trip spending connected to the visit.

Visitation
610,000
509,000
429,000

Table 39. Total Estimated Annual Visitation Estimate

2011	2016	2021
Viewing Natural Features	Fishing	Fishing
Hunting	Viewing Natural Features	Hiking/Walking
Viewing Natural Features	Hiking/Walking	Relaxing
Relaxing	Relaxing	Viewing Wildlife
Fishing	Hunting	Driving for Pleasure
Viewing Wildlife	Motorized Water Activities	Viewing Natural Features
Driving for Pleasure	Viewing Wildlife	Developed Camping
Picnicking	Driving for Pleasure	Motorized Water Activities
Picnicking	Developed Camping	Other Non-motorized
Motorized Trail Activity	Snowmobiling	Nature Study
Developed Camping	Resort Use	Picnicking

Table 40. Top 10 Activity Participation for each National Visitor Use Monitoring (NVUM) survey year

Table 41. Visitor gender demographics

Year	Responses from Females	Responses from Males
2011	26.3%	73.7%
2016	32.5%	67.5%
2021	33.7%	66.3%

Table 42. Visitor race/ethnicity

Year	American Indian/Alaska Native	White	Other
2011	3%	92.9%	4.1%
2016	4.2%	94.8%	1%
2021	.5%	99.2	.3%

Table 43. Visitor age

Year	Under 16	16-29	30-59	60-older
2011	20.3%	10.4%	45.3%	24.0%
2016	21.8%	10.2%	50.3%	17.7%
2021	24.4%	5.6%	33.4%	36.6%

Table 44. Visitors home location

Year	Itasca	Beltrami	Cass	Other
2011	46.2%	19.7%	10.9%	23.2%
2016	32%	25.2%	16%	26.8%
2021	28.5%	30.1%	9.6%	31.8%

Table 45. Recreation related economic factors

Economics	2011	2016	2021
Average Total Trip Spending	\$276	\$293	\$392
Percent Lodged at Forest Service developed campground	22.6%	17.6%	31.5%
Precent lodged at non-developed camping	7.1%	8.4%	2.7%
Percent Lodged in national forest cabin	27.9%	28.3%	5.3%
Income under \$50,000/year	38.9%	29.8%	.4%
Income over \$50,000/year	61.1%	70.2%	99.6%

Table 46. Overall visitor satisfaction

Visitor Overall Satisfaction	2011	2016	2021
Very Satisfied	61.7%	76.1%	83.7%
Very Dissatisfied	3.9%	2.8%	.3%

Table 47. Visitor Satisfaction related to Developed Sites

Item	2011	2016	2021
Developed Facilities Overall	87.7%	94.6%	82.5%
Access	92.1%	92.9%	93.2%
Services	90.9%	94.4%	86.4%
Feeling of Safety	100.0%	95.9%	100%

Discussion Summary of Monitoring #1

The NVUM surveys show a significant decrease of almost 30 percent in overall recreation use over the last three interview periods. While this decrease may be accurate in some areas of recreation use, other quantifiable numbers show a leveling or slight increase in overall recreation use. In fact, 2023 was a near record year for campground occupancy.

A few changes have occurred over the years which could affect the accuracy of the total numbers. In 2011, all interviewers were Forest employees and wore the uniform while out interviewing. In the following surveys, the high-use summer season was contracted and only one, instead of two, surveyors were required to be on site. In 2021, another change in the survey was made as a response to covid. The survey protocol was modified in that participants were not interviewed through the fall, winter, and spring recreation seasons and only did counts. This resulted in missing information in the sample of demographics economics, and other interview categories.

In most survey years, participation in Fishing, Viewing Natural Features, Viewing Wildlife, Hunting, Relaxing, and Driving for Pleasure were identified as the primary activity. After identifying their main recreational activity, visitors were asked how many hours they participated in that activity during their national forest visit. Some caution is needed when using this information as most Chippewa visitors participate in several recreation activities during each visit, such as relaxing and fishing while camping.

Basic demographic information helps recreation managers identify the profile of the visitors they serve. Management concerns such as providing recreation opportunities for underserved populations may be monitored with this information. The tables above provide basic demographic information about visitors interviewed regarding Gender, Race/Ethnicity, Age and home location respectively.

Consistently through the years, two-thirds of those recreating and interviewed in recreation surveys are men. Among racial and ethnic minorities, the most common interviewed are Native Americans in each of the survey years. The age distribution shows an even age of Forest users, with a lower percentage in the 16-29 age group. Approximately 75 percent of the visitors come from those living in the local area. Visitors from outside the three-county location have steadily increased over the three separate survey years.

Local communities look increasingly to tourism to support their communities. When considering recreationrelated visitor spending, managers are often interested both in identifying the average spending of individual visitors (or types of visitors), and the total spending associated with all recreation use.

Spending averages for visitors or visitor parties were estimated using data collected from NVUM. The average amount spent per visit by party was \$392 in 2021. Fifty-eight percent of visits included an overnight stay away from home.

For most visitors, developed and non-developed campgrounds were the primarily lodging destination for their trip at 32% and 3%, respectively. Many visitors stayed in their own home (27%) or with others (28%).

An important element of outdoor recreation program delivery is evaluating customer satisfaction with the recreation setting, facilities, and services provided. Satisfaction information helps the Forest decide where to invest in resources and to allocate resources more efficiently toward improving customer satisfaction. The overall satisfaction results for the Forest have been favorable. In 2021, 84% of all visitors were very satisfied with their overall recreation experience. The results for the composite indices were also very good. The satisfaction at developed sites and services provided decreased slightly over the past ten years, while the safety component maintained at a high level. Similar numbers occurred for non-developed sites as well.

Performance ratings for categories such as signing adequacy, road and trail conditions, and restroom cleanliness for all years varied. Overall, the visitors indicated the Forest has done a good job for each category of sites (day use, overnight developed and overnight non-developed sites).

Recommendations

The Forest should continue to monitor the NVUM results and compare to previous surveys to establish trends. Both developed and non-developed site use should be evaluated to determine whether the Forest should improve, maintain, or reduce facilities.

In 2017, the Forest analyzed and inventoried sites on the Forest through the recreation site analysis project (RSA). In 2016, the Forest began reviewing all dispersed camping sites on the Forest to reduce the number of managed and advertised sites from 350 to 79 currently.

Looking at use trends and listening to the public will help the Forest determine how to prioritize projects on the Forest and improve sustainability and customer satisfaction.

Evaluation of Monitoring Question and Indicator(s)

Future monitoring questions should be designed to refer to the changes implemented based on results from the NVUM surveys.

Monitoring Question 4

To what extent do Forest recreation facilities and opportunities achieve resource and social objectives?

Last Updated 2004.

Monitoring Indicator(s)

Recreation partner projects, dispersed recreation inventories, significant recreation events, and developed recreation improvements and projects.

Monitoring Frequency Annual.

Background and Drivers 36 CFR 219.12(a)(5)(vii)

Significant Recreation Events

A notable event affecting several recreation sites in 2024 was the transfer of 11,760 acres of Forest Service managed land to the Leech Lake Band of Ojibwe. Six boat landings, many dispersed sites, and Birches Picnic Area were part of this transfer.

Partner Projects

Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities for the visiting public includes many partnerships. Partnerships with the Chippewa National Forest in recreation have many long-standing shared objectives. Some of these include:

Minnesota Department of Natural Resources (Boat and Water) - The Forest works with Regional Boat and Water divisions to coordinate boat landing repairs and improvements, installation of fishing piers, and dock replacement. The Forest developed a cost-share agreement where the Forest contributes funds to an account used by the DNR to pay for and install repairs and improvements needed. This partnership works well as the DNR employs a specialized crew working exclusively on these types of projects.

Ruffed Grouse Society – This partnership allows for the mowing of many of the Forest's Hunter Walking trails. In 2024, this partnership includes funding for new signs at Johnson Lake Hunter Walking Trails.

Northern Lights Nordic Ski Club – This long-standing partnership allows the Club to groom the Suomi and Trout Lake Ski Trails on an as needed basis for reimbursement of groomer gas costs. In 2024, the Club successfully received a Resource Advisory Committee (RAC) grant to improve the safety of the Suomi Hills trails by working to straighten sharp corners and other troublesome areas.

Wilderness Wheelers OHV Club – This partnership made possible the development of the Wilderness OHV Trail in the northeast section of the Forest. The Club received a RAC grant in 2024 for further development of this OHV trail system.

Snowmobile Clubs – Area clubs work with Forest recreation personnel on maintaining the snowmobile trails to keep them cleared, signed, and groomed. Clubs receive some funding from the counties to aid in expenses through gas tax funds.

Edge of the Wilderness Board – This partnership works to promote the Marcell-Bigfork area for tourism and maintains the Edge of the Wilderness Visitor Center, open from Memorial Weekend to Labor Day Weekend through a cost-share agreement. Interpretive programs are provided weekly throughout the summer.

Dispersed Recreation Inventories

The Forest provides a wide range of dispersed recreation opportunities for the public. Many of these sites are used for camping and provide a range of amenities with some having a fire ring, wilderness toilet, and picnic table. The Forest manages 79 of these sites across the Forest. These are designated and maps are available on the Chippewa National Forest website and at all offices.

Developed Recreation Improvements and Projects

Several recreation projects have been completed in the last few years or are in process. Most of these projects have been funded by the Great American Outdoor Act (GAOA). Projects included improving the road to Stony Point Campground along with new plumbing and upgrades to the electric for all campsites. Other major projects include replacing the sewer system at Norway Beach Recreation Area with new separate septic systems. Future projects include the addition of electricity in more of the Forest campgrounds to help meet the needs of Forest visitors.

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7. Social and Economic Stability

In response to the monitoring questions below, several different monitoring indicators are presented and discussed related to timber management on the Chippewa National Forest. These indicators include timber target, volumes, acres, harvest by treatment method, revenues, ratio of sawtimber to pulpwood, revenues and payments to counties. Data from several fiscal years are included to provide an analysis of trends. This data was compiled from actual timber sales sold and harvested in fiscal year (FY) 2017-FY2023.

Key points

Output levels of timber harvest have remained approximately stable, while treatment methods are deviating from those anticipated for Decade 2.

The annual target for timber volume sold is negotiated between the Forest and the Region. The annual sell target has been relatively flat averaging 43.7 million board feet (MMBF) from FY2017–FY2023. Volume sold has been slightly below the assigned target from FY2017–FY2023. Acres sold have fluctuated from 5,693 acres in FY2017 to 4,001 acres in FY2023.

The ratio of sawtimber to pulpwood is lower than what was predicted in the Forest Plan for both Decade 1 and for the first three years of Decade 2.

Monitoring Questions

- 1. How close are projected outputs and services to actual?
- 2. To what extent does output levels of timber harvest and mix of saw timber and pulpwood compared to those levels projected?

Last Updated

FY2015 Monitoring and Evaluation Report.

Monitoring Indicator(s)

Timber: Table APP-D2: Acres of timber harvest by treatment method comparing estimated to actual volume sold and harvested annually; acres sold and harvested annually.

Monitoring Frequency

Every two years.

Background and Drivers

36 CFR 219.12(k) A quantitative estimate of performance comparing outputs and services with those projected by the forest plan.

The Forest Plan provides desired conditions, objectives, standards and guidelines pertaining to commercial timber harvest at:

D-TM-1	O-TM-1	Table APP-D2, corrected Sept. 4, 2007
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Monitoring Indicator 1

Results

Harvest by Treatment Method

The Forest uses a variety of silvicultural treatments to accomplish Forest Plan objectives. For Decade 1 (2004-2014), thinning treatments exceeded the planned acres while clearcutting treatments were below planned acres (table 48). Overall, total acres treated for Decade 1 (39,500 acres) were 51 percent of planned treatment acres (77,139 acres).

Table 48. Decade	1 (2004-2014) Proposed and actual acres of timber harvest by treatment method ¹
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Treatment	Proposed Decade 1 Treatment Acres	Decade 1 Actual Treated Acres	Proposed Decade 1 % acres treated	Actual Decade 1 Treated % acres
Thinning	16,000	18,130	21	46
Clearcut	29,866	12,777	39	32
Shelterwood	11,149	4,750	14	12
Uneven-aged	20,124	3,843	26	10
Totals	77,139	39,500	100%	100%

1.-From Forest Plan Table APP-D2 Administrative Correction Sept. 14, 2007. USDA Forest Service. 2004. Land and Resource Management Plan. Chippewa National Forest. Eastern Region, Milwaukee, Wisconsin.

For Decade 2 (2015-2025), the total probable acres treated increased to 82,222 (table 49) compared to 77,139 for Decade 1. For FY 2018-2023, total acres treated was 23,777, which is 48 percent of planned treatment acres on a per year basis (82,222 divided by 10 equals 8,222 acres per year).

Treatment	Probable Decade 2 Treatment Acres	Decade 2 Actual Treated Acres (FY18-23 data only)	Probable Decade 2 % acres treated	Actual Decade 2 Treated % acres (FY18-23 data only)
Thinning	11,578	6,186	14	39%
Clearcut	30,881	4,932	38	31%
Shelterwood	11,101	2,045	14	13%
Uneven-aged	28,662	2,692	35	17%
Totals	82,222	15,855	100%	100%

1.-From Forest Plan Table APP-D2 Administrative Correction Sept. 14, /2007

Allowable Sale Quantity (ASQ)

The allowable sale quantity (ASQ) is the maximum amount of volume that may be offered and sold during a given decade of Forest Plan implementation from land identified as suitable for timber management (2004 USDA). For decade 1, ASQ is 580 million board feet or 58 million board feet per year (MMBF). For decade 2, ASQ increases to 600 MMBF or 60 MMBF per year. For the period of FY2017-FY2023 of decade 2, the average volume sold is 42.1 MMBF or 70 percent of ASQ. For decade 1 (FY2004-FY2014), the average volume sold was 40.3 MMBF or 69 percent of ASQ (USDA 2017).

Discussion

For decade 1, thinning treatments totaled 18,130 acres while planned acres for thinning were 16,000 acres. Acres treated with clearcut treatments totaled 12,777 acres while planned acres for clearcut in decade 1 were 29,866 acres. The data from decade 1 indicate that thinning treatments are over prescribed and even-aged treatments such as clearcut and shelterwood are under prescribed. These management choices have direct impacts on the ability of the Forest to meet age class objectives in the Forest Plan.

It is important to note that the administrative correction issued September 14, 2007 by Forest Supervisor Robert Harper amending the proposed and probable practices table APP-D2 in the Forest Plan applies only to decade 1. The treatment method percentages and acres for decade 2 remain unchanged. This is important because the acres and percentage of thinning treatments was increased in decade 1 under the administrative correction.

For the first three years of decade 2 (FY2015-FY2017), thinning treatments totaled 6,186 acres while the planned total for decade 2 for thinning is 11,578 acres. The results indicate a significant accomplishment of thinning early in the decade (over 53 percent of the entire decade total). Table 50 shows the amount of Chippewa National Forest thinning for FY 2018-2023.

Fiscal Year	Thinning Acres
FY 2018	2,765
FY 2019	1,970
FY 2020	1,436
FY 2021	1,461
FY2022	2,150
FY2023	1,286
Total	11,068

 Table 50. Acres of thinning on the Chippewa National Forest for FY 2018-2023

For the first three years of decade 2 (FY2015-FY2017), even age treatments including clearcut and shelterwood treatments totaled 6,977 acres while the planned total for decade 2 for even aged treatments is 41,982 acres. The results indicate a potential underperformance in accomplishment of even aged treatments early in the decade (16.6 percent of the entire decade total) and potential for not meeting age class objectives in the Forest Plan.

Recommendations

Given that thinning treatments exceeded planned treatments for decade 1 and are on a trajectory to exceed planned levels for decade 2, consideration should be given to reducing prescribed thinning treatments in future decisions when viable alternatives exist for other treatment types. In addition, even aged management treatments were significantly less than planned treatments for decade 1 and are currently on a track to significantly underperform planned levels for decade 2. Even aged treatments including clearcut, seed tree and shelterwood harvests should be considered in future decisions where silviculturally appropriate. Considering more even aged treatments will help the Forest meet age class objectives in the Forest Plan and better balance age classes across the Forest.

Evaluation of Monitoring Question and Indicator

No changes needed.

Monitoring Indicator 2

Timber target (one-thousand board feet (MBF)); volume sold (MBF), volume harvested (MBF), uncut volume under contract (million board feet (MMBF)), acres sold, acres harvested, ratios of sawtimber to pulpwood volume sold compared to Forest Plan estimated ratios.

Results

Indicator	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY2022	FY2023
Timber Target (MMBF)	44.5	46	47.5	42	42	42	42
Volume Sold (MMBF)	45.8	46.2	43.8	41.9	42.5	40.4	34.7
Volume Harvested (MMBF)	45.1	50.7	46.1	34.1	31.9	30.3	39.3
Uncut volume under contract (MMBF)	126	121.5	119.1	126.8	137.7	147.7	143
Acres Sold	5,693	4,482	4,738	3,776	4,861	4,259	4,001
Acres Harvested	4,595	6,262	4,540	3,879	2,969	2,682	3,445

Table 51. Timber Target, Volume Offered and Sold, Volume Harvested, and Uncut Volume under Contract, and acres sold and harvested from fiscal years FY2017 to FY2023

Discussion

The annual target for timber volume sold is negotiated between the Forest and the Region. The annual sell target has been relatively flat averaging 43.7 MMBF from FY2017–FY2023. Volume sold has been slightly below the assigned target from FY2017–FY2023, averaging 42.1 MMBF. Acres sold have fluctuated from 6,262 acres in FY2018 to 2,682 acres in FY2022.

Volume harvested peaked in FY2018 at 50.7 MMBF and has leveled off in recent years at approximately 33 MMBF.

Uncut volume under contract has increased slightly, from 121.5 MMBF in FY2018 to 147.7 MMBF in FY 2022. This is equivalent to approximately 3.5 years of annual sell target volume under contract. Given that the contract duration of most timber sales is three to five years on the Forest, this amount of uncut volume under contract is normal.

The number of acres harvested have declined recently from 6,262 acres in FY2018 to 2,682 acres in FY2022 (table 51). Some recent decline in stumpage prices can explain some of the reduction in acres harvested as loggers will defer harvest until market conditions and prices improve.

Recent reports in Minnesota cite a declining demand for traditional forest products due to decreasing demand for paper products, changes in international markets and the 2008 collapse of the housing market (Minnesota Forest Resources Council 2018). The remaining mills in Minnesota have made improvements and upgrades as recent as 2013 to improve their positions in a competitive global marketplace (Deckard 2013). Examples of

improvements include West Fraser, Sappi and Potlatch. West Fraser installed new rotary drums in 2011 increasing their size and added a second weight scale at a cost of \$350,000. Sappi completed a \$170 million capital conversion project in 2013 at the Cloquet mill and now makes specialized cellulose used in textile and consumer goods markets. Potlatch added a fourth dry kiln that added capacity to dry a more diverse range of species including balsam fir.

Recommendations

Forest products offered on the Chippewa National Forest are important regionally as well as globally. In addition to providing important economic value to the region and state, forest management on the Chippewa National Forest meets a number of Forest Plan objectives for wildlife habitat, riparian restoration, fuels treatment, age class objectives and forest health. Timber target levels should be carefully considered and planned to sustain and maintain a consistent and reliable supply of forest products from the Forest.

Results

Fiscal Year	Total Value (\$)	Value \$ per MBF ¹	Value \$ per hundred cubic feet	Aspen pulpwood \$ per MBF	Sawtimber (80% +pine) \$ per MBF
FY 2017	3,287,356	71.60	43.90	89.40	111.30
FY 2018	3,387,974	73.20	45.20	87.20	114.60
FY 2019	3,622,390	82.70	49.10	67.60	130.40
FY 2020	2,529,419	60.30	37.10	64.20	98.80
FY 2021	2,843,054	66.70	40.50	61.50	115.00
FY2022	3,220,807	79.60	48.30	80.30	132.40
FY2023	1,850,882	53.40	32.90	52.60	112.70

Table 52. Value of stumpage offered and sold by the Chippewa National Forest from FY2017-FY2023

1.-MBF is a unit of measure that means per 1,000 board feet.

Discussion

Overall revenue for timber offered and sold decreased from fiscal year (FY) 2017 to FY 2023 (table 52). The average value of timber sold from FY2017-2023 on the Chippewa National Forest was \$2,963,126. Stumpage values in dollars per thousand board feet (MBF) and dollars per hundred cubic foot have declined in the last year.

Sawtimber prices have declined 31 percent from \$160.66/MBF in FY2015 to \$111.33/MBF in FY2017. The major species of sawtimber on the Chippewa National Forest is red pine. Aspen prices have declined from \$89.40/MBF in FY2017 to \$52.60/MBF in FY2023.

Competition in bidding by purchasers for federal timber has remained steady. In FY 2017, there were 18 different bidders with an average of 2.6 bidders per sale (USDA 2017). Bidders for Timber Contracts have declined with some sales only receiving one or two bidders in FY2018. The Chippewa National Forest (CPF) attracts some of the largest purchasers operating in the state of Minnesota due to large volume sales and all-season operating conditions.

Recommendations

Past trends indicate a consistent and steady interest by Purchasers in bidding on timber sales from the Chippewa National Forest. The exception is a declining level of interest in bidding on Integrated Resource Timber Contracts. Careful planning and consideration should be given to Integrated Resource Timber Contracts offerings to include service work that is attractive to Purchasers and consideration given to utilizing retained receipts to fund service work that is not desirable by timber Purchasers such as bud capping, tree release work and tree planting. In addition, the Forest needs to consider what the optimum mix of stewardship and regular timber sale offerings should be in an effort to retain interest and competition by Purchasers and to avoid no-bid situations in the future.

Results

Table 53. Ratio of sawtimber to pulpwood volume sold¹ from Chippewa National Forest Land and Resource Environmental Impact Statement (EIS) table TMB-20 for modified alternative E

Indicator	Decade 1	Actual Ratio	Actual Ratio	Actual Ratio	Actual Ratio
	(Proposed)	FY 2011	FY 2012	FY 2013	FY 2014
Sawtimber: Pulpwood	32:68	18:82	19:81	14:86	23:77

Indicator	Indicator Decade 2 A		Actual Ratio FY 2016	Actual Ratio FY 2017
Sawtimber: Pulpwood	43:57	26:74	23:77	21:79

1.-From Chippewa National Forest Land and Resource EIS table TMB-20 for modified alternative E. USDA Forest Service. 2004. Final Environmental Impact Statement for Forest Plan Revision, From the Chippewa National Forest and Superior National Forest. Eastern Region, Milwaukee, Wisconsin.

Discussion

As illustrated in table 53, the ratio of sawtimber to pulpwood is lower than what was predicted in the Forest Plan for both Decade 1 and for the years 2017-2023 of Decade 2. One of the reasons for this is the increased amount of thinning in pine stands and the removal of small diameter material. With the 2007 administrative correction, proposed thinning acres increased from 6,749 acres to 16,000 acres in Decade 1. In FY 2017, the ratio of sawtimber to pulpwood decreased to 21:79 compared to a ratio in FY2016 of 23:77 (table 53). Another reason for the lower percentage of sawtimber to pulpwood is the reduced even-aged harvest treatments in both Decade 1 and Decade 2 to date that would have increased the ratio of sawtimber to pulpwood due to the final harvest of mature and over mature trees.

Recommendations

The ratio of sawtimber to pulpwood is not meeting Forest Plan expectations for Decade 1 or Decade 2 currently. The acres of treatments using thinning are exceeding Forest Plan estimates for Decade 1 and show an expected similar result in decade 2, given the current actual acres in the 2017-2023 years of Decade 2. The Forest should consider prescribing more even-aged final harvest treatments to better balance the sawtimber to pulpwood ratio as well as meet age class objectives across the Forest. Forest Plan standard S-TM-5 allows even-aged regeneration harvest (clearcutting, seed tree, shelterwood) after a stand has reached at least 95 percent of culmination of mean annual increment (USDA 2004). For red pine and white pine, the minimum age for even-aged regeneration harvest is 60 years. Final harvest in aspen will not improve the sawtimber/pulpwood ratio as all aspen is sold as pulpwood and utilized by mills as pulpwood.

Results

Table 54. Payment to Counties for FY2017 to 2023

Fiscal Year (FY) 2018

County	Forest Service acres	Payment in Lieu of Taxes (PLIT) (total \$)	SRS Title I Funds (total \$)	SRS Title II Funds (total \$)	SRS grand total (total \$)
Beltrami	64,673	72,543.24	72,543.24	12,801.75	85,344.99
Cass	294,914	251,438.72	251,438.72	44,371.54	295,810.26
Itasca	312,532	361,513.84	334,007.35	31,435.99	365,443.34
Total	672,119	685,495.80	657,989.31	88,609.28	746,598.59

Fiscal Year (FY) 2019

County	Forest Service acres	Payment in Lieu of Taxes (PLIT) (total \$)	SRS Title I Funds (total \$)	SRS Title II Funds (total \$)	SRS grand total (total \$)
Beltrami	62,339	91,805	67,187.57	11,856.63	79,044.20
Cass	287,396	428,698	234,143.14	41,319.38	275,462.52
Itasca	306,664	459,124	293,771.98	27,649.13	321,421.11
Total	656,399	979,627	595,102.69	80,825.14	675,927.83

Fiscal Year (FY) 2020

County	Forest Service acres	Payment in Lieu of Taxes (PLIT) (total \$)	SRS Title I Funds (total \$)	SRS Title II Funds (total \$)	SRS grand total (total \$)
Beltrami	62,339	103,796	67,264.38	11,870.19	79,134.57
Cass	287,395	561,461	236,637.33	41,759.53	278,396.86
Itasca	306678	506,001	273,631.90	25,753.59	299,385.49
Total	656,412	1,171,258	577,533.61	79,383.31	656,916.92

Fiscal Year (FY) 2021

County	Forest Service acres	Payment in Lieu of Taxes (PLIT) (total \$)	SRS Title I Funds (total \$)	SRS Title II Funds (total \$)	SRS grand total (total \$)
Beltrami	62,226	111,318	77,510.61	13,678.34	13,678.34
Cass	287,396	590,246	275,075.81	48,542.79	48,542.79
Itasca	306,688	561,813	322,948.97	30,395.20	30,395.20
Total	656,310	1,263,377	675,535.39	92,616.33	92,616.33

Fiscal Year (FY) 2022

County	Forest Service acres	Payment in Lieu of Taxes (PLIT) (total \$)	SRS Title I Funds (total \$)	SRS Title II Funds (total \$)	SRS grand total (total \$)
Beltrami	62,229	119,438	72,012.87	12,708.15	84,721.02
Cass	287,375	621,289	265,008.72	46,766.25	311,774.97
Itasca	306,700	621,968	338,390.47	31,848.51	370,238.98
Total	656,304	1,362,695.00	675,412.06	91,322.91	766,734.97

County	Forest Service acres	Payment in Lieu of Taxes (PLIT) (total \$)	SRS Title I Funds (total \$)	SRS Title II Funds (total \$)	SRS grand total (total \$)
Beltrami	64,564.00	118,429	75,676.83	13,354.73	89,031.56
Cass	287,390	629,775	278,814.30	49,202.52	328,016.82
Itasca	306,700	616,141	N/A	N/A	N/A
Total	658,654.00	1,364,345.00	N/A	N/A	N/A

Fiscal Year (FY) 2023

Discussion

The federal government makes payments to states to cover some of the cost of local government services on tax-exempt National Forest System lands. The states pass those payments on to the counties in which National Forests are located. Payments in Lieu of Taxes (PILT) payments are calculated and made by the Department of Interior, Bureau of Land Management. These payments are appropriated annually by Congress based on available funding and formulas that consider the population in the affected counties, the number of acres of federal land in those counties, and other payments received by the counties based on federal land payments.

The Secure Rural Schools and Community Self- Determination Act (SRS) was enacted in 2000 and since then has been reauthorized several times. In a recent reauthorization, the FS requested states and counties to elect either to receive a share of the 25 percent rolling average payment or to receive a share of the Secure Rural Schools State (formula) payment. A county electing to receive a share of the State payment that is greater than \$100,000 annually was required to allocate 15-20 percent of its share for one or more of the following purposes: projects under Title II of the Act, Projects under Title III; or return the funds to the Treasury of the United States. Under the Secure Rural Schools Act additional money was made available to be used for projects recommended by local resource advisory committees (RACs) to maintain infrastructure, improve the health of watersheds and ecosystems, protect communities, and strengthen local economies. Payments to Counties for FY 2017-2023 are displayed above in table 54

Evaluation of Monitoring Question and Indicator(s)

The monitoring questions and associated indicators for the Timber Program required in the Final Monitoring Guide for the Chippewa National Forest are adequate and useful for determining trends and consistency with Forest Plan objectives.

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8. Soils

The physical, chemical, and biological properties of soils determine how their natural biologic, hydrologic, and other ecologic functions. Assessment these soil properties contributes to better understanding of how soil productivity is affected by management activities.

Key Points

Overall, past soil disturbance monitoring over the period of record indicates that harvest activities alone have resulted in little soil disturbance and Forest Plan desired conditions and objectives are generally being met.

Although the general level of soil disturbance is low over the period of the monitoring report, further evaluation of this monitoring question and indicator is necessary to ensure forest management activities are not affecting long-term soil productivity and viability of natural ecosystems.

Monitoring Question

Are the effects of Forest management, including prescriptions, resulting in significant changes to productivity of the land?

Last Updated

Since 2018 a combination of the Chippewa National Forest Monitoring and Inventory Survey Team and Soil Technicians have evaluated 149 stands before treatments and 96 stands post- treatments. Stands were surveyed from Mid-May through Early Sept each year. The evaluations followed the Forest Soil Disturbance Monitoring Protocol (Page-Dumroese et al. 2009a), which is designed to quickly assess changes to soil properties and assign soil disturbance classes based on forest floor and soil surface and subsurface conditions. Standards and guidelines from the Chippewa National Forest Land and Resource Management Plan (or Forest Plan) are being met. Through this last round of monitoring, we have found some suggested management activities to better protect soils and better meet Soil Quality Standards, and Standards and guidelines from the Forest Plan.

Monitoring Indicator

Summary of soil disturbance classes using the Forest Soil Disturbance Monitoring Protocol.

Monitoring Frequency

Since 2014, soil disturbance monitoring has occurred annually and will continue to into the foreseeable future. This section will summarize some main highlights of data since 2018.

Background and Drivers

Per the 2012 National Forest System Land Management Planning Rule (or Planning Rule), the monitoring element addressed in this section is 36 CFR 219.12(a)(5)(viii), "The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land. (16 U.S.C.1604(g)(3)(C))."

The Forest Plan provides desired conditions and objectives pertaining to maintenance/restoration of soil physical, chemical, and biological properties, whereby maintaining/enhancing soil biologic, hydrologic, and other ecosystem functions (USDA-FS 2004, Ch.2, pp.11-13) at:

D-WS-3	O-WS-9

D-WS-12 O-WS-10

The Forest Soil Disturbance Monitoring Protocol provides a means of estimating soil disturbance by calculating the number of points evaluated per sample unit, or in the case of this report, stands. At a minimum, a stand has 30 sample points, but the number of points needed to be statistically significant are based on the variability of the data collected and the confidence interval and interval width established prior to sampling. Each point is assigned a disturbance class based on the greatest degree of disturbance in any parameter, ranging from Class 0 (or no evidence of disturbance to Class 3 (or severe disturbance) (Page-Dumroese et al. 2009b). Areas classified as Class 3 are the most disturbed but may or may not be detrimentally disturbed for some ecological systems. The Forest Service Manual defines detrimental soils in terms of permanent soil impairment, or "… changes in soil properties (physical, chemical, and biological) that result in the loss of the inherent ecological capacity or hydrologic function of the soil resource that lasts beyond a land management planning period." (USDA-FS 2010) Soil sensitivity, natural disturbance adaptation of the site, and mitigation and best management practice effectiveness are all factors that must be considered by a specialist when determining the degree to which soils may be detrimentally impacted.

Pre-Harvest Monitoring Results

Since 2018, soil disturbance has been evaluated in 151 stands prior to treatment. Because there were 14 stands from 2015-2017, they have been included in the pre-treatment analysis since the pre-treatment data establishes baseline conditions for which to later compare post-harvest conditions and evaluate the intensity and scope of management effects to soils. Average soil disturbance observed since in 2015 through 2023 is shown in table 55.

Monitoring year	Average of Proportion Class 0	Average of Proportion Class 1	Average of Proportion Class 2	Average of Proportion Class 3	Average of Proportion Detrimental
2015 and 2016	0.98	0.00	0.02	0.00	0.00
2017	0.74	0.20	0.06	0.00	0.00
2018	0.50	0.21	0.26	0.03	0.02
2019	0.85	0.02	0.06	0.04	0.00
2020	0.60	0.35	0.05	0.00	0.01
2021	0.88	0.07	0.04	0.01	0.00
2022	1.42	0.29	0.08	0.04	0.03
2023	N/A	N/A	N/A	N/A	N/A

Table 55. Average soil disturbance in stands prior to treatment, 2015 to 2023

Currently, the Chippewa National Forest is monitoring physical soil attributes to determine site sustainability, hydrologic function, and site productivity (Page-Dumroese et al., 2009). Some level of soil disturbance is inevitable when it comes to timber harvest. However, knowing the pre-existing soil disturbance, whether it is occurring naturally or from a previous harvest, in a stand will help soil scientists determine their management plan before harvesting occurs. Having a better understanding of the soil characteristics by looking at the land type association (LTA) before harvest will help mitigate some losses in soil productivity of that site post-harvest. This section looks at Forest Soil Disturbance Monitoring Protocol (FSDMP) pre-harvest data collected since 2015 across the Chippewa National Forest.

Table 56 shows that greater than 90 percent of pre-harvest monitoring points in the Chippewa National Forest are undisturbed. However, as disturbance levels increase so does the percentage of the stand the disturbance covers. Just because FSDMP 3 occupies a greater percentage than FSDMP 1 and 2 it doesn't mean that this soil won't recover. To be classified as an FSDMP 3 the observation point needs to meet one option from the criteria: wheel tracks are highly evident (greater than 10 centimeters deep), forest floor missing, compaction increases (greater than 30 centimeters deep), erosion is severe, change in soil structure to massive or platy

(greater than 30 centimeters deep), and roots do not penetrate the platy structure. These options do not mean that there are detrimental effects.

Table 56. Average soil distur	bance across all pre-harve	est data in the Chippewa N	ational Forest since 2015

FSDMP ¹ 0	FSDMP 1	FSDMP 2	FSDMP 3		
90.1 percent	1.7 percent	3.0 percent	4.2 percent		

1.-FSDMP is the forest soil disturbance monitoring protocol.

The greatest pre-existing disturbance is found on land type association (LTAs) Sugar Hills Moraine (SHm), Marcell Moraine (Mm), and Agassiz Lake Plain (Alp) and is a well-represented sample size (figure 8). These three LTAs are predominantly fine-textured soils (silty/clayey). Compaction on fine-textured soils typically decreases overall soil productivity over time (Powers et al. 2005, Slesak et al. 2017). Loamy textured soils are more susceptible to long-term damage from compaction than clayey soils. Loamy soils typically have a high amount of pore space and low aggregate stability making them the most vulnerable to soil compaction.



Figure 8. FSDMP pre-harvest data across different land type associations (LTAs)

Bemidji Sand Plain (Bsp) is one of the least disturbed land type associations (LTAs), but it is underrepresented in the data. Bsp is predominantly a coarse-textured (sandy) soil and compaction on these soils tends to have two opposite results on productivity. The first result is compaction may increase plant biomass due to an increase in the amount of water that is held in the soil (Ponder et al., 2012; Powers et al., 2005). Having more water available for the trees will promote tree growth and aid in reducing drought stress. However, opposite results have been shown. Sandy soils typically have a low nutrient availability and compaction may negatively affect the soil nutrient pools (Curzon et al., 2022). A decrease in soil nutrients will reduce the amount of biomass that is harvestable for a given amount of time.

Sandy soils are typically more resistant to compaction than finer textured soils because sand is a much larger particle than clay. When sandy soils are compacted there are still gaps between the particles that allow water

through. When fine-textured soils are compacted the particles will be so tightly packed together that water can't get through.

Across the Chippewa National Forest pre-harvest soil disturbance is low, and well with in soil quality standards. The general trend of increasing disturbance with depth can be explained by user error due to naturally occurring processes, relic compaction from previous harvest events where the upper 10 cm recover from fine root penetration and freeze and thaw cycles, and previous studies showing compaction can remain in deeper portions of the soil for decades after harvest.

Post-Harvest Monitoring Results

Since 2018, soil disturbance has been evaluated in 96 stands following treatments ranging from commercial thinning to clearcut with reserves and site preparation. Treatments occurred during different times of the year, within varying terrain, soil types, and vegetation communities. Summary statistics from those 2018-2023 observations are shown in table 57.

Monitoring year	Average of Proportion Class 0	Average of Proportion Class 1	Average of Proportion Class 2	Average of Proportion Class 3	Average of Proportion Detrimental
2018	0.09	0.13	0.46	0.09	0.10
2019	0.55	0.30	0.20	0.01	0.12
2020	0.47	0.57	0.22	0.08	0.08
2021	0.61	0.20	0.16	0.04	0.01
2022	0.54	0.63	0.19	0.09	0.07
2023	0.67	0.10	0.14	0.08	0.01

Table 57. Summary of soil disturbance in 96 stands following disturbance

All post-harvest monitoring stands had an average 49 percent Class 0, 32 percent Class 1, 23 percent Class 2 and 6 percent Class 3, while 5 percent were considered detrimental to the soil resource. Figure 9 shows that the greatest proportion of soil disturbance amongst all of the post-harvest monitoring stands from 2018-2023 was recorded in lower disturbance classes, decreasing sharply as disturbance class increases. Of further note, the greatest variation generally occurred at lower levels of disturbance.



Figure 9. Average post-harvest disturbance by soil disturbance, 2018 to 2023

The monitoring indicates that the average proportion of undisturbed/class 0 areas from 2018 to the following years is considerably different. Additionally, there are drastically different proportions of class 1 areas between 2018 and 2023 (figure 10). This discrepancy is likely attributed to the absence of a soil scientist on the forest to train personnel conducting the evaluations. Another contributing factor could be the variability in monitoring locations and soil types. Certain soil types may make it easier to identify specific characteristics or to dig deep enough in the profile to detect compaction lower in the profile.

Class 2 disturbance has been the most consistently classified over the years, averaging around 23 percent disturbance.

The most commonly noted forms of soil disturbance are compaction, displacement, and minor rutting.



Figure 10. Post-harvest soil disturbance, 2018 to 2023

Discussion

Note the FSDMP was paired with the Dynamic Soil Property Project (DSP) in 2021, 2022 and 2023, which focused on soil health on different soil textures across treatment types, soil texture and time since treatment. This is why there is no survey work prior to treatments conducted in 2023. Also, its worthy to mention is some discrepancy in soil disturbance evaluations from year to year. Notably, evaluations, prior to 2019 there was not a soil scientist on the Chippewa National Forest completing or training staff to complete the FSDMP evaluations. In addition, there's some indication of inconsistency with how detrimental soil conditions are determined prior to 2020.

Overall, past soil disturbance monitoring over the period of record indicates that harvest activities alone have resulted in some soil disturbance and Forest Plan desired conditions and objectives are generally being met. In general, some level of disturbance is expected when conducting any land/ vegetation treatment creating soil disturbance. Soil disturbance can affect rooting depth and density, water retention and permeability, soil aeration, and microbial community composition and respiration which can alter micro-scale carbon and nitrogen processes.

Monitoring from the DSP project and soil samples that were analyzed indicates there was an effect on soil nutrients due to treatments. An increase FSDMP class showed no significant impacts on the forest floor and the soil nutrient stocks of calcium, magnesium, potassium, pH, and the carbon to nitrogen ratios while it did exhibit a significant effect on potassium, carbon and nitrogen stocks in the mineral soil (Laehn 2024).

Soil bulk density is an indicator of soil compaction. It affects infiltration, rooting depth, available water capacity, soil porosity and aeration, availability of nutrients for plant use, and activity of soil microorganisms, all of which influence key soil processes and productivity. Monitoring indicated that Soil bulk density significantly decreased over time in the upper 20 cm (Laehn 2024), which indicates recovery is occurring of the soil at those depths.

Overall, monitoring and analyzed soil samples indicated that intensive treatment (that is, clearcut harvesting) leads to soil nutrient losses that differ between parent materials, elevated bulk density levels that may persist past 15-20 years post-harvest, and various changes in soil nutrients across disturbance gradients. (Laehn 2024)

Recommendations

- Continue monitoring. Additional stands need to be monitored to tease out potential differences amongst treatments, site prep, terrain features, seasonal operation, soil types, and vegetation conditions. Particularly, the Hill City Till Plain needs more monitoring, more pre-harvest and post harvesting monitoring on the same stand is needed to better assess the effects of forest management activities and validate whether soils have recovered from past treatments.
- Continue to monitor treatments to refine soil quality standard and season of operation for Management implications on soil health.
- Pair monitoring data with potassium means clustering to assist silvicultural prescriptions and soil operating seasons across the Chippewa National Forest and aid in reducing impacts on soil.
- Incorporate other data into surveys such as soil moisture and a description of the disturbance effects on soil nutrients as supplementary material to the FSDMP.

Evaluation of Monitoring Question and Indicator(s)

Although the general level of soil disturbance is low over the period of the monitoring record for post-harvest evaluations, some of the pre-harvest evaluations had some soil disturbance. Further evaluation of this monitoring question and indicator is necessary to ensure forest management activities are not affecting long-term soil productivity and viability of natural ecosystems.

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9. Special Uses

The Special Uses program provides services supporting our national policy and federal land laws by authorizing uses on National Forest System lands. With the Chippewa National Forest's checkerboard ownership, there are many opportunities and needs to cross National Forest System lands to reach other ownerships. In addition, due to the location of lakes on the Forest, several recreational opportunities are provided such as private resorts, recreation residences, and organizational camps.

The Forest works with a diverse pool of customers including private citizens, utility companies, oil and gas companies, resort businesses, non-profit agencies, tribal governments, state and local government as well as other federal agencies.

Year	Number of special use permits	Generated Revenue				
2018	708	\$1,289,220				
2019	706	\$1,355,279				
2020	707	\$1,289,223				
2021	729	\$1,440,523				
2022	720	\$1,437,206				
2023	722	\$1,473,307				

Table 58. Permit data 2018 to 2023

The Chippewa National Forest offers a variety of special forest products to the public for personal commercial uses. Many of the special forest products including balsam boughs and firewood are economically and culturally significant to the public.

Special-use authorization is a legal document such as a permit, term permit, lease, or easement, which allows occupancy, use, rights, or privileges of National Forest System lands. The authorization is granted for a specific use of the land for a specific period of time. For most authorizations, there is a cost. Types of costs for authorizations are Cost Recovery Fees- an assessment of fees to recover agency processing costs for special use applications and monitoring costs for special use authorizations. These fees are separate from any fees charged for the use and occupancy of National Forest System lands. Land use fees are annual rental fees based on the fair market value for the uses authorized and is payable in advance. Fees are established by appraisal or other sound business management principles. Other Associated Costs applicants may be responsible for may be to provide information and reports necessary to determine the feasibility and environmental impacts of their proposal; compliance with applicable laws and regulations; and terms and conditions to be included in the authorization.

Key Points

The Special Uses program provides services supporting our national policy and federal land laws by authorizing uses on National Forest System lands. With the Chippewa National Forest's checkerboard ownership, there are many opportunities and needs to cross National Forest System lands to reach other ownerships. In addition, due to the location of lakes on the Forest, several recreational opportunities were provided such as private resorts, recreation residences, and organizational camps.

The Forest works with a diverse pool of customers including private citizens, utility companies, oil and gas companies, resorts businesses, non-profit agencies, tribal governments, state and local governments as well as other federal agencies. In Fiscal years 2016 and 2017, 677 and 647 special use permits were issued that generated \$1,264,657 and \$1,266,694 in revenue, respectively.

The Chippewa National Forest offers a variety of special forest products to the public for personal and commercial uses. Many of the special forest products including balsam boughs and firewood are economically and culturally significant to the public.

Monitoring Questions

Does Forest management of forest product, recreation and other special use permits meet Forest Plan and agency direction?

Last Updated 2004.

Monitoring Indicator(s)

Review of the multiple factors in special use permits including the number, type, revenue, number expired, renewed and issued, number out of compliance. Policy (handbook/manual) specific to the Chippewa National Forest outside of Regional and National direction.

Forest product permit types and number issued.

Monitoring Frequency

Measure and report 2 years.

Background and Drivers

The Forest Plan provides desired conditions, objectives, and guidelines pertaining to special uses at:

D-REC-5	O-SU-3	D-TS-5
O-SU-1	O-SU-4	G-VG-2
O-SU-2	O-SU-5	

The Special Uses program provides services supporting our national policy and federal land laws by authorizing uses on National Forest System lands. With the Chippewa National Forest's checkerboard ownership, there are many opportunities and needs to cross National Forest System lands to reach other ownerships. In addition, due to the location of lakes on the Forest, several recreational opportunities were provided such as private resorts, recreation residences, and organizational camps.

The Forest works with a diverse pool of customers including private citizens, utility companies, oil and gas companies, resorts businesses, non-profit agencies, tribal governments, state and local governments as well as other federal agencies.

In 2006, the Forest Service adopted final regulations to recover costs associated with processing applications for special use authorizations.

There are several special forest products permits issued on the Forest including balsam boughs, Christmas trees, walking sticks, maple taps, birch bark and firewood. Demand for balsam boughs remains steady and demand for firewood is usually dependent on home heating prices and weather conditions.

Monitoring Indicator 1 – Special Use Permits

Type of Permit	2018 Number of Permits	2018 Revenue (\$)	2019 Number of Permits	2019 Revenue (\$)
Miscellaneous	32	3,108	32	2,867
Organization Camp	5	1,653	4	2,581
Recreation Residences	286	1,159,518	286	1,202,518
Resorts	12	52,315	12	61,777
Oil and Gas Pipeline	8	23,712	5	24,613
Powerlines	9	1,205	9	1,239
Railroads	2	0	2	0
DOT Easements	34	0	34	0
FRTA Easements	68	0	72	0
FLPMA Easements	15	146	15	657
FLPMA Permits	211	9,406	212	19,966
Communication Towers	4	8,213	3	8,081
Communication Line Permits	11	7,157	10	7,428
Service Buildings/VIC	2	21,421	2	22,286
Outfitters and Guides	9	1,366	8	1,266
Total	708	1,289,220	706	1,355,279

Table 59. Special use permits by type and revenue, 2018 and 2019

Table 60. Special use permits by type and revenue 2020 and 2021

Type of Permit	2020 Number of Permits	2020 Revenue (\$)	2021 Number of Permits	2021 Revenue (\$)
Miscellaneous	28	1,761	35	3,106
Organization Camp	4	0	4	1,200
Recreation Residences	286	1,187,484	285	1,215,400
Resorts	10	31,795	10	124,154
Oil and Gas Pipeline	6	25,221	5	25,768
Powerlines	9	1,265	10	1,292
Railroads	2	0	2	0
DOT Easements	35	0	35	0
FRTA Easements	72	0	73	0
FLPMA Easements	14	668	15	2,236
FLPMA Permits	218	17,824	234	15,297

Type of Permit	2020 Number of Permits	2020 Revenue (\$)	2021 Number of Permits	2021 Revenue (\$)
Communication Towers	3	8,227	3	8,310
Communication Line Permits	10	5,361	10	10,225
Service Buildings/VIC	2	8400	2	32,487
Outfitters and Guides	8	1,217	6	1,048
Total	707	1,289,223	729	1,440,523

Table 61. Special use permits by type and revenue, 2022 and 2023

	2022 Number of	2022	2023 Number of	2023
Type of Permit	Permits	Revenue (\$)	Permits	Revenue (\$)
Miscellaneous	36	3,010	39	2,764
Organization Camp	4	9,907	4	4,819
Recreation Residences	285	1,238,766	285	1,282,111
Resorts	10	98,555	10	89,348
Oil and Gas Pipeline	5	36,180	5	36,943
Powerlines	10	1,817	9	1,844
Railroads	2	0	2	0
DOT Easements	35	0	35	0
FRTA Easements	72	0	73	0
FLPMA Easements	13	219	13	2,241
FLPMA Permits	226	10,730	223	9,825
Communication Towers	4	5,645	4	5,884
Communication Line Permits	10	10,410	10	10,628
Service Buildings/VIC	2	20,675	2	25,002
Outfitters and Guides	6	1,292	8	1,898
Total	720	1,437,206	722	1,473,307

Table 62. Permits expired or not administered to standard

Year	Expired	Not Administered to Standard
2018	13	37
2019	15	42
2020	20	50
2021	15	47
2022	19	43
2023	7	38

Table 63. Cost recovery fees collected

Year	Minor Cost Recovery Fee's collected
2018	\$6,726
2019	\$2,989
2020	\$6,019
2021	\$4,908
2022	\$8,758
2023	\$10,020

The Forest has two handbooks specific to management of special uses. The handbooks include:

Forest Service Handbook 2709.11 – Special Uses, Chapter 40 – Special Uses Administration (Supplement No: R9 Chippewa 2709.11-2010.1) Forest Service Handbook 2709.11 – Special Uses, Chapter 30 – Resorts and other Concessions involving Privately-Owned Improvements (Supplement No: R9 Chippewa 2709.14-2014.1)

Discussion Summary of Monitoring Indicator #1

In the Eastern Region, the Chippewa National Forest holds the most recreation residence permits. Management of these permits require considerable oversight due to the restrictions in the permit terms. Six of the Summer Home Groups, 88 cabins, are eligible for the National Register of Historic Places as part of historic districts and one residence is eligible as an individual property. Most of the Summer Home Groups also include archaeological sites. One Summer Home Group's National register status is being reexamine in 2024.

Resort permit oversite is another permit type requiring considerable oversite by staff. Two of the ten permitted resorts on the Forest are eligible for the National Register of Historic Places and most of the resorts also include archaeological sites within their permitted lots. One National Register evaluation was updated in 2023 which more firmly established the resort's historic significance.

The Chippewa National Forest generates around 20 percent of the Eastern Region special uses income, mainly due to the number of recreation residence permits.

The Chippewa National Forest generally keeps permittees in compliance with their permits but in recent years have been overwhelmed with the number of proposals needing review.

The Forest generally keeps permittees in compliance with their permits but in recent years have been overwhelmed with the number of proposals needing review.

Cost recovery fees come back to the Forest to cover salary expenses for staff time related to permit administration.

Monitoring Indicator 2 – Forest Products

Year	Christmas Trees	Balsam Boughs	Firewood
2018	234	38	249
2019	270	40	222
2020	271	17	195
2021	475	25	194
2022	472	18	218
2023	471	17	87

Table 64. Forest products

Discussion Summary of Monitoring Indicator #2

During the years of 2020 and 2023, firewood was authorized through "free use" permits due to the Covid Pandemic. The numbers were tracked differently; however, they should be fairly accurate.

Special forest products continue to be in demand from the Forest. A new emerging demand from the Forest is decorative birch poles and spruce tops. While not currently permitted for gathering on a personal or commercial basis, the Forest has received requests for the harvesting of birch poles and spruce tops as the market demand for these products is very high currently in northern Minnesota. While the Forest recognizes

the cultural significance of birch poles for local tribes, the increase in demand for decorative birch poles creates a concern in the regeneration of the species. Concerns for the harvest of spruce tops include practices killing the tree, making it susceptible to insect and disease, damaging the tree and limiting reproductive capability, or all the above.

Recommendations

The Forest continues to ensure special uses and forest products permits remain in compliance. Special Uses added 1 full-time position to assist with the management due to the increased requests. An additional request for 2 more full-time positions has been made for FY25.

The Forest will be evaluating opportunities in future years to find opportunities to be more efficient with reviewing permit requests with creating review processes and by drafting forest wide environmental analysis for existing roads that may be issued a special use road permit.

Evaluation of Monitoring Question and Indicator(s)

Understanding the different uses on the Forest is important as well as where the revenue is generated for the Forest Service.

References

U.S. Department of Agriculture, Forest Service. Special Uses Database (SUDS).

U.S. Department of Agriculture, Forest Service. Cut and Sold Report from the Corporate Database Warehouse (CDW).

10. Timber

National Forest Management Act (NFMA) (1976) allows timber harvest only where there is assurance that such lands can be adequately restocked within five years after harvest. Regeneration may occur naturally or by planting or seeding. Stocking surveys on regenerated stands are conducted the first, third and fifth years after harvest to assess stocking levels. Most planted sites require at least the full five years to be adequately stocked. Natural regeneration of hardwoods can usually be certified as adequately stocked following the third year stocking survey. What constitutes adequate stocking is defined in individual prescriptions and is dependent on objectives.

Monitoring Question

Are harvested lands adequately restocked within five years following harvest?

Last Updated

This question has remained the same since the 2004 Forest Plan was implemented. It originated with NFMA in 1976.

Monitoring Indicator(s)

Acres of regeneration harvest, acres certified within 5 years of harvest; percent certified stocked within 5 years of harvest.

Monitoring Frequency

On-going through every field season in the form of Stocking Surveys.

Background and Drivers

The Forest Service harvests timber from National Forest System lands only where there is assurance that such lands can be adequately restocked within five years after harvest NFMA. The certification process is how the Forest Service has chosen to indicate sites are adequately regenerated following harvest. Many variables enter into the successful establishment of tree regeneration. On the Chippewa National Forest competition from woody shrubs, sod, and deer browse are primary deterrents to meeting the objective. Up to one third of sites need to be replanted (following an initial planting) due to tree mortality.

Monitoring Indicator 1

This indicator includes acres of regeneration harvest, acres certified within 5 years of harvest, and percent certified stocked within 5 years of harvest.

Results and Discussion

Table 65 displays the primary activities that the Chippewa National Forest employs to establish regeneration following a harvest. Planting is the primary means to establish regeneration where conifers are the desired future condition. Natural regeneration is largely hardwood regeneration (including aspen).

Release consists of hand cutting of brush. The Chippewa National Forest has generally good sites. Good sites have brush competition. Hazel species are the primary competitor, but *Rubus sp.* can also be problematic where they occur. Aspen suckers are also unwanted competition when converting sites to conifers. Sedge and grass mats (sod) can also be challenging on some sites. There is little that can be done in these cases without the use of herbicides.

Deer and rabbit predation of young trees is an on-going problem. Nothing is done regarding rabbits. For deer browse, bud capping is done.

Reforestation Accomplishments Activity	Average ¹ for 2018-2023 (acres)
Planting	1,571
Seeding	6
Site Prep for Natural	148
Certification of Natural Regeneration without Site Preparation	2,024
Site Prep for Planting or Seedling	391
Release	2,103
Animal Damage Control (ADC)	1,791

Table 65. Acres of accomplishment (averaged) for the timeframe of fiscal years (FY) 2018-2023 for reforestation activities

1.-No planting occurred in 2020 due to the pandemic.

Table 66 shows the regeneration harvest acres and percent certified stocked within five years. Success was greatest on coppice cut sites with natural regeneration of hardwood/aspen from suckers and sprouts.

Stocking surveys are the mechanism by which certifications of regeneration are based on. In fiscal years (FY) 18-FY23 the forest conducted and average of 499 stocking surveys a year covering 8,412 acres a year.

Harvest Type	Average FY13-FY18 Regen Harvests	Average of FY13-FY18 Regen Harvest Acres	Average a year (FY18-FY23) Regen Harvest Acres Certified by FY End	Percent Certified Stocked Within 5 Years
Coppice Cuts	59	969	962	99%
Clearcuts	56	988	887	90%
Selection Cuts	35	851	726	85%
Seed Tree Cuts	12	633	583	92
All Regeneration Harvests	162	3,440	3,158	92%

 Table 66. Regeneration harvest and certification averages a year (FY2018-FY2023)

Recommendations

No changes to management practices or direction are recommended. A new staff plan has been adopted that should increase available staff. Tracking and maintain data on all the sites are a challenge and more staff may be required in the future to help with that aspect of the program.

Evaluation of Monitoring Question and Indicator(s)

No recommendations.

Monitoring Question

Is white pine being increased on the landscape?

Last Updated 2004.

Monitoring Indicator(s)

White pine frequency on the Forest landscape.

Monitoring Frequency

Bi-annually.

Background and Driver

36 CFR 219.12(a)(5)(iii)

The status of focal species to assess the ecological conditions required for diverse plant and animal communities.

White pine is a high-profile tree species in the forests of northern Minnesota and was selected as a management indicator species because:

- population changes are believed to indicate effects of forest management
- it is a species with many social, economic and ecological values
- it addresses major management issues about how much and where to promote white pine for
- its important wildlife habitat features, timber value, scenic quality, and role in maintaining ecologically healthy forest composition and structure
- it is considered to be a keystone species, in that its overall effects on critical ecological processes and biodiversity are greater than would be predicted by its abundance.

Monitoring Indicator 1

Amount of white pine as a component of other forest types based on frequency in regeneration and non-regeneration plots.

Acres and percent of white pine forest type by landscape ecosystem

Monitoring Frequency

2 years.

Results

Table 67. Frequency of white pine on regeneration and non-regeneration plots

Plot type	Total Plots	Plots with WP	Frequency
Regeneration plots	26,895	5,652	21%
Non-regeneration plots	77,976	8,926	11%

Discussion

To assess the results of white pine occurrence and management, common stand exam plots were used. There are currently 104,871 plots in FSVeg (Field Sampled Vegetation) that are valid (not archived). These are distributed across the Forest in every forest type and are divided into two strata. One stratum represents stands that are not in a regeneration state. This means they have not recently had any activity in them and are generally intermediate or mature in age. The other stratum represents plots found in regenerating stands where regeneration harvests have occurred. Frequency of white pine (the presence or absence of white pine on a plot) in each stratum was calculated (table 68). All plots are of the same size, and all sampling followed the same sample design. According to these data the Forest is regenerating white pine at a frequency nearly twice that found on the landscape in general, in Forest Service administered stands without recent management activities.

Regeneration harvests include clearcuts, shelterwood cuts with reserves, seed tree and selection harvests. Regeneration methods include planting of seedlings, artificial seeding, natural seeding, and coppice. Overstory trees are present on some of the regeneration plots, depending on the type of harvest and location of the plot. White pine is often a reserve species in harvests, though planted seedlings contribute considerably to the increased frequency on regeneration plots.

Monitoring Indicator 2

Regeneration of white pine.

Results

Table 68. White pine planted

Year	Seedlings Planted
2018	268,500
2019	440,000
2020	COVID – no planting
2021	751,300
2022	726,400
2023	563,100
2024	500,800

Discussion

Table 68 displays the number of white pine seedlings and seed planted each year starting with 2018 Generally 3 to 4 ounces of seed is applied per acre for reforestation.

Recommendations

None.

11. Transportation

The Chippewa National Forest aspires to provide the minimum road system needed that will provide safe and efficient access to areas throughout the Chippewa National Forest. In 2015, the Forest wide Travel Analysis took a scientific look at many risks and benefits of the current transportation system to help identify this potential minimum road system. All Chippewa National Forest system roads now have a "likely needed" or "likely not needed" classification assigned to help move towards a minimum necessary road system. This science-based information will inform staff during project planning efforts, prioritizing road maintenance, improvement projects or proposed road decommissioning activities.

Key Points

There was an emphasis on road inventories recently to improve the maps and database to more accurately reflect current actual ground conditions. This accounts for some of the mileage changes between Operating and Objective Maintenance Levels. The entire Forest road inventory was completed by Fall 2023.

The Forest continues with decommissioning roads in order to downsize the transportation system to reach the minimum system with to develop the minimum road system needed while still providing adequate access.

Monitoring Question

To what extent is the Forest, in coordination with other public road agencies, providing safe, cost effective, minimum necessary road systems for administrative and public use?

Last Updated

The 2014 Monitoring and Evaluation Report is the last know update for this monitoring question. (Chippewa National Forest, 2014)

Monitoring Indicator(s)

Indicators: Miles of road inventoried by Operational Maintenance Level

Monitoring Frequency

Master Road inventory is completed every 5 years for Operational Maintenance Level Roads 3, 4, and 5.

Background and Drivers

The National Forest Service System roads provide access to federal forest land, state, county, tribal and private land. Some roads are maintained for safe use by passenger cars (maintenance levels (ML) 3, 4, 5), some roads are maintained for high-clearance vehicle use (ML 2), and some roads are closed from all vehicle traffic (ML1). The higher an assigned maintenance level number, the more it costs to maintain that road corridor. The Forest land base is a checkerboard of ownership, which contributes to the need for a "seamless" interface with public roads for Forest users to efficiently maneuver through the Forest.

The following Desired Condition and Forest Plan Objectives (Chippewa National Forest, 2004) help to quantify the monitoring need:

D-TS-1	D-TS-4	O-TS-6
D-TS-2	O-TS-1	O-TS-7
D-TS- 3	O-TS-2	O-TS-8
Monitoring Indicator 1

Results

Table 69 provides a snapshot of the mileages by maintenance level from September 2024. Road inventory is an ongoing activity, and the numbers can change as inventory information becomes available. There is a five-year inventory cycle that was completed in 2023 which records the official miles of additions and deletions to the official system of record. No new roads were constructed during this monitoring period. The data being verified and updated comes from the USDA Forest Service NRM System (September 6, 2024).

Maintenance Level (ML)	Objective ML (miles)	Operational ML (miles)	Difference Operating - Objective	Explanation	Maintained in 2016 (miles & %)	Maintained in 2024 (Miles & %)
1	291.78	647.02	355.24	More miles are operating at ML1 than intended.	114 6%	54.8 3%
2	1324.55	1163.12	-161.43	Fewer miles are operating at ML 2 than intended.	114 6%	54.8 3%
3	240.59	267.47	26.88	More miles are operating at ML 3 than intended.	405 90%	503 98%
4	253.21	282.71	29.5	More miles are operating at ML 4 than intended	405 90%	503 98%
5	21.79	4.81	-16.98	Fewer miles are operating at ML 5 intended	405 90%	503 98%
Decom.	238.1	0.0	N/A	N/A	N/A	N/A
Total	2,369.93	2,369.93	N/A	N/A	N/A	N/A

Table 69. Chippewa National Forest transportation system by maintenance level (ML)

Data: NRM (September 6, 2024) System = Forest Service

Each National Forest Service System Road has an assigned objective maintenance level and an operational maintenance level. Objective maintenance levels refer to the planned or target level of maintenance for a road, while operational maintenance levels reflect the actual physical condition of the road, regardless of the target maintenance goals. There are significantly more roads operating at a Level 2 than any other maintenance level, as displayed in table 69. Only 3 percent of these maintenance level 2 roads receive routine maintenance. Few of the passenger-car designated roads (maintenance level 3, 4, and 5) are functioning at a level lower than their objective maintenance level due to lack of maintenance. There are 238.01 miles of roads with previous management decisions on file to decommission which, once completed, will further reduce system mileages. This is a backlog that is dealt with as time and funding permits.

Recommendations

Maintenance tasks done on Forest Service roads are hovering near the minimum allowable. The Forest should continue partnering with other public road agencies and the Leech Lake Band of Ojibwe to increase its ability to provide safe and efficient access throughout the Forest. Recent analysis shows more people are moving to the area which creates increased residential traffic, and higher maintenance requirements. The additional maintenance by our partners will increase the "seamless" interface, where the public enjoys more comfortable travel throughout a more seamless road system.

The Forest should continue moving towards the minimum road system. Ongoing road inventories will aid in identifying more roads to be included in the "Likely Not Needed" category, further downsizing the mileages. Fewer miles maintained will lead to lowered maintenance efforts and expenses. It will also provide greater and more efficient access to popular locations and recreation opportunities in the Forest. Additional public involvement is expected as more decisions will be required to determine the future Forest road system.

Evaluation of Monitoring Question and Indicator(s)

Improvements to the monitoring of closed roads is needed (ML1).

Roads that are gated for wildlife nesting areas should be checked periodically to ensure the wildlife protections are still necessary.

There should be a change in Forest direction of Off-highway vehicle use beyond some closed gates. Previous direction was to allow vehicles under 1,000 pounds to drive around gates to continue using the road while the gate is closed. This creates confusion by users not knowing the weight of their vehicles and also incorrectly assuming that all Forest Service gates can be driven around.

References

U.S. Department of Agriculture, Forest Service. 2004. Chippewa National Forest. Land and Resource Management Plan.

https://www.fs.usda.gov/detail/chippewa/landmanagement/planning/?cid=fsm9_016569

U.S. Department of Agriculture, Forest Service. 2014. Chippewa National Forest. Monitoring and Evaluation Report. <u>https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd548585.pdf</u>

12. Tribal Rights and Interests

Monitoring Questions:

The Forest Plan states three conditions to be monitored:

- 1. To what extent does the Forest emphasize agency, tribal, and public involvement and intergovernmental coordination with federal, state, county governments and agencies?
- 2. Is Forest management helping to sustain American Indians' way of life, cultural integrity, social cohesion, and economic well-being? Is the Forest facilitating the right of the Tribe to hunt, fish, and gather as retained via treaty?
- 3. Are government-to-government relationships functional?

This section includes three monitoring questions related to tribal rights and interests. The first addresses interagency coordination, the second relates to the Forest's efforts to sustain American Indian's lifeways and the legal rights of the Tribe to hunt, fish, and gather, followed by a discussion on the government-to-government relationship between the Leech Lake Band of Ojibwe (LLBO or Band) and the Chippewa National Forest (CPF or Forest).



The Leech Lake Tribal Council is the governing body of the Band with offices located in Cass Lake, Minnesota, and is a member of the Minnesota Chippewa Tribe. The Tribal Council consists of a Chairman, Vice Chairman, District 1 Representative, District 2 Representative, and District 3 Representative.

Eleven Indian communities make up the reservation, all of which are located within the proclamation boundary of the Chippewa National Forest. Cass Lake is the largest community within the reservation. In addition to Cass Lake, the recognized communities are Ball Club, Bena, Inger, Onigum, Mission, Pennington, Smokey Point, Sugar Point, Oak Point, and S. Lake. Oak Point had previously been known as Squaw Point, and S. Lake had previously been known as Squaw Lake. Each community is represented by a Local Indian Council (LIC), and the Leech Lake Band also maintains offices to represent the interests of off-reservation members in Bemidji, Duluth, and Minneapolis, Minnesota.

The relationship between the LLBO and the CPF is unlike any other in the Forest Service system. The Chippewa National Forest was formed out of lands that had originally been set aside in the mid-19th century to serve as the treaty guaranteed homeland for the Leech Lake Band of Ojibwe. This results in immense overlap today with approximately 90 percent of the Leech Lake Indian Reservation being found within the Chippewa National Forest, and approximately 45 percent of the Forest being found within the Reservation. This inextricably binds the management of the CPF with the social and economic well-being of the Leech Lake Band.

In addition to the practical implications of this overlap, the fact that the CPF was created by statute with provisions calling out specific obligations to the Leech Lake Band, amplifies the legal trust obligation owed

by the United States to the Band. In the first major treaty rights case in Minnesota, known as the Herbst decision, the United States District Court affirmed the retained treaty rights of the Band on the reservation. Further, during the course of this litigation, the United States asserted on behalf of the Band that treaty protected rights to hunt, fish and gather on the Leech Lake Indian Reservation are property rights held by the Band. Therefore, virtually all management activities on the CPF have the potential to affect rights protected by the "Just Compensation clause" of the Fifth Amendment of the United States Constitution.

Key Points

The Forest has a legal obligation to uphold its Federal Trust responsibility to the Leech Lake Band. A memorandum of understanding (MOU) signed by LLBO and the Chippewa National Forest (CPF) in 2019 expresses the will of each to work together to conserve resources significant to the Band's way of life and cultural identity. The 2024 MOU revision builds upon the tenants established in 2019 and further defines processes to clarify and enhance communications and processes designed to honor the Band's desire for increased involvement in projects on National Forest System lands. Key points in the 2024 MOU address refinement of a shared decision-making model for natural resource considerations, utilization of the Band's Traditional Ecological Knowledge, and expansion of the use of the Tribal Forest Protection Act.

Monitoring Questions

- 1. To what extent does the Forest emphasize agency, tribal, and public involvement and intergovernmental coordination with federal, state, county governments and agencies?
- 2. Is Forest management helping to sustain American Indians' way of life, cultural integrity, social cohesion, and economic well-being? Is the Forest facilitating the right of the Tribe to hunt, fish, and gather as retained via treaty?
- 3. Are government to government relationships functional?

Questions are linked to the MOU between LLBO and Chippewa National Forest.

The Tribe's comments about environmental projects will be considered.

These questions are addressed in Tribal Relations Annual Report

Monitoring Indicators

Question 1: Consultation on Chippewa National Forest proposed work; compliance with the MOU, and a summary of key information in the Tribal Relations Report.

Question 2: Compliance with the MOU, and a summary of key information in Tribal Relations Report.

Question 3: Consultation on environmental analysis and other Forest Service proposed work; compliance with the MOU, the National Environmental Policy Act, and the Tribal Historic Preservation Office.

Monitoring Frequency

Question 1: annual monitoring with a report every 2 years.

Question 2: annual reporting.

Question 3: annual monitoring with a report every 2 years.

Background and Drivers

Numerous locations throughout the Forest that have traditional, cultural, and spiritual significance to the Band. The use and protection of these areas is essential to maintaining traditional links to past generations.

The continued availability of traditionally utilized natural resources is crucial to Ojibwe culture. Now, as in the past, many places throughout the landscape are visited during a yearly cycle to collect food, medicinal plants, and other materials, as well as for religious practices and social gatherings. Plants and animals gathered from openings, aquatic environments, and forests provide sustenance. The traditions of gathering these and other natural resources continue to be economically and spiritually important. Because of its concern with the continuation of this aspect of Ojibwe culture, the Band takes an active role in the protection and restoration of many species of plants, animals, and fish. The Band also emphasizes that access to these resources and traditional cultural places is an inherent right.

The first Memorandum of Understanding (MOU) between the Band and the Forest (the Parties) was approved in 2003. Revisions to the original MOU occurred every five (5) years to reflect a strengthened relationship based on the growing understanding of the unique relationship between the Chippewa National Forest and the Leech Lake Band of Ojibwe.

The 2019 MOU revision includes provisions for achieving the Band's desired vegetation conditions (DVCs) on National Forest System Lands by developing a shared decision-making model for natural resource considerations, utilizing the Band's Traditional Ecological Knowledge, and expanding the use of the Tribal Forest Protection Act. The Forest has successfully implemented the Band's DVCs through participation of Division of Resource Management staff as part of project interdisciplinary teams.

The Regional Forester's approval of the 2024 MOU is expected mid-October 2024.

The forest plan includes desired condition and objectives at:

Question 1: D-CM-1, D-SE-4, D-REC-6 Question 2: D-TR-1, O-TR-1, O-TR-3, D-TR-3 Question 3: D-TR-2, O-TR-2, O-TR-4

Monitoring Question 1

To what extent does the Forest emphasize agency, tribal, and public involvement and inter-governmental coordination with federal, state, county governments and agencies?

Results

The Forest strives for appropriate involvement and inter-governmental coordination in each action affecting private citizens, the LLBO, and other governmental agencies.

Involvement with the broader public includes press releases related to SOPA (Schedule of Proposed Action) postings, pre-decisional project information and the opportunity to provide input through the SOPA, mailed notifications to individuals and groups who may be affected by a decision, and meetings when appropriate.

Both independently and at the LLBO's request, the Forest coordinates involvement with federal, state, and county governments when making management decisions that overlap jurisdictional authorities.

Monitoring Question 2

Is Forest management helping to sustain American Indians' way of life, cultural integrity, social cohesion, and economic well-being? Is the Forest facilitating the right of the Tribe to hunt, fish, and gather as retained via treaty?

Results

The Chippewa National Forest works with the Band in a variety of ways to improve the American Indian's way of life, cultural integrity, social cohesion, and economic well-being. This is achieved primarily through stewardship contracts, grants and agreements, and training. The Forest has also coordinated with the Band by providing training, working together to complete ecosystem restoration, prescribed burning, impoundment management, road maintenance, management of heritage resources, lands review, and public affairs.

Stewardship Contracts

The Forest regularly collaborates with the Band in multiple ways, including sharing sale area maps from timber sales and current information on recently completed harvest units to provide firewood harvesting opportunities across the Forest resulting from recent Forest Service timber sales.

Employees with the Band's Temporary Employment Program continue to exercise gathering rights across the Forest by sending out crews of employees and harvesting firewood and delivering to tribal members for home heating needs.

One of the Band's priorities, providing habitat for a shrinking snowshoe hare population, also benefits from timber sale information as it allows the Band to plan and execute habitat work.

Grants and Agreements

From 2015 to present, the Forest has successfully executed and closed over 50 grants and agreements with the Band ranging from road maintenance, shoreline restoration, berry and pollinator habitat, heritage survey work to invasive species control and fuels reduction. The following table 70 displays active grants and agreements with the Band, some of which have been in place for several years.

#	Type of Agreement	Purpose of Agreement and Results
1	Roads Agreement	Master Cooperative Forest Road Agreement
2	Participating Agreement	Seasonal Fire Positions
3	Participating Agreement	Native Berry Patch Restoration
4	Challenge Cost-Share	Heritage Surveys (2)
5	Participating Agreement	SW Cass Lake Hazardous Fuels Mitigation
6	Participating Agreement	LLBO Pollinator Restoration Project
7	Participating Agreement	Boat Cleaning Stations
8	Tribal Forest Protection Act (TFPA) 638	Pine Fire Tribal Forest Protection Act – 638
9	Participating Agreement	Bowstring Lakeshore Restoration Project
10	Challenge Cost-Share	Wildlife Habitat Improvement Project
11	Stewardship Agreement	Non-Native Invasive Plant Species Management
12	Participating Agreement	Prescribed Burn Fire Support
13	Domestic Grant	Inger Pow Wow Grounds Improvement & Maintenance
14	Roads Agreement	Chub Lake and Smith Landing Access Road Repair, Improvement & Maintenance
15	Good Neighbor Agreement	Aspen and Climate Change Management as Part of Larger TFPA Project
16	Participating Agreement	Vegetation Management Project
17	TFPA 638	Tribal Capacity Building for Cohesive Fire Strategy
18	Good Neighbor Agreement	Aquatic Invasive Control Using Diver Assisted Suction Harvesting

Table 70. Active grants and agreements with the Leech Lake Band of Ojibwe (LLBO)

#	Type of Agreement	Purpose of Agreement and Results
19	Good Neighbor Agreement	Ecological Monitoring and Assessment (2)
20	Challenge Cost-Share	Tribal Culture and Skills Support Project
21	Stewardship Agreement	Plughat Stewardship Project for Restoration & Maintenance of Wildlife Habitat & Reestablishment of Native Plant Species
22	Stewardship Agreement	Waterfowl Impoundment Management & Maintenance Restoration Project
23	TFPA 638	Ecological Fire Restoration & Capacity Building Part Two
24	Stewardship Agreement	Tribal Gathering Access Improvement & Restoration
25	TFPA 638	Thermal Precision Combat Non-Native Invasive Species

The Tribal Forest Protection Act (TFPA) authorizes the Secretaries of Agriculture and Interior to give special consideration to land management projects proposed by Tribes on Federal lands bordering or adjacent to Indian Trust Lands to address threats to Tribal forest lands, including wildfire and disease. A total of four TFPA proposals funded at over \$4,240,000, developed by the Band's Division of Resource Management and approved by the Regional Forester, were executed with an additional TFPA proposal pending. These include funding and technical assistance for building capacity in the Band's wildland fire program, early thinning in young, overstocked, planted pine stands, and increasing habitat for snowshoe hare and other wildlife species. red pine and white spruce plantation restoration, incorporation of prescribed fire, and mechanical treatment of non-native invasive plant species.

Tribal Timber Sale Coordination

Forest Service staff continue to work cooperatively with the Band's Division of Resource Management on tribal timber sales. This coordination has included access, designation of miscellaneous federal timber to facilitate access, road permit review, property line location and coordination with purchasers for biomass utilization on tribal land.

Ottertail Transmission Line Mitigation

The Forest Service continues our work planting fruiting shrubs on both National Forest and Tribal lands. Several planted areas provide berry picking opportunities for the Band. The remainder of these funds are earmarked for a project designed to enhance overland access to a wild rice bed.

Ecosystem Restoration

The Chippewa National Forest and the Band worked together to plant red and white pine seedlings in areas on the Forest. The Band's Division of Resource Management continues to work on Hazardous Fuels projects commonly known as "Stevens' Funds." The \$225,000.00 Onigum Vicinity Hazardous Fuels Reduction Fuels Project grant treated 580 acres in the Onigum area of the Reservation. This project included thinning, brushing and prescribed burning.

The Band participated with the Forest in prescribed burning at several areas on the Chippewa National Forest.

The Band participated in staffing high fire danger occurrences.

The Band completed a Forest Service funded Community Wildfire Protection Plan for the Reservation.

Under agreement, the Forest has trained and employed band members in the identification and eradication of invasive plant species. The crew received training on identification of various invasive plant species, as well as observing exotic earthworm infestations, at sites across the forest. The crew conducted hand and mechanical invasive plant control treatment on both tribal and National Forest lands.

Engineering

The Forest removed a Works Progress Administration (WPA) era concrete known as Knutson Dam, replacing it with a rock dam.

The Forest coordinated routine maintenance work at impoundments under an impoundment agreement with the Band.

The Forest updated the road maintenance cooperative agreement with the Band to blade and snowplow many roads.

The Forest completed a number of stewardship road proposals, including road reestablishment, blading, etc.

Heritage Resources Coordination

The Forest continues to consult with the LLBO Tribal Historic Preservation Office (THPO) for management projects while operating within the existing Programmatic Agreement with the LLBO THPO, the Minnesota State Historic Preservation Office (SHPO), and the Chippewa National Forest.

Lands/Recreation

On June 28, 2024, the Leech Lake Band of Ojibwe and the Chippewa National Forest have announced that a Decision Memo was signed by US Forest Service Regional Forester Tony Dixon designating selected parcels for transfer on the Chippewa National Forest. A total of approximately 11,778 national forest acres are being transferred under this Act. This action is a significant step in implementing the Leech Lake Band of Ojibwe Reservation Restoration Act, signed into law in December 2020 and meets the legislative target of approximately 11,760 acres of federal land, currently managed by the Chippewa National Forest, to be held in trust for the benefit of the Leech Lake Band of Ojibwe. With the signing, the Forest Service is poised to transfer 345 Restoration Parcels approximately 11,778 acres through legal descriptions publication in the Federal Register.

The Forest implemented a regional effort to offer fee-free developed recreation area use for tribal members in recognition of the Band's treaty reserved rights.

Training

The Forest Service, through its agreement with the U.S. Institute for Environmental Conflict Resolution, (the John S. McCain III National Center for Environmental Conflict Resolution as part of the Udall Foundation), to provide impartial collaboration, consensus-building, and conflict resolution services. Collaboratively, workshops designed through Udall were designed to enhance problem solving and decision-making by helping parties work together, build a shared understanding of issues, address concerns, and develop strong outcomes.

Monitoring Question 3

Are government to government relationships functional?

Background

Consultations occur on National and Regional issues and on local Forest projects. Forest level projects with potential to affect the Band's impacting Treaty Rights has been an emphasis. The director of the Band's Division of Resource Management is authorized by Tribal Council Resolution to serve as the point of contact for the Band on all matters concerning the Forest Service. Line and staff officers consult with the Leech Lake Division of Resource Management Director or delegated staff. Peer communication between Forest and Tribal staff is frequent and often unprompted by a directive.

Planning Team members and Line Officers on the Forest attend Local Indian Council meetings to provide and solicit information from Tribal communities on Forest Service projects planned within the reservation boundaries.

Results

The Forest Service implemented practices to manage for the Band's desired vegetation conditions within the reservation. The result of this effort was a signed Memorandum of Understanding between the Forest Service and the Band. Consultation under a MOU and with the Leech Lake Band of Ojibwe Tribal Historic Preservation Office (THPO) occurs for projects planned under the National Environmental Policy Act.

Other consultations occurred during project level analyses.

Recommendations

Continue to work with the Band and employees of the Chippewa National Forest to strengthen cultural awareness, consultation, communication, employment and outreach, partnerships, and resource management.

Continue efforts that facilitate greater involvement of all Tribal members in Forest programs and activities afforded the general public.

Continue connecting leaders from both governments to help address key issues that have the potential to cause discord and disrupt relations.

13. Watershed Health

Key Points

Best management practices (BMPs)

Best management practices (BMPs) were generally well-documented, implemented, and effective for the ground-based skidding and harvesting and utility sites.

Effective implementation of BMPs and Forest Plan standards and guidelines are moving the Forest toward desired conditions and objectives.

More detail in the planning documents and operation and maintenance plans may improve implementation and effectiveness of BMPs.

Operating plans inclusive of BMPs should be created for water accesses and dispersed sites to prevent water quality degradation or facilitate faster remedy of issues.

Wetland Restoration and Impoundment commissioning

Restoration of hydrology and wetland vegetation appears to be progressing well at each of the impoundment removal sites. The Forest is moving towards the desired conditions and objectives through effective implementation of relevant best management practices (BMPs) and Forest Plan standards and guidelines (S&Gs). The project met all laws and regulations pertinent to wetland restoration and results are consistent with management expectations.

Monitoring methodology adequately assessed the changes in hydrology and plant communities after restoration (impoundment removal) and is recommended for similar monitoring projects in the future.

Continued survival surveys are recommended to adequately assess reforestation efforts.

Aquatic Organism Passage (AOP) Restoration

The pace of using AOP restoration to advance forest plan desired conditions has slowed compared to the period the last major crossing assessments in 2008-2010, however continues to some degree.

Aquatic organism passage (AOP) is achieved through removing impoundments, dams, road crossing improvements, and beaver control.

Snow Trail crossing assessments have identified projects to be completed in upcoming years.

Most crossing assessments are 10-15 years old and new comprehensive surveys are recommended to identify AOP needs.

The use of beaver trapping and the removal or breaching of dams or beaver clogged culverts continues to be an effective way to both ensure aquatic organism passage and reduce erosion and sedimentation where Forest infrastructure and beaver populations conflict.

Monitoring Question

To what extent is Forest management affecting water quality, quantity, flow timing and the physical features of aquatic, riparian, or wetland ecosystems?

The Forest monitored several categories of management action and restoration activities to addressing this question.

- 1. National Best Management Practices (BMPs) surveys
- 2. Wetland Restoration and Impoundment Decommissioning Projects and Beaver Control
- 3. Aquatic Organism Passage Improvements

A.-Best Management Practices

Beginning in 2014, all national forests were required to monitor water quality best management practices (BMPs) annually for activities that occur on National Forest System Lands. The monitoring program was developed to improve accountability and performance in managing water quality consistent with the Federal Clean Water Act (CWA) and State water quality programs (USDA 2012). During fiscal years 2018-2023, the Forest has selected and surveyed 41 projects to evaluate core water quality BMPs for both implementation and effectiveness (table 71).

Date	Monitoring Activity	Site	Implementation	Effectiveness
July 26, 2018	Road Decommissioning	3359B	Marginal	Marginal
July 30, 2018	Use of Prescribed Fire	West Winnie Prescribed Fire - Unit 2	Fully	Effective
Aug. 9, 2018	Dispersed Rec	M39 - Spider Lake	No BMPs	Not
Aug. 9, 2018	Watercraft Launches	Deadhorse Lake Carry in	No BMPs	Not
Sept. 19, 2018	Timber Harvest	Stag, Payment Unit (PU)	Fully	Effective
Sept. 19, 2018	Timber Harvest	Cutaway, PU 3	Mostly	Effective
Aug. 15, 2019	Prescribed Fire	Moss Lake Unit 3	Marginal	Effective
Aug. 15, 2019	Developed Rec	Deer Lake Campground	Fully	Not
Aug. 21, 2019	Waterbody Crossing	Forest Road 2207	Marginal	Effective
Aug. 21, 2019	Waterbody Crossing	Forest Road 2171	Fully	Effective
Aug. 22, 2019	Developed Recreation	Stony Point Campground	Fully	Effective
Aug. 27, 2019	Timber Harvest	Tanglewood, Unit 3	Mostly	Effective
Sept. 19, 2018	Timber Harvest	Ethel, Unit 11	Mostly	Effective
Aug. 10, 2020	Timber Harvest	Stag Stewardship Unit 8	Marginal	Effective
Aug 13, 2020	Aquatic Ecosystem	Bag Lake and Ketchum Impoundments - Aquatic Organism Passage	Fully	Effective
Aug. 13, 2020	Aquatic Ecosystem	Six Mile Lake Aquatic Passage Project	Fully	Effective
Sept. 17, 2020	Waterbody Crossing	Forest Road 2144	No BMPs	Effective
Sept. 17, 2020	Waterbody Crossing	Forest Road 2182	No BMPs	Effective
Sept. 18, 2020	Waterbody Crossing	Forest Road 2104	No BMPs	Mostly
Oct. 5, 2021	Timber Harvest	Shallow Hail 8	Fully	Effective
Oct. 5, 2021	Timber Harvest	Shallow Two 27	Fully	Effective
Oct. 5, 2021	Timber Harvest	Burning Rabbit 12	Mostly	Effective
Oct. 5, 2021	Timber Harvest	The Trap 3	Marginal	Effective
June 9, 2022	Timber Harvest	Nushka 12	Fully	Effective

Table 71. Location of National Water Quality best management practices (BMPs) evaluated on the Forest from fiscal years 2018 to 2023

Date	Monitoring Activity	Site	Implementation	Effectiveness
June 9, 2022	Timber Harvest	Elbow Lake 8	Mostly	Effective
June 9, 2022	Timber Harvest	Beaver Lodge 3	Fully	Effective
June 9, 2022	Timber Harvest	Elbow Lake 4	Mostly	Effective
June 14, 2022	Watercraft Launches	Birches Water Access	No BMPs	Not
July 12, 2022	Prescribed Fire	Sunken Lake 2	Fully	Effective
July 15, 2022	Trails	30476 North Country Trail	No BMPs	Effective
Sept. 21, 2022	Aquatic Ecosystem	Sugar Lake Impoundment Decommission	Fully	Effective
Sept. 21, 2022	Aquatic Ecosystem	10 Section Impoundment Decommission	Fully	Effective
Sept. 21, 2022	Waterbody Crossing	2,127 mile post 4.85	Fully	Marginal
June 6, 2023	Prescribed Fire	Cuba Hill Impoundment Prescribed Fire Unit	Not	Effective
Sept. 26, 2023	Timber Harvest	Jingo Bello Unit 4	Mostly	Mostly
Sept. 26, 2023	Timber Harvest	Jingo Bello Unit 5	Mostly	Effective
Sept. 27, 2023	Timber Harvest	Mink Lake PU 17	Fully	Effective
Sept. 27, 2023	Timber Harvest	Sumara2 PU 10	Fully	Effective
Oct. 10, 2023	Prescribed Fire	Sunken 3A	Fully	Effective
Oct. 10, 2023	Prescribed Fire	West Winnie RX3	Not	Mostly
Oct. 10, 2023	Prescribed Fire	Tanglewood Unit 2	Not	Effective

Monitoring Method(s)

Completed projects were selected randomly for all sites except grazing which is the only allotment on the Forest. All projects had some interaction with the Aquatic Management Zone, an administrative zone adjacent to streams and other waterbodies (USDA 2012). Site location, project description, guidance documents (for example, Forest Plan, environmental assessments, operating and maintenance plans), photos, and best management practices (BMP) implementation and effectiveness were gathered and input into a national Forest Service database.

Results

Based on the documentation that was available and observations on the ground, water quality BMPs were generally well-documented and implemented for all the activities that required environmental assessment and contracting such as timber harvest, road and crossing construction or decommissioning, aquatic organism passages and impoundment restorations, and prescribed fire. The operation and maintenance activities did not identify soil and water BMPs to implement, instead following the Forest Plan and program goals, which can have conflicting priorities with water quality goals. In the cases where the activity inherently involved the water shoreland interface such as water access and dispersed camping, BMPs were not identified or implemented fully (table 71).

The BMPs implemented appeared to be effective on all but the two watercraft launches and two dispersed camping sites. Despite the rating of not effective, on a qualitative evaluation, all deficiencies found were localized, minor, and related to unmet maintenance needs with corrective actions identified. All four of these locations promote activity where forest users are crossing the water/shoreland interface, where it is difficult to prevent all erosion and sedimentation.

Implications

- Although the intent of the monitoring is focused on Clean Water Act accountability at a higher level in the FS organization, results also provide the Forest with insight into its forest management practices.
- Aside from the watercraft launch and dispersed camping sites, the Forest is moving toward the desired conditions and objectives through effective implementation of relevant best management practices (BMPs) and Forest Plan standards and guidelines (S&Gs) (Forest Plan, 2004). Results were generally consistent with management expectations.

Recommendations

- Although most of the sites evaluated had some level of BMP documentation, the Forest would be well served to add more detail to its planning documents and operation and maintenance plans. The lack of documented BMP consideration for operation and maintenance for watercraft launches and dispersed sites are a good example.
- The surveyed sites do not reflect the increased maintenance received at dispersed recreation sites and watercraft launch sites that has been ongoing in the last several years, however regular surveys and proactive maintenance would allow the forest to better meet desired conditions.

B.-Wetland Restoration

Between fiscal year (FY) 2018 and 2023, the Forest removed five wildlife impoundments and restored them to wetlands. Bowstring, 10 Section, Pine Tree 2, Sugar Lake, and Waban Impoundments. Past monitoring of similar decommissions report successful restoration of natural wetland functions, hydrologic functions, and recolonization of rich and abundant primarily native wetland species (Morley 2015)

Results

The removal of five impoundments restored natural water levels and flow and reconnected aquatic and riparian habitat for a range of plant and animal species. Restoration of 261 acres was achieve over the period. Of the remaining 17 waterfowl impoundment, none had a complete failure during the evaluation period indicating the forest has been prompt enough to maintain or restore the highest risk locations, however inspections continue to identify deficiencies in their condition and most show signs of nearing the end of their safe and useful lifespan.

Implications

- The Forest is moving towards the desired conditions and objectives through effective implementation of relevant best management practices (BMPs) and Forest Plan standards and guidelines (S&Gs). The projects met all laws and regulations pertinent to wetland restoration and results are consistent with management expectations.
- The monitoring protocol developed to assess change in wetland hydrology and vegetation following impoundment removal for prior projects was effective in the past, however this monitoring cycle, the protocols for BMP monitoring were conducted at four impoundment decommissioning, which evaluated the projects less thoroughly.

Recommendations

- The monitoring protocol developed and used is recommended for monitoring similar projects in the future.
- Longer-term survival surveys are necessary to assess reforestation success. In the future, a welldefined reforestation implementation and monitoring plan should be part of monitoring efforts.

C.-Aquatic Organism Passage

The Forest used various methods during the review period to further Forest Plan desired conditions for aquatic organism passage.

• D-WS-8: "Hydrologic connectivity of aquatic ecosystems and wetlands is maintained or restored to assure passage of water, sediment, nutrients, wood, invertebrates, and fish and to facilitate freshwater mussel dispersal. The number of impoundments is minimized."

Primary techniques used from FY 2018-2023 include the replacing road stream crossings with ones designed for better AOP, removing impoundments blocking natural migration of aquatic organism, removing manmade dams, and controlling beaver and removing dams where they are incompatible with Forest infrastructure investments.

Results

Specific monitoring to evaluate aquatic organism passage improvement results were not conducted over the review period. There are projects complete from FY 2018-2023 that have had the goal to improve or preserve aquatic organism passage. Bowstring, 10 Section, Pine Tree 2, Sugar Lake, and Waban Impoundments were all completed with the intent to restore natural aquatic organism passage (AOP) and appear to have been successful. The Forest also continues to cooperate with counties to improve county and state crossings within the National Forest Boundary through use of the Wyden amendments. Ongoing agreements have corrected AOP at several sites over the last few years and additional sites have been added to agreement for future years. The U.S. Animal and Plant Inspection Service (APHIS) agreement for beaver control provides for improved AOP as an incidental benefit, and in many cases as a primary benefit. In each of the years spanning FY 2018- FY 2023, the Forest has partnered with APHIS to remove 20-60 beaver and remove 2-8 dams that were adversely affecting Forest infrastructure and AOP.

Implications

- The Forest continues to progress towards Forest Plan desired conditions. New projects preserve or enhance AOP, with many projects listing AOP as a primary objective.
- Recent projects in development are focusing on snow trail crossings, which have historically been neglected and have presented opportunities for AOP improvement. These sites will be included in future monitoring cycles.
- The pace of AOP restoration has slowed, primarily because the most needed locations for AOP improvement were addressed in the decade prior to this review period, and road crossing surveys are getting old and may need to be done again forest wide.

Recommendations

- Continued use of impoundment decommissioning, AOP design when culverts are replaced, county and state partnerships for AOP improvement, and focused use of APHIS beaver control agreement will ensure the Forest continues to advance desired conditions with respect to AOP
- Continue to develop projects to improve AOP at snow and recreation trails that have historically gotten less attention.
- The forest would likely benefit from resurveying the crossings due to age of surveys and changing conditions.

References Cited

Best Management Practices

- U.S. Department of Agriculture, Forest Service. 2004. Chippewa National Forest. Land and Resource Management Plan. Chapter 2, 4. <u>https://www.fs.usda.gov/detail/chippewa/landmanagement/planning/?cid=fsm9_016569</u>
- U.S. Department of Agriculture, Forest Service. 2012. National Best Management Practices for Water Quality Management on National Forest System Lands. FS-990a. Washington, DC.

Wetland Restoration

Morley, David A. 2015. Wetland Mitigation Monitoring, Bemidji to Grand Rapids Transmission Line Project. U.S. Forest Service, Chippewa National Forest. Walker, MN.

14. Wildlife and Plants

Key Points

All management activities were completed within 2004 Forest Plan direction for TES and Regional Forester Sensitive Species. Forest Plan standards and guidelines are being met

The Forest contributed toward the conservation and recovery of the Canada lynx, gray wolf, northern longeared bat and rusty patched bumble bee through habitat and access management practices, collaboration with other federal and state agencies, as well as researchers, tribal bands and non-governmental partners.

The Forest will continue to plan on accomplishing annual wildlife outputs consistent with Forest Plan goals and objectives.

There has not been an increase in the snowmobile routes across the Forest.

Regional forester sensitive species (RFSS) and threatened and endangered species.

Projects analyzed either had no impact or were not likely to cause a trend to federal listing or loss of viability on the Forest.

Monitoring documented successful implementation of all Forest Plan Standards and Guidelines on the ground.

The Forest contributed toward the conservation and recovery of the Canada lynx, gray wolf, rusty patched bumble bee, and northern long-eared bat through habitat and access management practices, collaboration with other federal and state agencies, as well as researchers, tribal bands and non-governmental partners.

Wildlife Outputs

Monitoring Question

To what extent is Forest management improving aquatic and terrestrial wildlife habitat?

Monitoring Drivers

"36 CFR 219.12(a)(5)(vii) Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities.

Monitoring Indicators

Wildlife

• Acres of terrestrial wildlife habitat treated

Aquatics

- Acres of lake habitat treated
- Miles of stream habitat treated

Results

The Chippewa National Forest improved terrestrial wildlife habitat, aquatic, and stream habitat outputs from 2018-2023. Starting in 2020, the regional office no longer assigned program targets. Program targets are now accomplishments determined by the Forest based on capacity, partnerships and funding. The Chippewa

National Forest uses an integrated approach to meet these outputs through partnerships and other Chippewa National Forest resource outputs that benefit wildlife. Table 72 displays wildlife and aquatic outputs.

Habitat output	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Acres of wildlife habitat improved or restored	6,623	3,504	865	2,327	1,382	5,066
Acres of lake habitat improved or restored	574	301	0	104	30	1,613
Miles of stream habitat improved or restored	26	11	7	2	17	3

Table 72. Chippewa National Forest wildlife and aquatic outputs for 2018 to 2023

Wildlife: Threatened and Endangered Species, Sensitive Species & Ecological Conditions – Management Indicator Habitats (MIH)

This resource area monitors and evaluates habitat trends of designated Management Indicator Habitats (MIH). Given the wide array of wildlife species that occur on the Forests, MIHs were identified to provide a simplified, practical and reasonable approach to monitoring a broad spectrum of species at the landscape level. A key assumption in applying and evaluating MIHs is that ecological conditions are likely to provide for species viability and maintain well-distributed habitats if there is an adequate representation of the range of habitats that would have been present under the range of natural variability (Final Environmental Impact Statement (FEIS) p. 3.3.1-2, USDA Forest Service 2004)).

This section focuses on the summary for terrestrial forested MIHs 1-9 and 11-13 and their progress towards meeting Forest Plan objectives for habitats.

Monitoring Question

To what extent is Forest management contributing to the conservation of Threatened, Endangered, and Sensitive Species and moving toward short term (10-15 years) and long-term (100 years) objectives for their habitat?

Last Updated

Data was calculated in April 2018.

Monitoring Indicator(s)

- Management Indicator Habitats 1-9 by age class and Landscape Ecosystem
- Management Indicator Habitats 11-13
- Qualitative description of mitigation measures
- Individual habitat improvement projects

Monitoring Frequency

List the frequency of data collection for each monitoring indicator.

Background and Drivers

Monitoring is based on 36 CFR 219.12 (a)(5)(iv) The status of a select set of ecological conditions required under 36 CFR 219.9 to contribute to the recovery of federally listed Threatened and Endangered species, conserve proposed and candidate species and maintain a viable population of each species of conservation concern (2012 PR). Monitoring meets the following Forest Plan Desired Conditions and Objectives: D-WL-1-9, O-WL-1-3, O-WL-1-8, and O-WL-4-16.

Management Indicator Habitats 1-9 by age class and Landscape Ecosystem

Management indicator habitats are based on groupings of forest types in different age (table 73). The age groupings (table 74) are surrogates for ecological, successional or vegetation growth stages that reflect a variety of habitat conditions and situations.

МІН	Description and Forest Types
Upland forest	All upland forest types: jack pine, red pine, white pine, balsam fir-aspen-birch, spruce- fir, black spruce-jack pine, northern hardwoods, oak, maple, aspen, aspen-birch
Upland deciduous forest	All upland deciduous and deciduous dominated mixed forest types
Northern hardwood and oak forest	All northern hardwoods and oak forest types
Aspen-birch & mixed aspen-conifer forest	All aspen, birch, and aspen dominated aspen-birch-conifer mixed forest types
Upland conifer forest	All upland conifer and conifer dominated mixed forest types
Upland spruce-fir forest	All spruce-fir and spruce-fir dominated mixed forest types
Red and white pine forest	Both red and white pine forest types
Jack pine forest	Jack pine forest type
Lowland black spruce- tamarack forest	All lowland conifer and lowland mixed conifer types dominated by black spruce or tamarack

Table 73. Management indicator habitats (MIH) - description and forest types

Table 74. Management indicator habitat (MIH) 1-9 age grouping and forest types

Forest Type	Young	Mature/Old	Old/Old Growth	Old Growth Multi-aged
Jack pine	0-9	40-59	60-79	80+
Red pine	0-9	50-119	120-149	150+
White pine	0-9	50-119	120-149	150+
Lowland black spruce- tamarack	0-9	60-119	120-149	150+
White cedar	0-9	60-119	120-149	150+
Spruce-fir	0-9	50-89	90-149	150+
Upland northern hardwoods	0-9	60-119	120-149	150+
Oak	0-9	60-99	100-149	150+
Lowland northern hardwoods	0-9	60-119	120-149	150+
Aspen-birch	0-9	50-79	80+	80+

All MIHs are compatible with and complementary to Landscape Ecosystem objectives.

By moving toward Decade 2 objectives for these resources the Chippewa National Forest will move toward long-term desired conditions for desired amounts, quality, and distribution of MIHs and their associated species.

Results

The Forest Plan has tables for each landscape ecosystem (LE) that identifies MIH objectives along with age class and species composition objectives. Comparisons were made at the LE level to determine if the MIH trends were on track to meet the stated objectives for Decade 2 of Forest Plan implementation (USDA Forest

Service 2004, Forest Plan, pages 2-53 thru 2-80). What follows is a summary of the highlights of LE MIH conditions.

Dry Pine Landscape Ecosystem

Table 75. Dry pine landscape ecosystem (LE) management indicator habitat (MIH) age classes, 2024 f	or the
National Forest System (NFS) and the Leech Lake Reservation (LLR)	

Dry Pine MIH	NFS Young	LLR Young	NFS Mature	LLR Mature	NFS Old	LLR Old	FP Decade 2 Objectives, Young NFS	FP Decade 2 Objectives, Mature NFS	FP Decade 2 Objectives Old NFS
Upland Forest	443	303	4,827	3,797	998	575	< 2,200	> 2,700	> 1,700
Upland Deciduous	301	161	1570	951	573	274	< 500	< 1,300	> 100
Northern Hardwood	29	2	662	259	68	0	0	100	0
Aspen-Birch	272	159	908	692	504	274	< 500	< 900	> 100
Upland Conifer	142	142	3,257	2,846	426	301	< 1,700	> 1,400	< 1,600
Upland Spruce-Fir	0	0	29	10	48	13	0	0	0
Red and White Pine	92	92	3,128	2,757	77	47	< 300	> 1,200	100
Jack Pine	50	50	100	78	301	241	< 1,400	< 200	< 1,500
Lowland Black Spruce- Tamarack	0	0	89	81	6	5	0	< 200	> 100

Jack pine acres continue to be well below our Decade 2 objective of 4,961 acres. Acres of young and old jack pine have declined with an increase in mature jack pine acres since 2017 (USDA Forest Service 2019).

Aspen acres continue to be well above our Decade 2 objective of 12% (1,452 acres) at 26%.

Old upland forest MIH continues to be below Decade 2 objectives. Forest aging will help to move towards this objective.

Dry Mesic Pine Landscape Ecosystem

Table 76. Dry mesic pine landscape ecosystem (LE) management indicator habitat (MIH) age classes 2024for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

Dry Pine MIH	NFS Young	LLR Young	NFS Mature	LLR Mature	NFS Old	LLR Old	FP Decade 2 Objectives, Young NFS	FP Decade 2 Objectives, Mature NFS	FP Decade 2 Objectives Old NFS
Upland Forest	1,801	486	36,161	13,906	16,116	4,241	< 9,500	< 35,200	> 7,800
Upland Deciduous	1,738	477	25,858	9,721	13,813	3,379	< 8,200	< 28,300	> 6,800
Northern Hardwood	438	44	18,814	6,825	1,701	776	< 600	< 10,500	> 800
Aspen-Birch	1,300	433	7,044	2,896	12,112	2,603	< 7,200	< 13,700	< 5,600
Upland Conifer	62	9	10,303	4,186	2,303	863	1,200	> 6,900	> 1,000
Upland Spruce-Fir	54	9	852	280	569	143	< 500	> 1,200	> 200
Red and White Pine	8	0	9,389	3,906	1,460	657	> 400	> 5,600	> 100
Jack Pine	0	0	62	0	274	62	> 300	< 200	< 700

Dry Pine MIH	NFS Young	LLR Young	NFS Mature	LLR Mature	NFS Old	LLR Old	FP Decade 2 Objectives, Young NFS	FP Decade 2 Objectives, Mature NFS	FP Decade 2 Objectives Old NFS
Lowland Black Spruce- Tamarack	0	0	1,744	444	856	118	> 100	< 3,000	> 800

Northern hardwoods and aspen acres continue to exceed Decade 2 objectives.

White pine and upland spruce-fir acres continue to be below Decade 2 objectives and are declining in acreage instead of increasing. White pine declined by a few acres since 2015 while spruce-fir declined by about 240 acres since 2015 (USDA Forest Service 2015). Young red/white pine and young jack pine MIH's continue to be below Decade 2 objectives.

Dry Mesic Pine – Oak Landscape Ecosystem

Table 77. Dry Mesic Pine –Oak landscape ecosystem (LE) management indicator habitat (MIH) 2024 for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

Dry Pine MIH	NFS Young	LLR Young	NFS Mature	LLR Mature	NFS Old	LLR Old	FP Decade 2 Objectives, Young NFS	FP Decade 2 Objectives, Mature NFS	FP Decade 2 Objectives Old NFS
Upland Forest	4,066	2,222	67,644	46,739	29,483	19,73 1	< 17,500	< 63,000	> 19,600
Upland Deciduous	3,461	1,804	33,873	19,578	17,635	10,38 4	< 11,200	< 32,800	< 11,500
Northern Hardwood	342	221	17,286	10,262	3,109	2,492	< 300	> 10,800	> 1,100
Aspen-Birch	3,119	1,583	16,587	9,316	14,526	7,892	< 10,800	< 19,700	< 9,900
Upland Conifer	605	419	33,770	27,162	11,847	9,347	> 6,300	> 30,200	> 8,100
Upland Spruce-Fir	14	12	1,278	553	946	437	< 700	< 2,300	> 300
Red and White Pine	489	394	32,148	26,351	9,270	8,081	2,600	> 27,300	> 3,500
Jack Pine	102	13	344	258	1,632	829	> 3,000	< 600	< 4,300
Lowland Black Spruce- Tamarack	46	21	5,197	3,187	3,292	2,398	> 300	< 9,500	> 1,800

Aspen acres continue to exceed Decade 2 objectives.

Jack pine and red pine acres continue to be below Decade 2 objectives. Jack pine has declined instead of increased since 2015. Jack pine acres declined by about 755 acres since 2015. Red pine has increased since 2015 (USDA Forest Service 2015). Young jack pine and red/white pine MIH's continue to be below Decade 2 objectives, especially jack pine.

Young lowland black spruce-tamarack MIH is below Decade 2 objective.

Boreal Hardwood – Conifer Landscape Ecosystem

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Dry Pine MIH	NFS Young	LLR Young	NFS Mature	LLR Mature	NFS Old	LLR Old	FP Decade 2 Objectives, Young NFS	FP Decade 2 Objectives, Mature NFS	FP Decade 2 Objectives Old NFS
Upland Forest	3,648	840	32,339	10,271	17,925	4,594	< 12,000	< 33,000	> 7,600
Upland Deciduous	3,399	758	27,466	9,629	16,933	4,373	< 10,600	< 26,800	> 6,700
Northern Hardwood	142	0	14,176	6,571	3,548	1,610	< 200	< 10,200	> 900
Aspen-Birch	3,256	758	13,289	3,057	13,386	2,763	< 10,400	< 16,600	> 5,700
Upland Conifer	249	82	4,874	643	991	221	< 1,400	> 6,200	> 900
Upland Spruce-Fir	102	33	2,103	218	731	151	< 100	4,600	> 500
Red and White Pine	146	49	2,767	421	209	66	100	> 1,600	> 200
Jack Pine	0	0	4	4	52	5	< 300	0	< 200
Lowland Black Spruce- Tamarack	295	41	6,324	997	6,162	666	> 900	< 12,200	> 3,100

 Table 78. Boreal Hardwood – Conifer landscape ecosystem (LE) management indicator habitat (MIH) 2024

 for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

Aspen and northern hardwood acres continue to exceed Decade 2 objectives.

White pine and spruce-fir acres continue to be below Decade 2 objectives. White pine has slightly increased since 2015. Spruce-fir continues to decrease instead of increasing on the forest. Spruce-fir has declined by over 1,300 acres since 2015 (USDA Forest Service 2015).

Mature and older upland conifer MIHs continue to be below Decade 2 objectives.

Young lowland black spruce-tamarack MIH continues to be below Decade 2 objective.

Mesic Northern Hardwoods Landscape Ecosystem

 Table 79. Mesic Northern Hardwoods landscape ecosystem (LE) management indicator habitat (MIH) 2024
 for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

Dry Pine MIH	NFS Young	LLR Young	NFS Mature	LLR Mature	NFS Old	LLR Old	FP Decade 2 Objectives, Young NFS	FP Decade 2 Objectives, Mature NFS	FP Decade 2 Objectives Old NFS
Upland Forest	1,485	32	29,687	11,780	12,234	4,413	< 7,200	< 30,500	> 4,800
Upland Deciduous	1,386	32	27,240	11,342	11,902	4,293	< 6,800	< 29,100	> 4,300
Northern Hardwood	240	1	21,602	9,738	4,269	2,524	< 300	> 17,300	> 1,700
Aspen-Birch	1,146	32	56,38	1,604	7,633	1,768	> 6,500	< 11,100	> 2,600
Upland Conifer	99	0	2,447	438	332	120	> 300	> 1,400	> 500
Upland Spruce-Fir	28	0	707	43	204	86	> 200	> 1,000	> 300
Red and White Pine	71	0	1,740	395	113	30	< 200	> 400	> 200

Dry Pine MIH	NFS Young	LLR Young	NFS Mature	LLR Mature	NFS Old	LLR Old	FP Decade 2 Objectives, Young NFS	FP Decade 2 Objectives, Mature NFS	FP Decade 2 Objectives Old NFS
Jack Pine	0	0	0	0	15	4	0	0	0
Lowland Black Spruce- Tamarack	47	34	1,756	306	820	113	0	< 2,600	> 700

Aspen and northern hardwoods acres continue to exceed Decade 2 objectives.

Spruce-fir acres continue to be below Decade 2 objectives. Spruce-fir has declined by about 460 acres since 2015, instead of increasing (USDA Forest Service 2015).

Young aspen MIH is well below Decade 2 objectives.

Young, mature, and old spruce-fir MIH's are well below Decade 2 objectives.

Tamarack Swamp Landscape Ecosystem

Table 80. Tamarack Swamp landscape ecosystem (LE) management indicator habitat (MIH) 2024 for the National Forest System (NFS) and the Leech Lake Reservation (LLR)

Dry Pine MIH	NFS Young	LLR Young	NFS Mature	LLR Mature	NFS Old	LLR Old	FP Decade 2 Objectives, Young NFS	FP Decade 2 Objectives, Mature NFS	FP Decade 2 Objectives Old NFS
Upland Forest	869	152	5,851	3,216	5,342	3,338	< 1,700	< 6,200	> 2,000
Upland Deciduous	800	147	4,400	2,301	4,501	2,862	< 1,500	< 4,700	1,400
Northern Hardwood	10	5	1,913	1,243	1,251	1,136	< 100	1,300	> 100
Aspen-Birch	790	141	2,487	1,058	3,249	1,726	< 1,400	< 3,300	< 1,300
Upland Conifer	69	6	1,451	915	842	476	> 200	1,500	> 500
Upland Spruce-Fir	63	0	476	140	543	180	< 100	< 1,200	> 0
Red and White Pine	5	5	968	768	257	256	200	> 300	> 300
Jack Pine	0	0	7	7	41	41	> 100	0	< 100
Lowland Black Spruce- Tamarack	274	97	9,897	4,816	7,739	2,939	> 700	< 15,700	> 4,100

Aspen and northern hardwood acres continue to be above Decade 2 objectives.

Red pine acres continue to be below Decade 2 objectives.

Spruce-fir acres continue to be well below Decade 2 objectives. Spruce-fir has declined by over 100 acres since 2015, instead of increasing (USDA Forest Service 2015).

Mature northern hardwoods MIH currently exceeds Decade 2 objectives.

Old aspen-birch MIH currently exceeds Decade 2 objective.

Young and old red/white pine MIH's continue to be below Decade 2 objectives.

Young lowland black spruce-tamarack MIH continues to be below Decade 2 objective.

White Cedar Swamp Landscape Ecosystem

Dry Pine MIH	NFS Young	LLR Young	NFS Mature	LLR Mature	NFS Old	LLR Old	FP Decade 2 Objectives, Young NFS	FP Decade 2 Objectives, Mature NFS	FP Decade 2 Objectives Old NFS
Upland Forest	306	0	1,375	164	2,115	23	< 1,800	< 2,500	> 400
Upland Deciduous	293	0	1,282	164	2,051	23	< 1,800	< 2,300	> 300
Northern Hardwood	0	0	208	17	356	0	0	< 200	0
Aspen-Birch	293	0	1,073	147	1,695	23	< 1,800	< 2,100	> 300
Upland Conifer	13	0	93	0	64	0	0	< 300	> 0
Upland Spruce-Fir	13	0	81	0	42	0	0	< 300	> 0
Red and White Pine	0	0	12	0	0	0	0	0	0
Jack Pine	0	0	0	0	22	0	0	0	0
Lowland Black Spruce- Tamarack	5	0	429	0	470	0	0	< 900	> 200

Table 81. White Cedar Swamp landscape ecosystem (LE) management indicator h	abitat (MIH) 2024 for the
National Forest System (NFS) and the Leech Lake Reservation (LLR)	

Aspen acres continue to exceed Decade 2 objectives.

Spruce-fir acres continue to be below Decade 2 objectives. Spruce-fir has declined instead of increasing since 2015 (USDA Forest Service 2015).

Discussion

Overall, conifers continue to be below MIH age and/or acres parameters for Decade 2 in most landscape ecosystems (LEs). In some LEs conifers are declining instead of increasing, especially spruce-fir and jack pine.

Management indicator habitat MIH 7, mature/older red and white pine, remains above the Forest Plan Standard (S-WL-7) for maintaining 40,000 acres. MIH 7 is currently at 54,092 acres.

Aspen and in some LEs northern hardwoods continue to be over-represented.

Young black spruce-tamarack MIH continues to be below Decade 2 objectives in the tamarack swamp, boreal hardwoods, and dry mesic pine/oak LEs. Future harvest in these forest types need to be completed with caution, due to the continued long-term decline in Connecticut warbler populations on the Forest (Walton et. al. 2017).

Recommendations

Where appropriate, conversion of aspen and hardwoods to conifers should continue to be implemented to meet long-term MIH objectives. Restoration of conifers is a slow process. Increasing conifer presence on the landscape, including both increasing conifers as within-stand diversity, and through conversion of forest types, is a primary benefit to numerous wildlife species. It remains one of the more important coarse-filter MIH objectives with respect to maintaining viable populations of wildlife species.

Continue to monitor MIH 1-9 objectives. From a wildlife habitat perspective, it is important to pay particular attention to the older and conifer MIHs. They are the most lacking on the landscape.

Given the continued decline of spruce-fir across all LEs, a closer look may need to be taken at this MIH. Future management actions that result in a reduction in spruce-fir should be further evaluated and reconsidered to help to reverse this trend. Forest type conversions to spruce-fir may need to be a higher priority to reverse this trend.

Management Indicator Habitat - MIH 11 to 13

MIHs 11 (Upland Edge Habitat), 12 (Upland Interior Forest), and 13 (Large Upland Mature Patches) were used during Forest Plan Revision to assess the size, shape, and arrangement of forest types, habitats, and vegetation communities resulting from disturbance. A part of the landscape coarse filter, some wildlife species require or benefit from specific spatial arrangements, including large patches of contiguous habitat, linkages of habitat patches, or juxtaposition of patches (USDA Forest Service 2004, FEIS p. 3.2-50).

Within the context of the largely forested landscape matrix of the Chippewa National Forest, habitat fragmentation relates primarily to changes in the forest stand size, species composition and age of stands. Limits on harvest size for even-aged management in the 1986 Forest Plan tended to reduce stand sizes and increase fragmentation effects. At the time of Forest Plan Revision, clearcut harvests accounted for more than 90 percent of forest acres managed on the Chippewa National Forest. This type of management tends to increase edge and favor occurrence of popular wildlife game species such as deer and ruffed grouse. Conversely, it tends to act against species requiring larger areas of continuous forest. A number of wildlife and plant species have been shown to be associated with conditions existing in the interior of relatively large patches of mature vegetation, or to be adversely affected by the proximity of early seral stage vegetation and associated edge. (USDA Forest Service 2004, FEIS p. 3.2.52)

MIH 11

Management Indicator habitat MIH 11 provides a measure of habitat fragmentation resulting from forest management intensity. It measures edge density (mile/mile2) of young forest (age 0-9) for uplands and lowlands. The perimeter of young forest stands created by management (i.e. even-aged regeneration timber harvest) was measured, and a density amount calculated for uplands and lowlands forest. MIH 11 allows evaluation of species of management concern that are benefitted or adversely impacted by edge habitat, such as white-tailed deer, olive-sided flycatcher, American woodcock, and brown-headed cowbird (USDA Forest Service 2004, FEIS Table WLD-11 p. 3.3.2-1).

Results

MIH 11

Table 82 compares the edge density between the Forest Plan, currently, and future projections of edge density.

Table 82. Management induced edge density (miles	per miles-squared) for the Chippewa National Forest
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Year	Uplands (miles per miles squared)	Lowlands (miles per miles squared)
2004	2.76	0.33
2017	1.41	0.27
2022	1.41	0.31
2024	1.57	1.09
Decade 2 Objective	1.70	0.37

The 2024 data include all planned but not yet implemented timber harvests from vegetation management projects to date. The 2024 data have been aged out for 5 years.

Management-induced upland edge density reflects harvest intensity, that is, even-aged regeneration harvest. The 2004 Forest Plan brought in a much more mixed set of harvest types than were used previously. Less even-aged regeneration harvesting (for example, clearcut, shelterwood, seed tree) results in a lower edge density. Larger harvest unit sizes would also decrease edge density. The estimated edge density for the Forest's 2024 existing condition in Uplands are 8.3 percent below those that were forecast in the FEIS for the end of decade 2 but is 66% above the forecast for Lowlands (USDA Forest Service 2004, FEIS Table FSP-5 p. 3.2-72).

The following Forest Plan Objective is currently being met:

O-WL-36 Reduce amount of forest edge created through vegetation management activities, while still retaining a range of small patches and edge habitat.

MIH 12

MIH 12 provides a measure of the amount of forest interior habitat and/or the extent of large forest patches present on the Forest. This indicator allows evaluation of species of management concern that are known or thought to benefit from habitat characteristics associated with interior forest conditions. Table 83 displays the amount of interior forest on the Chippewa National Forest.

Year	Acres					
2004	38,690					
2017	43,071					
2022	49,134					
2024	50,159					
2029	54,136					

Table 83. Acres of interior forest

Since 2004, there has been a steady increase in acres of forest interior. Interior forest is predicted to continue to rise through 2029, based on all planned but not yet implemented timber harvests and forest aging.

The following Forest Plan Objective has been met:

• O-VG-21 Increase amount of interior forest habitat.

MIH 13 – Upland Mature Patches

MIH 13 is the size and amount of large (greater than 300 acres) mature and older (age 50 or older) upland forest patches.

Indicators 12 and 13 allow evaluation of species of management concern that are known or thought to benefit from environmental conditions such as interior forest, connected habitats, and patterns that emulate natural disturbances (USDA Forest Service 2004, FEIS p. 3.3.2-1), such as northern goshawk, goblin fern, spruce grouse, black-backed woodpecker, Connecticut warbler, red-shouldered hawk, four-toed salamander, Canada lynx, goblin fern, triangle grapefern, Goldie's woodfern, and Canada yew (USDA Forest Service 2004, FEIS Table WLD-12/13). These species are all currently listed as Regional Forester's Sensitive Species or are federally listed as Threatened.

The 2004 Forest Plan numbers are not directly comparable to those provided in the FEIS. Since the FEIS was written, changes in forest stand delineation have caused the need to develop a new GIS script to calculate patches so as to allow direct comparisons of similar forest conditions between years, and a new "baseline"

was generated to represent 2004 conditions. This technique was used to calculate acres and numbers of large, mature upland forest patches, as well as acres of forest interior.

Results

Table 84 indicates that there has been a steady increase in the number and acres of large upland mature patches greater than 300 acres since implementation of the 2004 Forest Plan began. The number of patches are predicted to remain steady over the next 5 years but acreage will increase.

Size class (acres)	2004 Forest Plan, Number	2004 Forest Plan, Acres	2017 Number	2017 Acres	2022 Number	2022 Acres
301-500	46	17,325	61	23,584	57	21,994
501-1000	31	20,897	44	29,372	42	29,254
1001-2,500	14	20,844	15	23,492	22	32,008
2,501-5,000	2	6,072	2	5,577	4	11,929
5,001-10,000	5	31,521	5	31,975	5	35,713
Total > 300	98	96,659	127	114,000	130	130,898
Total > 1,000	21	58,437	22	61,044	31	79,650

 Table 84. Large upland mature patches on the Chippewa National Forest

The following Forest Plan Objectives, Guidelines, and Standards have been met:

- O-VG-19 Maintain or increase the acres and number of patches of mature or older upland forest in patches 300 acres or greater.
- G-VG-1 Maintain a minimum of 19 patches of mature or older upland forest in patches of 1,000 acres or greater.
- S-VG-1 Maintain a minimum of 85,000 acres of mature or older forest in patches 300 acres or greater.

Discussion

The combined results for management indicator habitats (MIHs) 11, 12 and 13 indicate that conditions for wildlife species that require large upland mature forest patches and/or interior forest, or those that are sensitive to edge, are continuing to improve.

Recommendations

Since the quantity of upland mature patches is being met, future management should concentrate on those that provide the highest quality habitat features. A qualitative analysis of upland mature patches was developed in 2017 (USDA Forest Service 2018). Continue to follow through on the results of the analysis.

Look for opportunities to improve habitat in upland mature patches. For example, some upland mature patches contain red pine stands of plantation origin which currently may be providing poor quality wildlife habitat.

Qualitative Description of Mitigation Measures

Mitigation measures are an integral part of implementing the Forest Plan. The Forest Plan provides Standards and Guidelines that identify site specific and landscape scale mitigation measures for project implementation to alleviate or reduce potential impacts to certain wildlife species or their habitat.

Results

Bald Eagle

Forest Plan regulation S-WL-3 management activities for bald eagles is governed by the Northern States Bald Eagle Recovery Plan (Northern States Bald Eagle Recovery Team 1983). Activities around known nests are managed in 3 zones:

- Primary Zone All land use except actions necessary to protect or improve nest sites should be prohibited within 330 feet of the nest.
- Secondary Zone Land use activities that result in significant changes to the landscape, such as clearcutting, land clearing, or major construction, should be prohibited. Actions such as thinning or maintenance of existing improvements can be permitted within 660 feet of the nest.
- Tertiary Zone Some activities are permissible in this zone except during the most critical period from February 15 to August 31 within one-quarter mile of the nest.

Canada Lynx

Lynx habitat management is governed by Forest Plan Standards and Guidelines to conserve and maintain habitat for lynx and their primary prey, snowshoe hare. For vegetation management projects occurring within Lynx Analysis Units (LAU) the following Standards and Guidelines applied:

- G-WL-1 within LAUs on National Forest System land, moderate the timing, intensity, and extent of management activities, if necessary, to maintain required habitat components in lynx habitat, to reduce human influences on mortality risk and inter-specific competition, and to be responsive to current social and ecological constraints relevant to lynx habitat.
- G-WL-2 Provide for the protection of known active den sites during the denning season.
- G-WL-3 Limit disturbance with each LAU on National Forest System land as follow: if more than 30% of the total lynx habitat (all ownerships) within an LAU is currently in unsuitable condition, no further reduction of suitable conditions should occur as a result of vegetation management activities by the National Forest.
- S-WL-1 Management activities of National Forest System land shall not change more than 15 percent of lynx habitat on National Forest System land within an LAU to an unsuitable condition within a 10-year period.
- G-WL-4 Within an LAU, maintain or promote well distributed denning habitat in patches generally larger than five acres, compromising at least 10 percent of lynx habitat.
- G-WL-5 Following a disturbance on National Forest System land greater than 20 contiguous acres (such as a blowdown, fire, insect, or disease) that could contribute to lynx denning habitat, generally retain a minimum of 10% of the affected area on National Forest System land unless salvage or management-ignited fire is necessary to address human health and safety.

Northern Goshawk

Northern goshawk territories are governed by Forest Plan Standards and Guidelines for nesting and post-fledging zones within known territories. They include:

- S-WL-8 At northern goshawk nest sites with an existing nest structure, prohibit or minimize, to the extent practical, activities that may disturb nesting pairs during the critical nesting seasons (March 2 August 31). Maintain 50 acres around the nest in 100 percent mature forest conditions.
- G-WL-24 Within northern goshawk post-fledging areas, minimize activities to the extent practical, activities that may disturb nesting pairs during the critical nesting seasons (March 2 August 31).

Within a 500-acre area encompassing all known nests, maintain suitable habitat conditions on a minimum of 60 percent of the upland forested acres.

In addition to S-WL-8 and G-WL-24, the forest also manages goshawk habitat in the foraging zone. Within a 16,000-acre area encompassing all known nests, maintain suitable habitat conditions on a minimum of 40 percent of the upland forested acres. Evaluating the foraging zone allows for an overall assessment of habitat conditions in a goshawk territory.

Red-Shouldered Hawk

Red-shouldered hawk territories are governed by Forest Plan Guidelines for nest and post-fledging zones with known territories. They include:

- G-WL-13 At red-shouldered hawk nest sites with an existing nest structure, prohibit or minimize, to the extent practical, activities that may disturb nesting pairs during the critical nesting seasons (April 1 August 15). Maintain 50 acres around the nest in 100 percent mature forest conditions.
- G-WL-14 Within red-shoulder hawk breeding territories, minimize activities to the extent practical, activities that may disturb nesting pairs during the critical nesting seasons (March 2 August 31). Within a 600-acre area encompassing all known nests, maintain suitable habitat conditions on a minimum of 90 percent of the upland forested acres.

Black-Backed Woodpecker

Black-backed woodpecker habitat and nest sites are governed by Forest Plan Guidelines. They include:

- G-WL-19 Protect known nest sites with a 200-foot radius surrounding nest sites until young have fledged.
- G-WL-20 Where ecologically appropriated, retain 6-10 jack pine per acre in even aged regeneration harvests in mixed conifer stands.

Chippewa National Forest Breeding Bird Long Term Monitoring

The Avian Ecology Lab at the Natural Resources Research Institute completed the 29th year of Minnesota's National Forest Breeding Bird Monitoring Program in 2023. The monitoring project was established in 1991 in the Chippewa and Superior National Forests in response to the need for habitat-specific regional population data. This monitoring program was designed to 1) establish a baseline inventory of local forest breeding bird assemblages, 2) monitor population changes of forest bird species over time, and 3) identify bird-habitat associations, particularly those relevant to forest management activities. Below is a summary of the 2023 monitoring results.

- Seventy-one species in the Chippewa National Forest were included in the Long-Term Breeding Bird Monitoring with University of Minnesota Duluth – Natural Resource Research Institute. In 2023, 18 species had significantly increased trends, 21 species had significantly declining trends and 32 species had non-significant trend indices.
- Ten species have shown increasing trends over the last seven years: Black-and-white Warbler, Blackthroated Green Warbler, Blue Jay, Canada Warbler, Nashville Warbler, Ovenbird, Pileated Woodpecker, Pine Warbler, Red-breasted Nuthatch, and Veery. Ruby-throated Hummingbird, Rubycrowned Kinglet, and Lincoln's Sparrow have been increasing the last five years.
- Canada Jay and White-breasted Nuthatch both showed new significantly decreasing trends in Chippewa National Forest in 2023. Two species have shown significantly decreasing trends for at least the last twelve years: Connecticut Warbler and Song Sparrow. Chipping Sparrow, Least Flycatcher, and Winter Wren have had declining trends for ten years, and American Robin has shown a declining trend for the past nine years. Brown-headed Cowbird, Common Yellowthroat, Olive-

sided Flycatcher, Red-eyed Vireo, and Scarlet Tanager have been declining for the past seven years. Alder Flycatcher and Blue-headed Vireo have been declining for the past six years, and Blackcapped Chickadee and Indigo Bunting have declined over the past five years.

Regional Forester Sensitive Species

Background

Meeting this objective will involve two basic and complementary strategies that would be implemented based on species' habitat requirements and distribution, individual site conditions, expected management impacts, and other multiple use objectives. These strategies include:

- Landscape level (or coarse filter) management strategies: Addressing species' needs through integrated resource management at large landscape scales including, but not limited to: Landscape Ecosystem or Land type scales for vegetation and management indicator habitat objectives; watersheds for aquatic and riparian condition objectives; and Management Areas for desired or acceptable levels of human uses.
- Site-level (or fine filter) management strategies: Addressing species' needs by managing specifically for high quality potential habitat or known locations of sensitive species.

Results

Surveys

The Forest surveys for sensitive species every year, primarily in the area of upcoming vegetation management projects. From 2018-23, the Forest submitted an average of 9,051 acres for regional forester sensitive species (RFSS) surveys for future vegetation management projects. In 2022, COVID restrictions caused no acres to be surveyed. The Forest's Monitoring, Inventory and Survey Team (MIST) was responsible for the screening of habitat and completion of surveys for all sixty RFSS for the acres submitted. Results from the surveys drive the district interdisciplinary teams in project design through development of mitigation measures for those species identified.

Table 85. From 2018-23 the Forest (three districts) submitted an average of 9,051 acres for RFSSsurveys for future vegetation management projects

2018	2019	2020	2021	2022	2023
7,965	12,631 ¹	11,323	14,104	0	0 / 8,283 ²

4,783 acres were a late addition to the 2019 survey program, so some partial surveys were completed at that time.
 During 2023 no submissions were received timely, so it was not possible to complete screening and make adequate preparations for completing surveys. However, 8,283 acres were submitted February 1, 2023, so screening and surveys advanced partially through the season.

Category	2018	2019	2020	2021	2022	2023
Bird	20	17	15	21	50	47
Plant	154	153	148	68	108	50
Mammal	1	31	0	0	0	0
Other ³	12	52	31	33	23	0
Total	199	253	194	122	181	97

Table 86. Summary of RFSS¹ additions² to Forest records from 2018-2023

1.-Based on RFSS list applied prior to the 2024 revision

2.-Additions may result from new detections in the field, data mining from old results, data sharing from other agencies, or other sources. 3.-Other includes amphibians and invertebrates. The number of new locations recorded in the corporate database continues to increase which suggests our understanding of where and when to search for these species is improving. The most common RFSS species found from 2018-2023 were the bald eagle, ternate grapefern, Canada yew, white adder's mouth and bluntlobe grapefern. A number of new plant related species were found from 2018-2023. Table 88 lists the new species found.

Survey	2018	2019	2020	2021	2022	2023
Northern Goshawk	18,965	42,765	23,491	7,914	0	3,894
Red-Shouldered Hawk	10,676	12,541	6,030	3,015	0	2,512
Songbirds	369	680	219	473	0	207
Plants	6,761	9,661	8,718	5,216	1,431	1,535
Total acres surveyed	36,771	65,647	38,458	16,618	1,431	8,148

Table 87. Total acres surveyed for RFSS from 2018-2023

1 – Survey acreages are based on inferred broadcast distances, so may include unsuitable habitats and other ownerships.

2 – Survey acreages include more than one visit to some stands, e.g. a stand may be surveyed in June for one group of species and then surveyed in August for a different group of species.

Species	Category	Year added to list
Physconia subpallida	Lichen	2018
Xenonectriella leptalea	Fungi	2018
Bombus terricola	Insect	2018
Chaenothecopsis australis	Lichen	2019
Trichocolea tomentella	Plant	2019
Tricophorum clintonii	Plant	2019
Rubus stipulatus	Plant	2020
Juncus articulatus ¹	Plant	2021
Utricularia resupinata	Plant	2021
Biatoropsis angulate	Fungi	2022
Sarcosoma globosum	Fungi	2022

 Table 88. New RFFS Species Found on the Forest from 2018-2023

1.-This species was previously detected by Karen Myrhe (MN DNR), but not Chippewa National Forest verified until 2021.

In 2018 -2023, the Forest completed an average of 37,611 acres of call point surveys for regional forester sensitive species (RFSS) bird species (goshawk and red shouldered hawk) on all ownerships including unsuitable habitat within the call zone. Raptor call point surveys are conducted from designated points in or proximate to suitable habitat for the respective species. The broadcast radii are inferred as being 1,320 feet (one-quarter mile) for our recordings and broadcast equipment. This yields an approximate sample area of 125 acres for each call point. Given such a large sample area, unsuitable habitats fall within the sample area. Additionally, placement of points sometimes results in small amounts of overlap of sample areas

Including all four plant survey seasons, surveys from 2018-2023 averaged 5,553 stand acres. Due to covid restrictions, a reduced number of acres were completed in 2022 and 2023 for RFSS plant species. By using our screening criteria, conducting recon prior to survey seasons, and tracking the history of past survey efforts, we were able to dismiss 60 percent of acres from the survey efforts in from 2018-2023.

Because these are simple detection surveys and because there is no repeatability between years of submissions, (what is submitted one year can be considerably different from another year), it is difficult to infer trends.

RFSS Location Monitoring

The Forest also actively monitors known locations of RFSS on an annual basis to determine if changes may have occurred at each of the locations. Efforts were also made to review and update old data and records to accurately reflect the locations of RFSS species and potential changes to the habitat.

Rare Plant Monitoring

In 2015, plant surveyors re-visited 43 sites across the Forest to look for previously noted occurrences of RFSS plants. Revisits occurred at the appropriate detection periods for each RFSS plant between late April and early September.

Plants Re-Located

RFSS plants were relocated at 30 of the 43 sites (69 percent). The vast majority of these plant populations remained stable and intact (LaPlant and Cable 2015). For the sites monitored in 2015, the known populations of *Botrychium lanceolatum, B. pallidum, B. rugulosum, Cypripedium arietinum, Dryopteris goldiana, Erythronim albidum, Platanthera clavellata, Pseudocyphellaria crocata, Sticta beauvoisii,* and *Taxis canadensis* were found to have approximately the same number of plants and intact habitat as compared to the description from the previous detection(s) (LaPlant pers comm 2016). This suggests some degree of stability for these populations. However, our sample sizes were small for most species, so it is difficult to draw inferences regarding species population trends or stability on the Forest.

• Goblin fern (*Botrychium mormo*): Notable changes occurred at one goblin fern site where only 1 plant was detected in 2015, compared to an estimated 200-plus plants in 2012. In total, 9 goblin fern records were checked in 2015. Six apparently were extirpated or nearly so. Two did not display significant changes. The final site did not have a significant change, but a satellite colony of 15 plants was located nearby. This was attributed to missing the satellite colony in the past and was not regarded as an expansion of the population (LaPlant pers comm 2016). Monitoring of all 9 goblin fern records continued to affirm the alarming trend of this species failing in the face of invasion by non-native earthworms.

Plants Not Re-Located

At 13 other sites, surveyors did not relocate the regional forester sensitive species (RFSS) plants.

- Five goblin fern (*Botrychium mormo*) sites had evidence of severely wormed habitat reflected in the lack of humus layer, the presence of bare mineral soil, earthworm castings and middens. These are important parts of the evidentiary trail implicating non-native earthworms to contributing to the decline of this species. Given that *Botrychium mormo* requires a humus layer, this result is not surprising. We are working to increase public understanding of the impact of worms but beyond education, there is little additional response we can take.
- At one pale moonwort (*Botrychium pallidum*) site with a dense population of poison ivy, the species was not relocated.
- At a bluntlobe grapefern (*Botrychium oneidense*) site, plants were just emerging so positive identification was not possible.
- At 2 limestone oak fern (*Gymnocarpium robertianum*) sites, surveyors found appropriate habitat but no plants.

- At a bog adders-mouth (*Malaxis paludosa*) site, there was excellent quality habitat, but no plants noted.
- At 2 sites of white adder's-mouth orchid (*Malaxis brachypoda*), there were no visible plants in 2015. Surveyors noted habitat changes in tree species at one location and possibly too much water at another locale.
- For the only known site of squirrel-corn (*Dicentra canadensis*) on the Forest, which was verified by botanist Welby Smith, (MN DNR), surveyors found plants of the common look alike species, Dutchman's breeches (*Dicentra cucullaria*) but did not find the squirrel-corn. The two species differ only by flower shape.

RFSS Habitat Risk Assessments

The Monitoring and Inventory Survey Team continues to make improvements to the screening process in surveying various RFSS on the Forest. In 2015, risk assessments and reviews were completed for Connecticut warbler and bay-breasted warbler. The Connecticut warbler review resulted in a simplified screening criteria which eliminated subjective interpretation of field data. The bay-breasted warbler review affirmed the recommendation to no longer survey for this species on the Forest. Plant risk assessments were deferred due to seasonal conflicts.

Monitoring Question

To what extent is the Forest maintaining no net increase in groomed or designated over-the-snow trail routes unless the designation effectively consolidates use and improves lynx habitat through a net reduction of compacted snow areas?

Monitoring Drivers

The Forest Plan includes the following standard and guidelines pertaining to wildlife:

S-WL-2 G-WL-6, 8

Monitoring Indicators

Density (miles/square mile) of roads and snow-compacting trails by Lynx Analysis Unit.

Background

All Grant-In-Aid (GIA) snowmobile trails on the Chippewa National Forest are operated and maintained through agreements with Cass and Itasca Counties. In turn the counties partner with local snowmobile clubs who perform grooming and trail maintenance. There are a total of 17 GIA trails on the forest.

Cross-country snowmobile travel is prohibited and has been since the 1986 Forest Plan. To provide a range of outdoor recreation opportunities the Chippewa National Forest maintains five non-motorized trail systems that are groomed for cross-country skiing. Grooming is performed by Forest Service personnel or through partnerships with other government agencies, clubs, or individuals.

The Lynx Conservation Assessment and Strategy (LCAS) is the guiding document that directs lynx conservation in the United States. The LCAS identified effects of roads and recreational winter trails are largely focused on winter access into lynx habitat (Ruediger et al. 2000).

Most recreational activities are unlikely to have a large effect on the prey base, unless the activity is concentrated within primary forging sites or directly reduces habitat and prey abundance. Recreation is more likely to impact lynx by compacting snow through over the snow trail routes, allowing competing predators to

access lynx habitat; or by creating disturbances of a magnitude or timing that make a forging site largely less desirable for lynx.

Results

Table 89. Total miles of snowmobile and cross-country trails- 2017

Deer River Ranger District

Trail	Miles
Avenue of Pines	21.9
Bowstring East	19.1
Bowstring West	41.9
Cameron	14.4
Marcell North	14.2
Marcell South	10.2
Pipeline	8.5
Suomi Hills X-country	20.8
Taconite	3.1
Winnie	14.1
Suomi Hills Snowmobile	18.7

Walker Ranger District

Trail	Miles
Chippewa C	23.0
Eagle Country	6.6
Lost Girl	19.5
Paul Bunyan	12.3
Snoway One	7.3
Soo Line	21.0
Triville	18.8
Shingobee	5.6
Goose Lake	12.5
Total miles:	312.5

Since 2004, there have been temporary reroutes of snowmobile trails due to logging operations, or flooded sections of trail by beaver in the fall. These reroutes are temporary in nature lasting a few weeks to 1-2 seasons depending upon scope of the project.

Additionally, there have been and will continue to be minor reroutes that are necessary to correct changes in recreation easements for GIA trails over private lands. These corrections are typically made using unplowed forest roads that result in no net gain in snow grooming activities. If a reroute requires earth disturbing activities a decision notice or memo is prepared to disclose environmental effects.

In 2023, the Forest Recreation Program made corrections to Infrastructure Database (INFRA) and Geographic Information System (GIS) data that incorrectly designated summer hiking trails as over the snow trails. This database correction reduced the total designated over the snow trails from 378 mile to 312.5 miles. Table 89 displays the updated list of designated over the snow trails.

Implications

There hasn't been an increase in the snowmobile routes across the Forest thus no reduction in large tracts of undisturbed areas desirable for lynx. The actual number of snowmobile routes decreased across the Forest due to database corrections that incorrectly designated summer only hiking trails as over the snow trails.

This monitoring question looks to the effect of designated over-the-snow-trail routes and roads used by snowmobiles but do not consider a designated trail that may also affect the lynx habitat. This use of roads and other habitat effects such as continuous habitat and population/distribution of prey species may also have effects on lynx.

New Issues

Each year, snowmobile clubs from Itasca County approach the Forest Service with proposals to add approximately 20 miles of groomed Grant-in-Aid snowmobile trails that follow existing roads. The intention is to create additional trail riding opportunities and to connect local businesses to the extensive snowmobile trail system. The Forest has not had the budget nor the capacity to respond to these proposals.

Further evaluation of the Forest Plan in the context of responding to the creation of snowmobile trails has identified the discrepancy between S-SWL-2 and O-RMV2.

Recommendations

Monitor snowmobile and other winter recreation activity use on non-designated winter trail that may impact forging sites within large undisturbed areas.

Reconcile the discrepancy between the O-RMV-2 and S-SWL-2 in terms of the original intent of the Forest Plan.

Upland Mature Patches

Upland mature patches are governed by Forest Plan Standards and Guidelines for maintaining mature/older forest conditions. They include:

- G-VG-1 Maintain a minimum of 19 patches of mature or older upland forest in patches of 1,000 acres or greater.
- S-VG-2 Maintain a minimum of 85,000 acres of mature or older forest in patches 300 acres or greater.
- S-VG-3 In mature or older upland forest types managed to maintain patches of 300 acres or greater, vegetation management treatments that maintain a 50 percent minimum canopy closure and maintain large diameter trees are allowable.

Discussion

The Forest Plan provides for the protection, enhancement, and maintenance of wildlife habitat at a sitespecific scale and at a landscape scale. Continuing to use this two-tiered approach will be important to maintain and improve wildlife habitat and reduce potential impacts from proposed projects on the Forest.

Recommendations

Continue to manage bald eagle nest sites according to the Northern States Bald Eagle Recovery Plan (Northern States Bald Eagle Recovery Team 1983).

Canada lynx Forest Plan Standards and Guidelines should be updated to reflect current management guidelines in the 3rd edition of the Canada Lynx Conservation Assessment and Strategy (Interagency Lynx

Biology Team 2013). The Chippewa National Forest is now located within secondary/peripheral areas which have more liberal management direction.

The effectiveness of the nest buffers surrounding northern goshawk nests should be evaluated to determine if they are providing sufficient habitat for maintaining territories.

Since the number and acres of upland mature patches is currently above Forest Plan Standards and Guidelines, the quality of the patches should be further evaluated. Future management should look at maintaining those patches of the highest quality and potentially improving or reducing the patches of lower quality.

Habitat Improvement Projects

Planning and implementing wildlife habitat improvement projects across the Forest allows the Forest to be pro-active in improving wildlife habitat. Forest Plan Desired Conditions (USDA Forest Service 2044) D-WL-1, 2, and 3 identify the need to provide habitat and maintain viable populations for all existing native species and contribute to the conversation and recovery of federally listed, proposed, or candidate threatened and endangered species and their habitat.

Results

In 2017, the Lydick Brook East Wildlife Habitat Improvement Project Decision Memo was signed. This project is located on the Blackduck Ranger District. The objectives of this project are to increase stand structure; increase species diversity; promote snag development; promote coarse woody debris; promote native plant communities; and to improve the resiliency of the red pine forest through diversification. The project is located within a large upland mature patch that is dominated by plantation origin red pine.

Implementation of this project is being completed cooperatively with The Nature Conservancy through a stewardship agreement.

Discussion

The Forest continues to have opportunities to be pro-active in planning and implementing wildlife habitat improvement projects for a myriad of wildlife species and habitat types. Recently emerging concerns, such as the decline in pollinators, increases the opportunities and need to be pro-active on the Forest.

Recommendations

Continue to look for opportunities to improve habitat conditions within upland mature patches.

Use more non-traditional approaches to thinning red pine plantations, such as variable density thinning, to accelerate habitat improvement.

Look for opportunities to improve habitat for pollinator species.

Evaluation of Monitoring Question and Indicator(s)

Our monitoring programs are subject to change as needed (adaptive monitoring). This section is to offer recommendations on how we can improve this monitoring question and indicator(s), if any. If recommending the elimination of this question or indicator(s), offer justification as to why. Changes to the monitoring program can be made with an administrative change to the land management plan.

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15. Fire and Fuels

Within this chapter the topics of Fire, Fuels Reduction, and Wildland Fires are discussed. Activities from FY2018 – FY2023 are included; 2014 was the last time fire and fuel information was reported in a Monitoring and Evaluation Report.

Over time, there has been a shift in how fire is viewed, from a destructive, negative force to an increased understanding of how fire contributes to healthy, resilient ecosystems and that some ecosystems need fire. The negative impacts of decades of fire suppression in fire adapted ecosystems have become clear, as has the realization that prescribed burning and fuels treatments can reduce fire danger to communities at risk and overall risk of extreme wildfires (USDA 2016, USDOI 2014, 2023).

Current Forest Service policies and the National Cohesive Wildland Fire Management Strategy stress the importance of creating resilient landscapes and restoring healthy, resilient, fire-adapted ecosystems, in addition to protecting communities from wildland fire (USDA 2016, USDOI 2014, 2023). During the 2018-2023 period, the Chippewa National Forest continued work on hazardous fuel treatments and prescribed burning to reduce hazardous fuels, improve the health and resilience of fire adapted ecosystems, and suppress unplanned wildfires.

During this time, there have been management changes and an increased focus on restoring fire dependent systems on the Forest. In 2019, the Chippewa National Forest began managing the forest in shared stewardship with the Leech Lake Band of Ojibwe (LLBO) through a memorandum of understanding (MOU) and a renewed focus on fulfilling Trust Responsibilities. In 2020, LLBO submitted the Tribal Forest Protection Act (TFPA) Proposal Regarding Fire Dependent Stands and Climate Change. This TFPA requested an increase in pace and scale of prescribed fire, build collaborative efforts to manage projects, and continue to discuss collaborative projects that support fire dependent communities for both cultural and natural values, among others.

These changes in how fire is viewed, Forest Service policies, and local management are influencing how the Chippewa National Forest includes fire, particularly prescribed burning, in both planning and management efforts. Ultimately, these actions will lead to healthier, more resilient forests and ecosystems as well as safer communities.

Key Points

- The Forest's management of fire, particularly prescribed fire is changing. Prescribed burning will be used to restore fire dependent ecosystems, and the Forest is currently planning management that will be increase prescribed burning projects on the landscape.
- The Forest is meeting hazardous fuel reduction objectives for wet meadow and upland burning. Wet meadow treatments have been successful in reducing the number and size of person caused fires. The upland burning program is successful in reducing the fuel loading that contributes to increased fire behavior in wildland fire situations. In addition, these burns accomplish objectives for wildlife habitat improvement and restore fire to a fire dependent pine ecosystem.
- Fire statistics show person caused fires are the main cause of wildland fires on the Forest. These fires result in the most acres burned.
- The Forest Plan does not allow for the management of wildland fire for resource benefit, and thus all wildland fire is deemed to be unwanted wildland fire and actively suppressed to protect life and natural resources.

• Increased wildfire activity and increased conditions conducive to large fires are forecast due to the effects of Climate Change.

Fuels reduction section tracks the number of acres that are treated for hazardous fuels reduction through fire, mechanical treatment, and timber harvest activities during FY2018 – FY2023 and discusses how these treatments are meeting resource objectives. The Wildland fire section tracks the number of unwanted wildfires by causal category and acreage.

Monitoring Question

How, where, and to what extent will prescribe fire be used to maintain desired fuels levels, and/or mimic natural processes, and/or maintain/improve vegetation conditions, and/or restore natural processes and functions to ecosystems?

Monitoring Drivers

Within the Chippewa National Forest Plan under Forest Wide Management and Direction, on page 2-18, it states the following desired conditions:

(**D-ID-4**) Accumulations of natural and activity fuels are treated to enhance ecosystem resiliency and to maintain desired fuels levels.

(D-ID-5) Fire is present on the landscape, restoring or maintaining desirable attributes, processes, and functions of natural communities.

Under the desired condition are the following objectives:

(O-ID-1) Increase the amount of forest restored to or maintained in a healthy condition with reduced risk of and damage from fire, insects, and diseases.

(O-ID-2) Establish, maintain, or improve the condition of vegetation using prescribed fire, mechanical treatments, and other tools.

(O-ID-3) Treat areas of highest fire risk to minimize the effects of unwanted wildland fire.

(O-ID-4) Reduce fuels and control vegetation in the understory of stands that have historically had naturally occurring low intensity surface fires.

Monitoring Activities

A. Fuel Reduction

Based on reviewing the Forest Service Activities Tracking System (FACTS) database, the forest accomplished 57,735 acres to reduce fuels between FY2018 – FY2023. Of the total acres treated for fuels 13,431 acres were accomplished as primary fuels projects, and 44,304 acres were accomplished as integrated projects with other disciplines.

The forest accomplished 10,045 acres of hazardous fuels reduction prescribed burning between FY2018 – FY2023. Prescribed burning for hazardous fuels reduction is comprised of pile burning, broadcast burning (wet meadow and harvest slash) and understory burning (upland burning). The remainder of the acres were accomplished by mechanical means such as timber harvest (23,922 acres) or chipping, crushing, TSI and piling of fuels (23,768 acres).

Pile Burning

The primary objective of pile burning is to reduce fuels that result from some type of mechanical treatment. Most of this burning focuses on fuels created during timber harvest activities. This type of burning activity accounted for roughly 1,046 acres during fiscal years FY2018 - FY2023 timeframe. The objectives include:

- 1. Consume at least 70 percent of the 1-hour fuels and 10-hour fuels.
- 2. Consume at least 50 percent of the 100-hour fuels and 1000-hour fuels.

Wet Meadow Burning

From a hazardous fuel standpoint, the objectives of these burns are related to fuels reduction, and moderating the potential fire behavior of the light flashy fuels to aid in suppression of a fire should one start in these areas. This type of burning activity accounted for roughly 5,689 acres during FY2018 - FY2023 timeframe. The objectives included:

- 1. Remove 50 percent or more of the 10-hour fuels across 50 100 percent of the burn area.
- 2. Remove 50 percent or more of the 10-hour fuels across 75 100 percent of the burn area.
- 3. Top Kill 25 percent or more of encroaching brush on 50 100 percent of the burn perimeter.

Secondary objectives from this type of fire use are the reduction of shrub species that encroach upon these meadows with the lack of fire, and improvement of wildlife habitat.

To monitor for these objectives, photo points were established within the unit, and ocular measurements of pre and post burn fuel loadings taken.



Figure 11. The photograph on left depicts pre-burn conditions of brush prior to leaf out. The photograph on right depicts post-burn conditions of brush which has been top killed by fire.

Upland Burning

The objectives for these burns may vary based on the overall objectives of the burns. Objectives may include removing understory vegetation such as balsam fir to decrease the ability of a surface fire to transition to a crown fire that may cause a stand replacing fire, or they may mimic a high frequency/low severity fire that would have historically been common in the pine stands of our Forest.

The Forest burned roughly 3,310 acres of uplands during FY2018 - FY2023 timeframe. Generally, the objectives for hazardous fuels reduction are:

- 1. Remove 75 percent or more of the 1-hour fuels.
- 2. Remove 50 percent or more of the 10-hour fuels.
- 3. On average, limit Crown Scorch on over-story pine to less than 50 percent.

Secondary objectives of these burns include stimulation of native plants such as blueberries, and improvement of browse for wildlife.



Figure 12. The photographs show pre- and post-burn conditions of the sample site. Note the reduced surface fuels and fire-killed balsam fir in post-burn photo on the right.

Results

Wet Meadow Burning

Based on monitoring wet meadow burns completed from 2018-2023, the Forest is meeting specified hazardous fuels reduction objectives. While the objectives are being met, the benefits from a fuel standpoint are short lived because a new crop of fuel (meadow grass) will regenerate during the growing season. Until a new crop of grass has regenerated and cured, burning reduces the hazardous fuels and the occurrence of human caused fires. These burns have been successful in reducing the number and size of person caused fires within the Forest. In addition to fuels reduction, other resource benefits from burning include maintaining a meadow ecosystem and improving wildlife habitat.

Upland Burning

Monitoring results of the upland burning indicate the forest has been successful in meeting the hazardous fuels objectives for the upland burn units. Generally, results exceed the objective of removing 75 percent of the 1-hour fuels within the units being burnt. The reduction of the 10-hour fuels exceeds the objective of 50 percent removal of the fuels. Crown scorch of the overstory pine is typically within the 20-25 percent range for all units being burned.

Monitoring results indicate that the upland burning program is successful in reducing the fuel loading that can contribute to increased fire behavior should a wildland fire occur within the burn units. By decreasing the fire behavior, the overstory pines have an increased ability to survive a wildland fire. Additionally, these burns may become effective areas for suppression activities due to decreased fuels loading and decreased fire behavior.

In addition to the removal of fuel loading, these burns accomplish secondary objectives of wildlife habitat improvement and restoring fire to a fire dependent pine ecosystem.

Looking back over the 2018-2023 timeframe, the Forest's prescribed fire program has been and continues to be successful in meeting the respective burn objectives. Given the limited burning windows, there is potential for increased success in the future, especially in the upland burning program, through different ways of doing business. An example includes utilizing larger burn units instead of many small units. Larger burn units would increase efficiency, reduce cost, and allow for better use of the limited burn opportunities. Other examples include integrating fuels needs with other programs such as wildlife or engaging outside partners to increase funds and personnel that may be available to implement high priority burns. Many of these changes are already being implemented and success is being realized.

B. Wildland Fires

The presence of fire on the landscape is appropriate and desirable, but unwanted wildland fire is actively suppressed where necessary to protect life, investments, and natural resources (D-ID-6, Forest Plan p. 2-18).

Monitoring Question

What level of wildland fire on the landscape is appropriate and desirable and to what extent is unwanted wildland fire on the landscape suppressed?

Results

Monitoring tracks trends in the number and acres of wildland fires and the causal agents that are occurring on the forest. With this information, fire managers can determine future needs within the fire program such as changes to prevention needs, hazardous fuels treatments, etc.

Based on fire reports completed for wildland fires within the protection area of the Chippewa National Forest, there were 132 wildfires which burnt a total of 325 acres during FY2018 – FY2023. The 20-year average is 35 fires and 114 acres for the forest. During FY2018 – FY2023 the smallest fire was 0.1 acres, the largest 60 acres, and the average wildfire acreage burned was 2.5 acres. All wildland fires on the forest were contained and/or controlled during initial attack operations.

Table 90 displays fire name, acres burned, and year burnt for fires one acre or larger occurring between 2018 and 2023. Table 91 shows wildfire acres burnt during the past 6 years and the 20-year average for each statistical cause. Table 92 shows the number of wildfires by statistical cause during the past 6 years and the 20-year average.

Fire	Acres Burned	Year
Toby	12	2018
Little Spring	2	2018
Oslund	5	2018
West Ball Club	17	2018
Horseshoe	42	2018
Sucker	5	2018
Tamarack	32	2019
Pond	2	2019
Walleye	9	2019
October Pipeline	2	2019
Up North	18	2020
Sand Lake	2	2020

Table 90. Wildfires 2 acres or larger from 2018 to 2023

Fire	Acres Burned	Year
Pipeline Road	2	2020
Mississippi	11	2020
Eagles Nest	4	2021
Easter	30	2021
Swamp	3	2021
Million Lake	6	2022
Scoffner	27	2022
Big Deer	4	2023

Table 91. Wildfire acres during past 6 years and their cause

Cause	2018	2019	2020	2021	2022	2023	20 Year Average
Lightning	0	0	0	3.6	0	0	1.71
Equipment	0	0.2	0.1	0.1	0	0	1.02
Smoking	0	0	0.1	0	0	0	0.40
Campfire	.25	0	0	0	0.1	0	4.57
Debris Burning	76.85	33.07	19	0.7	0.5	0	18.44
Railroad	0	0	0	0	0	0	0.19
Arson	12.69	1.3	0.25	0	0	0	38.27
Children	0.1	0	0	0	0	0	1.64
Miscellaneous	76.5	16.05	0.9	33.8	0.38	4.74	46.03
Unknown	0	0	13.5	4.1	25.87	0.1	2.18
Total	166.39	50.62	33.85	42.3	26.85	4.84	114.45

Table 92. Number of wildfires by statistical cause during the past 6 years

Cause	2018	2019	2020	2021	2022	2023	20 Year Average
Lightning	0	0	0	1	0	0	0.55
Equipment	0	1	1	1	0	0	1.6
Smoking	0	0	1	0	0	0	0.45
Campfire	1	0	0	0	1	0	2.3
Debris Burning	9	8	2	7	3	0	9.45
Railroad	0	0	0	0	0	0	0.5
Arson	16	2	1	0	0	0	8.4
Children	1	0	0	0	0	0	1.5
Miscellaneous	16	15	5	10	5	4	9.9
Unknown	0	0	5	8	7	1	1.05
Total	43	26	15	27	16	5	35.7

Looking at the statistics for wildland fires during FY 2018 - FY 2023 and over a twenty-year average on the Chippewa National Forest, it becomes obvious that person caused fires are the main cause of wildland fires on the forest. These fires are also the fires that result in the most acres burnt. Most of the fires listed under the miscellaneous category are suspected to be person caused, but a definitive cause for the fire is not identified.

The Forest Plan does not allow for the management of wildland fire for resource benefit, and thus all wildland fire is deemed to be unwanted wildland fire and actively suppressed to protect life and natural resources.

Implications

- The Forest is meeting hazardous fuel reduction objectives for wet meadow and upland burning.
- Wet meadow treatments have been successful in reducing the number and size of person caused fires.
- The upland burning program is successful in reducing the fuel loading that contributes to increased fire behavior in wildland fire situations. In addition, these burns accomplish objectives for wildlife habitat improvement and restore fire to a fire dependent pine ecosystem.
- Fire statistics show person caused fires are the main cause of wildland fires on the Forest. These fires result in the most acres burned.

C. Future

Climate Change effects, such as increases in temperature, changes in evapotranspiration rates, reduced soil moisture, changing precipitation patterns, and lengthening dry or drought periods are predicted, and are already occurring in Minnesota (MN DNR 2011). In addition, climate change is expected to increase both wildfire activity and the weather conditions conducive for large fires (National Climate Assessment 2023). Managing for healthy, resilient, fire-adapted ecosystems will reduce the risk of increased high severity wildfire while providing these systems with the diversity and resilience necessary to evolve with changing climatic conditions.

However, restoring fire to ecosystems after approximately a 100 years of fire suppression is not without challenges. Weather and climate are drivers of fire behavior, including prescribed burns. Here in north-central Minnesota, challenges include cool temperatures and wet fuels in spring and fall, conditions that may become too dry for prescribed burning in summer (Handler 2014), or lack of resources depending on nationwide fire activity. The multiple ownerships and fragmented nature of the Chippewa National Forest create difficulties burning large acreages and across different ownerships. Furthermore, the forested ecosystems themselves have changed, due to the lack of disturbance (Nowacki 2008).

The Chippewa National Forest is striving to increase pace and scale for prescribed burning and continuing to complete hazardous fuel treatments to increase health and resilience of forested systems, restore fire dependent ecosystems, and protect communities at risk. This includes identifying appropriate areas for hazardous fuels treatments and prescribed burning, as well as increasing the amount of prescribed burning during planning efforts to restore fire dependent systems. Another component of this effort is a Forest Service Agreement with the Leech Lake Band of Ojibwe to build their fire program capacity through the purchase of equipment and engines and funding for personnel and training. This additional capacity and trained personnel will support prescribed burning operations on the Forest.

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Chapter 3. Administrative Corrections and Amendments to the Forest Plan

The Chippewa National Forest Land and Resource Management Plan (Forest Plan) was revised in 2004 in accordance with the 1982 Planning Rule. Since 2000, several planning rules have been in effect. Administrative corrections were made in accordance with the Planning Rule (PR) in effect at the time of the change. The most recent change, the 2012 Planning Rule, went into effect on March 23, 2012.

All the changes to the Forest Plan thus far have been minor in scope.

Type of Change	Date	Content
Amendment 1	Nov. 15, 2007	Change to Guideline on prohibited OHV use (G-ORV-1)
Amendment 2	June 4, 2009	Change to North Winnie SPNM Boundary
Amendment 3	July 19, 2013	Project Specific amendment for mature and older jack pine forest (S-WL-10)
Administrative Correction 1	Aug. 17, 2006	Change to Glossary definitions
Administrative Correction 2	Aug. 30, 2006	Change to Monitoring Plan
Administrative Correction 3	Aug. 18, 2006	Change to Timber Management Guideline (G-TM-7)
Administrative Correction 4	Aug. 18, 2006	Change to Heritage, Recreation, and Access Guideline (G-WSR-7)
Administrative Correction 5	Aug. 18, 2006	Correction to Executive Summary Table
Administrative Correction 6	Aug. 18, 2006	Change to Watershed Health, Riparian Areas and Soil Resources Table (Table G-WS-8a)
Administrative Correction 7	Aug. 18, 2006	Change to SIO Map
Administrative Correction 8	Sept. 18, 2006	Change to National ORV Definitions
Administrative Correction 9	Sept. 14, 2007	Change to Proposed and Probable Practices
Administrative Correction 10	Aug. 10, 2009	Change to Boundary of Candidate Research Natural Area, Sunken Lake
Administrative Change 11	Apr. 28, 2016	Chapter 4 Monitoring and Evaluation Change
Errata 1	Aug. 18, 2006	Change to Record of Decision (ROD)

Table 93. Forest plan amendments, corrections, and errata

Changes to the monitoring program (Forest Plan, Chapter 4) were made in 2016 to bring it into alignment with direction provided in the 2012 Planning Rule (36 CFR Part 219.12).

The amendments, administrative corrections, as well as the corrected pages from the set of Plan documents can be found at: <u>https://www.fs.usda.gov/main/chippewa/landmanagement/planning</u>

We encourage people to use this resource for accessing the most up to date information on amendments and administrative corrections. Future amendments will also be listed in the Chippewa National Forest Schedule of Proposed Actions which is distributed quarterly. We will continue to provide opportunity for public involvement at the project level and during any substantive changes to the Forest Plan.

Chapter 4. Preparers

The following people collected, evaluated, or contributed time and or data for this Monitoring and Evaluation Report.

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