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2020-2024 (5-Year)
Monitoring Evaluation Report
for the Hiawatha National Forest



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Summary of Findings and Results

Table 1. shows a summary of key findings and conclusions from this report. The findings are recommended changes that may lead to changes to the Monitoring Program, management and activities, or the Forest Plan. See Appendix A for additional details and rationale for dropped questions and body of the report for more details regarding any specific recommendations/opportunities for change.

Table 1. Summary of key findings and conclusions from this report.

Monitoring Item	Key Finding/Conclusion	Based on the evaluation of monitoring results, what changes are recommended or may be warranted?
Question #1	Monitoring item/s changed	Change to monitoring program Change to management activities
Question #2	Monitoring item/s changed	Change to monitoring program Change to Forest Plan Change to management activities
Question #3 - Drop	Incorporate into Question #1	Change to monitoring program
Question #4	Monitoring item/s changed	Change to monitoring program
Question #5	Monitoring item/s changed	Change to monitoring program
Question #6	Data not available; change question or drop in future reports	Change to monitoring program
Question #7	Data not available; change question or drop in future reports	Change to monitoring program
Question #8	Data not available; change question or drop in future reports	Change to monitoring program
Question #9	Monitoring item/s changed	Change to monitoring program Change to Forest Plan
Question #11	Monitoring item/s changed	Change to monitoring program
Question #12		Change to management activities
Question #14		Change to management activities
Question #15 - Drop	Data not available	Change to monitoring program
Question #16 - Drop	Incorporate into Question #14	Change to monitoring program
Question #17 - Drop	Incorporate into Questions #1 & #19	Change to monitoring program
Question #18 - Drop	Incorporate into Questions #1 & #19	Change to monitoring program
Question #19	Monitoring item/s changed Negative data trend	Change to monitoring program Change to Forest Plan Change to management activities
Question #21		Change to management activities
Question #22	Monitoring item/s changed	Change to monitoring program
Question #24	Monitoring item/s changed	Change to monitoring program

Monitoring Item	Key Finding/Conclusion	Based on the evaluation of monitoring results, what changes are recommended or may be warranted?
Question #25	Uncertain data trend	Change to management activities
Question #26 - Drop	Data not available	Change to monitoring program
Question #27	Uncertain data trend	Change to management activities
Question #29	Monitoring item/s changed	Change to monitoring program Change to Forest Plan Change to management activities
Question #30	Monitoring item/s changed	Change to monitoring program Change to Forest Plan Change to management activities
Question #31	Monitoring item/s changed	Change to management activities
Question #32		Change to management activities
Question #33	Monitoring item/s change	Change to monitoring program Change to management activities
Question #34	Monitoring item/s change	Change to monitoring program
Question #35	Monitoring item/s change	Change to monitoring program Change to management activities

Introduction

Purpose

The purpose of the biennial monitoring evaluation report is to help the responsible official determine whether a change is needed in Forest Plan direction, such as plan components or other plan content that guide management of resources in the plan area. The biennial monitoring evaluation report represents one part of the Forest Service's overall monitoring program for this National Forest unit. The biennial monitoring evaluation report is not a decision document—it evaluates monitoring questions and indicators presented in the Plan Monitoring Program in Chapter 4 of the Forest Plan, in relation to management actions carried out in the plan area. The Hiawatha National Forest is issuing a 5-year report to cover 2020-2025 monitoring efforts.

Monitoring and evaluation are key components of adaptive management. For this reason, an evaluation report is scheduled for production every two years, however, due to staffing changes, a report has not been completed since 2019. This is our fourth written report of this evaluation since the Hiawatha Forest Plan was amended in 2016 to add new monitoring requirements provided in the 2012 Planning Rule (36 CFR 219.12(a)(5)(i-viii)). This report indicates whether a change to the Forest Plan, management activities, monitoring program or forest assessment may be needed based on the new information. A downloadable copy of this monitoring report is available at https://www.fs.usda.gov/r09/hiawatha/planning .

Objectives

There are several objectives for this report, including:

- Assess the current condition (i.e., status) and trend of selected forest resources.
- Document implementation of the Plan monitoring program including changed conditions or status of key characteristics used to assess accomplishments and progress toward achievement of the selected Land and Resource Management Plan components.
- Evaluate relevant assumptions, changed conditions, management effectiveness, and progress towards achieving the selected desired conditions, objectives, and goals described in the Forest Plan
- Assess the status of previous recommended options for change based on previous monitoring & evaluation reports.
- Document any scheduled monitoring actions that have not been completed and the reasons and rationale why it has not.
- Present any new information not outlined in the current plan monitoring program that is relevant to the evaluation of the selected monitoring questions.
- Present recommended change opportunities to the responsible official.

How to Use this Report

This report is a tool and a resource for the Forest Service to assess the condition of forest resources in relation to Forest Plan direction and management actions. It is also a tool and a resource for the public to learn more about how the Forest Service is managing forest resources.

The plan-monitoring program identifies the monitoring questions and associated indicators to respond to eight required monitoring elements provided in the 2012 Planning Rule [36 CFR

219.12(a)(5)(i-viii)]. This report is the vehicle for disseminating information to leadership to evaluate the need for change by comparing on-the-ground conditions to desired conditions outlined in the Forest Plan.

Monitoring questions and indicators provide information to help guide management decisions for resources in the plan area, including testing relevant assumptions, tracking changes, and measuring effectiveness and progress toward meeting Forest Plan direction.

Monitoring and evaluation determine how well the Forest Plan is working. It is designed to answer the following questions:

- *Did we do what we said we were going to do?* This question addresses how well the Forest Plan direction is being implemented. Collected information is compared to Forest Plan objectives, standards and guidelines, and management area direction.
- *Did it work how we said it would?* This question addresses whether the application of Forest Plan standards and guidelines is achieving objectives; and whether objectives are achieving goals.
- *Is our understanding and science correct?* This question addresses whether the assumptions and predicted effects used to formulate the goals and objectives are valid.

The Forest Plan (page 4-1) states that a key requirement of a monitoring strategy is that the public be given timely, accurate information about Forest Plan implementation. This is done through the release of a biennial monitoring and evaluation report. Due to the pandemic and staffing shortages, reports were not yet posted for 2019 – 2024, therefore, this five-year report was compiled.

The Importance of Public Participation

Our intent for public participation is to give the public access to all information developed through monitoring activities and "obtain public feedback on what the monitoring information suggests about the effectiveness of the Forest Plan" (Forest Service Handbook 1909.12_42.14c). Completed reports are published on the Hiawatha National Forest public webpage at https://www.fs.usda.gov/projects/hiawatha and an email notice is sent to those who signed up for updates on the Forest's electronic mailing list.

About Our Forest Plan Monitoring Program

Monitoring and evaluation requirements have been established through the National Forest Management Act (NFMA) at 36 CFR 219. Additional direction is provided by the Forest Service in Chapter 30 – Monitoring – of the Land Management Handbook (FSH 1909.12).

Monitoring and evaluation are separate, sequential activities. Monitoring involves repeated collection 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 Land Management Plan (LMP) are being met. Monitoring and evaluation are critical steps in the process of keeping the LMP responsive to changing conditions, thereby providing the feedback mechanism for an adaptive management framework. The results are used to identify when changes to the LMP, or the way it is implemented, are needed.

LMP Monitoring on the Hiawatha National Forest has two major components: the Monitoring Program (contained within the LMP), and the Biennial Monitoring and Evaluation Report. Each are described below.

Monitoring Program

The Hiawatha National Forest monitoring program was updated in 2016 for consistency with the 2012 planning regulations [36 CFR 219.12 (c)(1)]. The 2006 Hiawatha National Forest Plan was administratively changed to include the updated monitoring program (Chapter 4). For a copy of the current monitoring program go to https://www.fs.usda.gov/sites/nfs/files/r09/hiawatha/publication/Revised%20Forest%20Plan%20Chapter%204.pdf . Monitoring questions and indicators were selected to inform the management of resources on the plan area and not every plan component was determined necessary to track [36 CFR 219.12(a)(2)].

The monitoring program contained within the LMP is strategic in nature and provides programmatic direction for monitoring and evaluating LMP implementation. 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.

Biennial Monitoring and Evaluation Report (Monitoring Report)

Providing timely, accurate monitoring information to the responsible official and to the public is a key requirement of the plan monitoring program. This report is the vehicle for disseminating this information.

Evaluation is the process of transforming monitoring data into information, a value-added process. It is a process of synthesis that brings together value, judgement, and reason with monitoring information to answer the question, "So what?" and "Why?" Evaluation requires context. A sense of the history of the place or the circumstances (temporal and spatial context) is 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. Evaluations assess whether management activities are moving toward desired conditions. 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 report.

The monitoring report is intended to be a comprehensive compilation of all the monitoring and evaluation described in the plan. This report will provide summaries of data collected, and complete evaluations of the data. The evaluation process determines whether the observed changes are consistent with LMP 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.

In the context of Forest Planning there are three main types of monitoring activities:

- Are we implementing the Forest Plan direction properly? Are we meeting our management targets and project guidelines? (implementation monitoring)
- Are we achieving our Forest Plan management goals and desired outcomes? (effectiveness monitoring)

- Are the assumptions and models used in creating and implementing the LMP valid? (validation monitoring)

Implementation monitoring is important for tracking progress and accomplishments. However, effectiveness and validation monitoring drive and support the adaptive management process. Effectiveness monitoring evaluates condition and trend relative to desired conditions. Validation monitoring tests hypotheses and provides information that might necessitate changes to desired conditions in the plan, e.g., is what we think the desired state should be really accurate?

Roles and Responsibilities

The Forest Plan Monitoring Program requires a coordinated effort by many people, from the people who collect the data (see monitoring questions), to the people outside the Forest Service who provide feedback and assistance, to the decision maker.

Shannon Rische, Forest Supervisor for Hiawatha National Forest, is the Responsible Official for the Forest Plan. The Forest Supervisor has the discretion to set the scope and scale of the plan monitoring program after considering information needs and the financial and technical capabilities of the agency (36 CFR 219.12 (a)(4)). This report will be provided to her so that she can determine whether changes are needed to the Monitoring Program or the Hiawatha Forest Plan's direction.

Becky Cain, Forest Planner, is responsible for the coordination of and producing this report for the Hiawatha National Forest, Munising Ranger District, Munising, Michigan, 906-387-2512, rebecca.cain@usda.gov.

Resource specialists performed data collection, evaluated information, and reported findings in this document. The specialists' names and roles are disclosed for each monitoring question.

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Eric Drake, Heritage Program Manager
Greg Gardner, Forest Engineer
Brian Hinch, Recreation Program Manager (Acting)
Andrew Rogers, Recreation Management Specialist (Special Areas)

Other Agencies Providing Monitoring Guidance:
Eastern Regional Office. The Regional Office (https://www.fs.usda.gov/r9) develops regional policies and directives (https://www.fs.usda.gov/im/directives/) on monitoring and evaluation.

U.S. Forest Service, Eastern Region State, Private, and Tribal Forestry, Forest Health. (https://www.fs.usda.gov/r09/state-private-tribal) Forest Health Protection provides technical assistance on forest health-related matters, particularly those related to disturbance agents such as native and non-native insects, pathogens, and invasive plants.

U.S. Forest Service, Northern Research Station. (https://research.fs.usda.gov/nrs) The Northern Research Station (NRS) provides scientific and technical expertise to conduct effectiveness and validation monitoring and evaluation. Their responsibilities include advising and assisting the Forest in developing monitoring study plans, analyzing and interpreting data, reporting study results and conclusions, and publishing study results in regional publications. The NRS also serves as the Research Natural Area (RNA) and Experimental Forest (Dukes) oversight, coordinating research permits and research data sharing with the Forest.

U.S. Fish and Wildlife Service. The U.S. Fish and Wildlife Service provides monitoring and reporting requirements for threatened and endangered species.

Michigan Department of Natural Resources, Forest Health Division. Michigan Department of Natural Resources works with the Forest to prevent, evaluate, and manage the occurrence and impacts of both native and exotic forest insects and diseases.

MDNR – Department of Environment, Great Lakes, and Energy, Drinking Water and Environmental Health Division. (www.michigan.gov/dnr) Michigan Forestry Best Management Practices for Soil and Water Quality.

MDNR – Fisheries Division. (https://www.michigan.gov/dnr/managing-resources/fisheries) Fisheries biologists, technicians and management teams are constantly making decisions on how best to manage Michigan's fisheries. Scientific, research-based decisions on rearing and stocking fish, regulations for fishing the Great Lakes, inland lakes and streams, and managing invasive species are some of the key elements of the Fisheries Division.

Michigan Natural Features Inventory. (https://mnfi.anr.msu.edu/) MNFI is the authoritative source of scientific information and expertise on Michigan's rare animal and plant species and natural communities. MNFI provides species information and occurrence data and assists the forest implement and document rare animal and plant occurrence monitoring.

Monitoring Evaluation

The Monitoring Evaluation section below presents the most current information (data and evaluations) for each monitoring question contained within the Hiawatha National Forest 2006 Land Management Plan.

Please see **Appendix A** for a list of those monitoring questions that were due for evaluation during this reporting cycle but were not included.

This section, and all its subsections, describes the details of how monitoring data were collected, reported, and evaluated for the Plan Monitoring Program to support the recommendation options. This section displays a summary of data results compiled for each monitoring item. The organization of this section follows the organization of the monitoring program contained within the Land and Resource Management Plan

Each monitoring item includes 1) a summary of the monitoring question and its indicator(s); 2) an evaluation of the monitoring results; and 3) an adaptive management finding on whether recommendation options could be considered for future changes or not.

Monitoring Element 1 – Status of select watershed conditions

Monitoring Question 1. How is the Forest complying with the Clean Water Act requirements for the protection of streams, lakes, ponds, and wetlands and their associated riparian ecosystems?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
Bi-Annually	2024	2 Years	2019	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) *Implementation and effectiveness of Best Management Practices to ensure compliance with Clean Water Act.*	2500 Watershed Management, page 2-13, Goal 5. Water quality is maintained to the standards identified by the State of Michigan; Clean Water Act (33 USC 1251 et seq. (1972); Forest Service Policy for Water Quality Management; National Core BMP Monitoring Program
(ii) *Effectiveness of Best Management Practices in the protection of streams, lakes, ponds, wetland and riparian ecosystems affected*	2500 Watershed Management, page 2-13, Goal 5. Water quality is maintained to the standards identified by the State of Michigan; Clean Water Act (33 USC 1251 et seq. (1972); Forest Service Policy for Water Quality Management; National Core BMP Monitoring Program
Who Collected this data?	BMP Interdisciplinary teams for the respective resource areas evaluated; led by Watershed Program.
Who is responsible for analyzing the question?	Lindsey Goss, Forest Watershed Program Manager Ryan Bevernitz, Forest Soil Scientist

Methodologies, New Science or Other Information

The Hiawatha National Forest utilizes methods outlined in the National Core Best Management Practices (BMP) program and the State of Michigan Forestry BMPs to demonstrate compliance with the Clean Water Act in the protection of waterbodies, streams, lakes, ponds, riparian areas, floodplains, wetlands, and their respective ecosystems. BMPs are the primary mechanism to minimize non-point source pollution for protection of water quality during and after project implementation and serve as a mechanism to demonstrate compliance with the **Clean Water Act**. BMP monitoring provides a tool to assess if BMPs were prescribed during project planning, implemented on the ground, and how effective they were in the protection of water quality and aquatic ecosystems. Regional, State, and local BMP guidance are used to develop site-specific BMP prescriptions for planning and implementation documents. Monitoring described in this report was conducted using protocols of the USFS National BMP Program and State of Michigan Forestry BMPs for Soil and Water Quality (DNR).

Riparian Management Zones (RMZ) includes the area 100-ft (and up to 175ft on steep 50% slopes) on both sides of perennial or intermittent streams and around the perimeter of open water bodies. RMZs function to protect water quality by providing an area of vegetation to dissipate run-off and to trap and filter out suspended sediments, nutrients, chemicals, and other polluting agents before they reach a body of water. An RMZ also provides shade, thus reducing thermal pollution. The term Riparian Management Zones (RMZs) are used in the state of Michigan BMP manual, but are sometimes called buffer strips, filter strips, streamside management areas or zones, or Aquatic Management Zones (AMZs National Core BMP Program).

Monitoring Results

National Core BMP:

This report summarizes results of BMP monitoring conducted in fiscal years 2015 (FY15) through 2024 (FY24) in accordance with the National BMP Program. The Hiawatha National Forest met its monitoring objectives by completing the assigned target of 14 evaluations for each two-year monitoring period, resulting in a total of 72 evaluations across eight resource areas. Approximately half of these evaluations were conducted on randomly selected sites, while the remaining evaluations focused on nonrandom sites chosen for condition assessments. These nonrandom selections typically occurred on sites with proposed or completed management activities, ensuring that monitoring efforts addressed both representative conditions and areas influenced by active management. Most of the evaluations occurred for roads, recreation, and vegetation management which had the highest volume of maintenance and management activities occurring on Hiawatha within the 10-year monitoring period (Note: road stream crossing improvement projects fall within the road protocols, results summarized in question 29).

Implementation Results: Implementation ratings summarize the extent to which required BMPs from planning documents (e.g., NEPA decisions and Forest Plans) were applied on the ground at the monitoring site. For sites rated *no BMPs*, there was no written evidence that BMPs were specified in a planning document. BMP implementation results do not directly report environmental impacts. They do report on the level of compliance with measures known to protect water resources, which may suggest potential for water quality impacts.

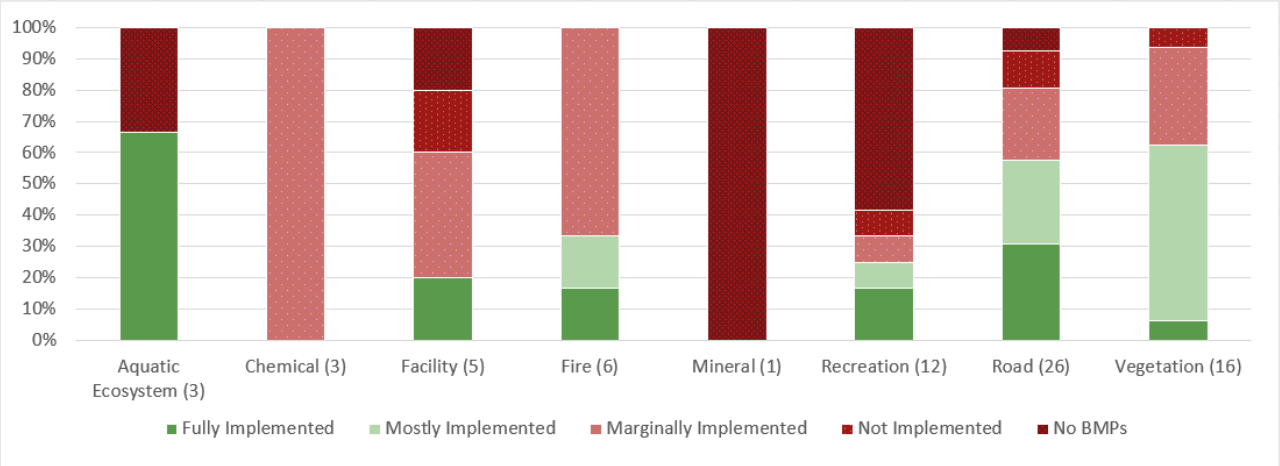


Figure 1. Question 1 - National Core BMP implementation rating results 2015-2024 (n=72).

- 46% of sites monitored had BMPs *fully or mostly implemented,* 29% were *marginally implemented*, and 8% *not implemented*.
- 17% of the evaluations were missing written BMPs, resulting in *No BMPs* ratings.
- Recreation (*n=12*) and Minerals (*n=1*) had the highest frequency of missing BMP documentation.
- Lower implementation ratings occurred in the Chemical (*n=3*), Facility (*n=5*), and Fire (*n=6*) assessments.

Effectiveness Results: Effectiveness ratings summarize the degree to which BMPs, as implemented, were effective at protecting water quality. The assessment evaluates evidence of sediment or other pollutants leaving the project area and entering the Riparian Management Zone (RMZ) or nearby waterbody.

Effectiveness results are not quantitative, and instances of water quality or water body impacts can vary in scope and extent. A rating of *effective* indicates no adverse impacts occur across the site, while a rating of *mostly effective* indicates minor and/or temporary impacts occurred. The Forest Service National BMP Monitoring protocols evaluate locations of highest risk (near water) and report the most severe instances of erosion or deposition observed across a site.

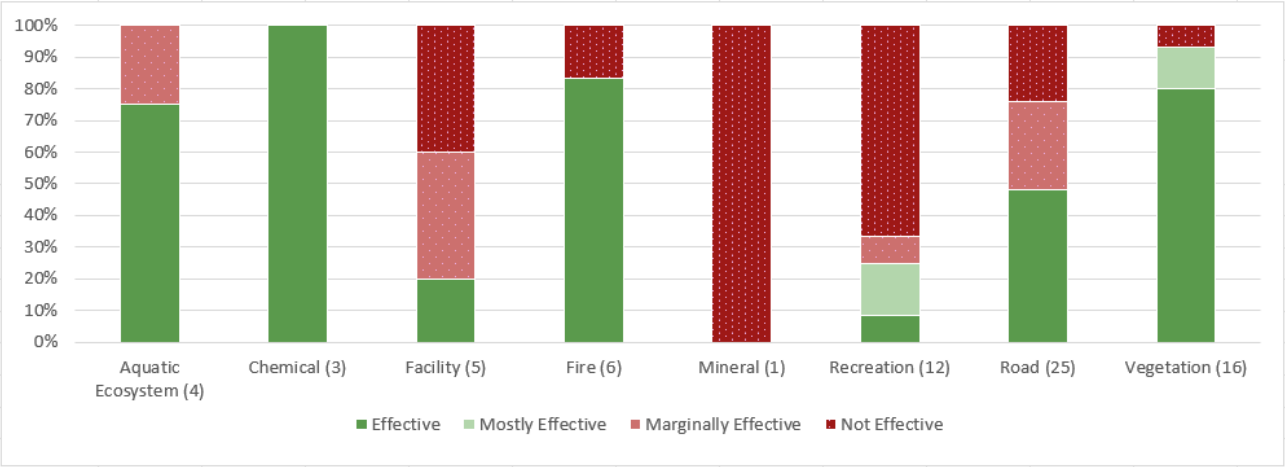


Figure 2. Question 1 - National Core BMP Effectiveness Rating Results 2015-2024 (n=72).

- BMPs were *effective or mostly effective* at 58% of sites with completed effectiveness evaluations.
- Lower effectiveness ratings were observed in Recreation, Facilities, and Minerals categories, though sample sizes were small for Facilities and Minerals.
- Roads was the category with the largest number of completed evaluations. Results were split, with half of the evaluations rated *effective* at protecting water quality, and half the evaluations rated *marginally* to *not effective*.

Big Picture Trends Regional and National: Regional trends provide context for interpreting local monitoring results. In review of the Region 9 (R9) R9_BMP_Road_Protocols_Report 2015-2024, the Hiawatha National Forest had implementation trends that were similar to regional and national ten-year reports:

- Effectiveness ratings were higher than implementation ratings.
- Recreation, Facilities, Minerals, and Chemical categories had the lowest implementation ratings.
- Mineral and Recreation had the largest frequency of BMPs missing from planning documents (largely resulting from a lack of recreation-based operation and maintenance (O&M) plans).
- Recreation, Facilities, Minerals, and Roads categories had the lowest effectiveness ratings for protecting water quality.

Hiawatha values differed from regional trends, with lower implementation and effectiveness rates.

- 17% of evaluations on the Hiawatha had no BMPs specified compared to only 10% of evaluations in the R9 summary.
- 46% of sites monitored had BMPs *fully or mostly implemented* on the Forest, compared to 61% and 63% regionally and nationally, respectively.
- Effectiveness ratings (58% effective) were lower than the national and regional averages at 71% and 70%, respectively.

Discussion: Marginal or incomplete BMP implementation did not always result in observable water resource impacts on the forest; however, the absence of written BMPs does present an increased overall risk of adverse impacts to water resources. Sites with higher BMP implementation ratings showed a greater percentage of evaluations with high effectiveness in protecting water resources. In contrast, sites without written BMP plans had a larger proportion of evaluations that were not effective in providing adequate protection. The R9 10-year BMP report identified a statistically significant correlation between implementation and effectiveness, with evaluations where BMPs were fully or mostly implemented being more likely to receive a good effectiveness rating compared to those with lower implementation levels (Chi-square test, $p < 0.05$). **Monitoring results indicate that BMP effectiveness could be improved by ensuring written BMPs are included in planning documents.** Examples of missing BMPs include methods of erosion control, stabilization measures, seasonal operating restrictions, and use-related limitations.

Another possible factor contributing to the Forest's lower effectiveness ratings compared to the regional and national averages is that the Hiawatha National Forest has substantially more land-to-water interfaces than other Forests in the region. Therefore, a greater proportion of land management on the Hiawatha occurs within riparian, wetland, and aquatic ecosystems compared to other National Forests. The Hiawatha National Forest is unique in that it is the only National Forest with shorelines along and with all major rivers and associated tributaries flowing into three Great Lakes. As a result, it has more shoreline requiring protection than any other forest in the contiguous United States. The boundary between upland terrain and wetland or riparian ground is often indistinct and not always evident on the ground or within spatial GIS data. It is also common for areas presumed to be upland during dry years to exhibit strong wetland or riparian characteristics during wetter years.

While models and field interpretations may vary, they consistently indicate that the Hiawatha National Forest is a very wet landscape with extensive coverage of wetlands, streams, and shorelines. **For BMP evaluations, this means there are more opportunities to detect water resource impacts such as sedimentation, erosion, rutting, or altered bank and shoreline morphology along a given waterbody transect.** These factors may have influenced the Forest's results.

Results: National BMP Corrective and Adaptive Management Actions

Each BMP evaluation protocol contains questions regarding corrective or adaptive management actions that the interdisciplinary team considers as options to improve outcomes.

- **Corrective actions** are typically applied to problems identified at the project site evaluated.
- **Adaptive management recommendations** are typically meant to be applied broadly to management of all projects of the type being evaluated.

In order to pinpoint areas of greatest vulnerability, a summary of corrective actions and adaptive management recommendations for resource areas with overall lower implementation or lower effectiveness ratings (Chemicals, Facilities, Fire, Minerals, and Recreation) and the most frequently evaluated protocols (Roads and Vegetation) within the monitoring period is included in this report. (Table 2). Question 29, Table 72 in summarizes these results for roads. The National BMP evaluation form does not include a section for providing positive feedback therefore positive results are not reflected in the table.

Table 2. Question 1 - Common Issues Reported, Corrective Actions, and Adaptive Management Recommendations.

(As documented by BMP interdisciplinary teams during field evaluations 2015-2024. Note: some corrective and adaptive management changes have begun but will take years to be reflected in the data set.)

BMP Evaluation	Corrective Actions, Issues Reported, and Recommendations
Chem A/B – Chemical Use Near/In Waterbodies	• Forest Wide Non-Native Invasive Plants (NNIP) EA did not include specified provisions to protect water, aquatic, and riparian resources. • EA referenced incorrect BMP document for timber and road management. • ORV used for treatment in a wetland, tire tracks visible around breached closure and visual to other ORVs from roadway. • NEPA should have stated no ORV use in wetlands and waterbodies. The marsh master would have been the better option for accessing the snowmobile trail.
Fac B – Non-Corridor Facilities / Special Uses	• Resource and safety issues occurred; use was out of compliance. • Specifications pertaining to water quality, hazardous materials, inspection reports were not specified in Operation and Maintenance (O&M) plans. • Many Special Use Permits (SUPs) lacked O&M plans or O&M Plans were missing. • Insufficient staff to keep up with the 350-370 permits. • Most of the issues documented in the evaluations were attributed to lack of staff to get the forest into compliance with permits.
Fac C – Pipelines / Transmission Lines / ROWs	• Utility corridors consistently had ineffective and breached closures, or no physical closures to prohibit unauthorized use ORV use. • ORV-related water quality impacts were observed: stream bank erosion, rutting sedimentation, and wetland damage.
Fac D – Completed Facility Reclamation	• NEPA lacked resource specialist review or input. • Non-native seed mixes used. Forest Plan requires native mixes. Invasive species.

BMP Evaluation	Corrective Actions, Issues Reported, and Recommendations
Fire A - Use of Prescribed Fire	• Fire line construction and rehabilitation needed improvement. • Dozer/blading techniques had lower effectiveness ratings than non-mechanical methods (chainsaws, leaf blowers, drip torches, wet lines). • Minimizing ground disturbance and fire line depth improved revegetation. • Seeding was recommended for dozer lines with bare soil. • RX fire is the preferred alternative to site preparation in sensitive landscapes. • Burn plans should contain provisions for protecting water, aquatic, and riparian resources.
Fire B - Wildfire Management Actions	• Include BMPs in delegation of authority. • Complete Fire Management Plan for the Forest. • Consider adapting Minimum Impact Suppression Tactics into SOPs. • Assign a resource advisor during initial attack so the dozer line construction can be evaluated. Type 4 incidents receive DOA from the Forest Supervisor to all Type 4 ICs, annually. DOAs lack resource specific BMPs.
Min B Active Non-Placer Mineral Operations	• Gravel pit had 12 non-native invasives with 2 aquatic invasive plant species. • NNIP being spread on forest from pit, 13 permits, and FS road operations. • Regular NNIP treatments are needed in gravel pits, with inspections and treatments occurring prior to use. • The waterbody evaluated was non-natural, created through pit excavation.
Rec A - Developed Recreation Sites	• Unauthorized motorized use along sensitive lake/river shoreline. • User-created trails cause erosion and resource damage. • Use is restricted to designated trails; designated trails do not present on all campground maps. • Users often disregarded signage without physical barriers. • Concessionaires could discourage unlawful use if made aware. • Closure and rehabilitation of user-created trails needed.
Rec B - Dispersed Recreation Areas	• No O&M Plan exists and no clear guidance for dispersed site operations. • Need for erosion control and sediment mitigations, staffing shortages often delay corrective work. • Site reduction treatments were insufficient. Footprint could be reduced. • NEPA lacked specifics to spatial extent and size.
Rec C - Completed Construction or Rerouting Trails	• Hiawatha employees should have reviewed project plans/contracts pre-implementation. • Erosion control measures listed in the NEPA (silt fence, seeding) were not installed. Resulted in erosion and sedimentation in wetland. • Recreation crews should always have seed (annual oats or rye) for on-the-spot stabilization of trail construction and maintenances projects. • General lack of readily available materials during trail construction leads to gaps in erosion mitigation.

BMP Evaluation	Corrective Actions, Issues Reported, and Recommendations
Rec D – Rec D - Trail Operation and Maintenance	• Trail O&M plans are needed. No O&M Plan exists to allow immediate action when resource issues are identified. • NEPA timelines and processes hinder ability to apply corrective action to protect water quality and repair riparian resource issues. • Inspections often do not occur at a critical time (staffing issues). • Silt fences left on site causes problems; biodegradable erosion control can be left onsite and prevent gravel and sediment depositions to streams. • Many snowmobile trails across the forest lack physical closure during snow free conditions, unauthorized ORV use causes wetland damage. • There is a need for clearer use restrictions where ATV damage persists.
Rec G – Watercraft Launch Construction/O&M	• Construction should occur only after receiving required state permits. • Turbidity curtains applied but were ineffective due to windy conditions. • It is difficult to stop construction when conditions are not favorable.
Veg A – Skidding & Harvesting	• BMPs missing in prescriptions; RMZ documentation lacking. • EA specifications are not always included in prescriptions. • RMZs should have been marked on the ground and shown on Sale Area Map (SAM). • Wetland/Pools/RMZs would be detected if layout were in snow-free conditions. • Wetland portions prone to rutting should be dropped from units. • Buffer wetlands and exclude RMZs where feasible. • Contracts should specify seeding of landings and roads; Botany consultation needed. • Sales administered by partners need FS close-out and better FS communications. • Improved coordination among sale prep, silviculture, hydro/soils staff needed. • Continued RMZ/BMP training needed.
Veg C – Mechanical Site Treatments	• Slash placed in woodland vernal pond for equipment passage. • RMZ identification (100 ft min) was needed before marking.

State of Michigan BMPs in Forestry/Timber Operations:

State of Michigan BMP monitoring was conducted on 71 post-harvest timber sale payment units (PU) with wetlands and/or riparian management zones (RMZ) within their boundary. This monitoring was conducted annually from 2013 through 2024 (excluding 2015 and 2021 due to staffing shortages). The units monitored usually coincided with PUs that were also scheduled to be monitored for post-harvest soil disturbance using the Forest Soil Disturbance Monitoring Protocol (FSDMP, refer to Question 33). FSDMP units are selected with a goal of wide representation of soil types and harvest methods, with preference given to those units that contain applicable BMPs. A total of 9 BMP categories are evaluated within each payment unit. Two of the categories, wetlands and riparian Management zones, are shown in this section. Roads are discussed in Monitoring Question 29.

Ratings within BMP guidelines were combined as "*BMP Properly Applied or Acceptable Variation"* and ratings outside of BMP guidance were combined as "*BMP Needed, Not Applied or Improperly Applied*" If a certain question is not relevant to the conditions that exist, it will receive a "NA" rating and will not be included in the analysis. The number of relevant observations (n) should be considered when reviewing the data in the results section.

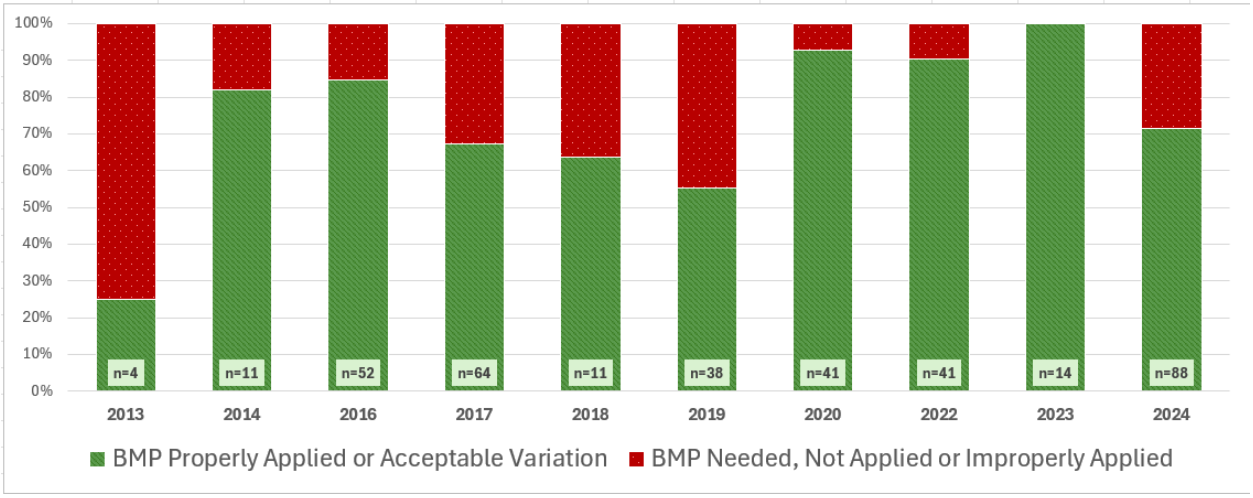


Figure 3. Question 1 **-** Average annual application of MI State BMPs in RMZs (2013-2024)

Results from monitoring completed between 2013 and 2024 showed:

- BMPs to protect soil and water resources within **riparian management zones** were properly applied at 76% of the monitored sites.
- Application of appropriate BMPs in RMZs showed a steady decline from 2016-2019, followed by improved application rates in 2020-2024 (Figure 3).
- BMPs to protect **wetlands** during timber harvest were properly applied 75% of the time.
- Lowest BMP ratings for timber harvest in wetlands were in 2023 and 2024. This may be explained by warmer winter temperatures and less snow cover during winter harvest compared to other years.

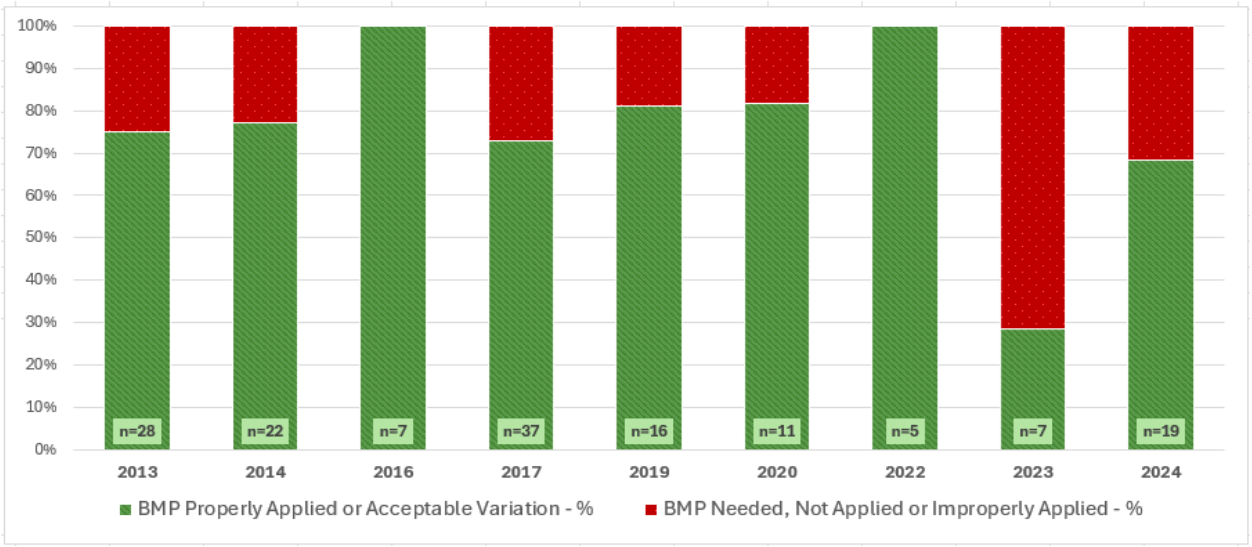


Figure 4. Question 1 - Average annual application of MI State BMPs in Wetlands (2013-2024)

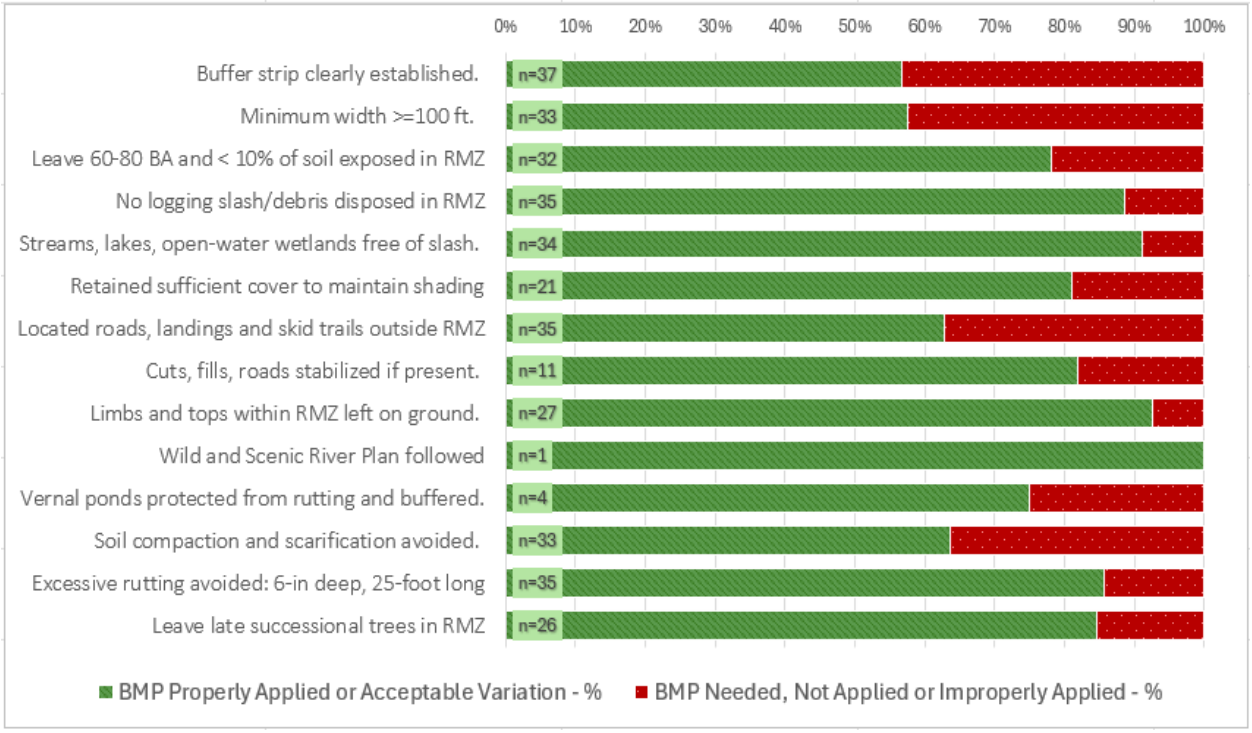


Figure 5. Question 1 - Percent Application of MI State BMPs for Forestry/Timber Operations in Riparian Management Zones (2013-2024).

The average percentage application of BMPs for RMZs is shown in **Figure 5, Question 1**. Within this category, the questions with the lowest average application rate were:

- Riparian Buffer strip clearly established (43% improperly applied)
- Minimum width >=100 ft (42% improperly applied)
- Skid trails located outside RMZ (37% improperly applied)
- Soil compaction and scarification avoided in RMZ (36% improperly applied).
- Vernal Pools/Woodland Ponds adequately protected and buffered (25% improperly applied)

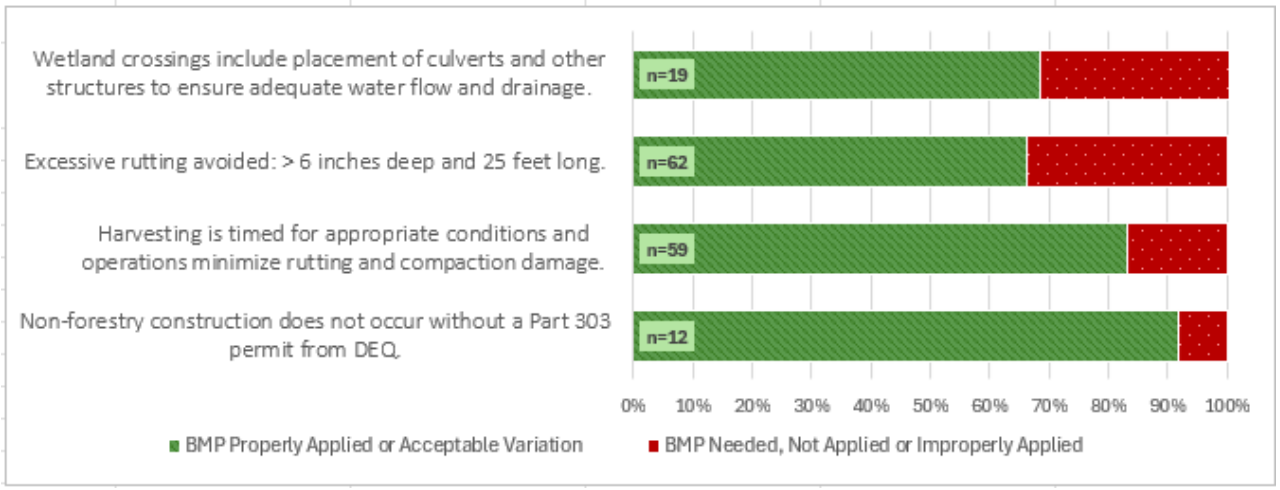


Figure 6. Question 1 - Percent Application of MI State BMPs in Wetlands for Forestry/Timber Operations (2013-2024)

Riparian Management Zone Post-Harvest BMP Results: The RMZ questions are closely linked, so missing one BMP often leads to others not being applied. Sites where RMZ boundaries were not clearly marked (either on the ground or on sale area maps) consistently had lower effectiveness ratings for related BMPs. Without clearly established buffer strips on the ground or on sale area maps, RMZs often failed to meet the required 100-foot width, leading to skid trails within the RMZ, soil compaction, exposed soil, and rutting.

Skid trails are prone to erosion, compaction, and rutting which can impair infiltration and riparian function. It is common practice for loggers to establish a skid trail along the unit boundaries as it improves boundary visibility and means loggers are less likely to accidentally cut a tree outside the unit boundary, which has legal ramifications (timber theft and breach of contract). Consequently, nearly all unit boundaries that are located within a riparian area will have a skid trail within the riparian zone. The resulting compaction, exposed soil, and rutting will therefore also be within the riparian area. Similar patterns of wetland damage and excessive rutting were observed along skid trails adjacent to unit boundaries that overlapped with lower-elevation hydric soils along the edge of the unit boundary.

Vernal Pools/Woodland Pond Post-Harvest BMP Results: Only four of the monitored units contained a vernal pool. Three of the four pools were found to be adequately protected. Although vernal pools are prevalent across the landscape, geospatial technology to detect them has only been available on the Hiawatha at a very limited spatial extent. New mapping technologies are actively being developed to identify these unique habitats and hydrologic features across the forest. The number of vernal pools included in future evaluations will likely increase as mapping capabilities improve. The same RMZ exclusion and no-harvest buffer that apply to streams, lakes, and open waterbodies should also apply to vernal pools and woodland ponds.

Wetland Post-Harvest BMP Results: For the wetland BMP evaluations, the only notable annual trends were observed in 2023 and 2024, which showed the lowest annual effectiveness ratings for wetland harvest (Figure 4. - Question 1). This rating was largely due to the high occurrence of excessive rutting (>6” deep and >25’ long) which resulted from inadequate snow depth and lack of frozen ground conditions during operations (Figure 6. - Question 1). Overall, excessive rutting occurred in 34% of units monitored throughout the monitoring period.

The wetland impacts from excessive rutting were largely observed on primary skid trails and on skid trails adjacent to unit boundaries that dropped into slightly lower elevation hydric soils along the edge of the unit. Purchasers almost always established skid trails immediately adjacent to the unit boundary for ease of boundary visibility during logging operations; therefore, the edges of units generally have more traffic and more disturbance than other locations within the unit. The pattern of warmer winters observed during the monitoring period has resulted in fewer frozen, “operable days”, with the reduction more pronounced on the west unit than on the east. Many adaptive management actions have already been implemented to address these documented issues.

One of the adaptive management actions implemented has been to exclude wetland inclusions from unit boundaries to facilitate “all-year operations” or “winter, dry summer” without causing irreversible damage to soils and wetlands. A challenge that remains is that wetland boundaries are not always clearcut. Different models (ELTP, SURGO, NHD, and NWI) often show slightly different boundaries, sometimes varying by a few hundred feet or less.

Due to the high occurrence of impacts from excessive rutting documented at unit boundaries and for other reasons discussed throughout, the west unit of the Hiawatha began using timber sale checklists

in 2019 that included GIS review, with field review by soils and hydrology personnel added in 2020/2021. Even with these added measures, the boundary between upland terrain and wetland or riparian ground is often indistinct and not always evident in the field. Several areas presumed to be upland during field reviews conducted in dry years exhibited strong wetland characteristics during wetter years. Consequently, unit boundary skid trail-related wetland damage unintentionally occurs within Payment Units designated "all-year" and "winter, dry summer" operating seasons. **It is recommended that a 30-ft buffer be applied to wetlands for harvest units intended for year-round operation and a 30-ft buffer be applied to organic wetlands (ELTP 80s) intended for all-year" and "winter, dry summer".**

Data management and Database Updates: Forest Plan **2500 Watershed management - Goal 4** states that riparian corridors are managed for riparian-dependent resources. This goal cannot be achieved if riparian corridors fall within the *suitable for timber production* classification. **To meet this goal the Forest should (1) remove riparian corridors from the timber suitability classification, and (2) begin updating stand boundaries with every timber sale.**

These actions would support riparian resource protection and streamline timber production processes by reducing the need for altered prescriptions in small land segments and reduce the additional workload put on prescription writers, sale administrators, marking/layout crews, and zone hydrologists to ensure BMPs and contract specifications are followed in the riparian areas.

If these management actions cannot be implemented and there remains a need to harvest timber within these areas, **RMZs and wetland boundaries must be shown on sale maps and marked on the ground.** This option would require the greatest level of effort and staffing capacity and has not been successfully implemented on the Hiawatha even during periods of higher staffing capacity.

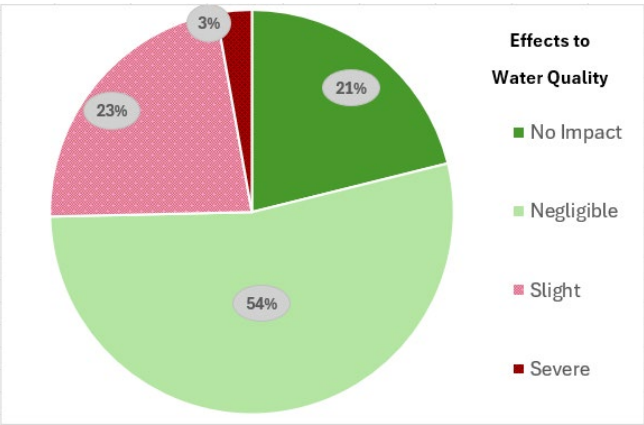


Figure 7. Question 1 - Impacts to Water Quality as rated through with State BMP evaluations 1-year post timber harvest 2013-2024 (n=71).

MI State BMP Field Rating Impacts to Water Quality: Proper application of BMPs is associated with water quality protection; however not all cases of missing or improperly applied BMOs resulted in documented impacts. Impacts are dependent on proximity of water bodies and other environmental factors. The monitoring survey captures an overall rating on the impact to water quality based on site observations for the individual timber harvest unit (severe, slight, negligible, or no impact). Within this monitoring period, approximately 26% of the surveys had impacts to water quality, with 23%

being slight impacts and only 3% of surveys documenting severe impacts to water quality (Figure 7. - Question 1).

What is the status and trend of the monitoring indicator in relation to the target? Overall, Hiawatha is on the lower end of BMP implementation and effectiveness ratings compared to regional and national levels. While targets are not set for implementation or effectiveness ratings, it could be interpreted that the Forest is within target for some resource areas or activities and outside the target for others. The wet nature of the Forest could help explain the higher occurrences of documented impacts. However, the results still suggest room for improvement through corrective or adaptive management actions, as outlined below. This indicates that there is meaningful opportunity for improvement.

Monitoring Discussion and Findings

We can reasonably conclude that the Hiawatha could improve overall effectiveness by ensuring that written BMPs such as methods of erosion control, stabilization measures, seasonal operating restrictions, and use-related limitations are incorporated into planning documents.

O&Ms Plans – Site BMPs Many of the evaluations on the Hiawatha did not have NEPA documentation (CEs or EAs) specifying BMPs for water resource protection because the activities fell under routine maintenance. This would be adequate if the forest had Operation and Maintenance (O&M) plans for routine maintenance activities; however, such O&M plans do not exist or are not required for most of the activities or resource areas evaluated including Recreation, Roads, Facilities (Special Uses), and Minerals (Gravel Pits). During field evaluations, the interdisciplinary teams largely attributed poor ratings to said resource area not having O&M plans (refer to Issues Reported, Corrective Actions, and Management Recommendations **Table 1 Question 1**, and **Table 72 Question 29**).

Developing resource-specific O&M plans could improve consistency in BMP implementation. Developing such plans requires time and substantial effort, therefore one option may be **the development of resource or activity specific "cheat sheets" that summarizes relevant BMPs to protect water and wetland resources**. These documents could be shared with field crews, project managers, and permit holders to support consistent implementation of soil and water protective practices.

Limitations to Use: The most common cause of resource damage identified by interdisciplinary teams during the evaluations was insufficient or lack of limitations on use. The most common occurrence was wetland damage and water resource impacts resulting from unauthorized ORV use on shorelines, utility corridors, skid trials, closed roads, and snow mobile trials.

Recreation: Widespread expansion of damage at recreation sites was observed across all types of recreation areas, including day use sites, dispersed recreation sites, campgrounds, and both motorized and nonmotorized trails. The resource damage took many forms. Common issues included:

- Erosion, sedimentation, and changes to shoreline and stream morphology caused by recreational foot traffic creating "social trails."
- ORVs driving on shorelines, beaches, through streams, and in wetlands.
- Soil compaction and vegetation damage (trampled vegetation, stunted growth, and broken limbs used for firewood) resulting from uncontrolled expansion of existing sites.
- Trash and human waste located within riparian areas.

Improved signage and informational materials (e.g., maps, permits) that clearly communicate limits to use may reduce resource impacts. Examples of such messages may include:

- Camping limited to 14 days
- No camping or fires permitted within 100 feet of shoreline or on the beach
- Please stay on designated trails
- Area closed to ORVs for habitat protection
- Include designated trails on campground maps.

In addition, i**ncreased use of physical barriers such wooden fences, bollards, or boulders at recreation sites** would also help dictate where foot traffic and ORVs are permitted to go.

Facilities/SUPs: Most of the facility protocols evaluated during the monitoring period pertained to Recreation Special Use Permits (cabin rentals, rec-residence) and Utility Corridor Operation and Maintenance. The issues related to **limitations on use** were like those identified above for recreation (erosion, compaction, social trials, ORV damage, rutting and soils compaction).

Evaluations frequently identified O&M plans that lacked provisions for water resource protection or were missing from permit files. Unauthorized ORV use within utility corridors corresponded with observed wetland disturbance, riparian impacts, and sediment deposition in streams. Comments from multiple BMP interdisciplinary team reviews indicated that staffing within Lands and Special Uses was insufficient to keep up with the high volume of permits requiring compliance oversight. Recommendations from these reviews included:

- Requiring O&M plans—including provisions to protect soil and water resources—as mandatory components of permit request packages. Denying incomplete permit applications that are missing O&M plans.
- Some interdisciplinary reviews identified the option of temporarily limiting acceptance of new SUP permits until staffing capacity increases.
- Maintain adequate staffing in lands and special uses would allow for increased permit compliance, and better address BMPs for implementation and monitoring of Facilities (SUPS).
- Provide short, one-page language for recurring types of permit documents to ensure soil and water protection requirements are consistently included. Examples may include:
    - Kayak and backpacking group sizes should be no larger than 8 people in size.
    - Limiting overnight trips to 14 days per group.
    - Inspections of utility corridors shall not permit the use of ORVs in wetlands.
    - Inspect physical conditions of corridor closures during routine corridor inspections.
    - The permittee is responsible for maintaining and repairing physical barriers when breaches occur.

Fire/Fuels: The fire BMP evaluations noted room for improvement by specifying BMPs for soil and water protections in the burn plan and specifically identifying BMPs in the “unique features” section in the burn plans. Fire evaluations identified opportunities to improve fire line construction techniques and rehabilitation. Evaluations that used dozers and blading have lower effectiveness rating than sites that utilized other methods of control such as roads or rivers and utilized non-mechanical techniques to create lines such as chainsaws, leaf blowers, wet lines, and drip torches.

Minimizing ground disturbance and the depth of the fire line may improve rates of revegetation and overall success of fire rehabilitation efforts.
Recommendations to reduce impacts during wildfire response included:

- Include BMPs in delegation of authority.
- Complete the Fire Management Plan for the Forest.
- Consider adapting Minimum Impact Suppression Tactics into SOPs.

Minerals: Gravel pits/NNIP Prevention: During the 10-year monitoring period, the Forest evaluated only one minerals BMP protocol at a gravel pit. The waterbody at this site was not natural; it had been artificially created through gravel extraction. However, the evaluation still yielded meaningful information and highlighted a critical management concern in need of improvement as the evaluation brought attention to the Forest Plan **2800 Minerals and Geology - Goal 4**. "*non-native and invasive species are controlled in gravel pits*" was not being met.

During the evaluation, the interdisciplinary team documented an infestation of 12 non-native and invasive plant (NNIP) species within the pit, including two aquatic invasive species. This finding is relevant because gravel from this pit is used regularly for road maintenance and creating potential pathways for NNIP spread. Monitoring indicates prevention is more effective than mitigation when addressing the spread of NNIP.

Following the BMP evaluation, the Forest contracted the treatment of all gravel pits (possibly only on the West Zone) for nonnative invasive species (NNIS). However, the contract was of short -duration, likely limited to a single treatment conducted during 2020, and was probably insufficient to deplete the seed bank or provide long-term prevention. The interdisciplinary team recommended establishing- annual inspections prior to use and annual NNIP treatments for all gravel on the Forest, with the understanding that treatments may need to occur multiple times within a growing season.

It is unclear whether gravel pit inspections and NNIP treatments have occurred at a frequency sufficient to limit spread.

Chemical Uses: The chemical evaluations included *Phragmites* treatment along two great lakes shorelines and in wetlands along a utility corridor. The documented reason for the low implementation ratings for all three treatments is that the Forest Wide Non-Native Invasive Plants (NNIP) EA did not include specified provisions to protect water, aquatic, and riparian resources. The NEPA did state several times to follow the *Michigan Forestry Best Management Practices for Soil and Water Quality*, however this document pertains to forest activities such as timber and forest road management and it does not include any provisions to protect water, aquatic, and riparian resources as it pertains to treating nonnative invasive species or chemical applications in or near water and riparian areas. The majority of BMPs evaluated were indirectly specified in the manufacturer's label requirements for handling, applying, storing, or transporting pesticides.

Per the EA, the botany program should inform resource specialists annually of their annual program of work for NNIP treatments. Sites-specific provisions to protect water, aquatic, and riparian resources from the National BMP Manual could be developed and shared at that time.

The Great Lakes Forest is Wet: Given the vast amount of water resources needing protection on the Forest, cross-program training and interdisciplinary coordination are critical. Improved communication may provide a straightforward way to enhance both implementation and effectiveness. The BMP monitoring teams on the Hiawatha have generated many actionable

corrective and management recommendations (**Table 1. Question 1 and Table 72. Question 29**) that can improve outcomes of outyear BMP evaluations and the overall condition of water resources on the forest. The Hiawatha Watershed Program has produced the Forest's first biannual BMP report (2023–2024), as well as the first 10-year summary through this M&E report. These reports provide a mechanism for summarizing findings and conveying adaptive management recommendations that inform leadership and improve cross-program communication among resource specialists, project managers, and program areas. **The recommendation is to continue to prioritize interdisciplinary involvement for national BMP monitoring targets and to prioritize biannual, five-year, and ten-year M&E reports at the forest level.**

Adaptive Management Considerations

The Forest Plan monitoring program is meant to "enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed" (36 CFR 219.12).

The following adaptive management recommendations were identified by Interdisciplinary BMP teams. It should be noted that some recommended adaptive management improvements have already been initiated because of interdisciplinary contributions made during the Road BMP evaluations.

Recreation:

- **Limiting certain types of use may reduce documented resource impacts.**
- Resource damage can be avoided or reduced by improving signage and informational materials (e.g., maps, permits) that clearly communicate limits to use, such as:
    - camping limited to 14 days.
    - no camping or fires permitted within 100 feet of shoreline (or on the beach).
    - please stay on designated trails.
    - area closed to ORVs for habitat protection.
    - include designated trails on campground maps.
- Physical barriers can provide defined access points for foot traffic and ORVs.
- Recreation and Trail Crews are recommended to keep a supply of annual oats or rye for prompt stabilization of disturbed soils.

Minerals: Gravel pits/NNIP Prevention (Minerals BMPs):

- A**ll gravel pits should be inspected and treated for NNIP and AIS prior to use**, and/or annually, to prevent the spread of seed through timber road improvements and annual road maintenance activities. This is supported by FP Goal FP 2800 Minerals and Geology 4. "*non-native and invasive species are controlled in gravel pits*".

Facilities/SUP:

- Requiring O&M plans—including provisions to protect soil and water resources—as a mandatory component of permit request packages. Deny incomplete permit applications that are missing O&M plans.
- Some interdisciplinary reviews identified the option of temporarily limiting acceptance of new SUP permits until staffing capacity increases. Maintaining adequate staffing in lands and

special uses would allow for increased permit compliance, and better address BMPs for implementation and monitoring of Facilities (SUPS).
- Physical barriers and closures are needed on most utility corridors to limit wetland and riparian damage resulting from unauthorized ORV use within the corridors.

Fire/Fuels (Prescribed and Wild):
- Limit the use of dozers and blading in fire line construction.
- Utilize non-mechanical techniques to create control lines such as chainsaws, leaf blowers, wet lines, and drip torches whenever feasible.
- Minimizing ground disturbance and the depth of the fire line to improve rates of revegetation and overall success of fire line rehabilitation efforts.
- Seeding or hand placement of dead and down woody material should occur on dozer lines with bare soil.
- Wildfire - Include BMPs in delegation of authority, Complete the Fire Management Plan for the Forest. Consider adapting Minimum Impact Suppression Tactics into SOPs.

Vegetation (Timber and Reforestation) Management:
- Riparian Management Zones (RMZs) are recommended for exclusion from timber harvest units and removal from timber suitability for better alignment with Forest Plan 2500 Watershed Management - Goal 4. The goal is to manage riparian corridors for riparian-dependent resources.
- Vernal pools should have the same no harvest RMZ exclusion as above.
- A minimum 30ft buffer should be applied to wetlands within harvest units intended for year-round operation.
- A minimum 30ft buffer should also be applied to organic wetlands (ELTP 80s, poorly drained hydric soils) for harvest units intended for winter–summer operations.
- Corrective Management Action: The spatial extent of **RMZs and wetlands MUST be depicted on sale area maps and marked on the ground if not excluded from the harvest units.** NOTE: *This option requires substantial effort and staffing capacity.*
- Current checklist reviews are occurring primarily with hydrology staff. Soil staff should also be involved in field interpretation of wetland boundaries to better confirm wetland extent.
- Corrective Vegetation Management Action: Data clean up.
    - Remove riparian areas, and other landforms that would result in irreversible damage if harvested, from the timber suitability dataset.
    - Require more frequent updates to adjust and correct stand boundaries as mapping technologies improve and discrepancies are encountered.

O&M Plans and/or Written BMPs Plans:
- A written, site-specific project plan that summarizes all relevant BMPs should be completed for every project, even those implemented internally, to ensure that BMPs and design criteria are identified before work begins.
- Resource areas most in need of written BMP Plans include Recreation, Fire/Fuels, Special Use Permits (including Utility Corridors), Chemical uses, and Roads/Transportation.

- In the absence of an O&M Road Plan, a written BMP Plan can serve as a quick reference for erosion control, seeding, and stabilization measures.
- These plans should be customized by resource area or common activity types and shared with field crews, C&M crews, project managers, and permit holders to support reliable application of soil and water protective practices.
- A potential corrective action is the development of resource-specific O&M plans.

Limiting ORV Damage:

- Unauthorized ORV use has been associated with wetland, shoreline, and stream impacts in multiple program areas.
- Areas needing corrective actions to help limit unauthorized ORV activities include Recreation, Trails, SUP/utility corridors, Fire/Fuels, Roads/Transportation, Vegetation Management (skid trails).
- Use of robust, effective barriers such as wooden fences, bollards, boulders, vegetation transplants, hand placement of dead and down woody materials, and gates are recommended.
- Earth berms should be reinforced with vegetation transplants, stumps or slash to prevent rapid deterioration.
- Closures should be in a location where natural features or existing vegetation prevent vehicle traffic from going around the barrier.

Chemical Uses:

- Using an Errata, correct the NNIP EA reference in the design criteria from the State of Michigan BMPs to the National Core BMPs.
- Per the NNIP EA, the botany program should inform resource specialists annually of their annual program of work for NNIP treatments. Site-specific provisions to protect water, aquatic, and riparian resources from the National BMP Manual could be developed and shared at that time.

Region 9 Adaptive Management Recommendations applicable to the Hiawatha National Forest:

- Improve understanding of results at the Unit level to drive continuous BMP improvement.
- Ensure that BMP evaluations are a multi-disciplinary effort to engage all affected programs in the process, increase understanding of BMPs, and develop feasible follow-up actions.
- Identify road and recreation site BMPs applicable to construction, operation, and maintenance phases. Strengthen cross-program work to train staff, partners, volunteers, and contractors in these practices, particularly as new people engage in this work.
    - *Recommended action*: develop customizable BMP checklists and training materials for activities/protocols with the most frequent concerns.
- Increase frequency and effectiveness of maintenance on roads, trails, and recreation sites to address frequently observed BMP effectiveness issues.
- Maintain adequate staffing in soil and hydrology disciplines to ensure all phases of BMP implementation and monitoring are adequately addressed.

Monitoring Question 2. To what extent are we moving watersheds and riparian corridors toward the desired condition?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
Annually	2024	2 Years (Indicators i, ii & iv)	2019	**Yes**
Annually	2024	2-6 Years (Indicators iii, v & vi)	Have not yet been reported	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) Miles of roads and trail decommissioned (obliterated) for improved riparian and watershed condition	2500 Watershed Management, page 2-13, Objective 1. 2500 Riparian Management Standard 1
(ii) Stream crossing, aquatic organism passage improvements, and crossing removals	2500 Watershed Management, page 2-13, Objective 2. 2500 Riparian Management Standard 1
(iii) Acres of non-native invasive species treated in riparian areas and wetlands.	2500 Watershed Management, page 2-13, Objective 6.
(iv) Acres of riparian vegetation improvements	2500 Watershed Management, page 2-13, Objective 7. 2500 Riparian Management Standard 1
(v) Watershed Condition Class Score (25 indicators)	2500 Watershed Management, page 2-13, Objective 4.
(vi) Percentage of fifth level watersheds with improved condition classes.	#52011 Watershed Condition Class Framework assessment of 6th level watersheds.
Who Collected this data?	Watershed, Fisheries, and Botany Programs
Who is responsible for analyzing the question?	Lindsey Goss, Forest Watershed Program Manager Justin Bournoville, Forest Botanist

New Science or Other Information

The Watershed Condition Framework established in 2010 provides a consistent, comparable, and credible process for improving the health of watersheds on National Forests and grasslands. This framework supports planning and prioritization of watershed restoration activities under the Forest Service's national framework.

The tabular data in this section is consistent with National Accomplishment reporting and was modified to include standardized metrics as summarized in National GPAS (geo-enabled Performance Accountability System) reports derived from national databases (Natural Resource Manager [NRM], Infrastructure [INFRA], Watershed Improvement Tracker [WIT], Threatened, Endangered, and Sensitive Plants - Invasive Species Forest Service Activity Tracking System[*TESP-IS FACTS], and* Watershed Condition Assessment and Tracking Tool [*WCATT]).*

Monitoring Results

Watershed conditions were assessed using methods outlined in the Watershed Condition Class (WCC) framework. Data was derived from the NRM WCATT National Database and covers the period 2010 through 2024. Accomplishment-based datasets were generated through National GPAS reports and include annual summaries for the five-year period, 2020–2024.

Data

Watershed Condition Classification

FP 2500 Watershed Objective 4 states during the planning period, assess conditions and identify improvement opportunities in all Forest sixth level watersheds (HUC 12).

Timeline of WCC on the Hiawatha - Watershed Condition Classification assessments

2011 - 79 sixth-level watersheds were assessed by interdisciplinary teams using existing datasets and corporate knowledge. Documentation was limited on how many values were derived (e.g., aquatic habitat). Some values and watershed ratings appear erroneous (e.g., open road density, NNIP). Two Watershed Restoration Action Plans were developed identifying "essential projects" improvement opportunities for two Priority watersheds on the forest.

2016 - Reassessed watersheds with changes in 303(d) impaired water listings. No other significant changes were observed on the Forest warranting reassessment.

2021 - Reassessed watershed condition ratings for all watersheds on the Hiawatha. Values (e.g. open road density, erosion, aquatic habitat) were not actually re-calculated therefore utilizing some of the same erroneous datasets from 2011.

2023 - Moved one priority watershed, Little Black Creek Sturgeon River, into an improved condition.

2024 - An interdisciplinary team conducted a pilot reassessment of the Taylor Creek Watershed using new WCC 2.0 methodologies. The ID Team developed the Taylor Creek Watershed Restoration Action Plan, including Essential Projects intended to improve conditions.

2026 - A mandatory WCC 2.0 reassessment was assigned to all National Forests but later changed to optional. The Hiawatha did not participate in the optional reassessment.

Table 3. Question 2 - Hiawatha Priority Watersheds, timelines and link to Watershed Restoration Action Plans.

A priority watershed is moved to an improved condition, following the completion of all Essential Projects identified within a Watershed Restoration Action Plan.

Priority Watershed	Year WRAP Established	Year Condition Improved	Link to WRAP or Summary
Little Black Creek Sturgeon River HUC: 040301120205	2011	2023 (improved)	LittleBlackCreek-SturgeonRiver.pdf WRAP040301120205.PDF
Eighteen-mile Creek HUC: 040301120204	2011	2026 (planned)	WRAP040301120204.PDF
Au Train River HUC: 40202010112	2023	2030 (planned)	Au Train River Priority Watershed WRAP 2023 Signed.pdf
Taylor Creek HUC: 040700020104	2024	2031 (planned)	Taylor Creek WRAP Signed 2024.pdf

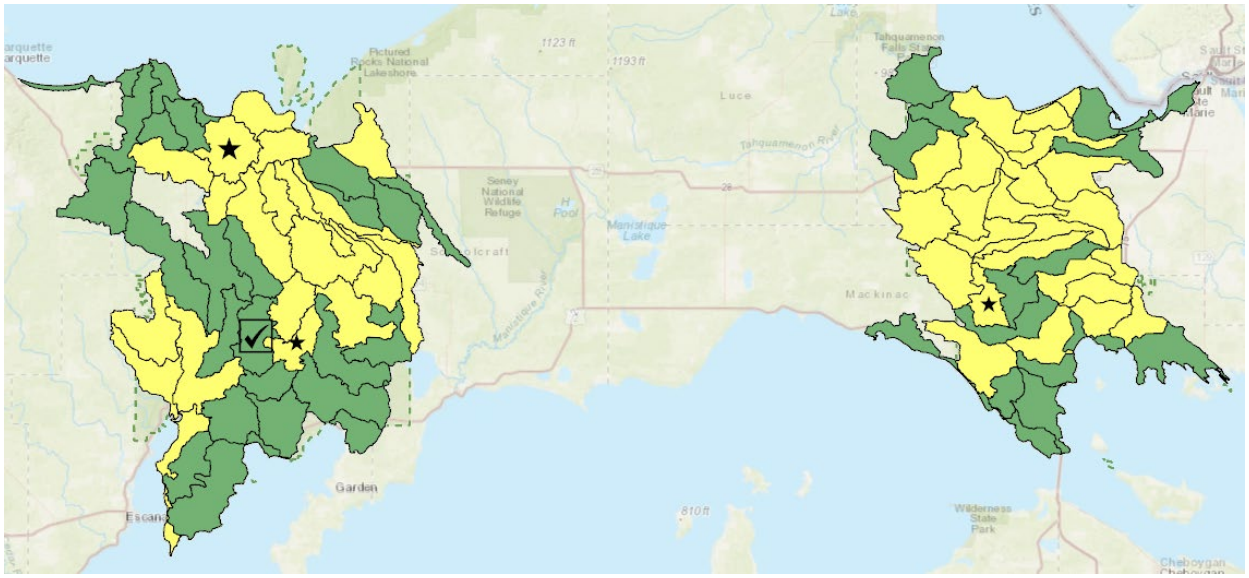


Figure 8. Question 2 - Map of Watershed Condition Class. The included Hiawatha 79 watersheds meeting the criteria for the WCC framework.

Data source:
https://usfs.maps.arcgis.com/apps/MapSeries/index.html?appid=f4332e5b80c44874952b57e1db0b4407

As of 2024, watershed conditions on the Hiawatha National Forest were classified as follows:

- Condition Class I (Functioning Properly – Green): 36 watersheds (approximately 46%)
- Condition Class II (Functioning at Risk – Yellow): 43 watersheds (approximately 54%)
- Condition Class III (Impaired Function): 0 watersheds

Two primary indicators negatively influencing watershed condition ratings on the forest—and which can be improved through targeted land management actions—include

- Aquatic Connectivity
- Open Road and Motorized Trail Density

Aquatic Connectivity: Stream crossing inventories, as of 2024, documented a total of 184 aquatic barriers at all or most stream flow conditions (e.g. perched and undersized culverts), and an additional 45 aquatic barriers at low-flow conditions (e.g. no thalweg sand bed box culvert). Stream crossing inventories are ongoing, continuing through 2027. Subsequent inventories identified additional aquatic barriers beyond those documented in 2024.

Open Road and Motorized Trail Density: A standardized indicator for assessing impacts to hydrology and sediment regimes within the Watershed Condition Classification (WCC) Framework. The rating rule set specifies sixth level watersheds with <1 mi/mi^2 density are rated as “Good- Functioning Properly”, 1.0-2.4 mi/mi^2 as “Fair – Functioning at Risk”, and >2.4 mi/mi^2 as “Poor – Impaired Function”.

Table 4. Question 2 - Count of sixth level watersheds binned by conditions class rating based on open road (maintenance level 2-5) and motorized trail densities.

Cumulative percentage of watersheds by condition class density thresholds.

Open Road/Trail Density Condition Class Thresholds	Open Road (Count of Watersheds)	Motorized Trails (Count of Watersheds)	Cumulative count watersheds within thresholds.	Cumulative percent watersheds within thresholds
Good - Functioning Properly (<1 mi/mi^2)	8	79	6	**8%**
Fair - Functioning at Risk (1 to 2.4 mi/ mi^2)	46	0	40	**51%**
Poor - Impaired Function (>2.4 mi/mi^2)	25	0	33	**42%**

A total of 33 watersheds exceed the impaired function threshold of 2.4 mi/mi^2 for open road and motorized trail density, and 40 watersheds fall within the at-risk range. Although this analysis is cumulative, the high density of open roads—defined as Maintenance Levels 2 through 5—is the primary driver of risk and impaired function. Currently, only 8% of watersheds on the forest have open road and motorized trail densities within the "Good" threshold (less than 1.0 mi/mi^2), indicating properly functioning conditions.

Table 5. Question 2 – Objective and accomplished watershed management monitoring indictors (revised).

Indicator	2020	2021	2022	2023	2024	Total
i. Miles of roads decommissioned for improved riparian and watershed condition (2020 & 2021 INFRA Roads, 2022-2024 WIT) **Objective**: 20 segments/5 miles per year	8.3	7.8	5.87	3.8*	8.6*	34.38
ii. Stream crossings and aquatic organism passage improvements, barrier removals and crossing removals (INRFA and WIT) **Objective:** 2 per year, and as needed	2	1	2	8	5*	23
iii. Acres of non-native invasive species treatments in riparian areas and wetlands (NRM TESP-IS and FACTS) **Objective:** 10-acres per year.	37	70	85	20	20	232
iv. Acres of riparian vegetation planting (WIT) **Objective:** 100-acre per year	0	37	5	40	31	112

***Internal records used due to accomplishment gaps in the NRM INFRA database and annual GPAS reports.

What level of confidence is there in the accuracy and precision?

Spatial Model Uncertainty: There will always be a degree of uncertainty in calculations related to wetlands and riparian areas, as all spatial datasets are derived from models of conditions. The relatively flat topography of the forest makes accurate modeling particularly challenging. To address these limitations, new models are actively being developed that incorporate LiDAR technologies for improved hydrologic feature mapping across the forest. These advancements are expected to enhance accuracy and reduce uncertainty in future assessments.

Road and Trail Mapping errors: Calculations involving roads and trails also carry uncertainty. Many roads on the forest are either unmapped or incorrectly mapped. Best Management Practice (BMP) inventories have identified numerous roads classified as closed (Operation Maintenance Level 1) that lack physical barriers and are, in fact, open to motorized vehicles. Mapping limitations may result in higher actual open road and trail densities than currently reported.

INFRA Accomplishment Omissions: During the development of this report, multiple years of data gaps were identified, primarily related to transportation system accomplishments not being fully entered into the NRM INFRA Transportation national reporting database. When omissions were detected, summaries were created using internal records to ensure completeness.

Monitoring Discussion and Findings

Watershed Condition Classification

FP 2500 Watershed Objective 4 In this planning period, the objective was to assess conditions and identify improvement opportunities in all Forest sixth level watersheds. This objective was achieved in 2011; however, some values used to develop the original scores are known to be erroneous. Since then, new guidance and datasets have been developed at the national level to improve confidence in watershed scores. A national re-evaluation using the updated WCC 2.0 methodology was planned for 2026 but has been paused. It is recommended that all new Priority Watersheds be reassessed using the updated WCC 2.0 rules prior to, or in conjunction with, Watershed Restoration Action Plan development.

FP 2500 Watershed- Objective 5 Hiawatha has a total of 79 watersheds that contain at least 5 percent of National Forest System lands classified under the Watershed Condition Framework. The objective to improve the conditions of 10% of the watersheds, equates to 8 watersheds moved to improved conditions. During the planning period, the forest improved the condition of one watershed, meaning the stated objective was not met. The objective could be revised to be more in line with national recommendation of improving conditions in two watersheds and developing two new Watershed Restoration Action Plans every five to ten years. The Hiawatha would still be slightly behind the objective; however, the adjustment would make targets more aligned with national guidance and operational capacity.

Recommendations

Objective 5 could reference the Watershed Condition Framework guidance for establishing watershed improvements

Road Decommission & Obliteration Improvements **FP2500 Watershed Objective 1** In this planning period, obliterate, relocate or improve 20 segments of roads and trails in riparian corridors. FP**7700 Transportation Road Closure/Decommission Objective 2** is decommission 5 miles of road per year.

On average the Hiawatha has exceeded the 5-mile annual transportation objective. While neither NRM Database readily quantifies miles or segments within riparian corridors, available records indicate many decommissioned roads occurred in riparian or wetland areas, suggesting the segment objective was likely met.

Despite these accomplishments, cumulative milage and open road densities still exceed national thresholds for healthy functioning watersheds (Table 4 Question 2) and some management areas exceed Forest Plan Road densities (FP Table 7700-1, MA 8.3). High road densities will continue to be a

major driver toward "at risk" and "impaired" watershed conditions. The Forest continues to reduce road densities specifically targeting roads with stream crossings, and/or located in riparian and wetlands, or in watersheds exceeding impaired open road thresholds of 2.4 miles per square mile open road thresholds. Road decommissioning projects that include culvert removals also serve as a multitube of benefits to watershed conditions and aquatic connectivity.

Recommendations
Continue to reduce system road densities specifically targeting road decommission projects with stream crossings, and/or located in riparian and wetlands, or in watersheds exceeding impaired open road thresholds of 2.4 miles per square mile open road thresholds.

Stream Crossings and Culverts

The Forest, on average, exceeded **FP 7700 Transportation Objective 3** to replace two major cultures annually. However, these improvements address only a small fraction of the documented 184 barriers to aquatic organism passage and do not approach the improvements necessary to meet the intent of **FP 2500 Watershed Objective 2**, to improve crossings as needed to facilitate flow, sediment transport and/or passage of aquatic species.

There are several factors why the forest cannot meet this objective, including capacity and cost. During the planning period the forest has taken steps to improve efficiency including:

- Developed a Forest-Wide Stream Crossing Categorical Exclusion (CE)
- Increased use of partnership agreements for design, contract oversight, and construction

FP2500 Riparian Standard 1 states roads or trail crossings will preserve wetland cross drainage, however roads in riparian areas typically alter infiltration and groundwater/surface water flow patterns. Costly and time-consuming techniques such as using concepts of stream simulation design, and proper cross drain culvert spacing and embedded depth can mitigate some of the hydrology and sedimentation issues. However, no road construction technique can truly preserve natural subsurface flow patterns in wetland and riparian ecosystems.

Recommendations
Continue road decommissioning in riparian and wetland areas, and restrict any new forest system road construction in riparian areas and wetlands.

Riparian Vegetation Improvements
2500 Watershed Management, Objective 7 the objective of 100-acres of riparian vegetation improvements per year was not met during the planning period. The forest had many small, time-intensive and site-specific riparian improvements (<1 acre per site) including willow, dog wood, sedges, grasses, and herbaceous plantings for improved function. However, most of the riparian improvements accomplished during the planning period were achieved by planting white pine and other conifers along riparian corridors and on decommissioned riparian roads. The white pine and conifer species historically dominated the riparian ecosystems.

While planting these saplings provides annual acreage of improvement, benefits to aquatic habitat and riparian ecosystems will not be observed until the riparian trees reach maturity and have adequate canopy size to shade streams and promote a long-term sustainable supply of woody material to streams and riparian ecosystems. **As** discussed in greater detail in question 1 and 4, a more effective way to enhance and improve riparian ecosystem's function is through passive

techniques which focus on protecting existing and riparian vegetation. This can be achieved through the establishment of a 100-foot no-cut riparian buffer and limiting disturbances, such as road construction, within riparian areas.

FP2500 Watershed Goal 4. Riparian corridors are managed for riparian-dependent resources by restoring and enhancing the riparian ecological function. However, many of the riparian corridors fall within the timber suitability classification, therefore those riparian areas have traditionally been managed for timber resources, creating conflicts with this goal.

Recommendations
Forest Plan Watershed Management objectives are recommended for an update to:
- Establish a 100-foot no-timber harvest buffer along streams and waterbodies.
- Remove riparian buffers from the suitable timber classification.

Non-native invasive species treatments
2500 Watershed Management, page 2-14, Objective 6 is to treat 10 acres of non-native invasive species in riparian areas per year. This number was derived during an era when NNIS were not as prevalent on the landscape. The Hiawatha exceeds the 10-acre objective annually. Despite treatment levels exceeding the 10-acre objective, NNIS remains widespread in riparian ecosystems. Increasing recreational use of personal kayaks and ORVs are a major source of NNIS within the riparian ecosystems Outreach and education can support efforts to reduce NNIS spread. Continue partnership investments investing in outreach and education and invest in NNIP treatments.

Recommendations
Continue partnership investments, continue NNIS treatments in riparian and wetland ecosystems, and increase outreach and education to reduce spread.

Adaptive Management Considerations
The forest plan monitoring program is meant to "enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed" (36 CFR 219.12). The proceeding bullets include adaptive management recommendations; rational for each **recommendation** is described in the preceding **Discussion and Findings**

- Prioritize road decommissioning in watersheds exceeding the impaired threshold (2.4 mi/mi^2) or containing stream crossings
- Increase use of partnership agreements for design contract oversight, and construction of aquatic organism passage and stream crossing improvements.
- Continue road decommissioning in riparian and wetland area.
- Limit new forest system road construction in riparian and wetland areas unless required for resource protection or access needs
- Update Forest Plan Watershed Management objectives to establish a 100-foot no-timber harvest buffer along streams and waterbodies.
- Remove riparian buffers from the suitable timber classification
- Continue increasing NNIS treatments in riparian and wetland ecosystems
- Expand outreach and education efforts aimed at reducing NNIS spread."
- Improve and prioritize accomplishment reporting and database management (NRM)

Table 6. Question 2 **-** Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan	X		
Management activities	X		
Plan monitoring program	X		

Table 7. Question 2 - Monitoring indicator status summary

Evaluation Report Year	Result*	Recommendation(s) (if applicable)	Recommendation Status
2024	**2** and 4	Add "watersheds and..." to the monitoring question to better align with the drivers. Edit indicators (i) and (ii) to match standard reporting metrics for the objectives. Remove Aquatic Ecosystems drivers and add 2500 Riparian Management Standard 1 to indicators (i) and (ii).	Indicators were edited for the 2020-2024 M&E Report.

***Result: 1)** Interval of data collection beyond this reporting cycle (*indicate date of next time this monitoring item will be evaluated*); **2)** Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired**; 3)** More time/data are needed to understand status or progress of the Plan Component(s)**; 4**) Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired**; 5)** Methods inadequate to answer monitoring question.

Monitoring Element 2 – Status of select ecological conditions

Monitoring Question 4. To what extent are ecologically healthy and productive aquatic ecosystems being restored?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
Annually	2024	2 Years	Stricken from previous reports	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) Miles of riparian and in-channel stream habitat restored or enhanced.	2600 Wildlife Management, page 2-16, Objectives 1-3 2500 Watershed Management, Desired Condition, see Forest Plan page 2-13
(ii) Number of lakes restored or enhanced during the planning period	2600 Wildlife Management, page 2-16, Objective 2.
(iii) Number and location of wetlands with aquatic invasive species present or absent ***(remove 2025)***	2500 Aquatic Ecosystem Management, page 2-14, Standards and Guidelines
(iv) Acres treated to control aquatic invasive species	2500 Soil Resources Management, page 2-15, Objectives 1-3
(v) Number of educational contacts related to aquatic invasive species	
(vi) Acres of soil hydrologic function impaired by past management activities ***(moved to Question #33)***	3400 Forest Pest Management, page 2-22, Goal 4
(vii) Trends in desired native fish population ***(stricken 2025)***	2600 Wildlife, Fish and Sensitive Plant Habitat Management, page 2-16, Goals 3, 5 and 6, and Objectives 1, 2, and 3
Who Collected this data?	Watershed, Fisheries, Soils, and Botany Programs
Who is responsible for analyzing the queston?	Lucas Langstaff, Forest Fisheries Biologist Lindsey Goss, Forest Watershed Program Manager Justin Bournoville, Forest Botanist Ryan Bevernitz, Forest Soil Scientist

New Science or Other Information

A time span of 10 to 20 years with at least 3 monitoring events would be required to determine trends in desired fish populations with any statistical confidence, therefore Question 4, Indicator (vii) is outside the five-year timeframe for this report and was therefore omitted.

Monitoring Results

The data populated in this section was generated through National GPAS reports and include annual summaries for the five-year period, 2020–2024. Local Cooperative Invasive Species Management Areas (CISMA) partners provided metrics pertaining to user outreach.

Data

Table 8. Question 4 – Monitoring Indicator summarized by year

Indicator	2020	2021	2022	2023	2024	Total
i. Miles of stream habitat restored or enhanced (WIT) ***Objective:*** *9 to 13 miles Per year*	4.8	6.1	12.2	4.1	8.9	36.4
ii. Number of lakes restored or enhanced during the planning period. ***Objective:*** *3 to 5 per year*	3	1	1	1	1	7
iv. Acres treated to control aquatic invasive "vegetative" species (NRM TESP-IS)	0.7	0.3	0.1	7.4	*7.4*	15.9
v. Number of impressions made through aquatic invasive species education and outreach (CISMA Partners)	4,000	7,500	5,900	23,000	6,649	47,049

What is the status and trend of the monitoring indicator in relation to the target?

Table 9. Question 4 **-** Summary of monitoring evaluation trends for all indicators

Current Status	Trend Towards Target	Trend Away from Target
Within target	2	0
Outside target	0	2

What level of confidence is there in the accuracy and precision? The results in this section have the same uncertainty as discussed in Question 2, pertaining to spatial model uncertainty, road and trail , mapping errors, and INFRA accomplishment omissions.

Monitoring Discussion and Findings

2600 Wildlife, Fish and Sensitive Plant Habitat Management, Objective 1 is to restore or enhance 9 to 13 miles of riparian and in-channel stream habitat annually, with 7 to 11 miles focused on cold-water and cool-water habitats. During the five-year planning period, the Hiawatha achieved this objective only once—in 2022. This occurred during the timeframe in which restoration methods were being updated and staffing levels varied. At the time the Forest Plan was developed, this objective was met using older, short-term, "cookie-cutter" artificial habitat techniques that required annual construction and maintenance, such as log bank covers, sediment basin construction, K-dams, and spawning gravel placement. Recent scientific research has shown that more natural, passive

techniques—or more technical approaches with long-term benefits—are more effective for protecting and restoring riparian and stream habitats.

One of the most effective ways to enhance riparian and aquatic ecosystems is through passive techniques that protect riparian vegetation and promote natural geomorphic processes by encouraging the long-term recruitment of large woody material. This can be achieved by establishing a 100-foot no-cut riparian buffer. Traditionally, trees within riparian areas have been actively managed to reduce competition and improve stand vigor. In contrast, passive restoration management allows competition and promotes the natural decadence of older overstory vegetation, creating a sustainable source of large woody material. These materials naturally form scour pools, provide protective cover, increase habitat complexity, and promote channel sinuosity. An abundance of woody material within channels and associated floodplains also helps dissipate energy during high-flow events while capturing sediment and nutrients improving the riparian ecosystem health.

Many large streams were significantly altered by historic land management practices, such as logging splash dams, channel straightening, and the construction of major roads that restrict lateral stream migration. Restoring these larger river habitats is complex and often requires more intensive active restoration approaches, such as road relocations and mechanical installation of tree groupings and deflecting log jams, to rewild rivers and restore healthy ecosystems for the long-term Congressional designations and overlapping jurisdictions influence the scope and timing of restoration activities. Staffing levels affect the scale and pace at which large river restoration projects can be undertaken.

Most stream miles improved were accomplished through barrier removals during road decommissioning projects and through aquatic organism passage (AOP) improvement projects implemented via partnership agreements with county road commissions, nonprofit organizations, and in-house by the Forest Service Construction and Maintenance crew. While these AOP projects improve aquatic connectivity (as discussed in Question 2), some projects did not incorporate stream simulation design concepts. Stream simulation is time-consuming and technically complex, but it is an attainable approach for achieving stream habitat restoration objectives while aligning with timber management and transportation management objectives.

Recommendations
The establishment of a 100-foot no-timber-harvest buffer should be established along riparian corridors for streams and lakes to support passive restoration Processes. Focusing efforts to Integrate stream simulation design into timber haul route and road improvement projects may be an attainable approach for achieving stream habitat restoration objectives while aligning with timber management and transportation management objectives.

2600 Wildlife, Fish and Sensitive Plant Habitat Management, Objective 2 is to annually restore or enhance conditions for warmwater fish communities in 3 to 5 lakes. The Forest has consistently failed to meet this objective throughout the planning period. Inland lake large woody material projects, including log cribs and tree drops, have been the primary mechanism for working toward this goal. Similar to stream ecosystems, many lake habitats have been depleted of natural wood recruitment due to a combination of historic land management practices (e.g., logging) and physical removal for recreational purposes (e.g., boating, swimming). Large wood plays a critical role in the food web structure of lentic aquatic ecosystems.

These projects have been successful at securing external grant support. However, project completion rates were influenced by staffing levels, The Forest has only been able to focus on completing one to two inland lake large woody material projects per year, which have relied heavily on multidisciplinary program staff support. Workload distribution and staffing availability affected project capacity during the period.

Recommendations
The Forest should continue striving to meet this target but may need to rely more heavily on partner support to help restore inland lake warmwater fish community food webs. Passive techniques, such as no-harvest buffer zones, will also facilitate natural processes of wood recruitment into lentic ecosystems.

2600 Wildlife, Fish and Sensitive Plant Habitat Management, Objective 3 is to annually conduct fishery resource inventories on 7 to 10 lakes and 5 to 8 streams to assess habitat capability and fish populations in meeting public needs. On average, the fisheries program—along with state and tribal partners—surveys fewer lakes and streams per year than the objective requires, with survey numbers varying based on available staff and partner contribution. If data were collected as outlined in the objective, it could be used to identify statistically significant ***Trends in desired native fish populations (****Question 4 Monitoring Indicator ivv).*

Recommendations
Continue coordinating with MDNR for fisheries resource inventories and further prioritize lakes and streams. The Forest may want to broaden the scope of this objective to include aquatic surveys and habitat condition assessments for a wider range of native aquatic species important to ecosystem health or species at risk of habitat degradation (e.g., mussels, macroinvertebrates), rather than focusing solely on fish populations desired for public recreation.

2500 Watershed Management, Objective 6 (2-14): There is not a specific target for Monitoring Question 4 indicator (iv) Acres treated to control aquatic invasive species (AIS). However, given the similarity between monitoring question 4 indicator (iv) and monitoring question 2 indicator (iii), a 10-acre per objective is being used. Priority AIS targeted for treatment during the 2020-2024 monitoring period were primarily purple loosestrife (*Lythrum salicaria*) and non-native common reed (*Phragmites australis*) but also included early detection and rapid response efforts of recently documented common frogbit (*Hydrocharis morsus-ranae*) infestations. Most AIS treatments accomplished during the 2020-2024 monitoring period were implemented through partners. **Annual treatment acreage did not reach the referenced benchmark; treatment levels increased in later years. Future treatments are expected to prioritize species based on resource availability.** The definition of Aquatic invasive species includes both flora and fauna. The Hiawatha only treats plant AIS. The forest does not maintain any records of non-botanical AIS such as spiny water fleas, zebra or quagga mussels. Sea lamprey are the only known non-plant AIS to be treated within the Forest boundary, and that is conducted by the US Fish and Wildlife Service – Sea Lamprey Control.

Recommendations
Continue investing in partnerships that implement NNIS control in aquatic ecosystems.

3400 Forest Pest Management, Goal 4 (2-22): Educational materials about controlling and/or reducing the spread of non-native invasive species are developed and distributed at appropriate locations including boat launches, trailheads, etc. There is not a specific target for monitoring question 4 indicator (v) Number of educational contacts related to aquatic invasive species. Outreach

and educational efforts were conducted through Cooperative Invasives Species Management Area (CISMA) partners during the 2020-2024 monitoring period that contribute to the Forest Plan goal. Outreach and educational efforts include both passive impressions made through media, such as social media posts, radio or TV spots, or printed materials, and active impressions made through outreach events, such as workshops, landing blitzes, or operation of decontamination/boat wash units. Outreach and educational activities are used to support AIS prevention efforts.

Recommendations
Continue investing in partnerships that implement outreach and educational activities that prevent the introduction and spread of AIS.

Adaptive Management Considerations
The Forest Plan monitoring program is meant to "enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed" (36 CFR 219.12).

- **Update management objectives or standards in the Forest Plan to implement a no-cut riparian buffer.** The establishment of a **100-foot no-timber-harvest buffers** along riparian corridors for streams and lakes is identified as an approach intended to support passive restoration processes... Under this recommendation, tree cutting within the buffer would be limited to activities where the primary intent is to improve aquatic habitat, enhance riparian ecosystem health, or address user safety concerns.
- **Focusing efforts to integrate stream simulation design** into timber haul route and road improvement projects may be an attainable approach for achieving stream habitat restoration objectives while aligning with timber management and transportation management objectives.
- **Adequate staffing in the aquatics and fisheries program** is identified as a factor affecting completion of program **objectives.** However, during periods of fisheries staff shortages, the Forest may need to rely more heavily on partner support to accomplish aquatic habitat restoration and survey objectives. The Forest may evaluate opportunities to coordinate with external organizations that have capacity to conduct aquatic habitat restoration or survey activities.
- **Forest Plan Wildlife, Fish and Sensitive Plant Habitat Management, Objective 3**. The Forest may want to broaden the scope of this objective to include aquatic surveys and habitat condition assessments for a wider range of native aquatic species important to ecosystem health or species at risk of habitat degradation (e.g., mussels, macroinvertebrates), rather than focusing solely on fish populations desired for public recreation.

Table 10. Question 4 **-** Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan	X		
Management activities	X		
Plan monitoring program	X		

Table 11. Question 4 - Monitoring indicator status summary

Evaluation Report Year	Result*	Recommendation(s) (if applicable)	Recommendation Status
2024	**3 and 4**	Drop indicator (iii). Incorporated indicator (vi) into Question #33. Added **3400 Forest Pest Management, Goal 4 (2-22)**	Indicators were edited, moved, or dropped for the 2020-2024 M&E Report.

***Result: 1)** Interval of data collection beyond this reporting cycle (*indicate date of next time this monitoring item will be evaluated*); **2)** Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired**; 3)** More time/data are needed to understand status or progress of the Plan Component(s)**; 4**) Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired**; 5)** Methods inadequate to answer monitoring question.

Monitoring Question 5. To what extent is the Forest maintaining or restoring conditions that result from or emulate natural ecological processes?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
Annually	2024	2 Years (indicator i)	2019	**Yes**
Annually	2024	2 Years (indicator ii)	Has not yet been reported	**No**
Annually	2024	10 years (indicators iii and iv)	Has not yet been reported	**No**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) Acres of prescribed burn to restore wetland and terrestrial habitat	2400 Vegetation Management, page 2-10, Desired Conditions 1-3
(ii) Numbers of years since fire occurred compared to historical fire regimes for a given ELTP or biophysical settling ***(stricken 2025)***	2400 Vegetation Management, page 22-10, Goals 1-3 5100 Fire Management, page 2-23, Desired Condition 3
(iii) Plant and animal population change before and after management that emulates natural ecological processes (prescribed burning, some timber harvest, mechanical opening treatments, stream flow restoration, etc. ***(removed 2025****)*	5100 Fuel Management, page 2-23, Objective 1.
(iv) Compare the current percent of acres measured against the 2005/2006 desired future condition by MA, ELT, early-, mid- and late seral condition and tree size classes ***(stricken 2025)***	
Who Collected this data?	**Wildlife and Fire/Fuels Programs**
Who is responsible for analyzing the question?	**Shelby Majors, Forest Fire Management Officer** **Chris Leeseberg, Forest Biologist**

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Monitoring Results

The Hiawatha National Forest 2006 Forest Plan, 5100 Fire Management, Fuel Management, Objectives states in this planning period the Forest will, "reduce wildfire risks by fuel management of an average of 1,000 acres per year."

During the 5-year monitoring period, the Forest treated an average of approximately 7,500 acres annually to reduce wildfire risk. In the Wildland Urban Interface (WUI) this has been an annual average of 1,442 acres and in the non-WUI an annual average of 6,046 acres.

Specifically, to Prescribed Fire as a treatment, the annual average has been 880 acres. Implementation has fluctuated between a low of 100 acres in FY2021 and a high of 2,376 acres in FY2024. Several factors have affected the timing and extent of prescribed burning, including:

- 2020 Coronavirus Pandemic (COVID-19)
- 2021 Regional Pause in Prescribed Fire
- 2022 US Forest Service 90 day pause and program review of Prescribed Burning
- Response emphasis to the national fire effort limiting availability of resources locally to implement specifically during National Preparedness Level of 3-5.

Data

Table 12. Question 5 - Hazardous Fuels Treatment Acres by Fiscal Year Data from Geo-Enabled Performance Accountability System (gPAS)

Fuels Accomplishment Description	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
Acres of non-WUI fuels treated	3,213	5,101	8,508	7,489	5,917
Acres of fuels treated in the WUI	623	1,812	196	1,751	2,828.00
Total Acres Treated to Reduce the Risk of Catastrophic Wildfire	3,836	6,913	8,704	9,240	8,745

Table 13. Question 5 - Specific to Prescribed fire accomplishments from FY20 through FY24

Prescribed Fire	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
Total Acres Accomplished	150	100	1277	497	2376

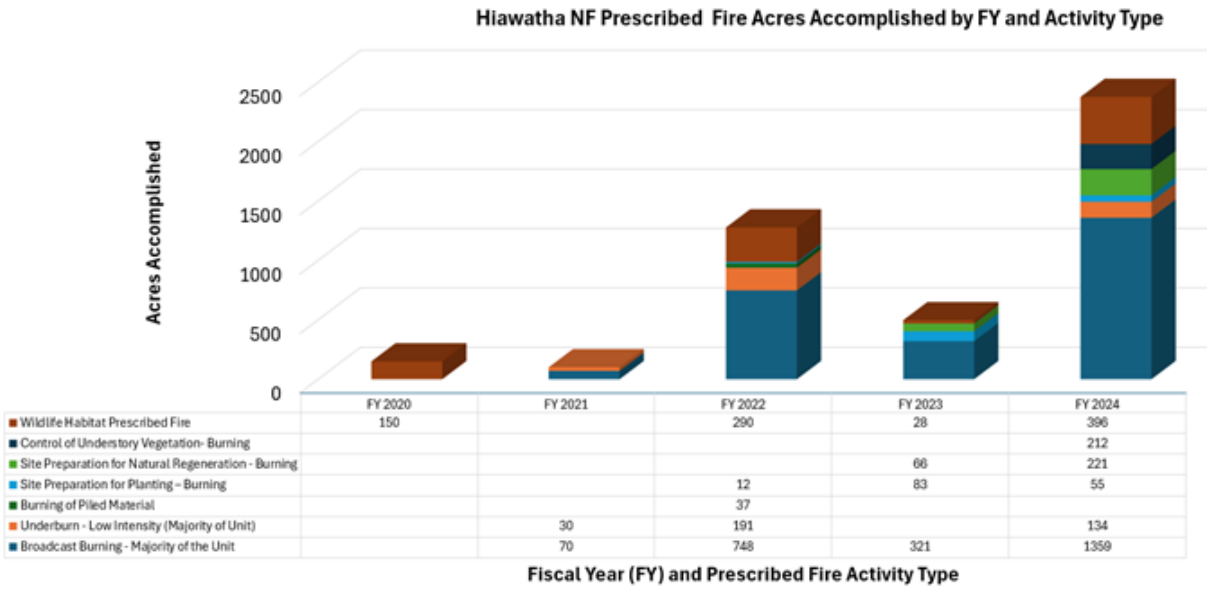


Figure 9. Question 5 - Prescribed fire accomplishments by FY and type

What is the status and trend of the monitoring indicator in relation to the target?

On average the Hiawatha National Forest has met the target of 1,000 acres as outlined in the FMP. Historical fire regime estimates suggest an annual mean of approximately 27,007 acres. Current fire activity remains below this estimated range.

Table 12. Question 5 - Summary of monitoring evaluation trends for all indicators

Current Status	Trend Towards Target	Trend Away from Target
Within target	1	0
Outside target	0	0

Monitoring Discussion and Findings

Related monitoring results are summarized in:

- Monitoring Element 3 – Status of focal species, Monitoring Question 13.
- Monitoring Element 4 – Threatened and endangered species, Monitoring Question 14.
- Monitoring Element 8 – Effects of management actions on productivity of land, Monitoring Question 33.
- Additional Monitoring Question, Monitoring Question 34.

Adaptive Management Considerations

In the Hiawatha National Forest 2006 Forest Plan primary focus for fire is prevention and suppression. Where prescribed fire is an objective, it is discussed in terms of treating “high fire hazard areas within the wildland/urban interface areas to reduce the risk from wildland fire” and is one of several tools that may be used to complete 1,000 acres a year.

In Chapter 1: Understanding the Forest Plan, Implementing the Forest Plan, Tools and Techniques Page 1-4 of the Forest Plan it states, “Prescribed fire will be used alone or with silvicultural treatments to mimic the effects of natural fire. Management ignited fire and lightning-caused fire will

help maintain, enhance and restore natural ecological processes. Minimum impact management tactics will generally be used in wildland fire suppression and in prescribed fire applications to reduce adverse fire suppression effects." In Chapter 2: Forest-wide Management Direction, 5100 Fire Management, Page 2-24, "Prescribed fire is present on the landscape, restoring or maintaining desirable plant community attributes, processes and functions."

In The National Strategy, The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy (2014) two of the three Cohesive Strategy Goals are:
Restore and maintain landscapes: Landscapes across all jurisdictions are resilient to fire related disturbances in accordance with management objectives.
Fire-adapted communities: Human populations and infrastructure can withstand a wildfire without loss of life and property.

Prescribed fire remains one of the management tools identified in the Forest Plan for reducing hazardous fuels and maintaining ecological processes. Prescribed fire contributes to maintaining natural firerelated ecological processes, supporting plant regeneration, habitat structure, and fuel reduction.

Table 14. Question 5 - Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan			X
Management activities			X
Plan monitoring program	X		

Table 15. Question 5 - Monitoring indicator status summary

Evaluation Report Year	Result*	Recommendation(s) (if applicable)	Recommendation Status
2024	**2**	Remove indicator (iii) - we do not monitor populations and are unable to answer this question.	Indicator (iii) was removed for the 2020-2024 M&E Report.

***Result:** **1)** Interval of data collection beyond this reporting cycle (*indicate date of next time this monitoring item will be evaluated*); **2)** Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired**; 3)** More time/data are needed to understand status or progress of the Plan Component(s)**; 4**) Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired**; 5)** Methods inadequate to answer monitoring question.

Monitoring Question 9. To what extent are RNAs and cRNAs being managed to protect their unique values and how are they contributing to research?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
Annually	2024	6 Years	Stricken from previous reports	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) Acres managed to protect unique values. *(ii) Number of research/educational permits authorized* ***(added 2025)***	MA 8.1 Suited Uses and Land Uses Management Standard 1.
Who Collected this data?	Forest RNA Coordinator and NRS Research Entomologist
Who is responsible for analyzing the question?	Becky Cain, Forest RNA Coordinator

Research Natural Area (RNA): Areas which are permanently protected and maintained in a natural condition, and which include: unique ecosystems or ecological features, habitat for rare or sensitive species of plants and animals, high-quality examples of common ecosystems.

The national network of RNAs helps to protect genetic, species, ecosystem and landscape level biological diversity. RNAs that represent natural condition, common ecosystems, serve as baseline or reference areas which can be compare with similar ecosystems undergoing silvicultural or other management prescriptions (Hiawatha 2006 Forest Plan, E-9)

Candidate Research Natural Area (cRNA): An area which has the potential for designation as a Research Natural Area, but needs formal evaluation (Hiawatha 2006 Forest Plan, E-2).

New Science or Other Information

The 2006 Hiawatha National Forest Plan designated 3 RNAs and 20 cRNAs, all of which make up Management Area (MA) 8.1 with the same Standards & Guidelines.

In 2010, a region-wide analysis was conducted to evaluate the Hiawatha's 20 cRNAs.
The analysis recommended that the Hiawatha proceed with establishing nine cRNAs as RNAs and report progress through monitoring reports.
The Hiawatha NF designated those nine RNAs in 2020 (11,798 acres). See table 9a below. The Hiawatha now has a total of 14,115 acres of RNAs. The remaining 11 cRNAs have not yet been designated to other management areas and still fall under the Standards & Guidelines of Management Area 8.1.

Monitoring Results

The following results reflect updates from data collected since 1974. New information collected or compiled from the last evaluation report (2020-2024) has been incorporated.

A total of 11,798 acres were designated as RNAs in 2020. Of the 5 research permits authorized within RNAs from 2020-2024, three were within newly designated RNAs.

Data

Table 16. Question 9 - Hiawatha's Designated RNAs and acres managed to protect unique values

Designated RNAs	Year Established	Acres	Unique Values
1. Dukes	1974	233	Mesic northern forest, northern white cedar, black ash, conifer and hemlock
2. Grand Island	1977	59	Mesic northern forest
3. Horseshoe Bay	1996	2065	Wet cobble beach, ridge swale complex and phragmites-red ash marsh
4. Rock River Canyon	2020	83	Moist non-acid cliff and mesic northern forest
5. Scott's Marsh	2020	1538	Patterned fen
6. Shingleton Bog	2020	3336	Patterned fen
7. Upper 18-mile Lake	2020	447	Northern fen
8. Nahma	2020	867	Paper birch, northern white cedar, black ash /American elm/red maple, northern red oak; Great Lakes coastal dune complex
9. Wedens Bay	2020	147	Paper birch, northern white cedar; Great lakes coastal dune complex
10. Little Waiska Basin	2020	496	Red maple; dissected clay lake plain
11. Point Aux Chenes Bay	2020	4366	Interdunal wetland
12. St. Martin's Peninsula (Point)	2020	518	Web cobble beach, fen-like wetlands
Total Acres Designated from 2020-2024		11,798	
Total Forest RNA Acres		**14,155**	

Table 17. Question 9 - Hiawatha's remaining cRNAs

Candidate RNAs	Year Not Accepted for RNA Status	Acres
1. Dukes RNA (expansion)	2010	63
2. Lake Stella Bog	2010	634
3. Eighteen Mile Lakes	2010	402
4. Lake Sixteen	2010	131
5. Ogontz Bay	2010	170
6. Ramsey-Lost Lakes (now includes Ogontz Lake Plain)	2010	1604
7. Lower Sturgeon River Floodplain	2010	662
8. Upper Sturgeon River	2010	151

9. Betchler Tamarack Flats	2010	421
10. Oak Ridge North	2010	120
11. Summerby Swamp	2010	1668
	Total Forest cRNA Acres	**6,026**

Table 18. Question 9 - Authorized research within RNAs

RNA Name	Approved Research Type	Year
Dukes	Permanent Plot Research	2007
Dukes	Importance of Gaps on Carbon Dynamics in Old-Growth Northern Hardwood Ecosystems of the Upper Great Lakes Region	2007
Dukes	Permanent Plot Research	2009
Point Aux Chenes	Restoration of native pine species in Great Lakes coastal environments	2011
Dukes	Assessing drivers and implications of canopy structural complexity in late-successional hemlock-northern hardwood forests	2012
Dukes	Remeasurement of long-term permanent plots	2012/13
Dukes	Developing long-term records of annual woody productivity for Upper Midwest old-growth hemlock-northern hardwood forests	2016
Dukes	Engineering Properties of Northern Hardwood Species of the Lake States —Effect of Silviculture Practices	2018
Dukes	Long-term productivity and regeneration dynamics	2019
2020-2024		
Dukes	Resampling Permanent Plots and Functional Trait Data Collection	2023
St. Martin's Peninsula	Dwarf Lake Iris Population Monitoring	2023
Shingleton Bog	GLRI PTF Rare Bee Survey 2023	2023
Dukes	Relating Functional Traits Dynamics to Carbon Dynamics	2024
Shingleton Bog	Bee survey	2024

What is the status and trend of the monitoring indicator in relation to the target?

There is no established target for this indicator. Current conditions are consistent with Forest Plan direction for managing RNAs.

Monitoring Discussion and Findings

Currently, over 14,000 acres of the Hiawatha National Forest are being managed as Research Natural Areas. These areas are managed under RNA standards and guidelines described in the Forest Plan. RNAs are being used for a range of silviculture, botany and wildlife research.

Adaptive Management Considerations

The Forest Plan monitoring program is meant to "enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed" (36 CFR 219.12).

Two items have been identified that will require a Forest Plan amendment. In 2010, when the Forest was directed to designate 9 cRNAs, they were also directed to incorporate the remaining 11 cRNAs into other appropriate management area(s) as soon as practicable. Currently, there are approximately 6,000 acres of cRNAs in our Forest Plan and GIS databases that must follow the strict RNA standards and guidelines. These acres should be analyzed for incorporation into other MAs. Due to staffing capacity, this endeavor will likely need to wait until Forest Plan revision.

The drivers listed in the monitoring plan for this question do not exist in Hiawatha's 2006 Forest Plan. They do not link to cRNA or RNA management in Management Area 8.1.
These drivers do not correspond to MA 8.1 direction and appear to have been assigned in error. See Table 19.

Adding a second indicator would provide additional information on research and educational use.

Table 19. Question 9 - Current and Recommended Monitoring Matrixes

Monitoring Question	Indicator(s)	Driver	Measurement Frequency	Evaluation /Reporting Frequency
Current Monitoring Matrix				
To what extent are RNAs and cRNAs being managed to protect their unique values and how are they contributing to research?	i) Acres managed to protect unique values	Land Ownership Goal 2; Prescribed Natural Fire Goal 1 (PNF is an outdated term. Appropriate Management Response is current term); Objective 1; Land Ownership Goal 2	Annually	6 years
Recommended Monitoring Matrix				
To what extent are RNAs and cRNAs being managed to protect their unique values and how are they contributing to research?	i) Acres managed to protect unique values **ii) Number of research/educational permits authorized**	**Land Uses Management Standard 1. Special use permits (including utility corridor permits) will not be issued in designated RNAs. Exceptions may be made for research or educational activities on a case-by-case basis.**	Annually	6 years

Table 20. Question 9 **-** Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan	X		
Management activities			X
Plan monitoring program	X		

Table 21. Question 9 - Monitoring indicator status summary

Evaluation Report Year	Result*	Recommendation(s) (if applicable)	Recommendation Status
2024	**2**	Change the driver/s for this monitoring question. Add additional indicator (ii) Consider Forest Plan amendment	Drivers were changed, and an indicator was added for the 2020-2024 M&E Report.

***Result:** **1)** Interval of data collection beyond this reporting cycle (*indicate date of next time this monitoring item will be evaluated*); **2)** Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired**; 3)** More time/data are needed to understand status or progress of the Plan Component(s)**; 4**) Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired**; 5)** Methods inadequate to answer monitoring question.

Monitoring Question 10. To what extent are key terrestrial habitat components (e.g., snags, woody material) being provided?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
By Project	2024	2 Years	2019	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) Number of den and snag trees per acre in managed stands	2600 Wildlife, Fish & Sensitive Plant Habitat, page 2-16 Structural guidelines for habitat reserves include • Two to four live trees greater than the average stand diameter per acre should be reserved, or variable size reserve islands/clumps up to a half-acre for every 10 acres should be reserved. • For uneven-aged managed stands, up to five live den trees per acre should be reserved. **In managed stands, reserve 2 to 10 snags, except where additional snags may benefit rare species.**
Who Collected this data?	**Wildlife Program**
Who is responsible for analyzing the question?	**Christopher Leeseberg, Forest Biologist**

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question. Species richness and evenness are influenced by stand characteristics such as structural and vertical diversity and the availability of coarse woody debris. Amphibian and reptile species associated with conifer forest types are often closely associated with the large coarse woody debris.

Most of the forest is mature with older-aged stand characteristics, such as snags naturally and downed woody debris. Project level mitigations include

- placing nest boxes for activities that reduce the number of snags or downed woody debris, such as thinning in red pine plantations and clear-cuts, to create wildlife openings.
- retaining variable-sized reserve islands of up to one-half acre for every ten acres to provide older-aged trees to serve as future snags.
- girdling live trees to accelerate tree mortality to create snags and downed woody debris. Implementing prescribed burning to reduce fuel loading and maintain fire-associated ecosystem processes.

Monitoring Results

The Forest Plan does not specify a quantitative target for habitat component levels.

The following results reflect updates from data collected from the Watershed Improvement Tracker (WIT) database.

Table 22. Question 10 - Habitat component projects with affected acres by fiscal year

Activity	Acres	Year
Ruby Snag Creation	215	2020
Bill's Pine Red Pine Snag Creation	196	2021
Dunklee Opening Maintenance	5	2021
Four Deuces Red Pine Snag Creation	473	2021
Nahma Marsh Tag Alder Regeneration	2	2021
North Bishop PU14 Drumming Log Creation	11	2021
North Bishop PU6 Drumming Log Creation	12	2021
Orchard PU25 Drumming Log Creation	10	2021
South Bishop Drumming Log Creation	20	2021
Wood Duck Nest Box Installation	6	2021
Dunklee Opening Maintenance	20	2022
Flikken Cherry Savanna Maintenance	5	2022
Iron Rim PU 11 Drumming Log Creation	35	2022
Iron Rim Snag Creation	59	2022
Red Pine Savanna Maintenance	11	2022
Mike White Opening Maintenance	35	2023
South Quarry Opening Maintenance	8	2023
Stella Swamp Stewardship PU11 Snag and Down Log Creation	42	2023
Stella Swamp Stewardship PU6 Snag and Down Log Creation	64	2023
Stella Swamp Stewardship PU7 Snag and Down Log Creation	24	2023
Coolaw Stewardship PU15 Snag and Down Log Creation	38	2024
FR3124 Snag Creation	59	2024
GrouseTown Stewardship PU11 Snag and Down Log Creation	19	2024
GrouseTown Stewardship PU14 Snag and Down Log Creation	28	2024
GrouseTown Stewardship PU20 Snag and Down Log Creation	57	2024
GrouseTown Stewardship PU21 Snag and Down Log Creation	33	2024
GrouseTown Stewardship PU22 Snag and Down Log Creation	44	2024
Highbridge Opening Maintenance	5	2024
Little Stella Stewardship PU9 Snag and Down Log Creation	8	2024
Paquette Opening Maintenance	12	2024
Scattered Coral Snag Creation	29	2024
Stella Swamp Stewardship PU13 Snag and Down Log Creation	39	2024
Stella Swamp Stewardship PU14 Snag and Down Log Creation	33	2024
Stella Swamp Stewardship PU15 Snag and Down Log Creation	50	2024
Stutt's Creek Stewardship PU10 Snag and Down Log Creation	60	2024

Activity	Acres	Year
Wyand Stewardship PU1 Snag and Down Log Creation	5	2024
Wyand Stewardship PU19 Snag and Down Log Creation	5	2024
Wyand Stewardship PU2 Snag and Down Log Creation	4	2024
Wyand Stewardship PU21 Snag and Down Log Creation	45	2024
Wyand Stewardship PU3 Snag and Down Log Creation	3	2024
Total Acres Created (2020-2024):	1834	

What is the status and trend of the monitoring indicator in relation to the target?

No quantitative target has been established for this indicator in the Forest Plan.

Monitoring Discussion and Findings

Retention of den and snag trees is incorporated into project-level analysis and implementation. While not specifically recorded as a forest-wide metric, there is no indication that Forest Plan direction is not being implemented appropriately.

Adaptive Management Considerations

The Forest Plan monitoring program is meant to "enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed" (36 CFR 219.12).

No changes to Forest Plan components or management activities were identified based on results for this monitoring period.

Table 23. Question 10 **-** Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan			X
Management activities			X
Plan monitoring program			X

Monitoring Question 11. To what extent are existing and potential old growth forest stands being managed or unmanaged to develop into or accelerate toward old growth?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
4 Years	2024	4 Years	Deferred since 2016	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) Acres of existing and potential old growth by forest type *(ii) Connectivity of old growth system* ***(remove 2025)***	2400 Vegetation Management – Old Growth, Goals 1-3, Objective 1, and Guidelines 1-5, page 2-11
Who Collected this data?	Silviculture Program
Who is responsible for analyzing the question?	Marjorie Allmaras, Silviculturist

New Science or Other Information

In 2024 there was an effort to review our current old growth and to create quantifiable criteria for old growth on the Hiawatha National Forest. This analysis will use research and data from that effort and the 2024 HIF Old Growth Whitepaper. Prior to 2024, this data was not available.

Monitoring Results

Remnant old growth stands are designated as old growth. Many designated old growth stands do not yet meet all old growth criteria and will require additional time to develop these characteristics. Harvesting does not occur in these stands because the old growth is classified as unsuited for timber production. This management direction facilitates an uninterrupted progression of stands toward old growth conditions with succession only influenced by natural disturbances. (FEIS 3-35)

Data

Table 24. Question 11 - The following results reflect stand information in June of 2024

HF Forest Type Group	Acres of Designated Old Growth	Acres Meeting HF OG Criteria*
Aspen-Birch types	6,934	
Oak types	40	
Oak-Pine Types	343	
Open - Upland	299	
Open - Wet	458	
Pine	7,725	2,243
Spruce-Fir-Conifer types	19,097	190
Upland Hardwood types	14,406	1,802
Wet-site Hardwood types	2,468	25
Total Acres	**51,770**	**4,260**

- These acres represent stands that meet old growth criteria but may not be formally designated.

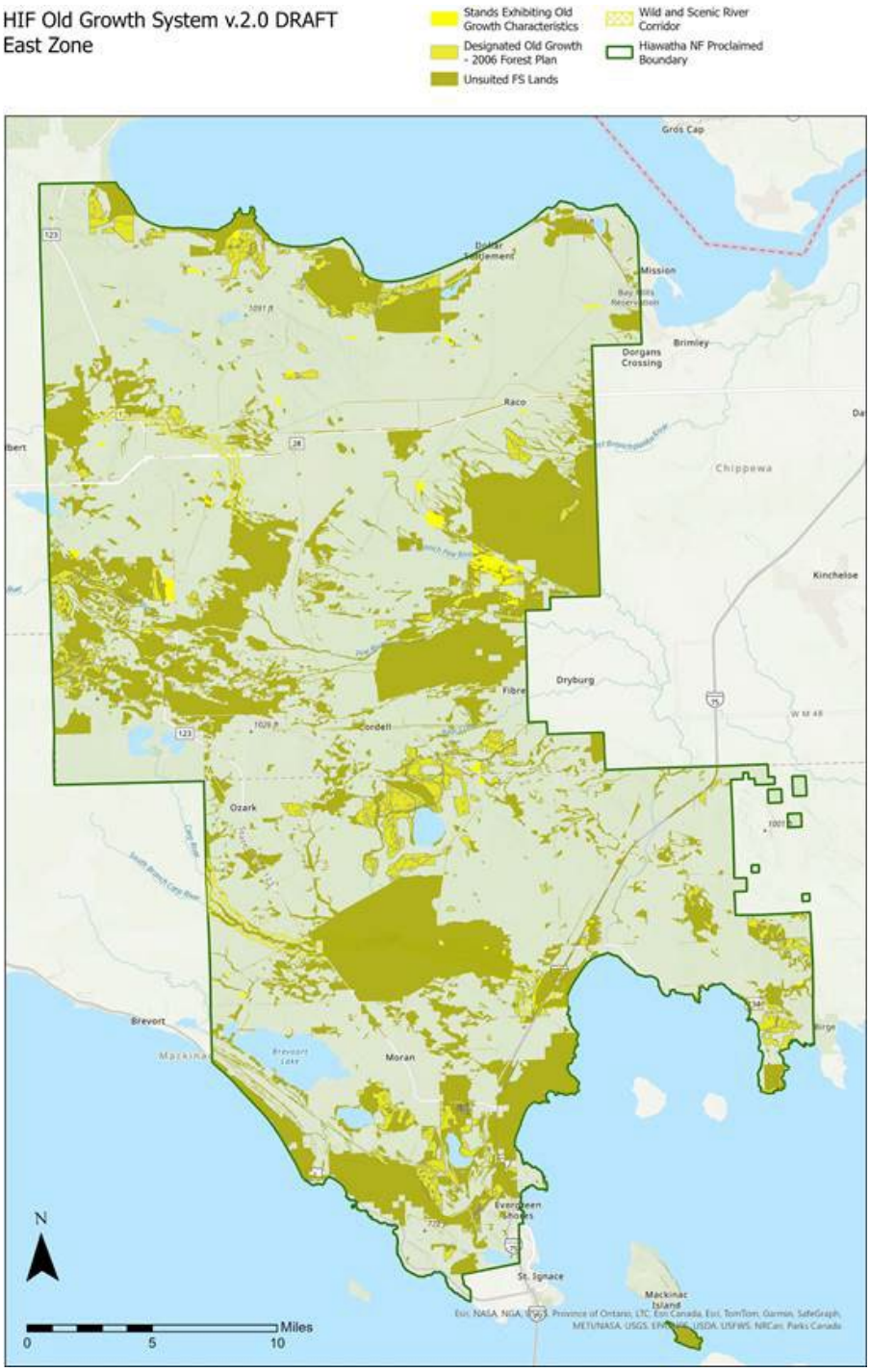


Figure 10. Question 11 - East Zone Unsuited Lands, Potential Old Growth and Designated Old Growth

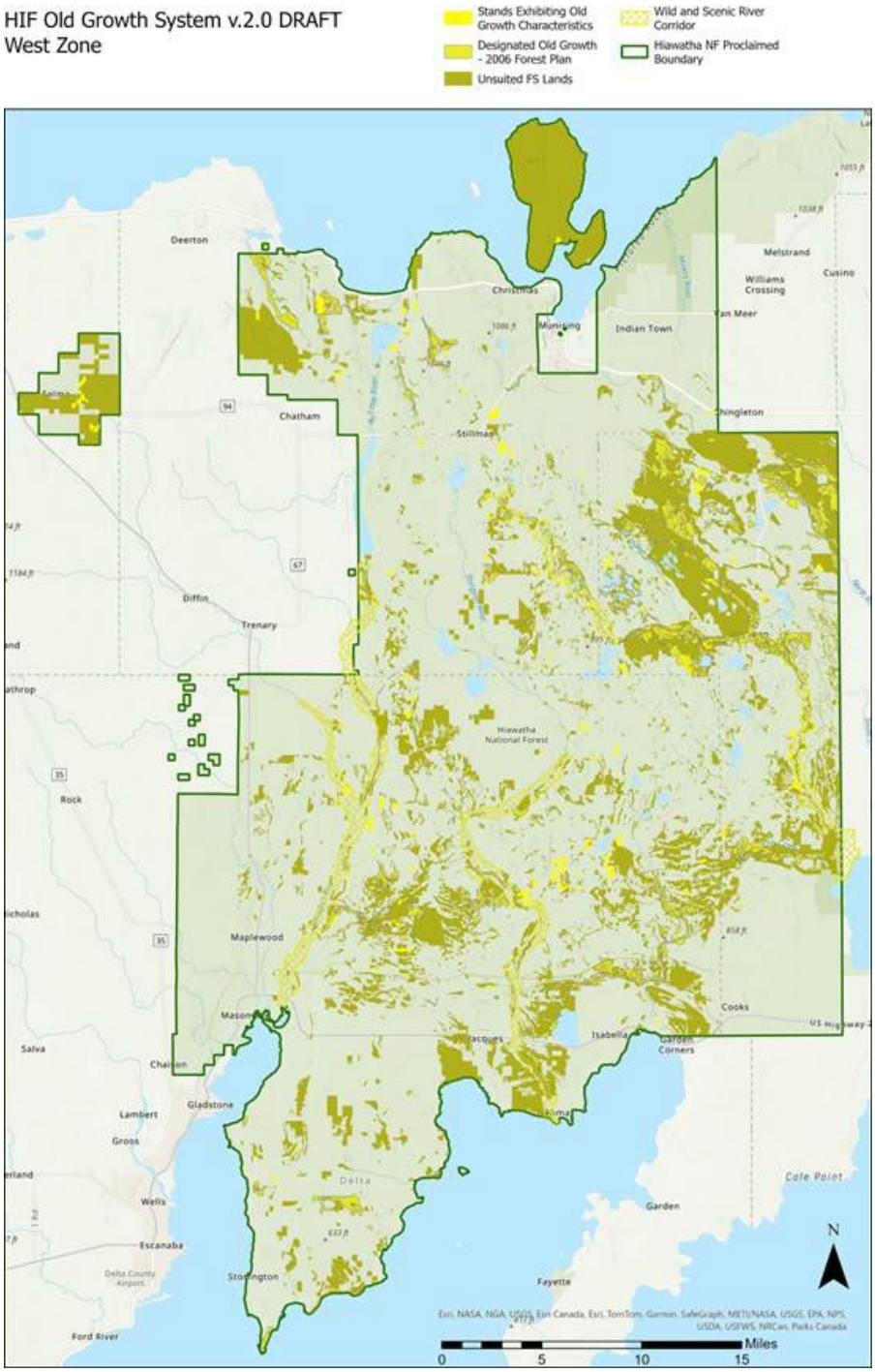


Figure 11. Question 11 - West Zone Unsuited Lands, Potential Old Growth and Designated Old Growth

What is the status and trend of the monitoring indicator in relation to the target?

The Hiawatha 2006 Forest Plan objective for old growth is to maintain a 52,000-acre old growth system. Using the quantifiable data from the 2024 Old Growth Whitepaper, the Hiawatha currently manages approximately 51,770 acres of designated old growth, with an additional 4,260 acres of stands that meet old growth criteria.

Table 25. Question 11 - Summary of monitoring evaluation trends for all indicators

Current Status	Trend Towards Target	Trend Away from Target
Within target	1	0
Outside target	0	0

What level of confidence is there in the accuracy and precision?

Data confidence is high based on recent verification and updated criteria from the 2024 Old Growth Whitepaper.

Monitoring Discussion and Findings

The monitoring findings show that removal of Indicator ii is appropriate. Old growth blocks were located during the development of the 2006 Forest Plan with connectivity in mind, however, there is no way to measure the data for connectivity.

Adaptive Management Considerations

The Forest Plan monitoring program is meant to "enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed" (36 CFR 219.12).

Updates to the monitoring program may be needed to align indicators with available measurable data

Table 26. Question 11 - Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan			X
Management activities			X
Plan monitoring program	X		

Table 27. Question 11 - Monitoring indicator status summary

Evaluation Report Year	Result*	Recommendation(s) (if applicable)	Recommendation Status
2024	**2**	Remove Indicator ii (Connectivity), which cannot be assessed with available data.	Indicator was removed for the 2020-2024 M&E Report.

***Result:** **1)** Interval of data collection beyond this reporting cycle (*indicate date of next time this monitoring item will be evaluated*); **2)** Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired**; 3)** More time/data are needed to understand status or progress of the Plan Component(s)**; 4**) Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired**; 5)** Methods inadequate to answer monitoring question.

Monitoring Question 12. How much even-aged management (especially clear-cutting) should be used? In what forest types should it be used?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
Decadal	Never	10 Years	Never	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) Acres of even-aged harvest that emulates natural disturbance regimes, creates wildlife habitat (e.g., jack pine barrens and well-distributed age classes of aspen-spruce-fir mixed stands) and moves toward veg comp goals	2600 Wildlife, Fish and Sensitive Plant Habitat Management 2400 Vegetation Management, Guideline 1
Who Collected this data?	Silviculture
Who is responsible for analyzing the question?	Marjorie Allmaras, Silviculturist

New Science or Other Information

No new science was incorporated into the evaluation. The suitability layer has been updated multiple times for various purposes since the Forest Plan was signed, including revisions to the ELT layer, particularly related to distinctions between ELT 30 and ELT 40.

Monitoring Results

Data reflect updates from 2006 through August 2025. The Forest Plan FEIS identifies 37,369 acres per decade as the benchmark for this monitoring question, representing the midpoint between minimum and maximum acres for size class 1 within vegetation composition goals across management areas (MAs) and ecological land types (ELTs). This acreage has not been achieved in any decade, due to factors such as early 2000s salvage harvesting that reduced merchantable aspen and jack pine, winter only access limitations, and a limited amount of red pine regeneration prior to the last five years.

Data

Current stand exam data (1974–2025), signed and unimplemented vegetation management NEPA decisions (preSept 2025), and timber sales sold between 2006 and August 2025 were used for the analysis. Tables present desired ranges and actual/planned acres by seral stage, MA, and ELT. Planned 3rddecade acres exclude areas covered by the Jack Pine Ecosystem Management EA and pending red pine clearcut reviews

Table 28. Question 12 - Even-aged harvest by seral class

Seral Stage	Maximum Acres	Minimum Acres	1st Decade	2nd Decade	Planned 3rd Decade
Aspen	14,199	3,088	3,596	4,725	9,699
Jack Pine	14,889	7,277	8,804	2,897	937
Mid Seral	15,021	3,253	1,539	3,156	5,705
Late Seral	19,028	5,736	1,819	1,277	2,365
Total	63,136	19,354	15,765	12,096	18,759

Table 29. Question 12 - Even-aged harvest by management area

MA	Maximum Acres	Minimum Acres	1st Decade	2nd Decade	Planned 3rd Decade
1.2	4,063	1,290	823	1,148	1,313
2.3	5,350	1,441	1,858	2,455	3,988
4.2	17,347	4,575	3,552	2,306	3,773
4.4	20,090	8,609	7,897	3,185	2,151
4.5	6,482	1,838	729	1,277	3,209
6.2	288	-		334	445
6.4	1,543	371	526	508	631
8.3	7,973	1,231	364	689	3,034
Total	63,136	19,354	15,765	12,096	18,759

Table 30. Question 12 - Even-aged harvest by ELT

ELT	Maximum Acres	Minimum Acres	1st Decade	2nd Decade	Planned 3rd Decade
10/20	25,801	10,037	9,742	4,308	5,090
30	11,521	3,241	1,592	3,088	2,736
40	5,129	844	750	1,837	2,116
60	10,637	2,775	1,733	1,614	4,161
7A	2,622	685	459	122	638
7B	3,834	1,081	1,255	671	2,102
8A	937	201	135	100	393
8B	2,654	490	98	355	1,523
Total	63,136	19,354	15,765	12,096	18,759

Table 31. Question 12 - Summary of monitoring evaluation trends for all indicators.

Current Status is the 2nd Decade and Trend is Planned 3rd Decade.

Current Status	Trend Towards Target	Trend Away from Target
Within target 4	Already within target - 11	Planned acres < sold in 2nd Decade and not within target- 3
Outside target 16	Planned acres > sold in 2nd Decade but not within target- 5	Planned acres exceed the maximum - 1

Decade 3 is in its initial stages, and adjustments are expected at the implementation stage due to issues such as accessibility constraints and low timber volume.

Monitoring Discussion and Findings

Aspen

Aspen size class 1 needs are concentrated in MA 1.2 (ELTs 60, 70B), MA 2.3 (ELTs 40, 60), and MA 4.4 (ELT 10/20). Salvage harvests in the late 1990s and early 2000s removed approximately half of suitable aspen, reducing availability for decades 1 and 2. Many stands require winter access, causing sale extensions and resulting in dropped overmature stands due to reduced volume or declining stand condition.

Jack Pine

Demand for jack pine size class 1 is concentrated in MA 4.4 (ELTs 10, 60) and MA 4.2 (ELT 10), representing about 90% of desired jack pine even aged management. These areas support Kirtland's warbler habitat. Decade2 management gaps prompted development of the Forest wide EA. Once finalized, planned decade3 acres are expected to increase to 8,787. Clearcutting is the established management approach for Kirtland's warbler habitat

Mid

The midseral class contains a mix of forest types (Table 32). Most planned even aged harvest acres are spruce fir. Approximately 40% of swamp conifer stands include substantial northern white cedar, which has low regeneration success under clearcutting per FP Guideline 1. These stands may be candidates for two aged approaches. Red pine is addressed separately due to its acreage and management considerations

Table 32 Question 12 - Number of acres in mid seral class by forest type group

Forest Type Group	% of Acres
Red pine	32%
Swamp conifer	32%
Spruce/Fir	18%
Aspen-spruce/fir	11%
Hardwoods	3%
Aspen	2%
Jack pine	1%
Eastern white pine	1%

Late

The late seral class is also composed of many different forest types, most of which are not considered suitable for even-aged management. See the table below.

Table 33. Question 12 - Number of acres in late seral class by forest type group and even-aged management suitability

Forest Type Group	% of Acres	Suitable for Even-aged Management
Hardwoods	52%	No
Red pine	18%	Yes
Northern white-cedar	13%	No
Spruce/Fir	8%	Yes
Eastern white pine	6%	No
Hemlock	3%	No

Most late seral forest types are not considered suitable for even aged management (Table 33). Current planned even aged harvests in this class primarily involve red pine, along with some hardwood and spruce fir stands affected by insects or disease. Red pine is addressed separately below.

Red Pine

Approximately 92% of red pine stands are suitable for timber production. Midseral red pine comprises roughly 46,640 acres and late seral approximately 48,691 acres. Distribution is highest in MA 4.4 (36%), MA 4.2 (33%), and MA 2.3 (17%). Stand ages range from saplings through mature classes, with 1% overmature and 59% mature. The Forest Plan includes vegetation composition objectives for red pine, including a specified acreage in size class 5 (average DBH >17.9 inches).

When deciding how much red pine to clearcut in the next decade there are three management options to consider:

- **Economic rotation scenario:** Would result in approximately 3,040 acres harvested. These stands may or may not be regenerated to red pine depending on the vegetation composition goals.
- **Even flow scenario:** Would result in approximately 7,000 acres harvested and regenerated to red pine.
- **Vegetation composition goals scenario:** Would require 2,040–4,790 acres regenerated across key MAs (4.4, 4.2, 2.3).

MA 4.4

On management area 4.4 about half of the red pine stands are on ELT 10. There are too many acres of red pine on ELT 10 currently. The JPEM EA will convert this excess to jack pine. This will leave about 20,000 acres of red pine. Of which between 600 and 1,000 acres should be regenerated over the next decade. Across the rest of the ELTs between 150 and 430 acres should be regenerated over the next decade. Across these same ELT a minimum of 700 acres should be managed for size class 5.

MA 4.2

On management area 4.2 about 56% of the red pine is on ELT 30. Due to the JPEM EA there will be a lack of 325 acres of red pine and opportunities to convert some jack pine (not associated with a KW block) or aspen should be sought. Of the existing red pine between 700 and 1,800 should be regenerated over the next decade. Between 4,000 and 7,000 acres should be maintained as size class 5. About 32% of the red pine is on ELT 10/20. There is a lack of 1,240 acres of red pine.

Opportunities should be sought to convert aspen and mid seral stands to red pine. Of the existing red pine between 400 and 1,000 acres could be regenerated over the next decade. Also, between 700 and 1,600 acres should be maintained as size class 5. Across the rest of the ELTs between 40 and 180 acres should be regenerated over the next decade and between 40 and 370 should be maintained as size class 5.

MA 2.3

On management area 2.3 about 48% of the red pine is on ELT 30. This is the only ELT with size class 1 goals. Over the next decade between 150 and 377 acres should be regenerated and between 300 and 754 acres maintained as size class 5. The red pine across the rest of the management area should not be regenerated.

Adaptive Management Considerations

Key Recommendations:

- Consider evaluating the appropriate balance of clearcuts, two aged, and uneven aged treatments across forest types.
- Consider conducting a Forest wide assessment of red pine conditions to support long-term planning.

Table 34. Question 12 - Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan			X
Management activities	X		
Plan monitoring program			X

The Forest Plan anticipated improvements in technology that would expand access to winter only sites. These improvements have not occurred, and access constraints continue to result in stands being removed during NEPA review or implementation. A Forestwide assessment of accessibility could improve efficiency in project planning.

Shifting vegetation NEPA boundaries from management areas to watershed boundaries has added complexity to achieving vegetation composition goals, as most management areas are based on Land Type Associations.

Aspen, Spruce, Fir and other Swamp Conifer Forest Types
Recent midseral management mixing aspen and conifers has broadened treatment types beyond clearcutting. Two aged systems create smaller structural patches beneficial to wildlife while maintaining operational efficiency. Planned decade 3 acres for even aged aspen harvest already exceed minimum desired acres in relevant ELTs. A future emphasis on identifying two aged opportunities may support multiple objectives

Red Pine
A determination of the desired level of red pine regeneration is a key planning need identified in the evaluation. Historic management created largely pure red pine plantations, and recent examples of insect driven stand loss in other species illustrate the potential risks associated with low species diversity. Establishing clear regeneration targets would help align species composition objectives with operational realities, including limited cone availability, the timing requirements of shelterwood systems, and challenges related to competing vegetation such as pin cherry and certain hardwoods. These factors also interact with requirements to maintain 13,700–16,600 acres of sizeclass5 red pine, underscoring the importance of deciding how much red pine should be regenerated to meet long-term structural and habitat objectives.

Monitoring Element 3 – Status of focal species

Monitoring Question 13. Is the type and frequency of disturbance associated with dry-sand outwash plains (ELT 10/20) appropriate to maintain ecosystem integrity throughout the historical range of variation?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
Annually	2024	10 Years	2019	**YES**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) Sharp-tailed grouse population trends	Forest Plan (2600) objective to maintain permanent openings within vegetation composition goals for habitat suitable for sharp-tailed grouse. Provide for KW management within forest-wide vegetation goals. Prescribed fire mimicking natural fires used as a management tool (2400). In MA 4.4 provide wildlife habitat for KW and other upland species such as sharp-tailed grouse, KW and Black-backed woodpecker. Provide large openings and savanna complexes. Key ecosystem components of dry northern forest/barrens include frequent fire or management to mimic fire (including timber harvest and prescribed burning), a large number of snags, biological legacies (large red/white pine retained) habitat connectivity resulting in large early successional complexes, pine age-class diversity. Scale: ELT 10/20, primarily on Management Areas 4.2 and 4.4, Forest-wide.
Who Collected this data?	Wildlife, Fire/Fuels, and Timber Programs
Who is responsible for analyzing the question?	Christopher Leeseberg, Forest Biologist

New Science or Other Information

Sharptailed grouse (*Tympanuchus phasianellus*) and species such as Kirtland's warbler (*Setophaga kirtlandii*) depend on open land and early successional conditions typical of jack pine ecosystems within ELT 10/20. These ecological land types occur on sandy outwash plains dominated by jack pine or red pine, with fire as the primary natural disturbance process. The Forest uses ecological land type classifications as described in the Forest Plan (p. 37).

Between 2020 and 2024, disturbances included approximately 1,068 acres of wildlife program opening maintenance, 4,581 acres of prescribed fire, and 34,880 acres of mechanical or timber

treatments. These disturbance types contribute to maintaining or creating suitable habitat by setting back succession, recycling nutrients, and supporting diverse and vigorous native plant communities. Management of permanent openings remained consistent with annual habitat improvement targets.

Monitoring Results

The Forest does not conduct population counts for sharptailed grouse. Monitoring instead evaluates habitat conditions and disturbance frequency. From 2020–2024, an average of more than 8,000 acres per year received treatment through opening maintenance, prescribed fire, or mechanical/timber activity. These treatments align with Forest Plan direction to maintain openings, mimic natural fire regimes, and sustain ecosystem components characteristic of dry northern forests and barrens.

Data

Table 35. Question 13 - Summary of acres treated between Fiscal Yeas 2020 and 2024.

FY	Wildlife Program Opening Maintenance	Rx	Mechanical/Timber Treatment	Total
2020	***	331	4663	**4994**
2021	52	532	6400	**6984**
2022	377	1343	8127	**9847**
2023	69	432	8957	**9458**
2024	570	1944	6733	**9247**

*** COVID19 restrictions in 2020 limited inhouse wildlife program work.

Monitoring Discussion and Findings

Disturbance patterns across ELT 10/20 fall within the range associated with maintaining early successional habitat conditions. Annual treatments through prescribed fire, mechanical activity, and opening maintenance collectively contribute to sustaining the open and semi open vegetation structure used by sharptailed grouse and other species dependent on disturbance driven ecosystems.

The distribution and frequency of treatments during 2020–2024 demonstrate consistent application of disturbance processes that mimic historical fire regimes and maintain ecological conditions typical of dry sand outwash plains. These activities support habitat objectives identified in the Forest Plan, including early successional complexes, connectivity, snag retention, and pine age class diversity.

Adaptive Management Considerations

• Continued evaluation of disturbance frequency and type may help ensure alignment with ecological conditions historically characteristic of ELT 10/20.
• Ongoing integration of prescribed fire, mechanical treatment, and opening maintenance may help sustain early successional structure and prevent succession beyond desired conditions.
• Tracking the spatial distribution of treatments across ELT 10/20 may assist in maintaining the landscape scale habitat configuration identified in Forest Plan direction

Monitoring Element 4 – Threatened and endangered species

Monitoring Question 14. To what extent is forest management contributing to the conservation of threatened and endangered species?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
Annually (Indicator i, ii, v)	2024	2 Years	2019	**Yes**
10 Years (Indicator iii, iv)	2024	10 Years	2019*	**Yes**

*Reporting for Indicators iii and iv are on a ten-year interval. Past data has been retained here for continuity.

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) Number of TES species for which recovery actions are accomplished	2600 Wildlife, Fish and Sensitive Plant Habitat Management, page 2-16, Goals 2 and 5.
(ii) Acres of habitat improved for TES species	2600 Wildlife, Fish and Sensitive Plant Habitat Management, Federal Threatened and Endangered Species and Regional Forester Sensitive Species (RFSS), page 2-17, Goals 1 and 2, Standards 1 and 2, Guidelines 1-4.
(iii)Number of species removed from TES lists	
(iv)TES Population Trends	
(v) Acres of appropriately stocked jack pine for KW habitat (over or under and with appropriate opening percentage)	Eastern Regional Sensitive Species Framework Lands are adequately restocked as specified in the Forest Plan
Who Collected this data?	Forest Botany Program and Michigan Natural Features Inventory Botanists
Who is responsible for analyzing the question?	Justin Bournoville, Forest Botanist

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Monitoring Results

The following threatened, endangered, and sensitive (TES) plant recovery and monitoring results reflect data collected by past and present Hiawatha National Forest botanists/ecologists and biological science technicians and Michigan Natural Features Inventory (MINFI) botanists. Hiawatha National Forest staff and MNFI staff conduct monitoring of known TES plant occurrences and project

level TES plant surveys of suitable habitat that are intended to identify new TES plant occurrences and evaluate habitat suitability. Between 4,000 and 5,000 acres of TES plant surveys are conducted annually on the Hiawatha National Forest.

The following non-native invasive species (NNIS) treatment results reflect data collected by past and present Hiawatha National Forest botanists/ecologists and biological science technicians and partner organizations including Lake to Lake Cooperative Invasive Species Management Area (CISMA), Three Shores CISMA, and Upper Peninsula Resource Conservation and Development Council (UPRC&D). Hiawatha National Forest staff and partner organizations collaborate to conduct NNIS treatments for a variety of management goals including the protection of TES plant occurrences and habitat. While the amount of NNIS treatments accomplished varies annually based on the capacity and resources of the Hiawatha National Forest and its partners, from 2010 to 2024 an average of approximately 14 acres of NNIS treatments were accomplished to protect TES plant occurrences and suitable habitat.

Data

Table 36. Question 14 - Monitoring Indicator (i): Number of TES species for which recovery actions are accomplished

Summary of recovery actions for federally threatened plants during the current and previous monitoring periods.

	2006-2015	2016-2017	2018-2019	2020-2024
Hart's tonguefern	Monitoring (two new occurrences); Surveys; Protect occurrences	Surveys; Protect occurrences	Surveys; Protect occurrences	Monitoring; Surveys; Protect occurrences
Pitcher's thistle	Monitoring; NNIS treatments; Protect occurrences	Monitoring; NNIS treatments; Protect occurrences	Protect occurrences	Monitoring; NNIS treatments; Protect occurrences
dwarf lake iris	Monitoring (one new occurrence); NNIS treatments; Protect occurrences	Monitoring; NNIS treatments; Protect occurrences	Monitoring; NNIS treatments; Protect occurrences	Monitoring; NNIS treatments; Protect occurrences
Houghton's goldenrod	Monitoring (two new occurrences); Surveys; Protect occurrences	Surveys; Protect occurrences	Surveys; Protect occurrences	Monitoring (three new occurrences); Protect occurrences
lakeside daisy	Monitoring (one new occurrence); NNIS treatments	Monitoring	Monitoring	Monitoring
Number of Species with recovery actions	**5**	**5**	**5**	**5**

Table 37. Question 14 - Acres of habitat improved for TES species

Area (acres) of federally threatened and Regional Forester Sensitive Species (RFSS) plant habitat improvement conducted on the Hiawatha National Forest between 2010 and 2024.

Year	Threatened Plant Habitat	RFSS Plant Habitat	Total Area (ac)
2010	0.0	5.8	**5.8**
2011	0.0	10.6	**10.6**
2012	0.0	9.0	**9.0**
2013	24.4	14.7	**39.1**
2014	91.2*	6.2	**97.4**
2015	164.7*	8.3	**173.0**
2016	252.9*	21.5	**274.4**
2017	147.7*	22.4	**170.1**
2018	1.0	15.0	**16.0**
2019	1.0	3.6	**4.6**
2020	0.0	1.5	**1.5**
2021	1.0	3.2	**4.2**
2022	24.5	1.9	**2.2**
2023	3.8	6.6	**10.4**
2024	8.9	6.1	**15.0**

* Includes 65.0, 101.7, 228.9, and 111.9 acres of Scot's pine (*Pinus sylvestris*) removal in the US 2 dunes in 2015, 2016, 2017, and 2018, respectively.

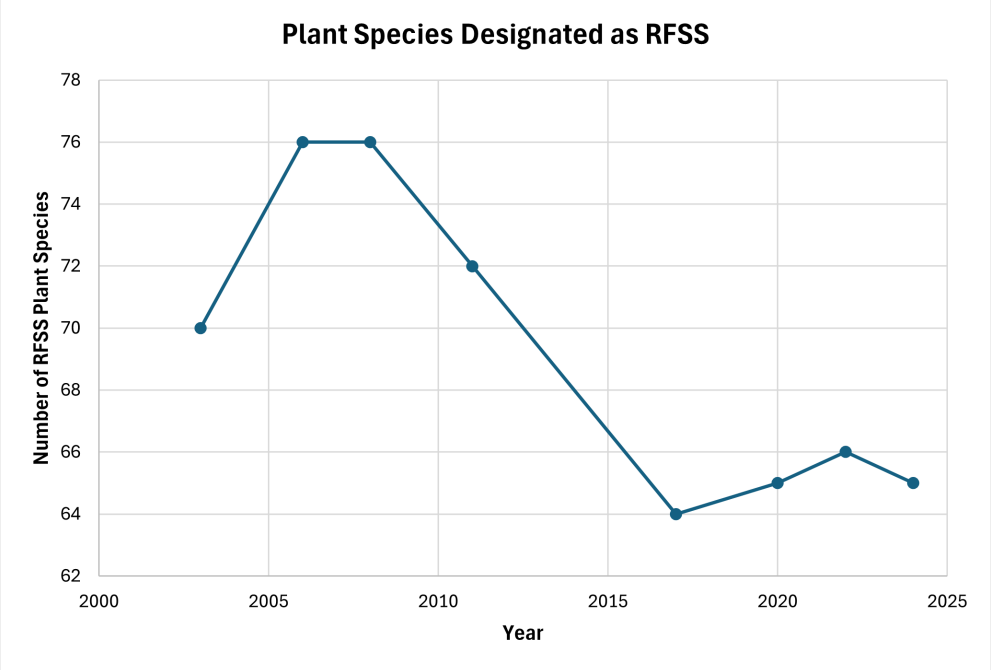


Figure 12. Question 14 - Monitoring Indicator (iii): Number of species removed from TES lists

Number of plant species designated as Regional Forester Sensitive Species (RFSS) on the Hiawatha National Forest from 2003 to 2024.

Table 38. Question 14 - Monitoring Indicator (iv): TES Trends

Population counts or estimates (≈) of federally threatened plant species by year of initial inventory and year of most recent monitoring.

Species	Location	Initial Inventory Year[1]	Population Count[1]	Recent Inventory Year[2]	Population Count[2]	Trend
Hart's tonguefern	East Lake NE	1985	64	2024	251	Apparently Stable
Hart's tonguefern	East Lake NW	1994	≈200	2024	417	Apparently Stable
Hart's tonguefern	East Lake SE	1994	≈500	2024	98*	Apparently Stable
Hart's tonguefern	East Lake SW	2007	194	2020	120	Apparently Stable
Hart's tonguefern	Gryke	2007	15	2022	50	Apparently Stable
Hart's tonguefern	Piehler	2012	3	2020	7	Apparently Stable
Hart's tonguefern	Pipeline	1997	59	2020	24	Apparently Stable
Hart's tonguefern	Taylor Creek	1991	≈600	2020	240*	Apparently Stable
Pitcher's thistle	Point Aux Chenes	1985	25	2014	3,142	Apparently Stable
Pitcher's thistle	US 2 Dunes	1993	19,190	2014	11,998	Apparently Stable
dwarf lake iris	Point Aux Chenes	1981	50	2021	0	Likely Extirpated
dwarf lake iris	Round Island	1993	≈25,000	2009	≈1,000	Apparently Stable
dwarf lake iris	St Martins Point	2014	≈4,000	2020	≈5,000	Apparently Stable
dwarf lake iris	Wedens Bay	2003	75	2023	≈1,000	Apparently Stable
Houghton's goldenrod	Aukland Rd Fen	1987	≈200	2012	≈50	Apparently Stable
Houghton's goldenrod	Brevoort Lake Fen	2024	53	2024	53	Apparently Stable
Houghton's goldenrod	Brevoort Lake Rd	2008	≈100	2015	≈600	Apparently Stable
Houghton's goldenrod	Castle Rock Ponds	2024	90	2024	90	Apparently Stable
Houghton's goldenrod	Castle Rock Rd	2001	≈250	2015	≈20,000	Apparently Stable
Houghton's goldenrod	Castle Rock Rd Fen	2021	≈150	2021	≈150	Apparently Stable
Houghton's goldenrod	Charles Rd Fen	1987	3	1987	3	Unknown
Houghton's goldenrod	Horseshoe Bay N	1993	45	2015	≈1,000	Apparently Stable

Species	Location	Initial Inventory Year[1]	Population Count[1]	Recent Inventory Year[2]	Population Count[2]	Trend
Houghton's goldenrod	Horseshoe Bay S	2008	≈500	2015	≈400	Apparently Stable
Houghton's goldenrod	I-75 N Fen	2004	1	2015	≈1,500	Apparently Stable
Houghton's goldenrod	I-75 S Fen	1987	?	1987	?	Unknown
Houghton's goldenrod	Point Aux Chenes	1985	50	2023	2,356	Apparently Stable
Houghton's goldenrod	Rabbits Back Point	2008	≈200	2012	≈100	Apparently Stable
Houghton's goldenrod	St. Martain Point	1987	≈50	2015	≈1,000	Apparently Stable
Houghton's goldenrod	Summerby Swamp	1987	≈90	2015	≈300	Apparently Stable
lakeside daisy	Brevoort Late Rd	1996	120	2023	417	Apparently Stable
lakeside daisy	M-134	2014	28	2020	≈200	Apparently Stable

1-Reflects the year a population count or estimate was documented, not the year of initial discovery
2-Reflects the last year a population count or estimate was made. Occurrence may have been subsequently monitored with no population count or estimate.
*Indicates only a partial inventory of the occurrence was conducted.

What is the status and trend of the monitoring indicator in relation to the target?

Monitoring Indicator (i): 2600 Wildlife, Fish and Sensitive Plant Habitat Management, Federal Threatened and Endangered Species and Regional Forester Sensitive Species (RFSS), page 2-17, Goal 1 states "The Hiawatha National Forest contributes to the conservation and recovery of federal threatened and endangered species" and 2600 Wildlife, Fish and Sensitive Plant Habitat Management, Federal Threatened and Endangered Species and Regional Forester Sensitive Species (RFSS), page 2-17, Standard 1 states "Signed federal recovery plans for threatened and endangered species will be implemented." Given these Forest Plan goals and standards, it is assumed that recovery actions for all five federally threatened plant species will be implemented and the target for monitoring indicator (i) will be 5.

Monitoring Indicator (ii): There is no target for this monitoring indicator.

Monitoring Indicator (iii): Number of species removed from TES lists: There is no target for this monitoring indicator.

Monitoring Indicator (iv): TES Population Trends: 2600 Wildlife, Fish and Sensitive Plant Habitat Management, Federal Threatened and Endangered Species and Regional Forester Sensitive Species (RFSS), page 2-17, Goal 1 states "The Hiawatha National Forest contributes to the conservation and recovery of federal threatened and endangered species" and 2600 Wildlife, Fish and Sensitive Plant Habitat Management, Federal Threatened and Endangered Species and Regional Forester Sensitive Species (RFSS), page 2-17, Standard 1 states "Signed federal recovery plans for threatened and endangered species will be implemented." Given these Forest Plan goals and standards, it is assumed that population trends for the five threatened plant species should be stable, at a minimum,

therefore the target for monitoring indicator (iv) will be stable trends for all five federally threatened plant species.

Table 39. Question 14 - Summary of monitoring evaluation trends for all indicators

Current Status	Trend Towards Target	Trend Away from Target
Within target	2	0
Outside target	0	0

What level of confidence is there in the accuracy and precision?

High to moderate confidence in the data for Monitoring Indicators (i). The data sources for this monitoring indicator include: 1. documented monitoring of Threatened, Endangered, and Sensitive (TES) plant occurrences in the Natural Resource Manager (NRM) Threatened, Endangered & Sensitive Plants-Invasive Species (TESP-IS) and Michigan Natural features Inventory (MNFI) Biotics geodatabases, 2. accomplished non-native invasive species (NNIS) treatments in the NRM TESP-IS geodatabase that occurred within occupied TES plant habitat or in adjacent unoccupied TES plant habitat, 3. documented project level surveys for TES plants in the NRM TESP-IS geodatabase or annual MNFI survey reports, and 4. design features incorporated in the proposed action of projects intended to avoid or minimize impacts to TES plant occurrences. TES plant monitoring data in the MNFI Biotics geodatabase is accurate and readily available. Project level surveys for TES plants are documented by MNFI in an annual survey report and are accurate and thorough. All accomplished TES plant monitoring and surveys and NNIS treatments are entered into the NRM TESP-IS geodatabase annually and are accurate and readily available. However, some accomplished activities may not have been entered into the NRM TESP-IS database due to position vacancies or lack of familiarity with the database over the years.

High to moderate confidence in the data used for Monitoring Indicator (ii). The data source for this monitoring indicator is accomplished non-native invasive species (NNIS) treatments in the Natural Resource Manager (NRM) Threatened, Endangered & Sensitive Plants-Invasive Species (TESP-IS) database that occurred within occupied threatened, endangered, or sensitive (TES) plant habitat or in adjacent unoccupied TES plant habitat. Accomplished NNIS treatments are entered into the NRM TESP-IS database annually and are accurate and readily available. However, some accomplished NNIS treatments may not have been entered into the NRM TESP-IS database due to position vacancies or lack of familiarity with the database.

High confidence in the data used for Monitoring Indicator (iii). The data source for this monitoring indicator is the Eastern Region Regional Forester Sensitive Species (RFSS) list and associated species risk evaluations in the Eastern Region RFSS database. The Eastern Region RFSS list has been documented since its inception and is accurate and readily available.

Moderate confidence for Monitoring Indicator (iv). The data source for this monitoring indicator is documented population counts or estimates for Threatened, Endangered, and Sensitive (TES) plant occurrences documented in the in the Natural Resource Manager (NRM) Threatened, Endangered & Sensitive Plants-Invasive Species (TESP-IS) and Michigan Natural features Inventory (MNFI) Biotics geodatabases. TES plant monitoring entered into the MNFI Biotics geodatabase is accurate and readily available. Accomplished TES plant monitoring is entered into the NRM TESP-IS geodatabase annually and is accurate and readily available. However, some accomplished TES plant monitoring

may not have been entered into the NRM TESP-IS database due to position vacancies or lack of familiarity with the database. Additionally, many of the population counts of TES plant occurrences made during monitoring are estimates, resulting in some uncertainty in accessed population trends.

Monitoring Discussion and Findings

Monitoring Indicator (i): Number of TES species for which recovery actions are accomplished

Management actions recommended for the conservation of Regional Forester Sensitive Species (RFSS) plants are detailed in species-specific conservation approaches. To date only one conservation approach has been drafted for RFSS plants on the Hiawatha National Forest, the "Conservation Approach for Goblin fern (Botrychium mormo)," There are no species-specific conservation approaches for the remaining 64 RFSS plant species on the Hiawatha National Forest. In lieu of these conservation approaches, and species-specific management practices, the Hiawatha National Forest contributes to the conservation of RFSS plants by implementing project specific design features intended to avoid and minimize adverse effects. These design features are recommended and implemented as needed, on a project-by-project basis.

Between 2020 and 2024 the Hiawatha National Forest accomplished recovery actions listed in the species-specific US Fish and Wildlife Service Recovery Plans for five federally threatened plant species. Below is a summary of those recovery actions.

Hart's tonguefern (*Asplenium scolopendrium* var. *americanum*)

- Protect known occurrences (implement design features to prevent direct effects, as needed).
- Conduct field surveys to determine new occurrences (conduct project level surveys, as needed).
- Monitor known occurrences (intermittently).

Pitcher's thistle (*Cirsium pitcheri*)

- Protect known occurrences (implement design features to prevent direct effects, as needed).
- Manage and restore habitat (conduct non-native invasive species control in occupied habitat, intermittently).
- Monitor known occurrences (annually).

dwarf lake iris (*Iris lacustris*)

- Protect known occurrences (implement design features to prevent direct effects, as needed).
- Manage and restore habitat (conduct non-native invasive species control in occupied habitat, annually).
- Monitor known occurrences (annually).

Houghton's goldenrod (Oligoneuron houghtonii)

- Protect known occurrences (implement design features to prevent direct effects, as needed).
- Conduct field surveys to determine new occurrences (conduct project level surveys, as needed).
- Monitor known occurrences (intermittently).
- lakeside daisy (*Tetraneuris herbacea*)

- Protect known occurrences (implement design features to prevent direct effects, as needed).
- Monitor known occurrences (annually).

Monitoring Indicator (ii): Acres of habitat improved for TES species

The primary activity in which the Hiawatha National Forest improves habitat for federally threatened plant species and Regional Forester Sensitive Species (RFSS) plants is controlling non-native invasive species within occupied and suitable unoccupied habitat. Controlling non-native invasive species reduces the threat of competition and maintains habitat suitability. Between 2020 and 2024 the Hiawatha National Forest conducted 23 non-native invasive species treatments, totaling 57.5 acres, that improved habitat for three federally threatened plant species and five RFSS plants. Most notably, a total of 29.6 acres of spotted knapweed (*Centaurea stoebe*), and common reed (*Phragmites australis*) treatments were conducted between 2020 and 2024 in Wedens Bay to improve habitat for the federally threatened dwarf lake iris (*Iris lacustris*).

Monitoring Indicator (iii): Number of species removed from TES lists

Prior to 2020 there were 64 plant species on the Hiawatha National Forest's Regional Forester Sensitive Species (RFSS) list. Between 2020 and 2024, three plant species were removed from the RFSS list and four plant species were added to the RFSS list, bringing the total to 65 plant species. The RFSS list was updated in 2020 with the addition of roundleaf violet (*Viola rotundifolia*), which had recently been documented within the proclaimed boundary and is the only known occurrence in Michigan. In 2022 limestone swamp bedstraw (*Galium brevipes*) was added to the RFSS list automatically due to the national conservation rank of vulnerable to secure (N3N4). In 2024 two non-vascular plant species, firedot lichen (*Caloplaca parvula*) and Lescur's pohlia moss (*Pohlia lescuriana*), were removed from the RFSS list because there were no documented occurrences of either species within the proclaimed boundary. Northern prostrate clubmoss (*Lycopodiella margueritiae*) was also removed from the RFSS list in 2024 but replaced with northern appressed clubmoss (*Lycopodiella subappressa*) due to some clarification on the identity of the species. Additionally, woodland pinedrops (*Pterospora andromedea*) was readded to the Hiawatha's RFSS list in 2024, after being removed from the RFSS list between 2011 and 2017. The completion of a risk assessment concluded there have been declines within some of the eastern, disjunct populations which warranted adding woodland pinedrops to the RFSS list. The removal of species from the RFSS list is not necessarily an indication of the Hiawatha National Forest's efforts to increase the population viability of a given species. Species are typically removed following the availability of new information, such as the documentation of new occurrences, range expansion, population increases, etc., and the completion of a risk evaluation that concludes viability is not a concern.

Monitoring Indicator (iv): TES Population Trends

Trends for Regional Forester Sensitive Species (RFSS) plants were not assessed during the 2020-2024 monitoring period, or any previous monitoring period, due to insufficient data. Data gaps for RFSS plant occurrences resulted from a lack of monitoring, a lack of population counts or estimates during monitoring efforts, or a lack of documenting monitoring efforts.

Trends for federally threatened plants were assessed during the 2020-2024 monitoring period, and prior monitoring periods, because sufficient data resulting from reoccurring monitoring and population counts or estimates were available. Below is a summary of the threatened plant monitoring.

Hart's tongue fern (Asplenium scolopendrium var. americanum)
Hart's tongue fern primarily occurs in Ontario, Canada and Michigan and New York, with disjunct populations in Tennessee, Alabama, and New Mexico. In Michigan, Hart's tonguefern occurs on limestone boulders and outcrops of the Niagara Escarpment in mesic northern forests of the eastern Upper Peninsula. There are eight occurrences of Hart's tonguefern on the Hiawatha National Forest, all of which are in northern Mackinac County. Two new occurrences of Hart's tonguefern were discovered in 2007 and 2012, and additional occurrences are possible in suitable habitat without recent botanical surveys. All eight Hart's tonguefern occurrences were monitored during the 2020-2024 monitoring period, with population counts indicating all eight occurrences are stable.

Range wide threats to Hart's tonguefern include habitat alteration and destruction resulting from logging and quarrying. Logging activities that alter the canopy conditions and thus light and moisture regimes threatened Harts tonguefern occurrences on the Hiawatha National Forest. However, design features, such as no activity, no disturbance buffers, are intended to avoid and minimize adverse effects to Hart's tonguefern occurrences. Occurrence monitoring and surveying of suitable habitat is anticipated to continue into the foreseeable future on the Hiawatha National Forest.

Pitcher's thistle (Cirsium pitcheri)
Pitcher's thistle is endemic to the Great Lakes region, occurring along the margins of Lakes Huron, Michigan, and Superior in Ontario, Canada and Illinois, Indiana, Michigan, and Wisconsin. In Michigan, Pitcher's thistle occurs in open sand dunes along Lakes Huron, Michigan, and Superior. There are two occurrences of Pitcher's thistle on the Hiawatha National Forest, both in Mackinac County. The two occurrences are part of one population that almost continuously extends seven miles along the Lake Michigan shoreline from Pointe aux Chenes Bay northwest along the dune system adjacent to US-2. The most recent population counts were gathered in 2014, though the occurrences were annually monitored during the 2020-2024 monitoring period, with monitoring indicating both occurrences are stable.

Range wide threats to Pitcher's thistle include habitat alteration and destruction resulting from development and recreational activities, including off-highway vehicle (OHV) traffic, and non-native invasive species. The Pitcher's thistle occurrences on the Hiawatha National Forest occur in popular recreation areas and are threatened by foot traffic and illegal OHV use. Adventive weevils introduced to control non-native invasive thistle species also pose a threat to Pitcher's thistle occurrences. Weevil detection surveys occurred on the Hiawatha National Forest during the 2020-2024 monitoring period, with positive detections in 2022, but no detections in 2024. Occurrence monitoring and weevil detection surveys are anticipated to continue into the foreseeable future on the Hiawatha National Forest.

Dwarf lake iris (Iris lacustris)
Dwarf lake iris is endemic to the Great Lakes region, occurring along the northern shores of Lakes Huron and Michigan in Ontario, Canada, and Michigan and Wisconsin. In Michigan, dwarf lake iris occurs in coastal boreal forests, rich conifer swamps, ridge swale complexes, and dune systems. There are four occurrences of dwarf lake iris on the Hiawatha National Forest, one in Delta County and three in Mackinac County. One occurrence at Pointe aux Chenes Bay was last observed in 1991 and is presumed to be extirpated. One occurrence on the St. Martin Peninsula was discovered in 2014. Two extant occurrences were monitored during the 2020-2024 monitoring period, with population counts indicating both occurrences are stable. The other extant occurrence on Round Island was last monitored in 2009.

Range wide threats to dwarf lake iris include habitat alteration and destruction resulting from development and recreational activities, including off-highway vehicle traffic, natural succession, and non-native invasive species. The primary threat to the occurrences on the Hiawatha National Forest is competition and habitat alteration from non-native invasive species. Off-highway vehicle (OHV) traffic is also a threat for the dwarf lake iris occurrence at Wedens Bay, though evidence of OHV use has been intermittent during past monitoring. Dwarf lake iris occurrence monitoring is anticipated to continue into the foreseeable future on the Hiawatha National Forest.

Houghton's goldenrod (Oligoneuron houghtonii)
Houghton's goldenrod is endemic to the Great Lakes region, primarily occurring along the northern shores of Lakes Huron and Michigan in Ontario, Canada, and Michigan, with disjunct occurrences in western New York. In Michigan, Houghton's goldenrod occurs in a variety of communities near the northern shores of Lakes Huron and Michigan in the Straits region. There are fifteen occurrences of Houghton's goldenrod on the Hiawatha National Forest, all of which are in Mackinac County. Three occurrences were first documented during the 2020-2024 monitoring period, and additional occurrences are possible in suitable habitat without recent botanical surveys. One additional occurrence was monitored during the 2020-2024 monitoring period, with population counts indicating the occurrence is stable. Two and seven occurrences were previously monitored in 2012 and 2015, respectively, with population counts indicating occurrences were stable. The status of the two remaining occurrences is unknown.

Range wide threats to Houghton's goldenrod include habitat alteration and destruction resulting from development and recreational activities, including off-highway vehicle (OHV) traffic, and non-native invasive species. The primary threat to the occurrences on the Hiawatha National Forest is illegal OHV use and competition and habitat alteration from non-native invasive species. There is a need to monitor Houghton's goldenrod occurrences on the Hiawatha National Forest and survey suitable habitat, since additional, undocumented occurrences may be possible.

Lakeside daisy (Tetraneuris herbacea)
Lakeside daisy is endemic to the Great Lakes region, primarily occurring in alvar communities in Ontario, Canada, and Illinois, Michigan, and Ohio. In Michigan, lakeside daisy habitat is not entirely known, though it seems to have an affinity to upland transition zones within calcareous northern fens of the eastern Upper Peninsula. There are two occurrences of lakeside daisy on the Hiawatha National Forest, both occurring in Mackinac County and adjacent to roads and within right-of ways. One occurrence is along both sides of Brevoort Lake Rd, occurring primarily on Michigan Nature Association land to the north, with three smaller subpopulations on Hiawatha National Forest land to the south. The other lakeside daisy occurrence is along M-134 and was documented in 2014. Both lakeside daisy occurrences were monitored during the 2020-2024 monitoring period, with population counts indicating both occurrences are stable.

Range wide threats to lakeside daisy include habitat destruction resulting from commercial quarrying, grazing, and development and natural succession resulting from fire suppression. On the Hiawatha National Forest both lakeside occurrences are vulnerable to and threatened by right-of-way maintenance. To ensure population redundancy and the long-term persistence of the species, the Hiawatha National Forest is collaborating with Michigan Nature Association, in coordination with the US Fish and Wildlife Service, to establish a new population of lakeside daisy on the Hiawatha National Forest. Lakeside daisy occurrence monitoring is anticipated to continue into the foreseeable future on the Hiawatha National Forest.

Adaptive Management Considerations

The Forest Plan monitoring program is meant to "enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed" (36 CFR 219.12).

Changes to monitoring indicators for monitoring question 14 are not needed since they can be used to roughly answer "To what extent is forest management contributing to the conservation of threatened and endangered species?"

The Hiawatha National Forest does not have the data available to adequately assess population trends for RFSS plants in monitoring indicator (iv). Investing in and making a concerted effort to monitor RFSS plant occurrences and document any prior RFSS plant monitoring in the NRM TESP-IS geodatabase is recommended and necessary to properly assess monitoring indictor (iv).

Table 40. Question 14 - Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan			X
Management activities	X		
Plan monitoring program			X

Monitoring Element 5 – Status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.

Monitoring Question 19. To what extent is the Forest providing snowmobile and OHV opportunities?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
Annually	2024	2 Years	Stricken from previous reports	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) Miles of designated snowmobile trails	2300 Motorized/non-motorized Trails, page 2-6 Goals 1 - 3, Objectives 2 - 4.
(ii) Miles of designated OHV trails ***(added 2025)***	2300 Motorized/non-motorized Trails, page 2-6 Goals 1 - 3, Objectives 2 - 4.
(iii) Miles of OML 2 forest roads open to snowmobile and OHV use ***(added 2025)***	2300 Motorized/non-motorized Trails, page 2-6 Goals 1 - 3, Objectives 2 - 4.
(iv) Miles of OML 3-5 forest roads open to OHV use ***(added 2025)***	2300 Motorized/non-motorized Trails, page 2-6 Goals 1 - 3, Objectives 2 - 4.
(v) Snowmobile and OHV trail agreements in place ***(added 2025)***	2300 Motorized/non-motorized Trails, page 2-6 Goals 1 - 3, Objectives 2 - 4.
Who Collected this data?	Recreation, GIS and Planning Programs
Who is responsible for analyzing the question?	Brian Hinch, Acting Forest Recreation Program Mgr Becky Cain, Forest Planner

Monitoring Results

The following results reflect updates from data collected by GIS Specialist, Shoshana Rosenberg on October 6th, 2025. This monitoring question was not included in previous reports.

Data

To better address the Monitoring Element – *Status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives*, the Forest added four new indicators to Question 19 that help determine progress toward meeting Forest Plan Objectives under 2300 Motorized/Non-motorized Trails. Previously, Question 19 evaluated only snowmobile use; it now includes both snowmobile and OHV use.

There are two tables within the Forest Plan that provide overarching guidance for meeting the snowmobile and OHV opportunities and objectives on the Hiawatha. Table 2300-5. Off-highway Vehicle (OHV) Trails, Roads and OHV Areas, and Table 2300-6. Snowmobile Trails, Roads and Snowmobile Areas (Forest Plan, pg. 2-6).

Table 2300-5. Off-Highway Vehicle (OHV) Trails, Roads and OHV Areas

Type of Access	Total
Maximum miles of trails	75 miles
Maximum miles of ML 3-5 Forest Service roads	150 miles
Maximum miles of ML 2 Forest Service roads	2,100 miles
Maximum acres of OHV area	15 acres

Figure 13. Question 19. - Forest Plan guidance for OHV use

Table 2300-6. Snowmobile Trails, Roads and Snowmobile Areas

Type of Access	Total
Maximum miles of groomed trails	340 miles
Maximum miles of open, ungroomed ML 3-5 roads	373 miles
Maximum miles of open, ungroomed ML 2 roads	2,100 miles
Maximum acres of snowmobile area	15 acres

Figure 14. Question 19. - Forest Plan guidance for Snowmobile use

Miles of designated snowmobile trails - The Forest manages 327 miles of designated snowmobile trails: 166 miles on the West Zone and 161 miles on the East Zone.

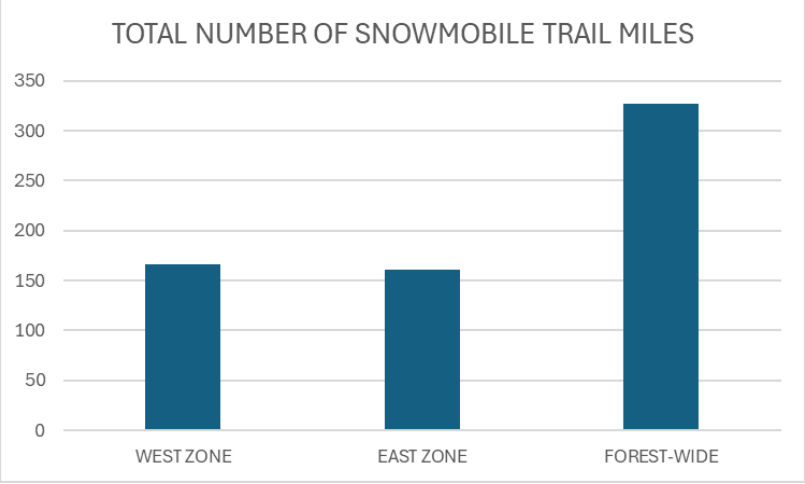


Figure 15. Question 19 - Total number of snowmobile trail miles currently on the Hiawatha National Forest

Miles of designated OHV trails - There is a total of 29 miles of OHV trails under FS jurisdiction, with 15 miles on the West Zone and 14 miles on the East Zone. Note: these calculations include segments that do not overlap roads open to OHV use.

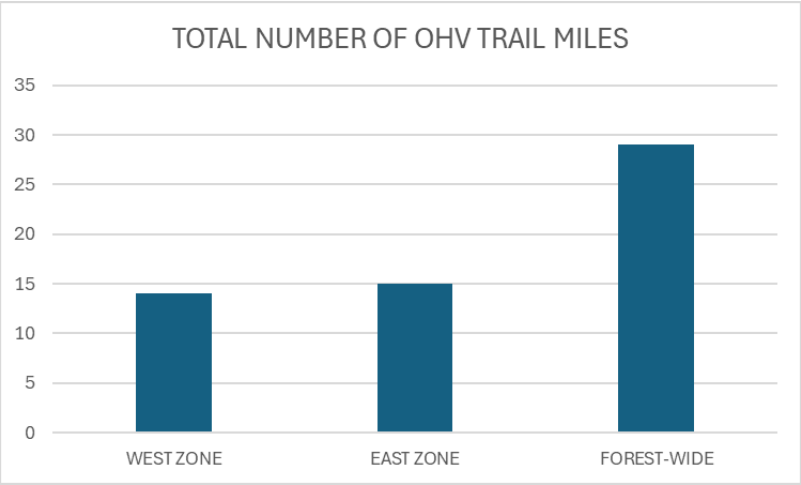


Figure 16. Question 19 - Total number of OHV trail miles on the Hiawatha National Forest

Miles of OML 2 forest roads open to snowmobiles and OHV use - There is a total of 1,628 miles of OML 2 roads open to snowmobile (ungroomed) and OHV use, with 1,051 miles on the West Zone and 577 miles on the East Zone.

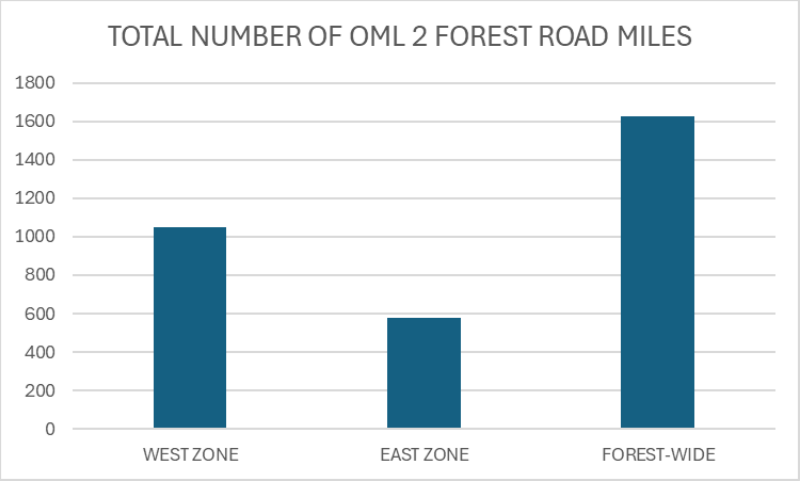


Figure 17. Question 19 - Total number of OML 2 road miles open to snowmobile and OHV use

Miles of OML 3-5 forest roads open to OHV use - There is a total of 197 miles of OML 3-5 roads open to OHV use, with 70 miles on the West Zone and 127 miles on the East Zone.

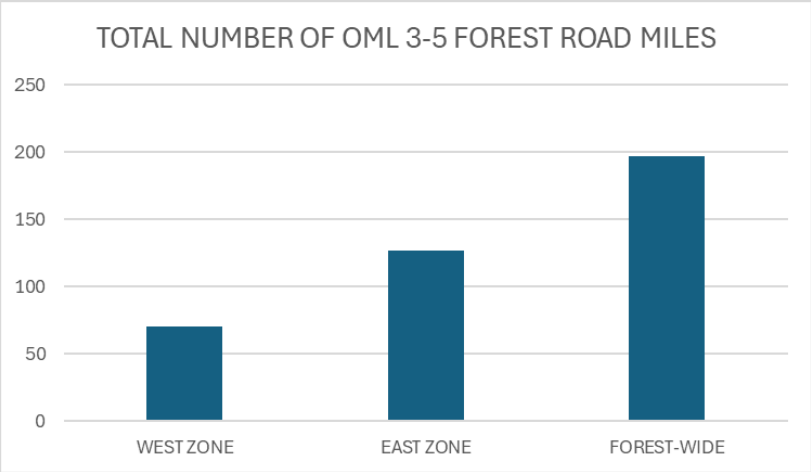


Figure 18. Question 19 - Total number of OML 3-5 road miles open to OHV use

Snowmobile and OHV trail agreements in place – The Forest Plan's 2300 Motorized & Non-motorized Trails Objective 2 states, "In this planning period, complete a snowmobile and OHV trail agreement with the State and other Michigan National Forests." The planning period mentioned in this objective covers 2006-present. The Forest entered into two 5-year agreements with the State and Michigan National Forests for the management of OHV routes and trails in 2006 and 2010. The last agreement expired in 2015, and no agreement was signed during this monitoring period (2019-2024). The Hiawatha entered into an agreement for the management of snowmobile trails in 2006. That agreement expired in 2011, and no new agreement was signed during this monitoring period (2020-2024).

What is the status and trend of the monitoring indicator in relation to the target?

The Forest Plan allows up to 340 miles of designated/groomed snowmobile trails (Table 2300-6, pg. 2-6). Based on the current number of miles of groomed snowmobile trails the Forest is approximately 13 miles below the allowable 340mile maximum. Current mileage is within the allowable range and moving toward the maximum.

The Forest Plan allows up to 75 miles of designated OHV trails (Table 2300-5, pg. 2-6). Based on the current numbers, the Forest is approximately 46 miles under our maximum allowed mileage. Current mileage is within the allowable range and moving toward the maximum.

Forest Plan guidance allows up to 2,100 miles of Operational Maintenance Level (OML) 2 forest roads be available for snowmobile and OHV use. The Forest currently has approximately 1,628 miles of OML 2 roads, all of which are open to ungroomed snowmobile and OHV use. Current mileage is within the allowable range and moving toward the maximum.
Forest Plan guidance allows up to 150 miles of OML 3-5 forest roads to be available for OHV use, and 373 miles be available for ungroomed snowmobile use. The Forest currently has approximately 197 miles of OML 3-5 roads open to OHV use, this is 47 miles over the Forest Plan guidance. The Forest is

outside of and trending away from its targeted amount. Current mileage is within the allowable range and moving toward the maximum.

Table 41. Question 19 – Status of snowmobile and OHV opportunities available on Forest

Road/Trail Type	Forest Plan Guidance	Current Miles	Difference
Snowmobile Trails	Up to 340 total miles	327 miles	13 miles
OHV Trails	75 miles	29 miles	46 miles
OML 2 Roads Open to snowmobiles and OHVs	~2,100 miles	1,628 miles	472 miles
OML 3-5 Roads Open to OHVs	150 miles	197 miles	47 miles

Table 42. Question 19 - Summary of monitoring evaluation trends for all indicators

Current Status	Trend Towards Target	Trend Away from Target
Within target	3	1
Outside target		1

What level of confidence is there in the accuracy and precision?

Confidence in trail mileage data is high due to reliance on regularly updated GIS datasets.

Monitoring Discussion and Findings

Given that the Forest is currently only 13 miles under the allowed miles of groomed snowmobile trails, the Forest should be strategic on utilizing this remaining mileage in collaboration with the Michigan Department of Natural Resources.

Collaboration with MDNR should acknowledge that OML 3–5 OHV mileage exceeds Forest Plan guidance, which will limit further discussions regarding connectivity routes on forest.

Adaptive Management Considerations

The Forest Plan monitoring program is meant to "enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed" (36 CFR 219.12).

Annual verification of snowmobile trail mileage with GIS staff may help ensure compliance with the Forest Plan standard. Continued coordination may help maintain trail connectivity for both snowmobile and OHV users.

A Forest Plan amendment may be considered if changes to trail designations are warranted. The current 5-year agreements between the Michigan National Forests and the State of Michigan for the management of snowmobile trails and OHV routes and trails are expired. Renewing these agreements may improve coordinated trail management.

Table 43. Question 19 - Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan	X		
Management activities	X		
Plan monitoring program	X		

Monitoring Question 20. To what extent is the Forest providing and maintaining a variety of inland lake watercraft accesses in motorized and non-motorized settings?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
Annually	2024	2 Years	Stricken from previous reports	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) Number of access sites by setting	2300 Great Lakes and Inland Lakes Access, page 2-5 Goal 1 and Objective 2
Who Collected this data?	Recreation and Fisheries Programs
Who is responsible for analyzing the question?	Brian Hinch, Acting Forest Recreation Program Manager

The Hiawatha has a variety of managed inland lake watercraft access sites across the Forest. In terms of type, these access sites are categorized as either back-in or carry-in (Table 44). They can also be categorized based on the Recreation Opportunity Setting (Table 45). The Forest has many access sites documented in Roaded Natural (RN) or Semi-Primitive Motorized (SPM) recreation opportunity settings across both zones. All ten of the Semi-Primitive Non-Motorized (SPNM) accesses listed represent individual lakes within the Big Island Lake Wilderness; in reality, most of these lakes have two or more accesses (e.g., trail in, trail out, campsite), but each lake is counted only once to not over-represent the level of access. Access sites in SPNM settings are low development, generally lower use, and typically low impact in nature. Finally, further down the development scale is the opportunity to carry-in to lakes with no developed access. Overall, the Forest maintains a variety of inland lake watercraft access opportunities across setting types.

Table 44. Question 20 - Access type by Zone

Inland Lake Access by Type	East Zone	West Zone	Total
Back-in	7	32	39
Carry-in*	8	22	30
Total	15	54	69

*Note: these are *managed* carry-in access sites. However, there are myriad opportunities across the Hiawatha for visitors to carry-in to inland lakes without formally managed access, and some visitors prefer this recreation opportunity.

Table 45. Question 20 - Access setting by Zone

Inland Lake Access by Setting	East Zone	West Zone	Total
Roaded Natural	10	33	43
Semi-Primitive Motorized	5	11	16
Semi-Primitive Non-Motorized	0	10	10
Total	15	54	69

New Science or Other Information

No new science was considered in the evaluation of this monitoring question. However, it is worth acknowledging an emerging technology that may increase non-motorized/carry-in access to sites traditionally considered inaccessible. Inflatable craft have seen major technological advancements in recent years, and there are indications that people are carrying inflatables further and through woods considered inaccessible for hard boats and then inflating when they arrive at the waterbody – commonly known as pack-rafting. In a similar vein, with improved battery technology and the ability to manufacture smaller items with lightweight materials, it may be easier to achieve motorized use in traditionally non-motorize settings.

Monitoring Results

These results reflect data collected in 2025 and summarized in the tables above. Since this question was not included in previous reports, no trend comparison is available.

Data

According to the 2025 data, 43% of managed inland lake access sites on the Hiawatha are carry-in while 57% are back-in. 86% of access in motorized settings (RN or SPM) while the remaining 14% are in a non-motorized setting (SPNM – Big Island Lake Wilderness). Confidence in these data is moderate. Data quantity is relatively high as several staff from recreation and fisheries provided lists of inland lake water access for both zones. Additional low development access sites may exist but are not fully documented. Data quality is moderate as there is some classification uncertainty exists due to differing interpretations of whether certain carry-in sites are formally managed. Similarly, there may be some back-in accesses may have developed beyond their originally intended level.

Monitoring Discussion and Findings

The indicator provides sufficient information to address the monitoring question. The Forest provides inland lake watercraft access across multiple setting types. Currently, no managed nonmotorized access sites are documented on the East Zone.

Adaptive Management Considerations

The Forest Plan monitoring program is meant to “enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed” (36 CFR 219.12).

For monitoring question 20, data show that inland lake watercraft access is available across motorized and nonmotorized settings.” Trend analysis is not possible because data were compiled for the first time in 2025. Based on current data, no changes to Forest Plan components were identified. In terms of management activities, inland lake watercraft accesses are relatively fixed – the Forest does not add or remove them frequently; instead, the primary associated activities are

monitoring and maintenance of existing accesses. Ongoing monitoring may help identify changes in access site development levels, emerging technologies, and user developed sites. Current management activities support a range of inland lake access opportunities.

Table 46. Question 20 **-** Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan			X
Management activities			X
Plan monitoring program			X

Table 47. Question 20 **–** Summary of where change may be warranted based on results

Evaluation Report Year	Result*	Recommendations (if applicable)	Recommendation Status
FY24	3	Examine fit/applicability of question and indicator with drivers; may be a better fit	Consider for next cycle

*Result: 1) Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); 2) Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired; 3) More time/data are needed to understand status or progress of the Plan Component(s); 4) Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; 5) Methods inadequate to answer monitoring question.

Monitoring Question 21. To what extent is wilderness being managed to protect the biological and physical resources and wilderness values while accommodating recreational uses?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
Annually	2024	10 Years	2019	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) Number of Wilderness Performance Elements met	2300 Wilderness, Goals 1
Who Collected this data?	Recreation and Wilderness Programs
Who is responsible for analyzing the question?	Andrew Rogers, Wilderness Program Manager

Wilderness Stewardship Performance (WSP) scores indicate that wilderness is successfully being managed to protect the biological and physical resources and wilderness values while accommodating recreational uses. The number of WSP elements met has increased from 2020 through the present. The 2019 M&E document did not report the number of WSP elements met.

Table 48. Question 21 - Number of performance elements met per year

Year	2020	2021	2022	2023	2024
Number of performance elements met	28	29	29	29	36

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Monitoring Results

These results reflect updates from data collected and reported annually in NRM-Wilderness from 2020 through 2024. This data represents new information collected since 2019; earlier reports did not include the number of WSP elements met.

Data

The table below shows that total elements met increased annually, while individual Wilderness trends varied. Two Wildernesses saw decreases in the number of WSP elements met in 2023, but both returned to an improving trend in 2024. Horseshoe Bay is the only Wilderness that has shown no changes over this monitoring period with six WSP elements being met in all five years.

Table 49. Question 21 - Number of performance elements met per year

Wilderness	2020	2021	2022	2023	2024
Big Island Lake	3	4	4	5	6
Delirium	6	6	6	5	7
Horseshoe Bay	6	6	6	6	6
Mackinac	5	5	5	4	6
Rock River Canyon	2	2	2	4	5
Round Island	6	6	6	5	6
Total	28	29	29	29	36

What is the status and trend of the monitoring indicator in relation to the target?

The nationally recognized threshold, according to the Forest Service Wilderness Stewardship Performance Guide, is for each Wilderness to meet at least six elements each year. Thus, the current condition across the Hiawatha's Wildernesses for these five years is mixed. The trend over these five years is positive – more Wildernesses met or exceeded the threshold at the end of the monitoring period than at the beginning.

Table 50. Question 21 **-** Summary of monitoring evaluation trends for indicator

Current Status	Trend Towards Target	Trend Away from Target
Within target		
Outside target	1	

Data quality and quantity increased over the monitoring period. There is better documentation at the end of the monitoring period than at the beginning. The last couple of years of data generation closely follow the Wilderness Stewardship Performance Guide; whereas, in earlier years, there were some deviations. Overall, data quality improved over the period, with later years more closely aligned with the Wilderness Stewardship Performance Guide.

Monitoring Discussion and Findings

The monitoring results adequately address the monitoring question. Monitoring indicates progress toward Forest Plan direction for wilderness stewardship. While performance varies among Wildernesses, recent data indicate improvement in several areas.
Continued application of the Wilderness Stewardship Performance Guide may help address remaining gaps.

Adaptive Management Considerations

The Forest Plan monitoring program is meant to "enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed" (36 CFR 219.12). In this case, the plan, when paired with the supplementary Wilderness Stewardship Performance Guide, provides direction for managing wilderness to protect the biological and physical resources and wilderness values while accommodating recreational use.

Table 51. Question 21 - Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan			X
Management activities	X		
Plan monitoring program			X

Table 52. Question 21 – Summary of where change may be warranted based on results

Evaluation Report Year	Result*	Recommendations (if applicable)	Recommendation Status
FY24	2	N/A	N/A

*Result: 1) Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); 2) Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired; 3) More time/data are needed to understand status or progress of the Plan Component(s); 4) Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; 5) Methods inadequate to answer monitoring question.

Monitoring Question 22. To what extent are Wild and Scenic River values being managed to protect the biological and physical resources while accommodating recreational uses?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
By Project	2024	2 Years	Stricken from previous reports	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) *Outstandingly Remarkable Values* ***maintained and enhanced (Edited 2025)***	2300 Wild and Scenic Rivers, page 2-9 Goals 1 and 4
Who Collected this data?	Recreation and Wilderness Programs
Who is responsible for analyzing the question?	Andrew Rogers, Wilderness Program Manager

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Monitoring Results

This question was not included in previous reports. To provide context for this monitoring question, fisheries, hydrology, and recreation staff were asked about recent or past Wild and Scenic River projects across the Hiawatha. Past management has included habitat work on the Indian and Carp Rivers. Other designated rivers have received management attention, though documentation is more limited. Through the Forest's landscape management efforts, there has been a steady amount of vegetation management and transportation system updates across the five Wild and Scenic Rivers' watersheds, including within the designated corridors. Recent work near the rivers has included prescribed fire, riparian planting, and recreation management activities aligned with Wild and Scenic Rivers objectives.

In recent years, several projects which qualify as "water resources projects" have occurred within the bed or banks of a designated river, which requires Wild and Scenic Rivers Act Section 7 review. The 2021 Carp FR3458 bridge replacement (completed in 2024) protects free flow and the Carp's ORVs while allowing for a safe and low impact crossing of the Carp in an area with busy dispersed uses. The 2022 Carp I-75 Abutment Armoring project (completed in 2024) protected free flow and the Carp's ORVs by sustaining current infrastructure at one of the busiest crossings on the Forest. The 2023 Indian FR2258 bridge replacement (completed in 2023) protects free flow and the Indian's ORVs while allowing for a safe and low impact crossing of the Indian River adjacent to a popular access point. The 2023 Carp FR3445 review approved removal of the existing 5-pier bridge and replacement with a new 2-pier bridge, which would improve free-flowing condition, if implemented, while sustaining the river's ORVs.

In 2023, an annual river-clearing contract began to re-open the Indian River (which is a system water trail) following several years without trail clearing. In 2024, an Outfitter and Guide permit was issued to a kayak outfitter on the Indian River, allowing for expanded recreational access to the river. Also in 2024, all Hiawatha recreation staff participated in a training on the Indian River which included discussion around Wild and Scenic designation and its purpose, training on paddling safety practices and equipment, and familiarization with a variety of nonmotorized watercraft; all of which supports management of Wild and Scenic Rivers to protect and enhance the values for which they were designated.

Passive management maintains existing freeflowing conditions and Outstandingly Remarkable Values (ORVs) Only included here are those specific projects and actions which generated some amount of documentation.

Data

Table 53. Question 22 - Project name and values protected or enhanced

Project	Values actively protected or enhanced
2021 Carp FR3458 Replacement	Free flow, ecological, fisheries, geologic, historic, recreational, wildlife
2022 Carp I-75 Abutment Armoring	Free flow, ecological, fisheries, geologic, historic, recreational, wildlife
2023 Indian FR2258 Bridge Replacement	Free flow, fisheries, hydrology, recreational, scenic, wildlife
Indian River annual clearing (2023, 2024)	Recreational
Indian River O&G Permit issued 2024	Recreational
2024 All-Forest River Training on Indian River	Recreational (improves management across all WSRs on the Hiawatha)

Monitoring results indicate that multiple actions protected or enhanced free flow and ORVs. There are several documented instances of actions which actively protected or enhanced free flow or ORVs. Further, holding these resources under the protection of the agency and managing for healthy watersheds also contributes to protecting free flow, water quality, and ORVs. The target for this monitoring indicator is to sustain each river's ORVs. There is not necessarily a specific number or range to attain; the goal is to see no diminishment of ORVs.

Table 54. Question 22 - Summary of monitoring evaluation trends for all indicators

Current Status	Trend Towards Target	Trend Away from Target
Within target	1	0
Outside target	0	0

The level of confidence is high for actions taken on Wild and Scenic Rivers during the monitoring period, since we have good records for the last two years. Data quality and quantity are both good for

this period. We also protect the ORVs passively through adjacent land and recreation management, but confidence in these outcomes is lower since there is not the same level of documentation compared to active management.

Monitoring Discussion and Findings

The list of Section 7 projects and other Wild and Scenic activities provides enough context to determine whether and to what extent river values are being managed to protect the biological and physical resources while accommodating recreational uses. The monitoring results indicate that the Forest has a robust Wild and Scenic Rivers management program that is appropriately responding to needs on the ground in order to protect biophysical resources while accommodating recreational uses. The Forest Plan direction linked to this monitoring question is being achieved. These results show that Forest staff are actively studying proposed water resources projects to ensure that they protect or enhance each river's ORVs. Beyond water resources projects, the Forest is taking steps internally and externally to support both resource management and recreational use

Adaptive Management Considerations

The Forest Plan monitoring program is meant to "enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed" (36 CFR 219.12). In this case, the plan provides ample direction to ensure that Wild and Scenic River values are being managed to protect the biological and physical resources while accommodating recreational uses.

Table 55. Question 22 **-** Summary of where change may be warranted based on all results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan			X
Management activities			X
Plan monitoring program	X		

Table 56. Question 22 - Monitoring indicator status summary

Evaluation Report Year	Result*	Recommendation(s) (if applicable)	Recommendation Status
2024	**2**	Change indicator to regionally used terminology. *i. Outstandingly remarkable values maintained and enhanced*	Question #22 indicator was changed for the 2020-2024 M&E Report.

***Result: 1)** Interval of data collection beyond this reporting cycle (*indicate date of next time this monitoring item will be evaluated*); **2)** Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired**; 3)** More time/data are needed to understand status or progress of the Plan Component(s)**; 4**) Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired**; 5)** Methods inadequate to answer monitoring question.

Monitoring Question 23. What is the status of visitor use and visitor satisfaction?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
5 Years	2021	6 Years	2017*	**Yes**

*Visitor Use and Satisfaction reporting is on a six-year interval. Past data has been retained here for continuity.

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) National Visitor Use Monitoring Metrics (2022 NVUM)	**2012 Planning Rule Required Monitoring Element**
Who Collected this data?	**Forest Staff**
Who is responsible for analyzing the question?	**Brian Hinch, Acting Forest Recreation Program Manager**

Monitoring Results

The latest National Visitor Use Monitoring (NVUM) survey for the Hiawatha National Forest was conducted in fiscal year 2022 (October 1, 2021–September 30, 2022). NVUM estimated approximately 698,200 annual visits to the Forest. An estimated 1,200 sitelevel recreation visits were recorded. Most visits occurred in the General Forest Area, followed by use of dayuse sites. Eighty-three percent of respondents reported being very satisfied with their visit.
Other satisfaction factors that were measured were visitor satisfaction with Forest-Wide Road Conditions (95.7 percent either very satisfied or somewhat satisfied with road conditions) and visitor satisfaction with Forest-Wide Signage (99.6 either very satisfied (79.62 percent) or somewhat satisfied with signage). Respondents also rated satisfaction with elements of developed and dispersed recreation sites.

The figures below highlight those results:

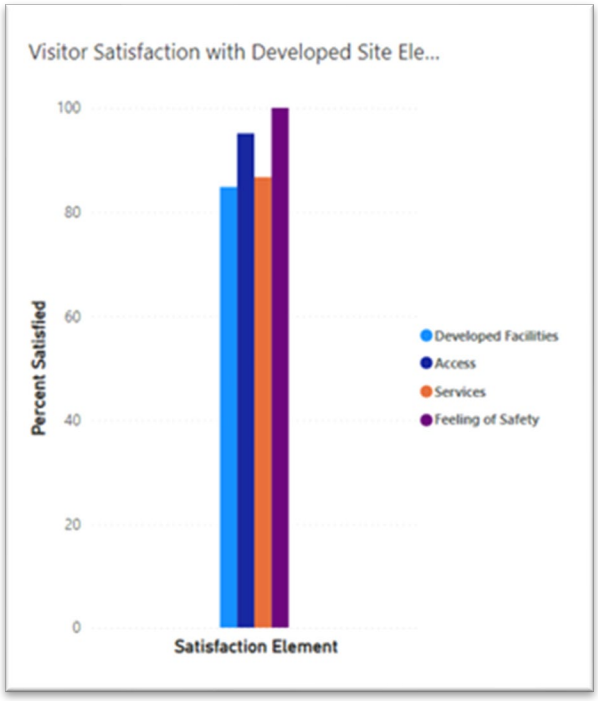


Figure 19. Question 23 – Visitor Satisfaction with Developed Recreation Sites

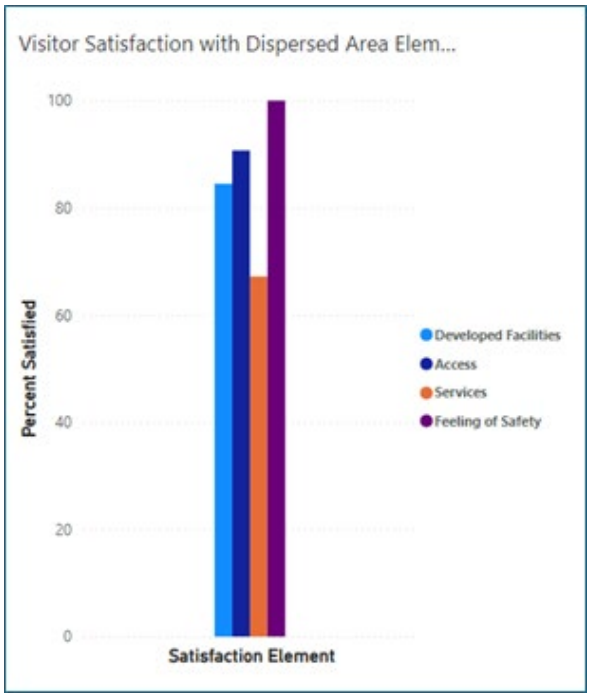


Figure 20. Question 23 - Visitor Satisfaction with Dispersed Recreation Sites

Data

What is the status and trend of the monitoring indicator in relation to the target?

No Forest Plan targets are associated with these indicators

What level of confidence is there in the accuracy and precision? Data was collected by survey staff across the Forest and compiled by the Washington Office.

Adaptive Management Considerations

No adaptive management changes were identified based on current results.

Monitoring Element 6 – Climate change and other stressors

Monitoring Question 24. How are the timing and duration of winter weather conditions changing across the plan area on an annual basis and management implications?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
Daily	2024	2 Years	2019	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) Accumulated Winter Season Severity Index (AWSSI). Index is based on data measured on a daily basis. *(1) Max temperature* *(2) Min temperature* *(3) Snowfall* *(4) Snow depth* *(ii) Winter duration **(added 2025)***	2012 Planning Rule Required Monitoring Element
Who Collected this data?	Multiple Forest Programs
Who is responsible for analyzing the question?	Becky Cain, Forest Planner/Climate Coordinator

New Science or Other Information

Forest Plan Direction - The monitoring element for climate change was added in 2016 as an administrative change to the 2006 Hiawatha National Forest Plan. While the Forest Plan does not directly address the effects of climate change, management direction and mitigation measures designed around forest health, by extension, include management for the effects of climate change.

Specifically, the plan provides forest-wide management direction for resources such as wildlife, fish, and sensitive plant habitat management (page 2-16), forest pest management (page 2-22), and fire management (page 2-23). Adaptations to mitigate climate change are included in the discussions for environmental management (page 2-2), vegetation management (page 2-10), and watershed management (page 2-13).

Climate change indicators were developed to identify key impacts to the Great Lakes region and track how changing climate is affecting Forest resources. Many activities depend on the winter season. As a result, the Forest chose to monitor winter severity and duration to assess how climate change is affecting activities guided by the Forest Plan.

The accumulated winter season severity index (AWSSI) tool provides an objective measure of annual and historic winter conditions dating back to 1951. The data incorporate maximum and minimum temperature, seasonal duration, snowfall, and snow depth, which are used to calculate an overall rating system from which winter severity can be quantified and compared from year to year.

The AWSSI was developed by the Midwestern Regional Climate Center (MRCC) to objectively quantify and describe the relative severity of the winter season. Defining the AWSSI Season – The AWSSI is not limited to meteorological winter (December – February) but is intended to capture winter weather from its earliest occurrence to its last.

Goals of AWSSI

- Use max/min temperature, snowfall, and snow depth to objectively index winter weather conditions.
- Create a historical database of AWSSI for locations with available temperature, snowfall and snow depth.
- Compare season to season AWSSI for a particular location in climatological context.
- Allow users access to objective data to make winter-informed decisions, especially pertaining to snow removal, commerce, and transportation.

The winter season begins with the first occurrence of any one of the following:

- First measurable snowfall greater than or equal to 0.1 inch
- Maximum temperature less than or equal to 32° F
- Winter season begins on December 1 if conditions above have not been observed.

The winter season ends with the last occurrence of any of the following:

- Last measurable snowfall greater than or equal to 0.1 inch
- Last day with 1 inch of snow on the ground
- Last day with max temperature less than or equal to 32°F
- Winter season ends February 28/29 if the above conditions occurred.

Monitoring Results

Weather station data from Sault Ste. Marie and Marquette, Michigan were used to calculate the average scores for the planning area. Data recorded over the planning period (2020-2024) indicate a broad array of seasonal conditions ranging from extreme to mild over a relatively brief period, which is consistent with measured data in temperature and snowfall.

Long-term shifts in temperatures, timing, and duration of climatic seasons can directly affect resource management—similarly, ecological conditions for habitat and species living at the margins of their survivable range. Changing climatic conditions may influence insect or disease dynamics.
Severe weather resulting from climate change could also result in an increased number of large-scale disturbances such as wind, ice storms, floods, and wildfire events.

The following results reflect updates from data collected since 1950, including this reporting period.

- The length of winter in Marquette area (West Zone) has remained relatively consistent since 1950, while AWSSI values suggest increasing variability in winter severity.
- The length of winter in Sault Ste Marie area (East Zone) has changed very little since 1950 AWSSI values for the East Zone suggest slightly lower winter severity during recent decades.

Data

Marquette, Michigan – West Zone data

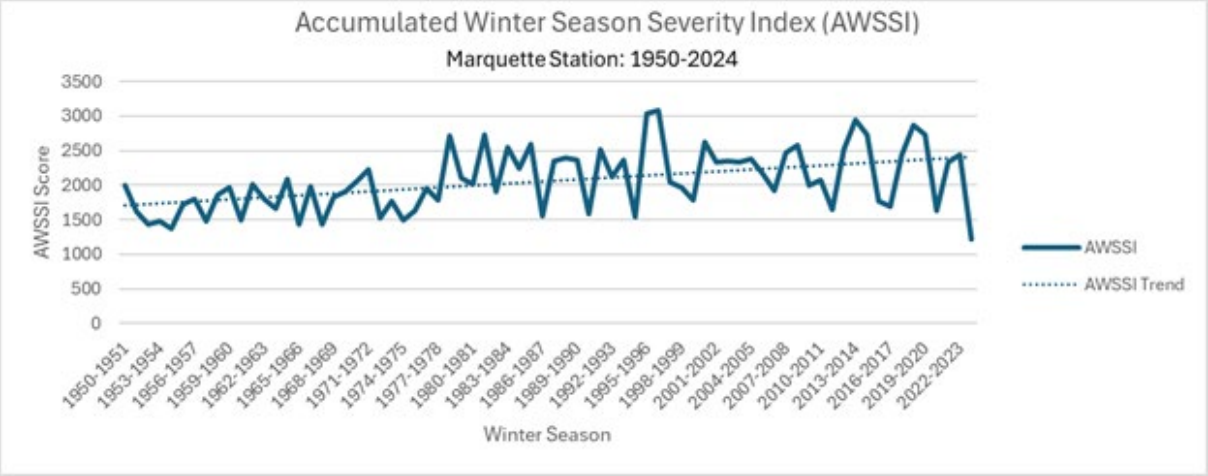


Figure 21. Question 24 - AWSSI for Marquette Station (1950-2024)

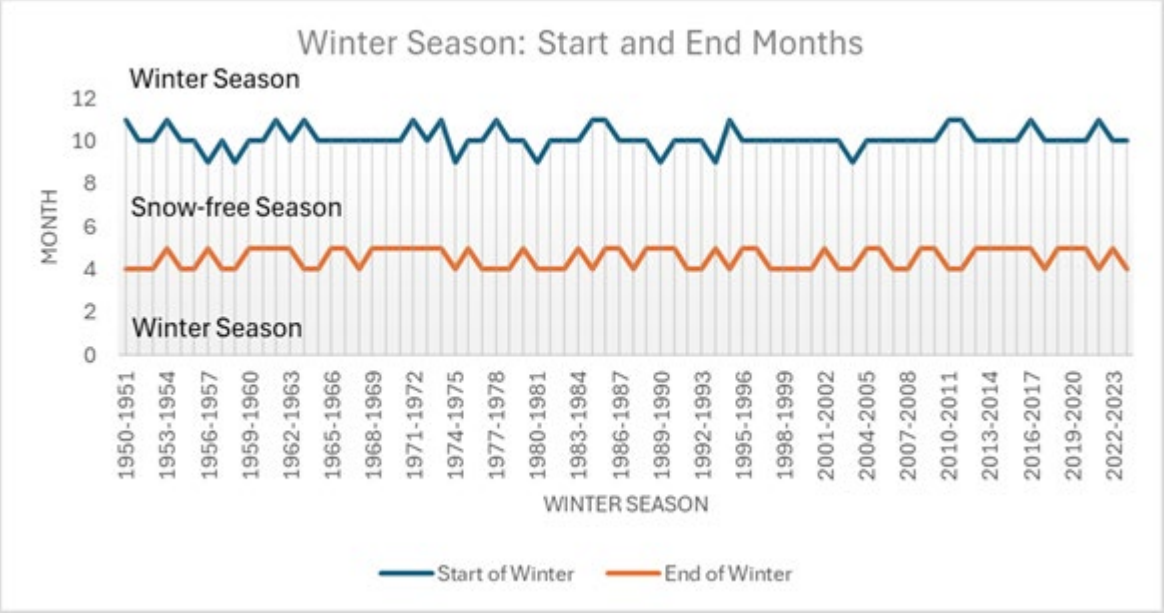


Figure 22. Question 24 - Winter Season Start and End Months for Marquette Station

Table 57. Question 24 - Winter Duration and AWSSI by decade for Marquette Station

Winter	Average Winter Start	Average Winter End	Average Length of Winter (Days)	AWSSI
1950-1959	October	April	177	1640
1960-1969	October	May	201	1769
1970-1979	October	May	189	1908
1980-1989	October	May	186	2243
1990-1999	October	May	186	2260
2000-2009	October	April	179	2293
2010-2019	October	May	188	2266
2020-2024	October	May	178	2068
Winter	**Actual Winter Start**	**Actual Winter End**	**Actual Length of Winter (Days)**	**AWSSI**
2019-2020	10/12/2019	5/10/2020	212	2727
2020-2021	10/2/2020	5/7/2021	218	1628
2021-2022	11/1/2021	4/27/2022	178	2331
2022-2023	10/17/2022	5/8/2023	204	2438
2023-2024	10/28/2023	4/23/2024	179	1217

Earliest Winter Start – 9/19/1956
Latest Winter Start – 11/19/1994 and 11/19/2016
Earliest Winter End – 4/5/1955
Latest Winter End – 5/24/2002
Average Winter Length 1950-2024: 197 days
Average AWSSI 1950-2024: 2061

Sault Ste Marie, Michigan – East Zone data

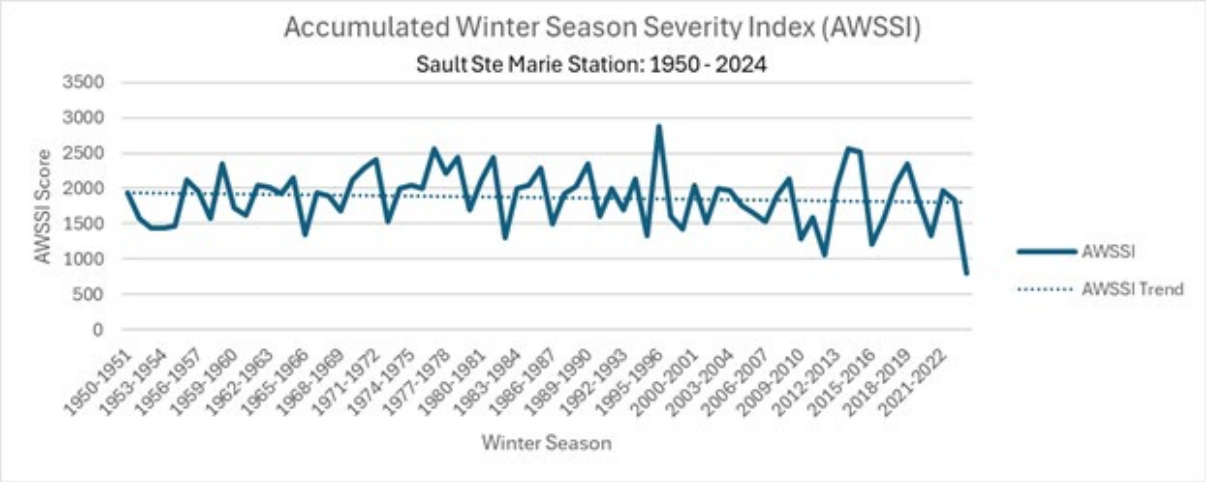


Figure 23. Question 24 - AWSSI for Sault Ste Marie Station (1950-2024)

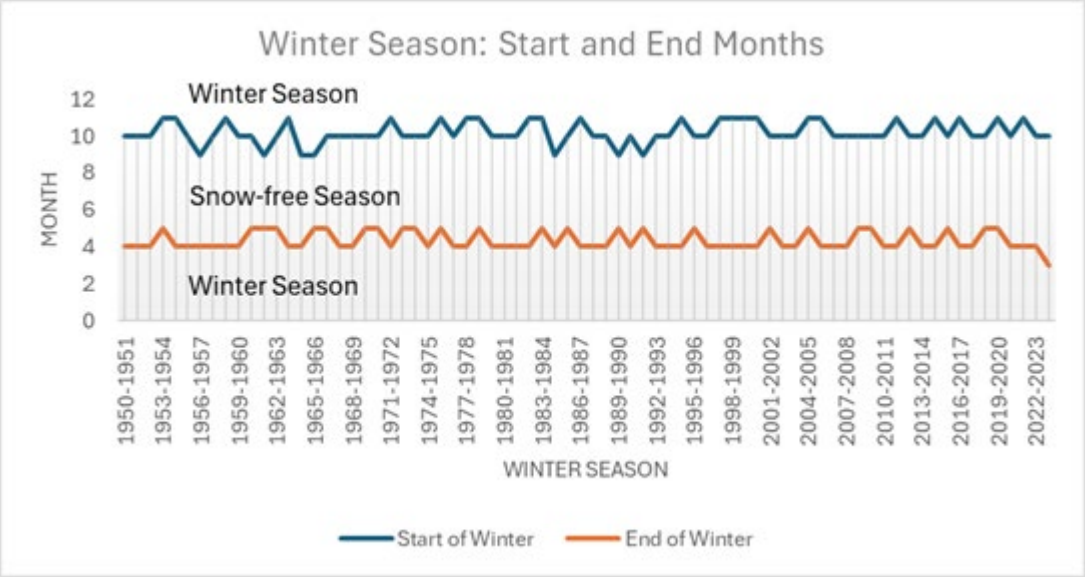


Figure 24. Question 24 - Winter Season Start and End Months for Sault Ste Marie Station

Table 58. Question 24 - Winter Duration and AWSSI by decade for Sault Ste Marie Station

Winter	Average Winter Start	Average Winter End	Average Length of Winter (Days)	AWSSI
1950-1959	October	April	177	1765
1960-1969	October	May	201	1835
1970-1979	October	May	189	2159
1980-1989	October	April	186	1936
1990-1999	October	April	186	1542
2000-2009	October	April	179	1791
2010-2019	October	April	188	1823
2020-2024	October	April	178	1547
Winter	**Actual Winter Start**	**Actual Winter End**	**Actual Length of Winter (Days)**	**AWSSI**
2019-2020	11/1/2019	5/9/2020	191	2351
2020-2021	10/16/2020	4/26/2021	193	1795
2021-2022	11/2/2021	4/18/2022	168	1338
2022-2023	10/19/2022	4/24/2023	188	1976
2023-2024	10/30/2023	3/25/2024	148	1827

Earliest Winter Start – 9/20/1956
Latest Winter Start – 11/22/1994
Earliest Winter End – 3/25/2024
Latest Winter End – 5/28/1966
Average Winter Length 1950-2024: 186 days
Average AWSSI 1950-2024: 1817

What is the status and trend of the monitoring indicator in relation to the target? There are no targets for these monitoring indicators.

What level of confidence is there in the accuracy and precision? There is a high degree of confidence in the data.

Monitoring Discussion and Findings

Changes to a variety of uses could occur depending on winter severity and duration. Winter recreation is a common activity on the Forest. Reduced winter duration or severity could affect activities reliant on frozen conditions and may shift recreation use toward warmer season opportunities. Some vegetation management projects are designed to occur only during the winter to allow heavy equipment to be used while saturated soils are frozen. Shorter or warmer winters could reduce frozen-ground work windows and increase the risk of soil disturbance during winter operations.

Adaptive Management Considerations

The Forest Plan monitoring program is meant to "enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed" (36 CFR 219.12).

The type of data being used to monitor these trends (changes in intensity and duration of winters) show very gradual changes over periods of time. **Extending the monitoring interval to 10 years may better reflect the gradual nature of long-term climate trends.**

Add a second indicator (ii) winter duration. Adding 'winter duration' as a second indicator may improve understanding of future management needs.

Add "and management implications" to the end of Question 24. If trends continue to move away from desired conditions, the Forest may need to consider changes in management practices and in future Forest Plan revisions.

Based on monitoring for forest health, there is no current need to revise practices or guidelines concerning climate change. However, the Forest recognizes climate change as an evolving science. Ongoing climate vulnerability assessments and collaborative efforts may inform future updates to climate monitoring questions and indicators. Additional indicators addressing other stressors (e.g., invasive species, insect and disease trends) may strengthen this monitoring question.

Table 59. Question 24 - Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan			X
Management activities			X
Plan monitoring program	X		

Table 60. Question 24 - Monitoring indicator status summary

Evaluation Report Year	Result*	Recommendation(s) (if applicable)	Recommendation Status
2024	3	Add indicator ii. Winter Duration	Indicator was added for the 2020-2024 M&E Report.

***Result:** **1)** Interval of data collection beyond this reporting cycle (*indicate date of next time this monitoring item will be evaluated*); **2)** Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired**; 3)** More time/data are needed to understand status or progress of the Plan Component(s)**; 4**) Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired**; 5)** Methods inadequate to answer monitoring question.

Monitoring Element 7 – Desired conditions and multiple-use opportunities

Monitoring Question 25. How close are projected outputs and services to actual?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
Annually or on a multiple year interval depending on resource	2024	2–10 Years	2019	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) A quantitative and qualitative estimate of performance, comparing outputs and services with those projected by the Forest Plan.	36 CFR 219.12 (a)(5)(vii) Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities. Forest Plan Appendix A, page A-1 – prescribes projected timber output levels, location (by ecological land type), and saw timber/pulpwood mix. Appendix A also provides an allowable sale quantity (ASQ) of 108.5 million board feet per year used as a reference to annual outputs.
Who Collected this data?	Timber Program via USFS Standard reporting, PTSAR Reports.
Who is responsible for analyzing the question?	Travis Coughlin, Forester

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Monitoring Results

The following results reflect updates from data collected from fiscal year 2020 to 2024 PTSAR reports and are displayed in the table below.

Data

Table 61. Question 25 - Summary of monitoring evaluation trends for all indicators

Fiscal Year	Timber Sold (Million Board Feet)	Percent of Allowable Sale Quantity (ASQ)
2020	37.6	34.7%
2021	58.1	53.5%
2022	62.9	58.0%
2023	68.4	63.0%
2024	70.3	64.8%

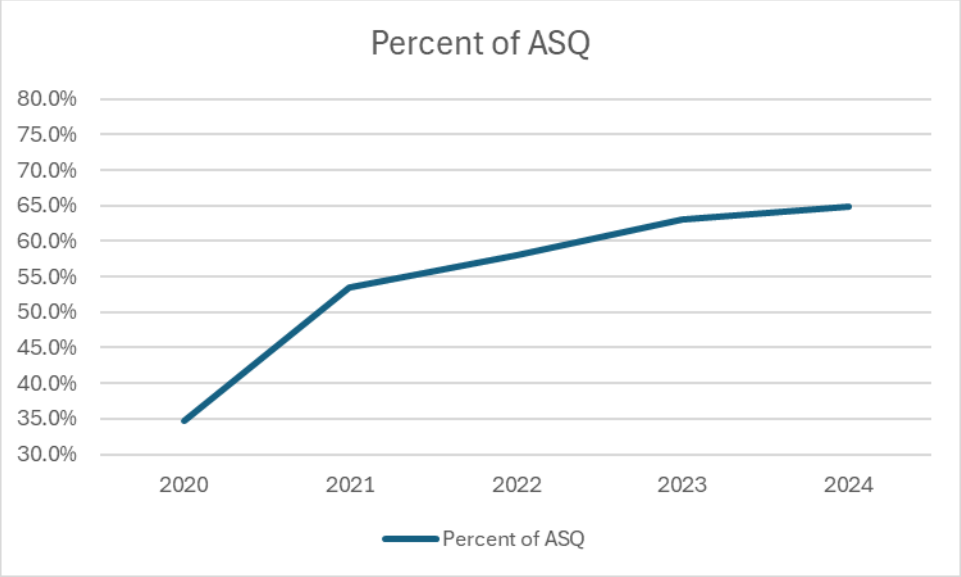


Figure 25. Question 25 - Summary of monitoring evaluation trends for all Question 25 indicators

What is the status and trend of the monitoring indicator in relation to the target?

Timber volume sold increased from 2020 to 2024, approaching the allowable sale quantity (ASQ).

Table 62. Question 25 - Summary of monitoring evaluation trends for all indicators

Current Status	Trend Towards Target	Trend Away from Target
Within target		
Outside target	1	

What level of confidence is there in the accuracy and precision?

Confidence in the data is high because it is derived from documented timber sale bidding records.

Monitoring Discussion and Findings

Timber production between 2020 and 2024 has increased and is expected to continue to grow in the future. Although timber outputs increased over the period, timber outputs have remained below the ASQ in all fiscal years to date.

Adaptive Management Considerations

The Forest Plan monitoring program is meant to "enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed" (36 CFR 219.12).

Based on increasing output trends, but not meeting ASQ, management approaches or Forest Plan output expectations may warrant further evaluation.

Table 63. Question 25 - Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan		X	
Management activities	X		
Plan monitoring program			X

Monitoring Question 27. To what extent is the Forest meeting the vegetative composition objectives?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
2-10 Years	2024	2–10 Years	Stricken from previous reports	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) Vegetative composition percentages by ELTP and MA	2400 Vegetation Management – Desired Conditions 1 and 2; Goals1-3
Who Collected this data?	Silviculture Program
Who is responsible for analyzing the question?	Marjorie Allmaras

New Science or Other Information

Using the 2004 stand exam data that was used to develop the Forest Plan and the stand exam data from August 2025, the ForIST seral coder was run. The 2004 stand exam data was used to calculate the existing condition for the 2006 Forest Plan, and the stand exam data from 2025 is the resulting data after 19 years of Forest Plan implementation.

Current acre totals differ from 2006 Forest Plan values due to two primary factors. First, there are minor differences in mapping protocol between data layers. This causes small polygon mismatches, “slivers”, among stand, ELT and suitability layers. These slivers were removed during the 2006 analysis but incorporated into larger polygons for the 2025 analysis. Also, changes were made to the suitability layer through a Forest Plan amendment.

Monitoring Results

MA 1.2 includes about 32,000 acres suited for timber production and about 50 acres of upland openings. Between 2004 and 2025 about 20,000 acres changed in either forest type or size class, and about 3,100 acres were harvested. This MA is managed primarily for aspen fiber, deer and grouse habitat, and dispersed recreation. The VCG reflects these goals in that they are primarily aimed at creating a balance of age classes in the Aspen and Mid Seral classes.

In MA 1.2 ELT 70A and 80A are about 300 acres each, ELT 10/20 is about 1,300 acres, and ELT 30, 40/50/90 and 80B are each about 3,000 acres. This makes them fairly minor components in any one project area. ELTs that dominate this MA are 60 at about 8,300 acres and 70B with 12,900 acres, so most of the harvesting since 2004 has focused on these two ELTs. This management emphasis is reflected in the results in the table below where most of the cells are either moving towards or are within the VCG. In the past five years, limited harvest on winter-only soils corresponds with reduced acres in A1 (ELT 70B).

MA 2.3 is about 177,800 acres suited for timber production and 60 acres of upland openings. Between 2004 and 2025 about 63,300 acres changed in either forest type or size class, and about

36,700 acres were harvested. This MA is managed primarily for hardwood sawlog and veneer lumber, recreation, and wildlife species such as red-shouldered hawk, American marten and redback salamander. The VCG are aimed primarily at large size / late seral class, which translates on the ground as uneven-aged hardwood stands of primarily sugar maple and American beech, with other species included as a minor component of most stands. Beech bark disease and emerald ash borer have caused widespread mortality in American beech and ash since 2004, causing many late seral stands to move down to size class 3.

ELT 80A is about 1,200 acres, ELT 70A is about 2,900 acres, and ELT 40/50/90 dominates this MA at about 101,700 acres. The rest of the ELTs range from 6,000 acres to 24,000 acres. In the past decade most treatments focused in the 40/50/90 ELT.

Most of this MA is within or moving towards VCG. One exception is aspen, due to a lack of harvest size classes 5 and 4 have increased and size class 1 has declined substantially.

MA 4.2 is about 104,900 acres suited for timber production and 100 acres of upland openings. Between 2004 and 2025 about 21,300 acres changed in either forest type or size class, and about 28,000 acres were harvested. This MA is managed primarily for conifer timber, for the economy and wildlife species, such as red squirrel, American marten, Kirtland's warbler and pine warbler. The desire for Kirtland's warbler habitat is reflected in the VCG for jack pine on ELT 10/20 (about 31,100 acres). A lot of red pine was planted in the CCC era on ELT 30 (about 32,500 acres). The Forest Plan desired condition keeps most of this red pine on the landscape, which is reflected in the large percentage of desired condition in the mid seral class, size classes 4 and 5 on ELT 30. ELT 40 (about 17,700 acres) is managed for uneven-aged hardwoods.

Most of this MA is either moving towards or is within the VCG. On ELT 10/20 there is still an excess of aspen. While there has been an improvement in size class 5 there is still a lack. This is especially true for ELT 30 where the desired minimum is 9,500 acres and there is less than 1,000 acres.

MA 4.4 is about 97,800 acres suited for timber production and 1,000 acres of upland openings. Between 2004 and 2025 about 41,100 acres changed in either forest type or size class, and about 21,000 acres were harvested. It is primarily managed for Kirtland's warbler, sandhill crane, black-backed woodpecker and sharp-tailed grouse habitat. This habitat is achieved mostly through conifer management, especially jack pine on ELT 10/20. ELT 10/20 is about 75,800 acres, ELT 60 is about 10,600 acres, and ELT 70A is about 5,000 acres. The rest of the ELTs range between 400 acres and 2,600 acres.

Jack pine size classes 1 and 3 are below forest VCG. There was a 10-year period where only a small amount of jack pine was harvested. This combined with the salvage harvesting that happened between 2006 and 2010 has created an overabundance of size class 2.

Jack pine acreage remains below VCG minimums. Future conversion of some red pine stands to jack pine may be required to meet VCG thresholds. Some conversions have occurred within the past five years. In 2016 late seral on ELT 10/20 exceeded the maximum number of desired acres by 4,600 acres and it is now down to 2,000 acres.

On ELT 60 and 70A almost all of the seral classes are within or moving towards VCG. The exceptions are jack pine as discussed above. On ELT 10/20, other than the jack pine two other areas are moving away from the VCG. Openings have decreased from 10% to 9%, and the desired minimum is 11%. Also, late seral size class 3 exceeds the desired number of acres.

MA 4.5 is about 72,400 acres suited for timber production and 200 acres of upland openings. Between 2004 and 2025 about 21,771 acres have changed in either forest type or size class, and about 4,300 acres were harvested. MA 4.5 is primarily managed for older forest habitat for wildlife and wetland plant communities. This desired condition is reflected in the VCG with the high minimum percentages for late seral size classes 4 and 5 in all the ELTs. ELT 80B is about 21,200 acres, ELT 70B is about 15,600 acres, and ELT 60 is about 12,800 acres. The rest of the ELTs range between 1,500 acres and 8,000 acres.

Across all ELTs mid seral in most size classes is moving towards from the desired VCG. Across most ELTs and size classes, late seral is moving towards the desired VCG. Where it is not moving towards the desired VCG, it is generally due to stands growing into a larger size class but not being replaced by new stands. Aspen acreage across ELTs is below VCG expectations, corresponding with increases in midseral classes.

MA 6.2 is about 11,100 acres suited for timber production. Between 2004 and 2025 about 3,200 acres changed in either forest type or size class, and about 2.300 acres were harvested. MA 6.2 is primarily managed for semi-primitive motorized recreation. ELT 40/50/90 is about 5,400 acres, and ELT 10/20 is about 2,700 acres. The VCGs concentrate most of the desired condition into late seral size class 4 and 5 across all of the ELTs. On ELT 40/50/90 late seral size classes 4 and 5 are moving towards or are within VCG. On ELT 10/20 late seral size classes 1 and 3 are within, size class 2 exceeds and size class 4 and 5 lack acres. Additional conversion of aspen, jack pine, and midseral stands may be necessary to achieve VCG distributions.

MA 6.4 is about 25,000 acres on the East Zone of the HIF. Between 2004 and 2025 about 17,700 acres changed in either forest type or size class, and about 2,617 acres were harvested. Wetlands occupy about 64 percent of the area and is primarily managed for timber. ELT 80A is about 300 acres. ELTs 60, 70B and 80B are about 5,000 acres each. The rest of the ELTs range between 1,000 acres and 3,700 acres. MA 6.4 is managed for semi-primitive motorized recreation.

On ELT 60 and 70B there is an overabundance of acres in the mid seral class that need to be converted to late seral or aspen. On 80B there is a lack size class 1. These trends align with reduced harvest activity on winter only soils during the past decade.

MA 8.3 is about 46,000 acres. Between 2004 and 2025 about 11,200 acres have changed in either forest type or size class, and about 3,400 acres were harvested. Wetlands occur on about 64 percent of the MA, and it is primarily managed for older secluded forests that provide remote habitats. Because harvesting has primarily been thinning, aspen size classes across all ELTs are trending away from VCG.

ELT 60 is about 10,000 acres; ELT 10/20 is about 7,700 acres and 80B are about 6,300 acres. ELT 30, 70A and 70B are about 5,000 acres each and ELT 40 and 80A are about 3,000 acres each. Most of the seral/size classes on ELT 60 are trending towards or are within VCG. On ELT 10/20, aspen and late seral are trending away from VCG, but jack pine and mid seral are either within or trending towards. On ELT 80B most of the VCG are either trending towards or are within the desired range.

Data

Below is an example of the results from the ForIST run. It is for management area (MA) 1.2. Red means moved away from desired conditions. Turquois means moved towards desired conditions. Green means they maintained being within desired conditions. White means they continued being outside of desired conditions.

Table 64. Question 27 - Management Area 1.2 ForIST data

ELT		Aspen		Openings		Jack Pine		Late Seral		Mid Seral	
	Size Class	FW % Before/ After	FP Goals Min/Max %	FW % Before/ After	FP Goals Min/Max %	FW % Before/ After	FP Goals Min/Max %	FW % Before/ After	FP Goals Min/Max %	FW % Before/ After	FP Goals Min/Max %
10	0			4/4	1/3						
10	1	1/1	2/6			16/16	2/6		1/4	1/1	0/3
10	2	30/31	8/18			8/8	3/12	11/11	3/12	11/11	1/3
10	3	2/2	10/18				5/20	5/5	3/12	1/2	2/4
10	4	2/2	0/3				1/5	4/4	8/20	2/2	
10	5										
30	0			15/16	1/3						
30	1	4/3	4/10					2/2		3/3	2/10
30	2	26/29	14/25					6/5		8/7	6/15
30	3	5/6	17/30					3/3	4/12	4/5	7/15
30	4	5/2	0/5					6/7	5/13	11/10	8/20
30	5	0/1						0/1	3/12	0/1	2/10
40	0			10/10							
40	1	2/0	4/10								1/5
40	2	17/14	10/20					10/8	5/10	4/3	2/8
40	3	2/5	17/25					12/19	10/20	2/4	3/10
40	4	6/2	4/10					31/27	6/16	6/5	6/10
40	5								3/13		
60	0			1/1	1/3						
60	1	7/1	5/10							3/0	1/10
60	2	16/17	25/35			1/1		8/9	1/5	15/12	2/15
60	3	3/14	31/40					3/9	5/15	5/16	3/18
60	4	14/3	0/5					5/2	4/15	14/8	5/20

ELT		Aspen		Openings		Jack Pine		Late Seral		Mid Seral	
60	5							0/1	2/10	0/3	1/12
7A	0			1/1	0/100						
7A	1	6/6	3/6			2/2			1/10		1/7
7A	2	5/5	15/20			2/2		19/49	3/12	8/9	7/15
7A	3	0/0	20/30					18/8	5/15	22/4	6/15
7A	4	12/12	0/10					2/1	6/15	2/0	
7A	5										
7B	0			0/2	0/100						
7B	1	13/0	3/8							4/0	
7B	2	20/29	15/30					5/4		9/14	
7B	3	2/19	20/30					3/8		9/14	
7B	4	12/1	0/10					4/2		11/3	
7B	5	1/1						0/1		1/1	

What is the status and trend of the monitoring indicator in relation to the target?

Of the 520 vegetation composition goals, 357 are either within a desirable target range or trending towards the target, and 163 are either trending away from target or outside of a desirable target range.

Table 65. Question 27 **-** Summary of monitoring evaluation trends for all vegetation composition goals

Current Status	Within Desired Target Range	Trend Towards Target	Trend Away from Target	Outside Desired Target Range
Within target	24	181	58	
Outside target		152	55	50

ForIST uses the provided stand data to code the seral stage and size class on land suited for timber production and upland openings. Seral stage is based on ELT and forest type. Size class is coded in one of three ways. First, if the stand exam is less than 10 years old it is based on the quadric mean diameter of the stand. Second, if the stand exam is greater than 10 years old it assigns a size class based on year of origin of the stand. Third, if the stand is a hardwood stand, and there is no year of origin, it is based on the size density class. In 2004 64% of lands suited for timber production had stand exams less than 10 years old. In 2025 44% of lands suited for timber production had stand exams less than 10 years old.

Monitoring Discussion and Findings

Overall trends since 2004 show movement toward vegetation composition goals.

Between the 2016 and current analyses, fewer goals and acres moved toward targets than in earlier periods. Two management decisions appear associated with these changes in trend. The first one is the 2018 decision to change the large vegetation NEPA boundaries from management areas to watershed boundaries. The other was the decision to move forward with single forest type NEPA. An example of this is management area 4.4, which is primarily managed for Kirtland's warbler. When MA

boundaries were used this meant on the West Zone MA 4.4 was within 2 project areas and on the East Zone one project area. With the change to watershed boundaries MA 4.4 now falls within 12 different project areas. This made achieving desired block sizes more difficult. This made the Jack Pine Ecosystem Management EA necessary. The EA's focus on jack pine size class 1 limited opportunities to address other vegetation composition goals.

Adaptive Management Considerations

Realigning largescale vegetation NEPA boundaries with LTAs/MAs may improve the ability to manage toward VCGs.

Table 66. Question 27 – Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan			X
Management activities	X		
Plan monitoring program			X

Monitoring Question 28. Has public demand for commodity uses and non-commodity opportunities changed?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
Annually	2024	2 Years	2017	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) By resource, situations that generate resource damage or demand exceeds Forest capacity to provide ***(only vegetation management was addressed in this report)****.*	Appendix A, page A-1 2400 Vegetation Management, page 2-10; Forest Products, Goals 1-2 2700 Land Use Management, page 2-21, Goals 1-2 2800 Minerals and Geology, page 2-21, Goals 1 and 4 2300 Recreation; Great Lakes and Inland Lakes Access, page 2-5, Goals 1 and 3; Development and Recreation Facilities, page 2-7, Goal 1
Who Collected this data?	Timber Program
Who is responsible for analyzing the question?	Travis Coughlin, Forester

New Science or Other Information

No new science or other information was used to inform the response to this question.

Monitoring Results

Results reflect data collected annually from 2020 to 2024.

Data

Table 67. Question 28 - Personal Use firewood permit volume sold and assigned timber targets by fiscal year

Fiscal Year	Personal Use Permits (MBF)	Assigned Timber Target (MBF)
2020	*	*
2021	*	58
2022	579.83	63
2023	592.49	68
2024	641.23	70

*Timber targets were suspended and firewood permits issued as freeuse during the COVID19 pandemic.

What is the status and trend of the monitoring indicator in relation to the target?

Personal use firewood volume and assigned timber targets increased during the 2020–2024 period.

Table 68. Question 28 - Summary of monitoring evaluation trends for all indicators

Current Status	Trend Towards Target	Trend Away from Target
Within target	2	0
Outside target	0	0

What level of confidence is there in the accuracy and precision? There is a high degree of confidence in the accuracy and precision of the data.

Monitoring Discussion and Findings

Public demand for commodity and non-commodity timber uses is measured by permits sold and assigned timber target; both have increased between 2020 and 2024. Data gaps in FY2020–2021 resulted from COVID19 operational changes, during which timber targets were suspended and firewood permits were issued as free use. Increases in permit volume coincided with higher levels of recreation use on the Forest.

Adaptive Management Considerations

The Forest Plan monitoring program is meant to "enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed" (36 CFR 219.12).

Assigned timber targets, when combined with personal use firewood permits, is still well below the allowable sales quantity identified in the Forest Plan, so no changes are recommended based on the results of this monitoring question.

Monitoring Question 29. To what extent is the transportation system meeting Forest Plan Goals and Objectives?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
Annually	2016	2 Years	2017	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) Miles of roads decommissioned *(ii) Are roads reconstructed and maintained within guidelines* *(iii) Are road closures effective* *(iv) Miles of roads reconstructed and bridges constructed and/or reconstructed* *(v) Number of culverts replaced*	7700 Transportation System, page 2-25 **All Goals, Objectives and Guidelines** **2500 Watershed Management, page 2-13.**
Who Collected this data?	**Engineering Program, Watershed Program and BMP Interdisciplinary teams for the respective resource areas evaluated.**
Who is responsible for analyzing the question?	**Lindsey Goss, Watershed Program Manager**

Monitoring Results

The following results reflect data derived from GPAS reports during the 5-year span 2020-2024, National Core BMP Road Protocol evaluations monitored from 2015-2024, and State BMP Road Evaluation results from 2013 through 2024. State BMP Road Evaluations occurred exclusively on roads used for recent timber sales and are monitored concurrently with FSDMP monitoring units (refer to question 33). Populations for the National Core BMP Road Protocols included all forest roads. Sites were selected (randomly or non-randomly) following a standard ruleset outlined in the respective road protocol.

Data

Table 69. Question 29 - Transportation objectives accomplished for road decommissioning, reconstruction, stream crossing improvement as reported through GPAS per year (2020-2014)

	2020	2021	2022	2023	2024	Total
i. Miles of roads decommissioned (2020 & 2021 INFRA Roads, 2022-2024 WIT) **Objective**: 5 miles per year	8.3	7.8	5.9*	3.8*	8.6*	34.4
ii. Miles Road Reconstruct (Sum of passenger and high clearance Reconstructed INFRA Roads) **Objective:** 10 miles per year	4.5	3.2	1.8	2.2	3.3	15
v. Stream crossings and aquatic organism passage improvements,	2	1	2	8	5*	23

barrier removals and crossing removals (INRFA and WIT) **Objective:** 2 per year, and as needed						

*Internal records used due to accomplishment gaps in the NRM INFRA database and annual GPAS reports.

Transportation Objectives 1-3

- **FP 7700 Objective 1** is to reconstruct 10 miles of road per year. Total sum of miles of road reconstruction to passenger and high clearance roads, reported as accomplished in GPAS NRM INRFRA Roads was much **lower than the objective** within the monitoring period Incomplete database records may have contributed to this discrepancy.
- The **FP 7700 Objective 3** to decommission 5 miles of road per year was met for all but one year. Some accomplishments appear underreported in the database; supplemental sources (WIT, internal records) were used when discrepancies were identified.
- The Forest, on average, exceeded **FP 7700 Transportation Objective 3** to replace two major culverts annually.

Forest Transportation Result for BMP Guidelines
Monitoring results for the State of Michigan BMP and National Core BMP Program and were used to determine if the transportation system is meeting BMP guidelines and transportation goals.

FP 7700 Transportation Goal 1. A road system is provided that is structurally adequate, safe**, environmentally sound and appropriately located** to provide transportation that is responsive to public and management needs.
FP 7700 Road Closure/Decom Goal 1. Road closures are effective and appropriately signed.
FP 2500 Riparian Ecosystem Guideline 1. The state of Michigan "Water Quality Management Practices on Forest Land" (BMPs) should be implemented as a minimum standard for managing forest resources on Forest System land.

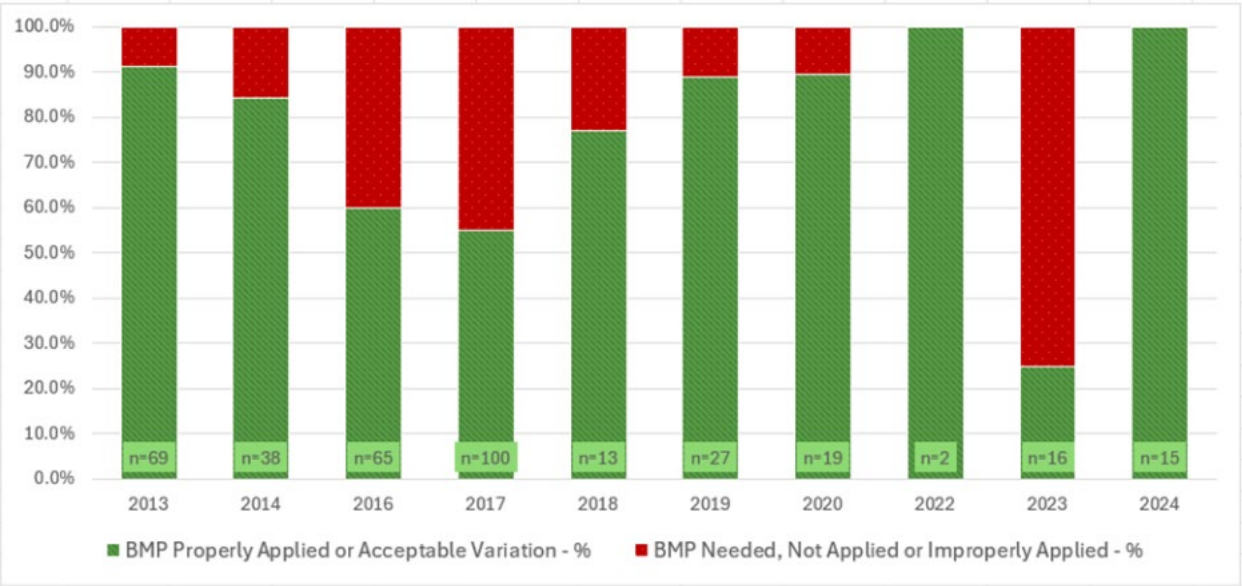


Figure 26. Question 29 - Application of State BMPs guidelines for roads in Timber Sales Areas.

State BMP results for roads used for timber operations throughout the monitoring period found:

- BMPs were properly applied to roads approximately 71% of the time.
- Proper application of BMPs for roads showed a decline from 2013 to 2017 with improvements made from 2018 through 2024 (Figure 26).
- 2023 results differed from other years, influenced by warmer, wet winter conditions and BMP application issues observed in one timber sale.
- The most common issue identified for road maintenance was cross drainage culverts not being sufficiently embedded. Cross drainage culverts should be embedded to 20% of their capacity to prevent ponding of water and to allow adequate transfer of ground water from one side of the road to the other.
- Other areas in need of improvement were BMPs pertaining to surface water drainage and stabilization. BMPs: Broad based dips, water diversion ditches, filter strips, cut slopes, in slopes, out slopes, and crowning.

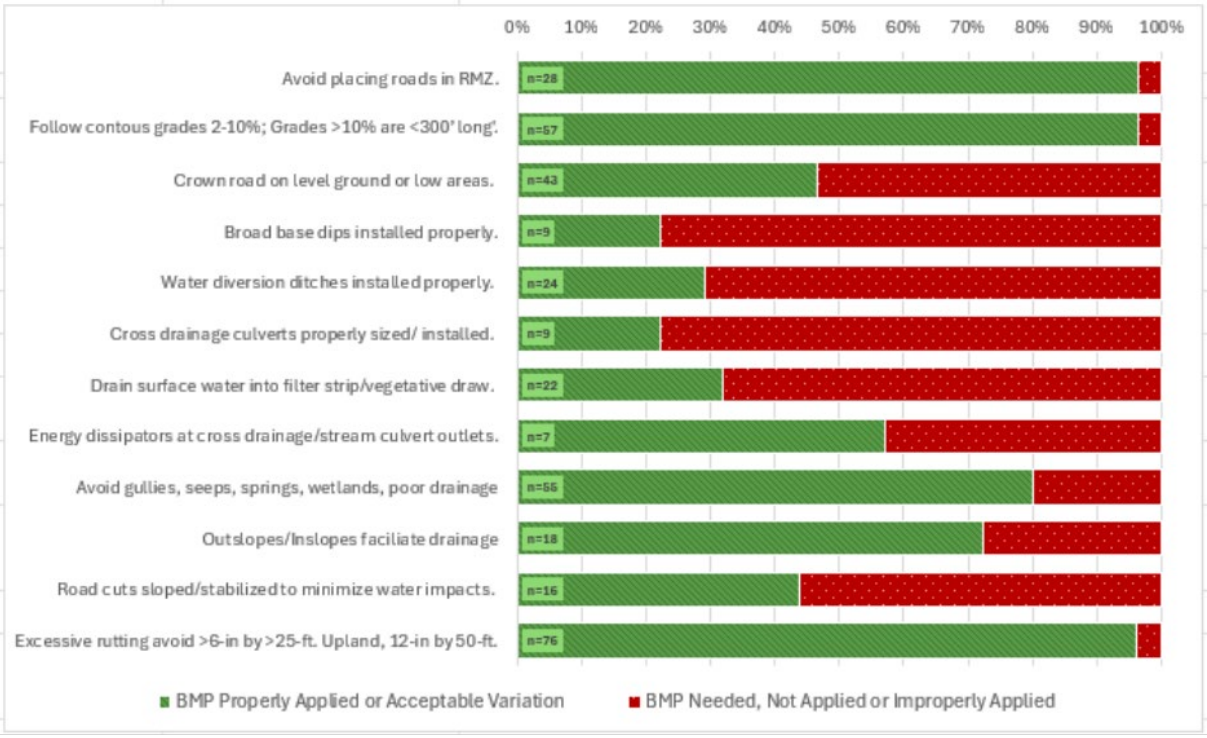


Figure 27. Questions 29 - State BMP component questions for roads used in timber operations, 2013-2024.

State BMPs results for roads closure and retirement (Figure 28) found:

- BMPs were applied properly 52% of the time for road closures and retirement.
- Annual application of BMPs for road closure and retirement ranged from 69-78% in the period of 2013 through 2016.
- Beginning in 2017 application rates dropped below 50% and remained at or below 50% through 2024

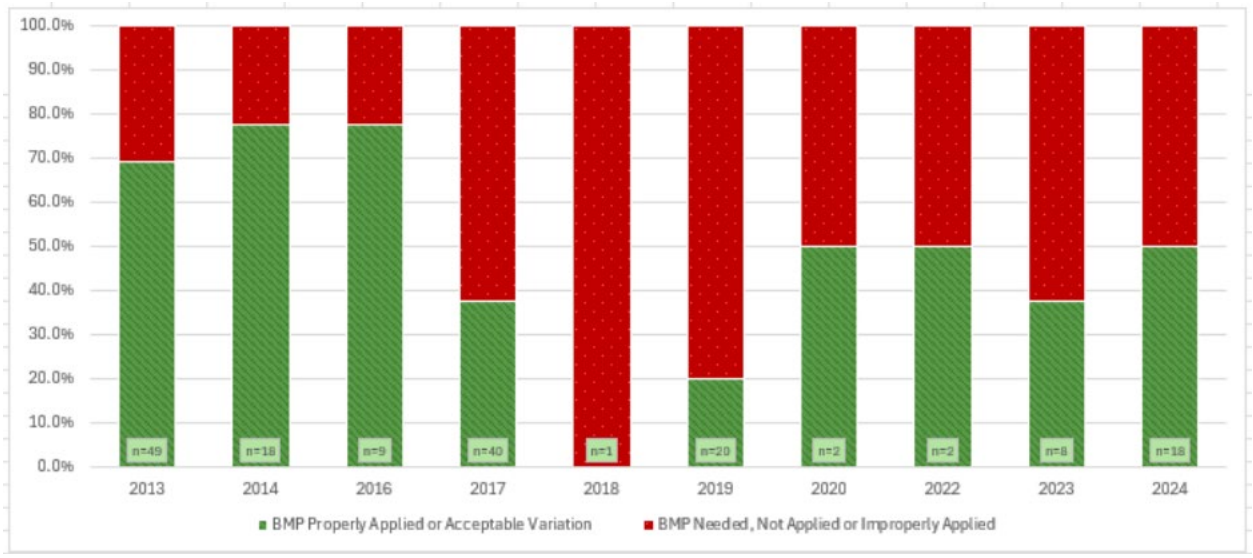


Figure 28. Question 29 - Annual trends BMPS application and effectiveness BMPs for road closure and retirement (decommission) in Timber Sales Areas.

Average annual application of BMPs for road closure and retirement appeared higher in the data 2012 through 2016 and Rates dropped below 50% and remained at or below 50% through 2024 (Figure 28). One contributing factor to the lower application rates observed between 2017 and 2024 may be the implementation of review process on NEPA decisions on road closures and decoms prior to conducting BMP evaluations. Evaluations conducted 2013 through 2016, relied solely on the specification listed in the timber sale contract to determine if roads were to be closed or remain open after the timber sales, and therefore did not always reflect the objective maintenance levels.

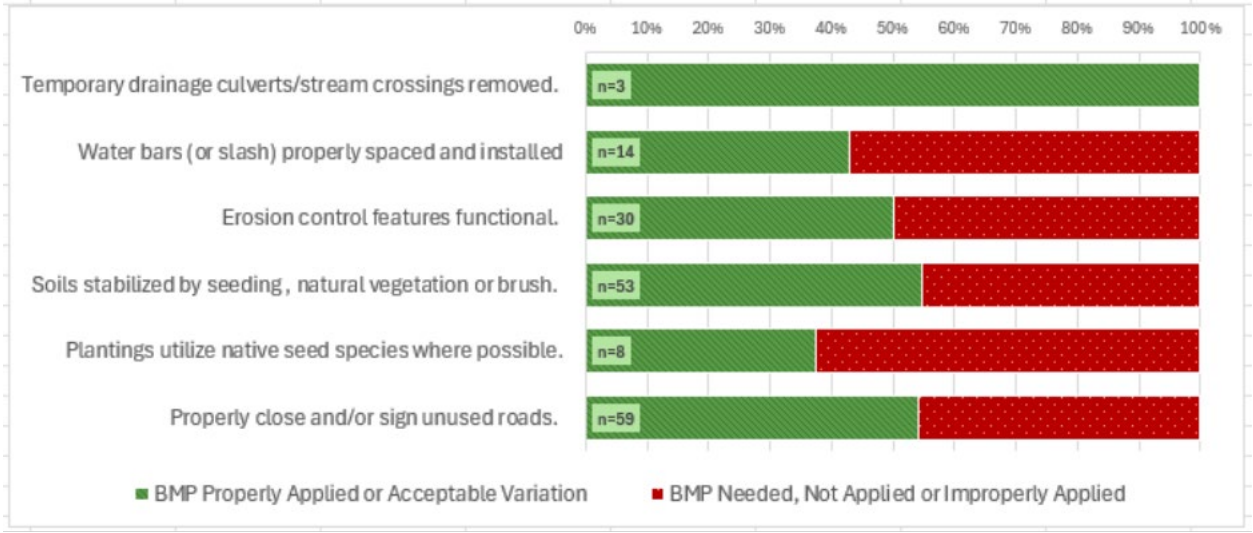


Figure 29. Question 29 - State BMP component questions for Road Closure and Retirement in used in timber operations.

On average, roads are not properly closed in 46% of timber sales evaluated. These ratings were primarily due to ineffective closures, but also due to lack of erosion control features and revegetation from native seeding or regeneration. This supports the findings of Roads D within the National Core

BMPs which found that 57% of the time that closures were not effective and 14% were marginally effective at keeping motorized traffic off the road.

National Core BMP Results

Table 70. Question 29 **-** Effectiveness of Road and Transportation BMP guidelines (2014-2025)

National Core BMP Evaluation	Mostly to Fully Effective	Marginal or Not Effective
Road A (2) Active Waterbody Crossing Construction	50%	50%
Road B (5) Completed Waterbody Crossing Construction	60%	40%
Road C (6) Road Operation and Maintenance	50%	**50%**
Road D (7) Stored Roads (OML 1)	29%	**71%**
Road E (2) Active Road Decommissioning	50%	**50%**
Road F (1) Completed Road Decommissioning	100%	0%
Road G (1) Snow Removal and Snow Storage	0%	100%

- Roads (n=25) were split, with half evaluations being effective to most effective at protecting water quality, and half the evaluations being marginal to not effective.
- Road D, Stored OML-1 Roads had most evaluations during the monitoring period.
- Road D, Stored OML-1 Roads also had the lowest effectiveness ratings, with 71% of the evaluations being marginally effective or not effect.
- Road Operation and Maintenance, Active Waterbody Crossing Construction, and Active Road Decommissioning, were effective at protecting water quality about 50% of the time.

Considering all roads evaluated under the National Core BMPs include a riparian area, waterbody, or wetland crossing, it's important to emphasize the potential impacts on water quality and ecosystem functions if BMPs are not implemented correctly and/or are ineffective.

National BMP Corrective and Adaptive Management Actions:
Each National Core BMP evaluation contains questions regarding corrective or adaptive management actions that the team considers as options to improve outcomes.

- **Corrective actions** are typically applied to problems identified at the project site evaluated.
- **Adaptive management recommendations** are typically meant to be applied broadly to management of all projects of the type being evaluated.

Table 71. Question 29 - National Core BMP consolidated summary of Issues Reported, Corrective Actions, and Adaptive Management Recommendations as documented by interdisciplinary teams during field evaluations for all road protocols evaluated 2015-2024.

BMP Evaluation	Issues Reported, Corrective Actions, and Management Recommendations
Road A – Active Road or Waterbody Crossing Construction or Reconstruction	• Longstanding perception State BMPs restricted sediment controls to silt fence; alternative erosion controls often not employed. • Temporary erosion controls (silt fence) not maintained; biodegradable erosion controls recommended at stream crossings for long-term function. • Most culvert installations do not meet USFS handbook policy to use stream simulation strategies. Reference FSH **7709.56b chapter 60 section 65.2.** • All crossings evaluated had corrective actions pertaining to design, slopes, and erosion control improvements
Road B – Completed Road or Waterbody Crossing Construction or Reconstruction	• Most crossings had some documented erosion at 1-year post-construction. • Improvements to slopes and applications of long-term biodegradable erosion controls (seed, straw matting, jute mats, and wattles) were noted. • One OML1 roads opened for construction was not closed after use. • Contracts listed generic "*DOT seed mixes*": instead of FS native seed mixes. • Subcontracts and contracts specs should be annual oats/rye or FS native mixes • Most culvert installations did not meet USFS handbook direction to use concepts of stream simulation design. • Some new box-culverts are now low-flow barrier to aquatic passage. • Project plans and designs were outdated; technical review should occur on designs greater than 5-years old.
Road C – Road Operation and Maintenance	• Multiple comments that designs could have been better for stream crossing improvements that went into timber sale contracts. Most comments were attributed to tight turnaround deadlines for designs for timber sales. • High frequency of erosion and sedimentation into water body when long term erosion controls were not installed after road reconstruction or culvert replacement occurred. • Timber sale contracts should incorporate both long-term and short-term erosions controls. Silt fence is during reconstructions, long-term stay in place (after re-construction) during logging and hauling operations. • When building up road prisms in wetlands, cross drainage structures must be incorporated, even if old cross drainage culvert cannot be located. • When timber sales were too large, road packages max out, and BMP standards were harder to achieve. Smaller sales could allow purchasers to perform higher quality road work. • Most evaluations focused on roads with recent operations or maintenance.
Road D – Stored Roads	• Roads open for activities need to be effectively closed after management use. The closure should be in a location where natural features or existing vegetation prevents vehicle traffic from going around the barrier. • Areas where sediment is entering streams could use more robust armoring of crossing approaches to minimize localized sediment inputs. • Additional details, including drawings, should be included in timber sale packages requiring temporary culvert installation and removal. • Gates can be effective closure mechanism on wetland roads with SUPs. • Using mats during frozen conditions can be effective for timber harvest. • Beaver issues at culverts on OML1 Roads, are problematic since the culverts don't receive maintenance.

BMP Evaluation	Issues Reported, Corrective Actions, and Management Recommendations
Road D – Stored Roads	• Recommended to remove culverts on OML 1 roads that are infrequently used in areas with high beaver activity. • Small drainage culverts often plug on closed roads; >18" size recommended • A failed stream culvert was found on OML-1 evaluation (2020). Need for NEPA delayed corrective action. Forest Stream Crossing CE first suggested in 2020.
Road E – Active Decommissioning	• Project plans lacked detailed written erosion control specifications. • Verbally communicated plans were effective but could be improved with written details to ensure erosion control features are installed properly. • Erosion control was more effective at decommissioning projects when a hydrologist was on site during construction compared to when absent.
Road F – Completed Decommissioning	(i) Decommissioning methods utilizing live tree and vegetation transplants with front-end loaders are very effective. FS contracts prohibit equipment specifications; C&M crew is only mechanism for selecting decom methods. • Hand dragging of dead and down woody materials and seeding are effective decommissioning and erosion control techniques that could be applied in areas limited by heritage constraints.
Road G – Snow Removal	• No O&M Plan or guidance for snowplowing exists. • Road G protocols are inherently difficult to use for random site selection therefore rarely evaluated.

- **FP 7700 Transportation Goal 1**. The road system is trending in the right direction toward being *structurally adequate, safe, environmentally sound, and appropriately located*, as assessed using BMP Guidelines.

- **FP 7700 Road Closure/Decommissioning Goal 1** *Road closures are effective and appropriately signed.* Implementation and effectiveness of road closures have remained consistently below optimal levels during the monitoring period, primarily due to ineffective closure methods. Additional contributing factors include a lack of erosion control features, stabilization, and adequate revegetation from native seeding or natural regeneration. The Forest has improved specifications within Timber Sale contracts to better align with NEPA decisions and to enhance the techniques used to close roads (for example, using berms with slash rather than soil berms). It is expected that the benefits of these improvements will be more apparent in the next M&E report after evaluations occur following the closure of active sales.

What is the status and trend of the monitoring indicator in relation to the target?

Several transportation objectives have low numeric targets compared to identified infrastructure needs. While some indicators were technically within target, the targets themselves represent a very low performance threshold (e.g. culvert replacements). One indicator did not meet the target; incomplete database records may have contributed. For other indicators, the targets are ambiguous and therefore should not be categorized as either within or outside the target range.

Table 72. Question 29 - Summary of monitoring evaluation trends for all indicators

Current Status	Trend Towards Target	Trend Away from Target
Within target	2	
Outside target	2	1

What level of confidence is there in the accuracy and precision? The results in this section have the same uncertainty as discussed in Question 2 pertaining to spatial model uncertainty, road and trail mapping errors, and INFRA accomplishment omissions.

Monitoring Discussion and Findings

Effectiveness of Road Closures: Road closure implementation challenges have been consistently documented. Comments from evaluations indicated several reasons. Early in the planning period, contract specifications were commonly absent for closing OML-1, non-system, and temporary roads after timber sale use. This was largely isolated to the west zone of the Forest. One underlying cause discovered through State and National BMP evaluations in 2015 or 2016 was lack of database upkeep. NEPA decisions to close or decommission a road were not entered in the NRM database of record, and consequently, were not being incorporated into project plans or timber sale contract specifications. To correct this issue, the Forest Transportation Planners began entering NEPA decisions into NRM. A five-year plan database was created, and west zone watershed staff also began developing timber sale checklists which detailed the road closures and decommissioning specifications.

Another common issue observed was breaches to berms and gates. Single berm closures frequently failed to prevent unauthorized access, as they are very easy to drive around and rapidly erode and evenly degrade to flat bumps that can easily be driven over by ORVs and 4-wheel drive vehicles. New methods of road closures are being applied specifying 50-100 feet of slash be used in combination with berms for closures.

Big Picture Trends Understanding larger trends, are important for interpreting local trends on the Forest. In review of the R9_BMP_Road_Protocols_Report 2015-2024, the trend in effectiveness ratings for roads on Hiawatha differed notably from what was observed at the Regional level. Stored roads (Road D) evaluations showed the largest deviation, with a Regional effectiveness of 53 percent compared to only 29 percent on Hiawatha. Because the Forest accounts for nearly half of all stored-road evaluations in the Region, understanding this discrepancy is important.

Multiple factors contribute to the lower effectiveness on the Hiawatha. Most OML1 roads on the Hiawatha are stored because they are located in wetlands or include wet or riparian crossings. Historically, their use was restricted to winter operations. However, social pressures (increased ORV use and special use permits) and climatic changes (warmer winters) have coincided with greater use of stored OML1 roads. Special use permit requests for closed OML1 wetland roads continue to increase annually. State and National BMPs document that many OML1 roads either lack physical barriers or have ineffective closures, such as soil berms, that fail to prevent motorized access. Many timber sale road packages on the West Zone also did not incorporate NEPA decisions, operating maintenance levels, or route status early in the monitoring period.

Any BMP evaluation conducted on a stored wetland road that had evidence of use during unfrozen conditions always had documented wetland impacts such as erosion, rutting, compaction or puddling, and therefore resulted in a lower effectiveness rating. Winter operating conditions—frozen soil (6inch depth) or compacted snow (12inch depth)- is the guideline used on the Hiawatha for wetland equipment operations however these conditions were rarely achieved for sufficient lengths of time needed for hauling during the monitoring period. These conditions corresponded with more frequent disturbances to saturated road surfaces. To compensate, many of the roads are being built up and widened with fill and gravel, which has far more long-lasting detrimental impacts to wetland function.

Culvert failures were also common due to the lack of routine maintenance on OML1 roads. Stored road upkeep typically occurs only during timber sale rotations. The Forest generally leaves culverts in place after timber sales close, even when stands will not be revisited for 15–20 years. These observations may inform future adaptive management efforts, as culverts and stream crossing structures could and should be removed on roads with longer timber rotation or on stored roads prone to beaver activity.

The Hiawatha demonstrated overall higher effectiveness ratings for road operation and maintenance compared to the regional average. This outcome is notable given that the Forest does not have a written O&M Plan for Roads or the Transportation System. One possible contributing factor is that the Hiawatha maintains its own Forest Service construction and maintenance crew, which more rapidly respond to and address deferred maintenance needs than other forests in the region who may rely solely on contracts and partners for annual grading and road maintenance activities. In the absence of a formal O&M Plan, it is recommended that hydrologists and soil scientists continue close coordination with C&M crews and provide written “cheat sheet” specifications for erosion control, seeding, and stabilization to be incorporated into daily C&M operations.

Contract seeding specifications: Monitoring found several instances of contracts and sub-awarded contract specifications stating that “*DOT seed mixes*” would be used. Department of Transportation (DOT) seed mixes are formulated by specialized commercial seed companies to meet strict state DOT specifications for erosion control and roadside vegetation; these mixes are not exclusive to DOT projects. They are widely available for purchase by contractors, landscapers, and the general public for projects requiring durable, fast-growing groundcover. However, such seed mixes often contain non-native, invasive, or noxious weed species. While they are designed for quick erosion control or pollinator benefits, these mixes frequently include aggressive, exotic species. Therefore, the use of such seed mixes is generally not consistent with the Forest Plan and NEPA Design Criteria. Because many contractor design templates have prefabricated specifications for “*DOT seed mixes*,” it is important for agreement leads, contract officers, and contract officer representatives to review contracts and sub-awarded contract specifications and remove any generic template references to “*DOT seed mixes*” prior to contract award. Contracts should contain language consistent with NEPA design criteria or include use the broadly applied specification “Use seeding mixtures approved by or provided by Forest Service botanist,” and/or specify “annual oats or annual rye.”

Data Management and Reporting: During the development of this report, multiple data gaps were identified, primarily related to transportation system accomplishments not being entered as accomplished in the NRM INFRA Transportation database. Omissions were detected with stream crossings and road decommissioning accomplishments. While difficult to quantify, it is likely that road reconstruction mileage and other annual road accomplishments are not accurately reflected in the

database, and consequently the Hiawatha did not get full credit for the full suite of access and infrastructure improvements accomplished annually through Timber Sales, Partners, and through our internal C&M crews. Program specific prioritization of database updates and accomplishment reporting would improve future M&E reporting.

Adaptive Management Considerations

The Forest Plan monitoring program is meant to "enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed" (36 CFR 219.12).

The following adaptive management recommendations were identified by Interdisciplinary BMP teams. It should be noted that several recommended adaptive management improvements have already been initiated because of interdisciplinary contributions made during the Road BMP evaluations.

Improve Effectiveness of Road Closures and Reduce OMl-1 Culvert Failures

- OML1 roads opened for management activities may require evaluation of closure methods to ensure they remain inaccessible after use
- Closures may be more effective when located where natural features or vegetation limit opportunities for bypassing barriers.
- Berms constructed using reinforced stumps, vegetation, or root wads, combined with slash placement, were more effective at limiting motorized access during evaluations.
- Single soil berms were often ineffective and could be replaced with alternative methods.
- Removing culverts on infrequently used OML1 roads may reduce failure risk, particularly in areas with beaver activity.
- **Reduce Culvert Failures** - Consider removing culverts and stream crossing structures on roads with longer timber rotations (greater than 15–20+ years between use).

Improve Stream Crossings and Wetland Crossing Design

- Incorporating stream simulation strategies into stream-crossing designs may improve aquatic organism passage (AOP).
- FP Objectives of 2 culvert improvements per year may warrant review in future **Forest Plan Revisions**, as the target only addresses a small fraction of the documented infrastructure needs.
- Wetland road crossings must include cross drainage structures when fill or road prism elevation is increased.
- Properly size and space cross drainage culverts (minimum 18 inches recommended).
- Embed culverts to 20% of their diameter to prevent ponding and ensure groundwater continuity.

Strengthen and Improve Methods for Erosion Control and Stabilization

- Temporary erosion control measures, such as silt fences, were most effective when applied during all phases of active construction within or adjacent to waterbodies.
- Ensure long-term erosion control and stabilization occurs immediately following reconstruction or culvert installation.

- Biodegradable erosion controls (seed, straw matting, jute mats, and wattles) are the recommended method for long-term stabilization.
- Annual oats or rye seed are recommended for rapid stabilization of disturbed soils by C&M crews.
- Other seeds mixtures should be approved by a Forest Service Botanist.

Improve Written Guidance and Contract Specifications

- Contracts should include seeding specifications consistent with NEPA design criteria or include use the broadly applied specification "Use seeding mixtures approved by or provided by Forest Service botanist," and/or specify "annual oats or annual rye.".
- Contracting officers, contracting officer representatives, and agreement leads agreement leads should review and remove generic or prefabricated references to "*DOT seed mixes*" prior to contract award or subaward.
- Improve contract language to include detailed long-term erosion control specifications.
- Additional details, including drawings, should be included in timber sale packages requiring temporary culvert installation and removal.
- In the absence of an O&M Road Plan, a written BMP Road Plan could be used as a quick reference for erosion control, seeding, and stabilization to and shared with C&M crew, operators, and partners.
- Future review of contracting policies may help determine whether flexibility for specialized equipment is appropriate based on monitoring results.

Continue reducing Road Density through Road Decommissioning

- Continue to reduce system road densities specifically targeting road decommissioning projects with stream crossings, located in riparian areas and wetlands, and/or in watersheds exceeding impaired open road thresholds of 2.4 miles per square mile.

Prioritize Transportation/Road Database Reporting

- Prioritizing annual accomplishment reporting may improve future monitoring accuracy.
- Aligning GPAS reports with on forest accomplishments may improve transparency and tracking.

Table 73. Question 2**9 -** Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan	X		
Management activities	X		
Plan monitoring program	X		

Table 74. Question 29 - Monitoring indicator status summary

Evaluation Report Year	Result*	Recommendation(s) (if applicable)	Recommendation Status
2024	**2** and 4	Separate Indicators (i) and (ii) into two separate monitoring indicators. Reword Indicator (iii). Add Indicator (v).	Indicators were edited for the 2020-2024 M&E Report.

- ***Result:** **1)** Interval of data collection beyond this reporting cycle (*indicate date of next time this monitoring item will be evaluated*); **2)** Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired**; 3)** More time/data are needed to understand status or progress of the Plan Component(s)**; 4**) Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired**; 5)** Methods inadequate to answer monitoring question.

Monitoring Question 30. To what extent is timber management occurring on lands suitable for such production?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
By Project	-	2 Years	Stricken from previous reports	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) Percentage of Acres of awarded timber sales on suitable ground ***(added 2025)***	Forest Plan Appendix A, page A-1 2400 Vegetation Management, page 2-10
Who Collected this data?	Timber Program
Who is responsible for analyzing the question?	Travis Coughlin, Forester

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Monitoring Results

The following results reflect timber sale data collected between October 1, 2019, and September 30, 2024.

Data

Table 75. Question 30 - Percent of Acres on Suitable Land Per Fiscal Year

Fiscal Year	Percentage of Acres Sold on Suitable Land
2020	98%
2021	97.50%
2022	96.20%
2023	92.60%
2024	83.60%

What is the status and trend of the monitoring indicator in relation to the target?

The Forest Plan allows harvest on nonsuited lands when project objectives extend beyond timber production.

Table 76. Question 30 - Summary of monitoring evaluation trends for all indicators

Current Status	Trend Towards Target	Trend Away from Target
Within target	0	1
Outside target	0	0

What level of confidence is there in the accuracy and precision?
There is a high degree of confidence and accuracy in the data.

Monitoring Discussion and Findings

The lower percentage of harvest on suited lands corresponds with harvest activities occurring in Semi Primitive Nonmotorized (MA 6.1) areas. There is a need to treat these acres, especially as we enter into the third decade of the Forest Plan.

Adaptive Management Considerations

The Forest Plan monitoring program is meant to "enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed" (36 CFR 219.12).

Section 219.11 of the Planning Rule and Chapter 60 of the FSH lists six criteria to be used to identify lands in the plan area as "not suited" for timber production. New mapping and modeling technologies have been developed since the development of the Forest Plan, such as lidar and improved geospatial modeling that can better identify areas meeting non-suitable definitions (e.g. ELTP mapping of peatlands, slopes exceeding 35%). The Planning Rule and the FSH describe a two-step process to identify lands not suitable for timber production based on legal and technical criteria. Hiawatha National Forest timber suitability is being reevaluated in FY26.

Table 77. Question 30 - Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan		X	
Management activities	X		
Plan monitoring program	X		

Table 78. Question 30 - Monitoring indicator status summary

Evaluation Report Year	Result*	Recommendation(s) (if applicable)	Recommendation Status
2024	**2**	Replace indicator (i) with new. (i) Percentage of Acres of awarded timber sales on suitable ground.	Question #30 indicator was added for the 2020-2024 M&E Report.

***Result: 1)** Interval of data collection beyond this reporting cycle (*indicate date of next time this monitoring item will be evaluated*); **2)** Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired**; 3)** More time/data are needed to understand status or progress of the Plan Component(s)**; 4**) Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired**; 5)** Methods inadequate to answer monitoring question.

Monitoring Question 31. To what extent do output levels, location of timber harvest, and mix of saw timber & pulpwood compare to those levels?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
Annually	2017	2 Years	2017	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) The difference between actual output of saw timber and pulpwood and project output	Forest Plan Appendix A, page A-1 2400 Vegetation Management, page 2-10
Who Collected this data?	Timber Program
Who is responsible for analyzing the question?	Travis Coughlin, Forester Jon Bosma, Timber Contracting Officer

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Monitoring Results

The following results reflect updates from data collected between October 1, 2019, and September 30, 2024.

There is no explicit goal in the Forest Plan for outputs of sawtimber vs. Pulpwood. Figure A-1 on page A-1 of the Forest Plan shows a bar graph for each decade of total volumes that can be harvested on a long-term sustained yield capacity, shows projected sawtimber to pulpwood proportions beginning near 70/30 and approaching approximately 50/50 over time. Over this 5-year period, harvest has been roughly 40% pulpwood and 60% sawtimber.

Data

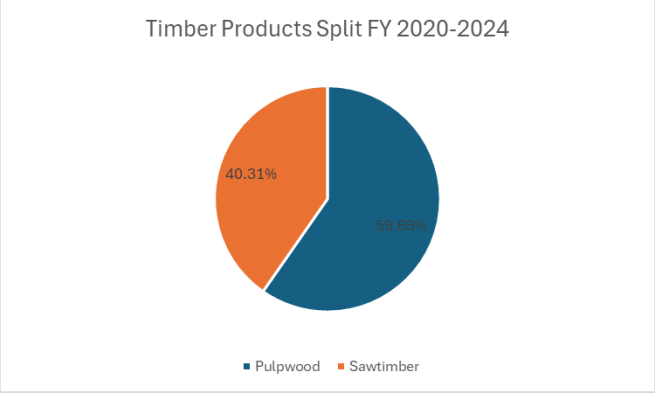


Figure 30. Question 31 - Hiawatha Timber Product Types (2020-2024)

What is the status and trend of the monitoring indicator in relation to the target?

Table 79. Question 31 - Summary of monitoring evaluation trends for all indicators

Current Status	Trend Towards Target	Trend Away from Target
Within target	0	0
Outside target	1	0

There is a high level of confidence in the accuracy of the data.

Monitoring Discussion and Findings

Although there is no explicit desired condition for split of sawtimber to pulpwood, the tables in the plan indicate an optimal split. Current outputs differ from that desired condition. Differences between Forest Service product classifications and industry processing practices may contribute to this variation. Some red pine sold as pulpwood is processed by industry as sawlogs, reflecting differences between Forest Service cruising standards and local processing practices.
Adjusting for these classification differences may yield a proportion nearer to the 50/50 range.

Adaptive Management Considerations

The Forest Plan monitoring program is meant to "enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed" (36 CFR 219.12).

These results may warrant evaluating timber cruising methods to improve alignment between Forest Service product classifications and industry processing practices.

Table 80. Question 31 - Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan			X
Management activities	X		
Plan monitoring program			X

Monitoring Question 32. Are harvested lands adequately restocked after five years?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
Annually	2024	2 Years	2019	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
Acres meeting required minimum percentage through first-, third- and fifth-year stocking surveys *(i) Acres that fail to meet minimum stocking requirements by silvicultural prescription*	Lands are adequately restocked as specified in the Forest Plan 2400 Vegetation Management, page 2-10 Forest Plan Appendix A, page A-1
Who Collected this data?	Silviculture Program
Who is responsible for analyzing the question?	Marjorie Allmaras

New Science or Other Information

None

Monitoring Results

Between 2015 and 2019, 17,310.2 acres received a final regeneration harvest. Of these, 9,803.6 (56.6%) acres were certified as regenerated within 5 years, 1,388.3 acres remain uncertified. Of the acres certified, 78.6 acres were certified as previous reforestation treatments unsuccessful, not adequately stocked and no further treatment planned.

Data

Table 81. Question 32 – Acres of regeneration harvest meeting or not meeting NFMA requirements

Total Acres Final Regeneration Harvest Between 2015 and 2019	Certified within 5 years	Certified > 5 years	Not Yet Certified
17,310.20	9,803.60	6,118.30	1,388.30

Table 82. Question 32 – Reasons why NFMA requirements were not met

Reason for Failure to Certify within 5 years	Acres
Failure to certify same FY as 5th year survey	2,775.20
Failure of timely stocking survey	2,573.40
2020 planting was canceled due to COVID	597.90
Natural regeneration failure - replanted	375.20
Natural regeneration failure and planting failure - replanting scheduled	292.80
Natural Regeneration not yet tall enough	195.20

Reason for Failure to Certify within 5 years	Acres
Natural regeneration failure and planting failure - no further treatment scheduled	149.30
Natural regeneration failure - replanting scheduled	124.60
Failure of timely site prep	113.30
Natural Regeneration Failure - no further treatment planned	100.00
No post-harvest activities scheduled.	72.10
Failure to certify	83.3
Planting failure - replanting scheduled	52.20
Planting delayed	8.20
Grand Total	7,512.70

Table 83. Question 32 – Type of NFMA Certification

Type of Certification	Acres
Stand is well established with sturdy seedlings and will require no further regen. treatments.	15,743.9
Failure / Mortality enough to require replanting of unit.	256.4
Regeneration material is present, but the number of seedlings present is below the amount prescribed, interplanting of additional seedlings is necessary.	679.4
Previous reforestation treatments unsuccessful, not adequately stocked, NO further treatment planned.	78.6
Regeneration material is present, and the stand is considered to satisfactory stocked and progressing toward requirements for certification	551.9

Monitoring Discussion and Findings

Approximately 71% of acres not certified within five years were associated with delays linked to incomplete or outdated entries in the FACTS database.
These data entry delays resulted in certification timelines extending between one and four years.

Adaptive Management Considerations

Improved FACTS database management—particularly on the West Zone—may enhance data accuracy and support consistent tracking of regeneration outcomes over time.

Table 84. Question 32 **-** Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan			X
Management activities	X		
Plan monitoring program			X

Monitoring Element 8 – Effects of management actions on productivity of land

Monitoring Question 33. Are the effects of Forest management, including prescriptions, resulting in changes to the productivity of the land?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
Annually	2024	2 years	2019	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) *The proportion of harvested or burned areas that have experienced detrimental changes in soil properties caused by soil use and management* ***(changed 2025)***	2500 Watershed Management, page 2-15 Soil Resources, Goals 2
Who Collected this data?	Watershed Program
Who is responsible for analyzing the question?	Ryan Bevernitz, Forest Soil Scientist

The Forest Soil Disturbance Monitoring Protocol (FSDMP) is a national protocol developed by the U.S. Forest Service to consistently assess, monitor, and communicate soil disturbances caused by land management activities, particularly those involving mechanized equipment like logging. It is part of an adaptive management framework aimed at maintaining or improving soil productivity and hydrologic function on National Forest lands. The FSDMP provides a standardized method to define and evaluate soil disturbance using a combination of scientifically informed risk ratings and visually observable soil-disturbance classes ranging from undisturbed (Class 0) to severely disturbed (Class 3). Detrimental soil disturbance (DSD) is based on the professional judgement of a qualified soil scientist (Page-Dumrose 2009) and has occurred if the soil, vegetation, or litter will not recover within the timespan of a normal rotation, or management event for uneven aged stands, and the disturbance was not part of the management intent. The Soil Disturbance Field Guide (Page-Dumrose 2009) supports FSDMP implementation in the field and supports consistent data collection and integrity of the results.

New Science or Other Information

FSDMP has been conducted annually on the forest since 2009. Results from FSDMP surveys were not included in the 2016-2017 or 2018-2019 Monitoring and Evaluation reports, meaning data was last reported in 2015. All available FSDMP data has now been compiled from the period of 2009-2024.

Table 85. Question 33 - Post-Harvest FSDMP Surveys Completed by Year

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
# of Post-Harvest FSDMP Surveys	14	29	16	11	23	0	9	15	21	10	15	10	2	17	10	13	**215**

Region 09 FSDMP summary report for 2015-2024.
(https://usfs.app.box.com/file/1865747984403)

Long Term Soil Productivity Study "Harvest impacts to stand development and soil properties across soil textures: 25-year response of the aspen Lake States LTSP installations"
(https://usfs.app.box.com/file/1609814607696)

There has been ongoing discussion of the definition of DSD and Soil Quality Standards (SQS) amongst R09 soils staff. A draft document on DSD has been created for R09:
https://usfs.app.box.com/file/1445431367105?s=typ2xy32yhwx294c7hhhmknz3yz3pm5w

Monitoring Results

The following results reflect updates from data collected in the timespan of 2016-2024. Table 85 shows the number of post-harvest surveys conducted annually. New information collected or compiled from the last evaluation report has been incorporated.

Data

While the main indicator is DSD, data within this section will display proportions of all disturbance classes and specific disturbance attributes to illustrate short-term changes to the productivity of the soil within the timespan of a normal rotation. Unless specifically noted, data within this section excludes units where site preparation was conducted.

Table 86. Question 33 - Average proportion of post-harvest soil disturbance class by year surveyed.

Year	0's - Undisturbed	1's - Slight Disturbance	2's - Moderate Disturbance	3's - Severe Disturbance	Detrimental Disturbance
2009	66.8%	18.7%	12.1%	2.7%	0.9%
2010	85.8%	9.2%	4.3%	0.8%	0.3%
2011	90.8%	5.4%	3.1%	0.8%	0.4%
2012	79.5%	13.1%	5.8%	1.7%	0.8%
2013	74.3%	10.7%	8.8%	6.2%	1.6%
2015	63.7%	20.9%	12.3%	3.9%	3.6%
2016	21.9%	55.6%	21.3%	1.6%	0.4%
2017	60.1%	14.9%	19.5%	6.3%	2.4%
2018	70.8%	18.2%	6.2%	4.0%	0.4%
2019	70.7%	15.1%	7.1%	8.5%	0.3%
2020	44.5%	40.6%	9.2%	5.6%	4.9%
2021	81.2%	4.8%	7.2%	6.8%	4.0%
2022	81.8%	6.0%	7.6%	4.4%	3.7%
2023	63.4%	20.6%	8.6%	7.7%	3.0%
2024	70.5%	13.9%	8.2%	7.4%	2.2%

The data indicate a trend of increasing DSD from the period of 2010-2015 followed by a period of less than 1% DSD in 2016, 2018, and 2019. In 2020 the highest annual DSD was documented with an average proportion of 4.9%.

From 2020–2024, the documented proportion of DSD decreased with the 2024 proportion (2.2%) approaching the long-term average of 1.6% DSD.

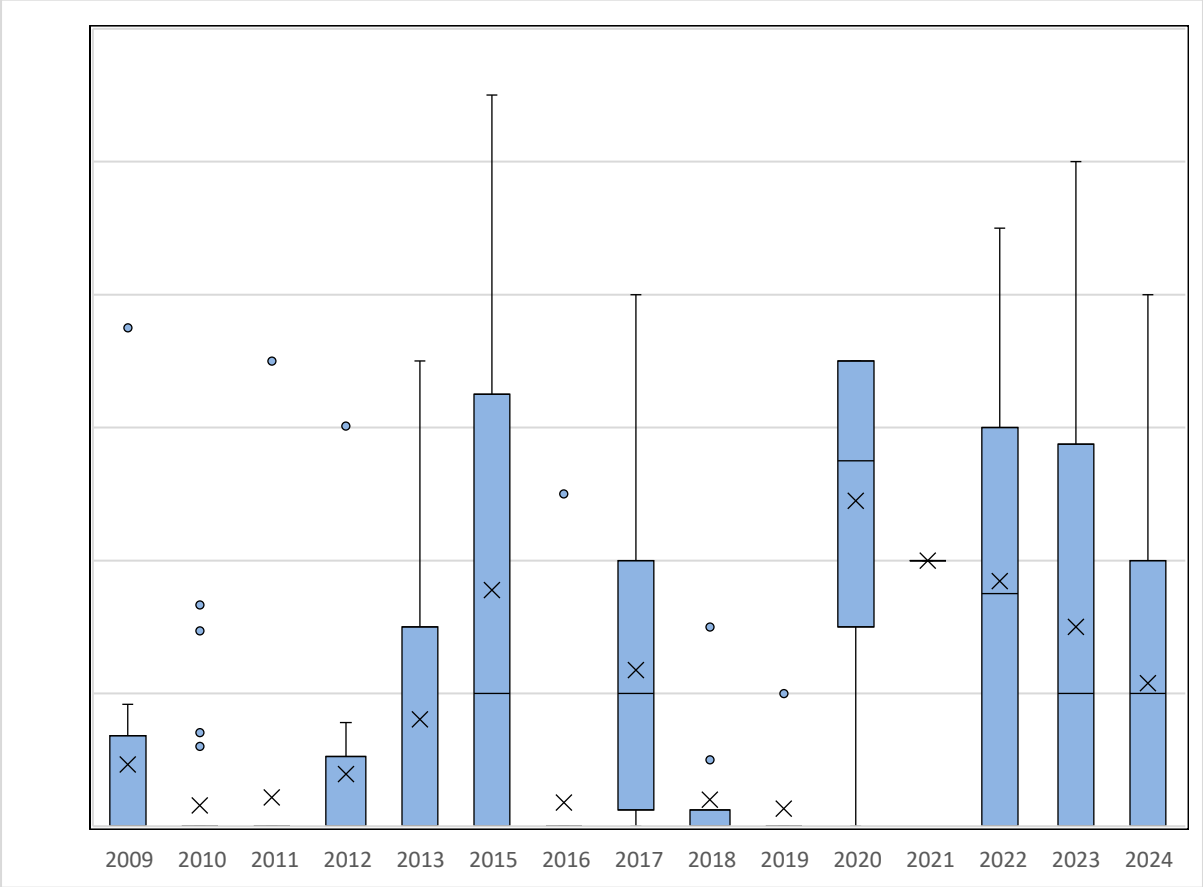


Figure 31. Question 33 - Post-Harvest Detrimental Soil Disturbance by Year Surveyed

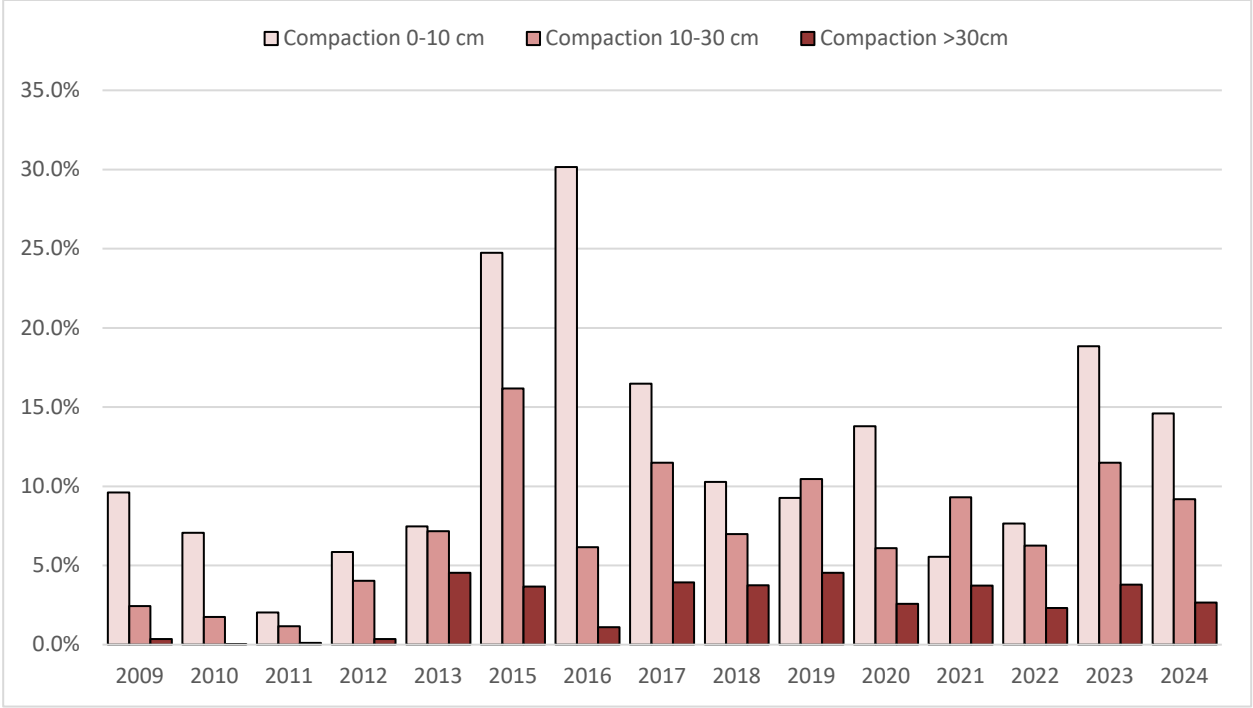


Figure 32. Question 33 - Average Post-Harvest Soil Compaction 2009-2024

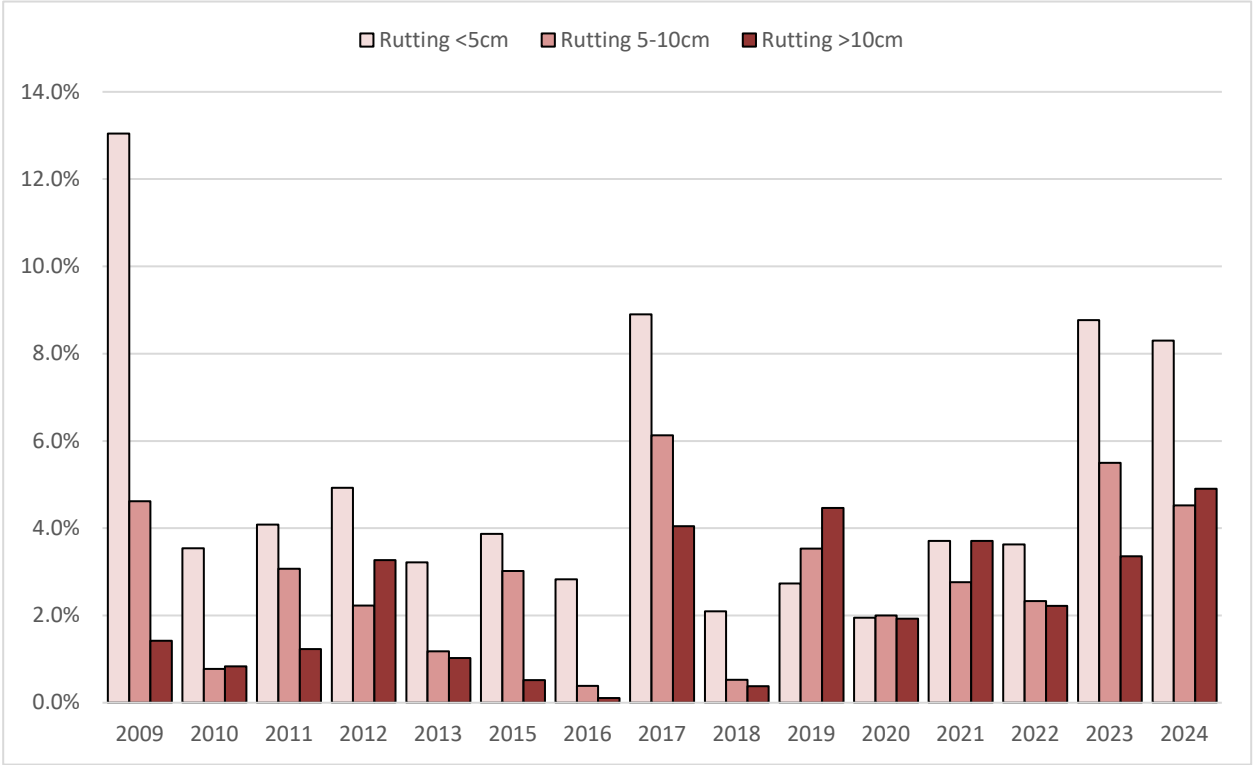


Figure 33. Question 33 - Average Post-Harvest Rutting 2009-2024

Harvest methods influence soil disturbance levels. In wet soils with low bearing strength, slash utilized on forwarding trails can minimize rutting and compaction. In even-age harvests there is typically abundant slash available to protect soil whereas uneven-age harvests may not have enough material available. Data indicate a small increase in rutting (>10 cm) in uneven aged harvests compared to even aged harvests.

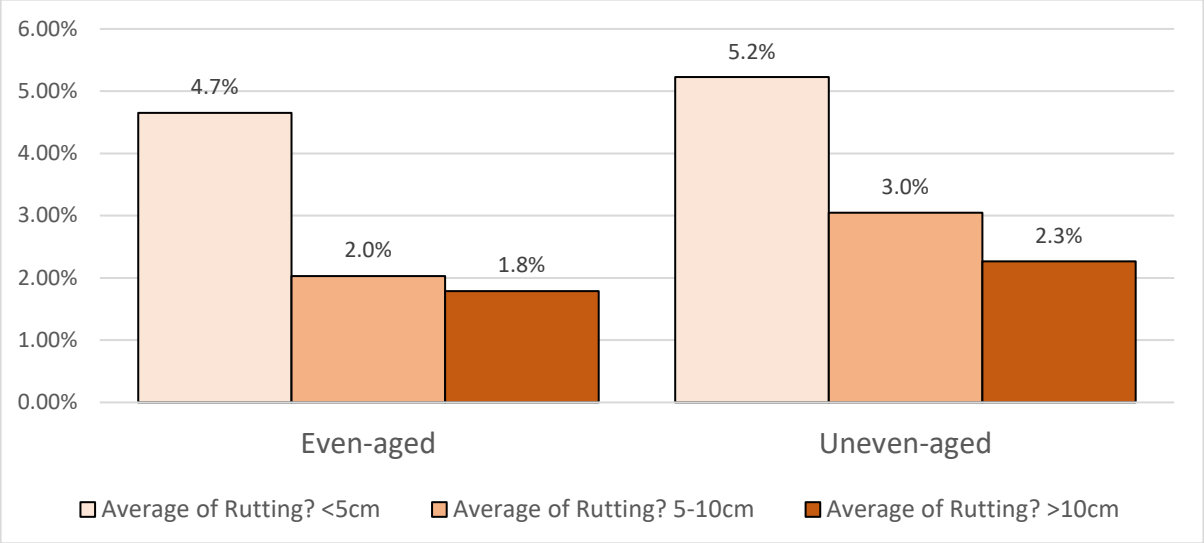


Figure 34. Question 33 - Average Post-Harvest Rutting by Harvest Type 2009-2024

Winter-only harvest units should have very minimal soil disturbance when conditions are favorable, but in warm winters with little snow cover or minimal frozen soil, the disturbance can be extensive, specifically in the form of rutting. The figure below shows an insignificant difference in disturbance between units with an operating season restriction and those that are year-round operation. This may reflect avoidance of winter only units during unfavorable conditions for operation.

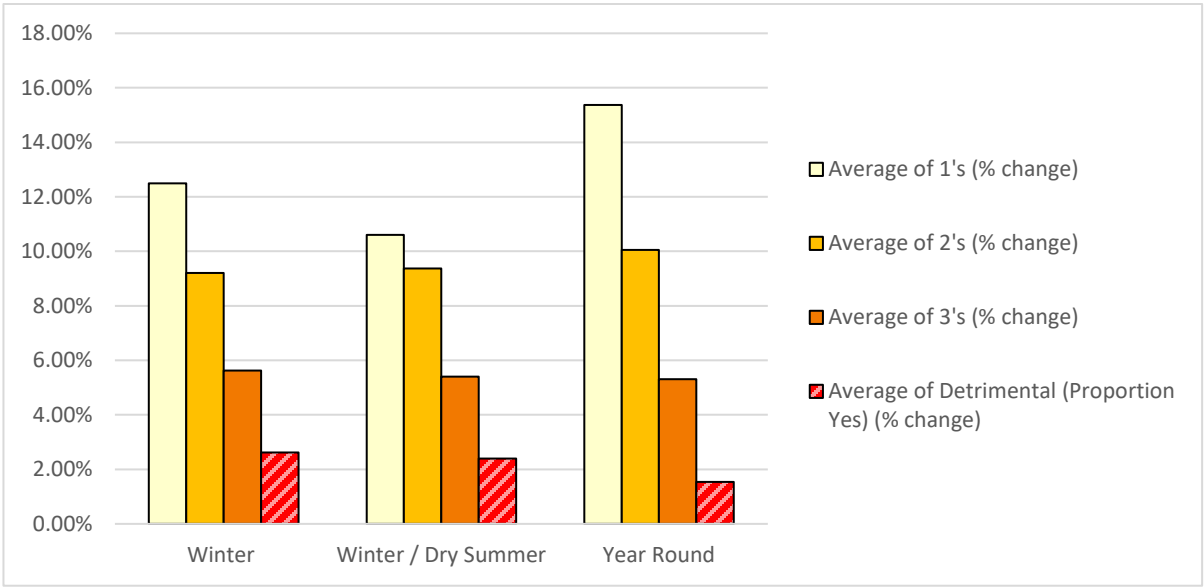


Figure 35. Question 33 - Average Disturbance Class by Operating Season 2009-2024

The Ecological Land Types (ELTs) that experience the most detrimental disturbance are those with a water table within 100cm of the surface for a portion of the year. ELT 60s have the highest average proportion of detrimental disturbance from the period of 2009-2024. ELT 70s have the 2nd highest proportion of DSD and have a water table within 30cm of the surface and generally have a Winter/Dry summer or Winter only operating season. ELT 80s have a water table within 30cm but also have >30cm of organic material on their surface. Harvesting is infrequent in these units, but when harvested have a Winter only operating season. There are only 3 FSDMP surveys on units that were predominantly ELT 80. The average of 0.3% DSD indicates these stands had adequate snowpack or frozen soil at the time of harvest.

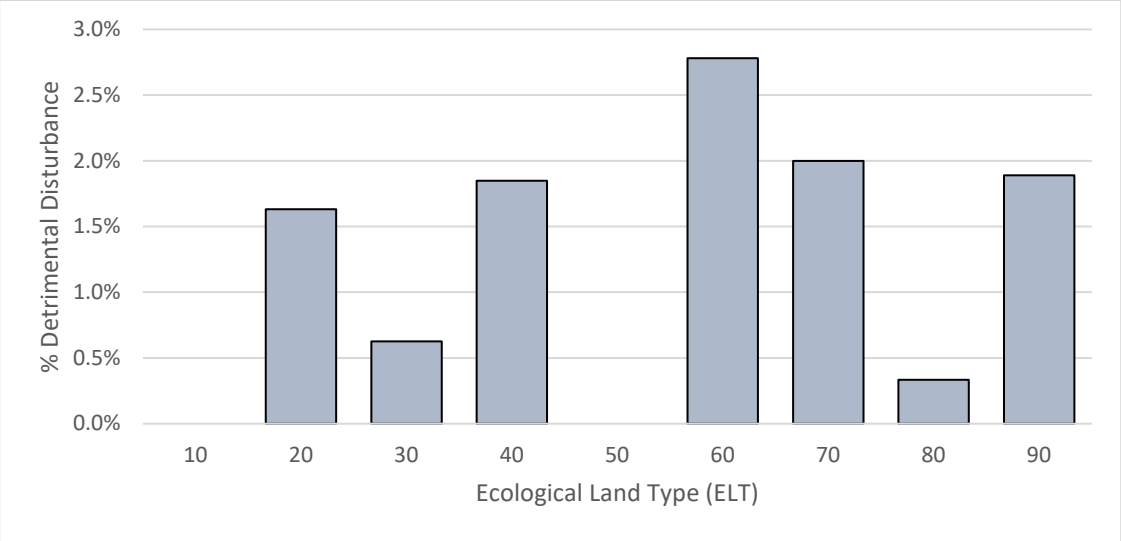


Figure 36. Question 33 - Average Post-Harvest Detrimental Disturbance by ELT 2009-2024

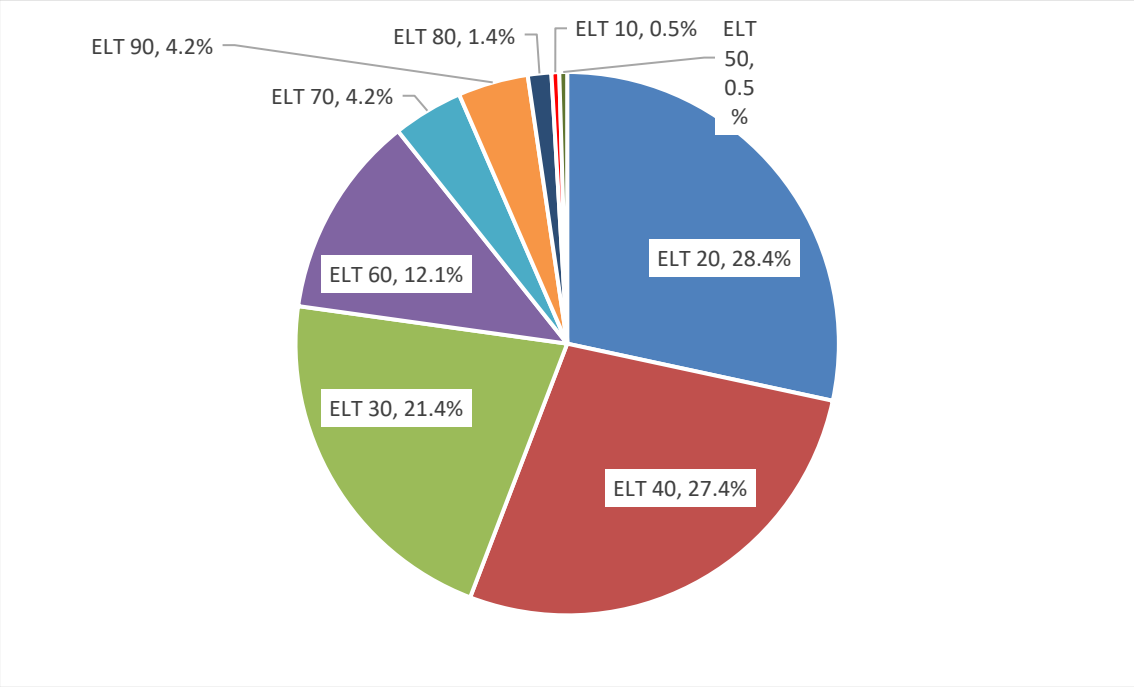


Figure 37. Question 33 - Proportion of FSDMP Surveys by Dominant ELT

Stands where site preparation was conducted were excluded from the results above which focus on the impacts of harvest activities. DSD is generally not documented in site preparation units due to the disturbance being the intended outcome. Under normal vegetation management, the removal of the forest floor to expose bare soil on sandy sites is considered DSD. The figure below shows that the proportion of bare soil after site preparation is approximately 48% higher than after normal timber harvest activities.

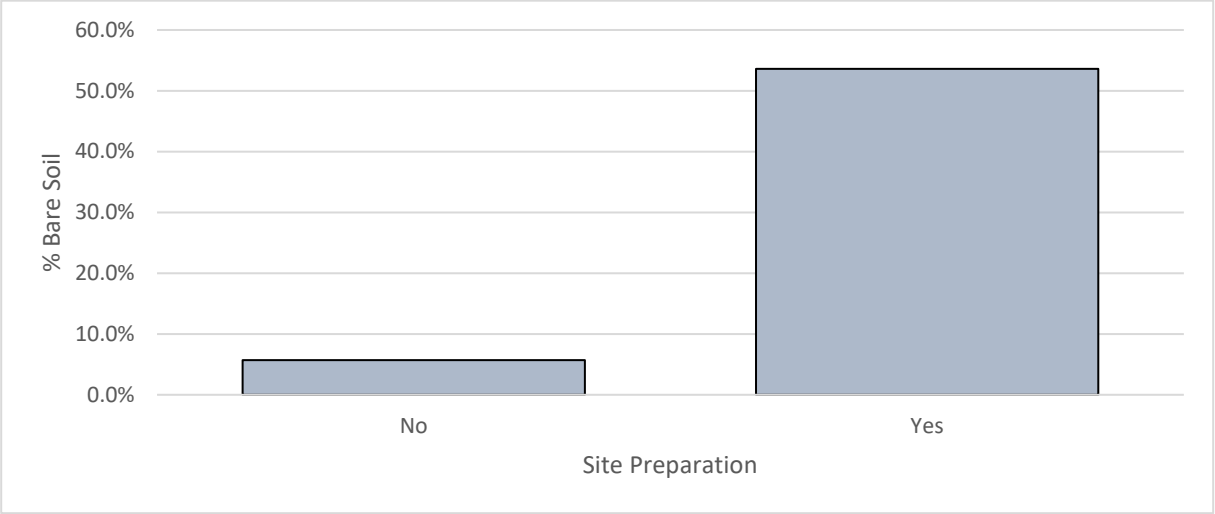


Figure 38. Question 33 - Average Proportion of Bare Soil Post-Harvest vs. Site Prep. 2009-2024

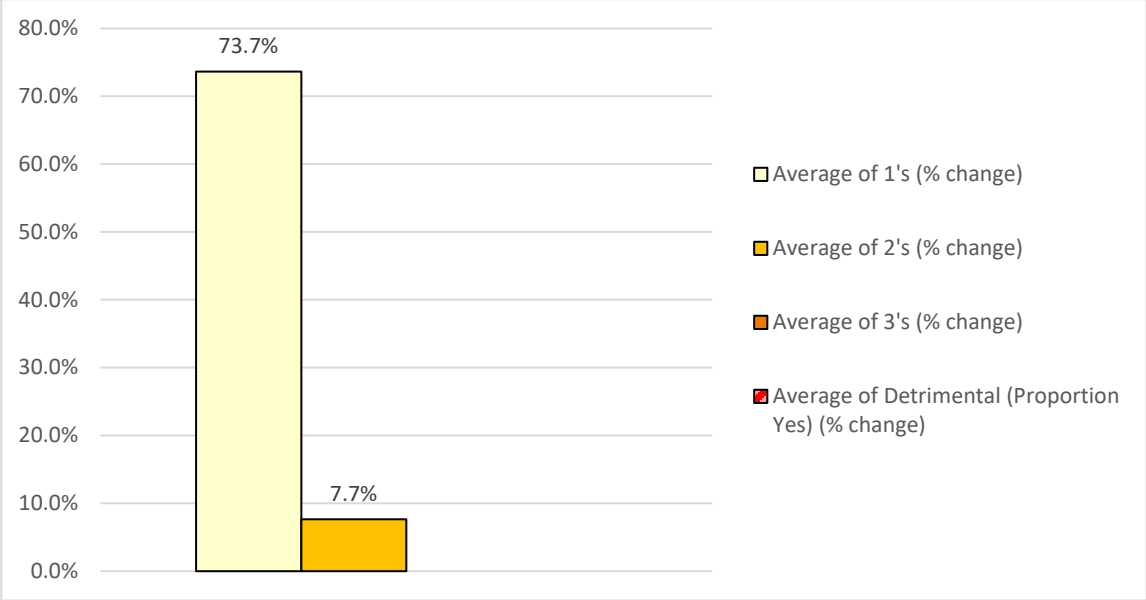


Figure 39. Question 33 - Average Proportion of Burn Impacts

Three prescribed burn units have been monitored for fire effects on soils using the FSDMP in 2019-2020. Post-fire monitoring results show that on average 73.7% of the unit's area is a Class 1- Light Impact, 7.7% of the area is Class 2 – Moderate Impact, and 0% of the area is Class 3- Severe Impacts.

No DSD was documented within the burn units. Fire control lines, which remove litter and topsoil, represent an additional source of soil disturbance not captured within the unit monitoring boundary.

What is the status and trend of the monitoring indicator in relation to the target?

Since the improved R09 standardization of what constitutes DSD, values have averaged approximately 3% annually. Individual stands that experience >8% DSD have soil disturbance beyond what is typically considered acceptable and have not implemented appropriate BMPs for soil. On an average annual basis, DSD has never exceeded 5% in the past 15 years. For the purposes of this indicator and monitoring period, the target will be considered less than 5% annual DSD with a goal of maintaining <3% DSD annually. Since most stands experience some DSD during normal operations, a continuing downward trend from the 2024 average DSD of 2.2% is not expected long-term.

Monitoring data indicated that the forest is within target, and the proportion of DSD has been trending downward annually for the past 5 years.

Table 87. Question 33 - Summary of monitoring evaluation trends for all indicators

Current Status	Trend Towards Target	Trend Away from Target
Within target	1	0
Outside target	0	0

There is a high level of confidence in the accuracy and precision of the data collected. The FSDMP allows the user to specify the confidence interval and interval width. The Region 09 standardization document requires that all FSDMP surveys will be conducted using a minimum confidence interval of 75 and an interval width of 10. This dictates how many sample points need to be collected within a harvest unit to accurately capture the variation in disturbance. Since DSD is based on the professional judgement of the user, some variation can be expected due to the variability between staff with various levels of technical experience.

Monitoring Discussion and Findings

Since 2016, pre-treatment FSDMP data has been collected on all stands that are expected to be post-harvest monitored. The minimal pre-harvest disturbance observed was typically from natural causes (tree-tips), legacy furrowing, skid trails, and landings. The overall lack of disturbance in pre-treatment surveys indicates that soils are mostly recovered from previous management activities outside of those areas mentioned above.

Post-treatment FSDMP data shows that there can be a wide variation in average DSD annually. This variation can be attributed to multiple factors including the environmental conditions of the stands selected for monitoring (soil types, soil moisture, operating season, topography), variability in staff's experience documenting soil disturbance, footprint of landings and temporary roads, and the overall number of stands that were monitored each year. The first figure in the section shows that since the last monitoring period, ending in 2019, the average DSD has been decreasing annually. This may be partially attributed to watershed staff beginning a process of proactively identifying sensitive soil areas before sales are laid out and making recommendations to either exclude the sensitive areas or apply a more restrictive operating season. Recently, due to the increasingly unpredictable winter conditions, more sensitive areas are being completely excluded from the sale. Field training days with

timber sale preparation crews looking at indicators of soil wetness have provided additional training in identifying sensitive areas, resulting in adjusted sale boundaries.

Looking at the entire FSDMP data set, the highest proportion of DSD occurs on harvest units that are dominantly ELT 60s and 70s. Typically, the wetter ELT 60's and ELT 70s have a winter only or dry summer operating season due to a water table occurring somewhere near the surface for some portion of the year. Low bearing strength due to thicker organic horizons and shallow water tables makes these areas more prone to rutting, compaction, and top-soil displacement when there is inadequate snow depth/frozen soil, or during rainy periods in summer. The three units mapped predominantly as ELT 80's showed minimal DSD indicating appropriate winter condition existed during operations.

While difficult to quantify with the FSDMP, much of the DSD that occurs outside of landings and primary skid trails to the landings, occurs in wet areas (ELTs 60,70,80) within a predominantly dry soil map unit that is rated as appropriate for year-round operations. These instances typically occur when the boundary is marked too far down a slope within, or on the edge of a wetland. A skid trail is generally created along this boundary where soils are not suitable to support equipment.

There has been an increase in instances of excessive rutting (>12in deep for >50ft) leading to erosion in harvest units mapped as ELT 40. Similarities between these harvest units included the following: soils were fine sands, soils had a heavier texture in the subsoil or substratum that was likely perching water, they were uneven aged harvests (single tree selection), and they were operated on during wet periods including spring break-up.

Annual average soil disturbance remains within soil quality standard (SQS) thresholds, with very few individual payment units exceeding the threshold. Since 2009, excluding site preparation, only 5 individual units out of 215 (2.3%) have exceeded 8% DSD and no units exceeded the previous SQS of 15% DSD. This indicates that although timber harvest is having impacts to soil productivity, most impacts are short-term.

Adaptive Management Considerations

The Forest Plan monitoring program is meant to "enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed" (36 CFR 219.12).

Design criteria considerations:

Due to recent observations of excessive rutting occurring on ELT 40's, as detailed in the discussion section, consideration should be given to assigning a Summer/Fall/Winter operating season to ELT 40's that have fine sand textures, a subsoil layer that perches water, and are prescribed an uneven aged harvest method. Doing so may reduce soil disturbance and protect soil and water resources and may also help maintain or improve stand productivity by reducing shallow root damage from rutting and lower the risk of bark slippage in the spring season.

As climate trends and predictive models indicate, winters are expected to become warmer with a greater share of precipitation falling as rain, consideration should be given to the efficiency and practicality of harvesting timber in sensitive areas that require snowpack or frozen conditions. This is especially true for the project areas in the southern portion of the West Zone. Timeframes to operate on these areas may become more unpredictable, with an overall trend toward shorter operating

seasons, leading to a greater risk of detrimental soil disturbance causing loss of productivity and hydrologic function.

Consideration should also be given to excluding and applying a buffer to hydric soil areas (ELT 70/80) within, and at the boundary of, units that are not intended for Winter only or Winter/Dry Summer operations. Skid trails in upland to wetland transitional areas are consistently where the most detrimental disturbance and excessive rutting is observed outside of landings, temp. roads, and primary skid trails. Applying a minimum 30ft buffer to hydric soils within units intended for year-round operation would ensure soil productivity and function is maintained in wetlands.

The indicator for this monitoring question has been changed from "Acres of whole tree harvesting on xeric sands" to "The proportion of harvested or burned areas that have experienced detrimental changes in soil properties caused by soil use and management". Forest Plan guidelines do not allow whole tree harvesting to occur on low fertility soils (ELT10/20) which are considered Xeric sands. Previous M&E reports stated that 0 acres of whole tree harvest occurred on Xeric sands on the forest. This information didn't answer the main question of what the effects of Forest Management are on the productivity of the land. The Forest has been monitoring soil disturbance on timber sales and prescribed fires using the FSDMP since 2009, which provides reliable data and trends that align with this new indicator and sufficiently answers the question being asked.

Table 88. Question 33 **-** Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan			X
Management activities	X		
Plan monitoring program	X		

Table 89. Question 33 - Monitoring indicator status summary

Evaluation Report Year	Result*	Recommendation(s) (if applicable)	Recommendation Status
2024	**2**	Change the indicator to more appropriately address the monitoring question.	Question #33 indicator was changed for the 2020-2024 M&E Report.

***Result: 1)** Interval of data collection beyond this reporting cycle (*indicate date of next time this monitoring item will be evaluated*); **2)** Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired**; 3)** More time/data are needed to understand status or progress of the Plan Component(s)**; 4**) Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired**; 5)** Methods inadequate to answer monitoring question.

Additional Monitoring Questions

Monitoring Question 34. To what extent is the Forest meeting its Federal Indian trust responsibility, including, but not limited to, meeting the requirements of memoranda of understanding, consulting with tribes on Forest management and actively seeking collaborative opportunities?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
Annually	-	2–10 Years	Stricken from previous reports	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(i) Number of Section 106 (National Historic Preservation Act) consultations *(ii) Number of collaborative discussions and/or project team participation* *(iii)Number of collaborative projects implemented* *(iv)Number of Tribal bi-lateral agreements* *(v) Number of partnership agreements* ***(All indicators edited 2025)***	1500 External Relations; Goal 1 – The Hiawatha N.F. will honor U.S. Government trust responsibility and treaty obligations towards Indian tribes within a government-to-government relationship. Objective 1 - Nothing in the Forest Plan or its implementation is intended to modify, abrogate or otherwise adversely affect tribal reserved, or treaty guaranteed rights applicable within the Forest.
Who Collected this data?	Heritage, Tribal Relations, and Planning Programs
Who is responsible for analyzing the question?	Paul Thompson, Tribal Liaison Eric Drake, Heritage Program Manager Becky Cain, Forest Planner

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Monitoring Results

The following results reflect updates from data collected from 2020-2024. This question was stricken from previous reports.

Collaborative Discussion and/or Project Team Participation – 14 projects

2020

- McNearny EA

2021

- Raco Airfield Impaired Lands Project
- Straits EA

2023
- Forest-wide Manoomin Traditional Foods Restoration Project

2024
- Forest-wide Stream Crossing Improvements and Jackpine Ecosystem Management Projects
- Carp EA

Ongoing (Annually or Quarterly)
- Grand Island Strategic Planning
- CORA Boat Launch Sites – annual meeting
- MTEG – Annual meetings, quarterly calls with FS invites
- VOIGT – Intertribal Task Force, (meets monthly by invite only)
- GLFWC – meets 6 times per year
- MDNR Wildlife Technical committee - quarterly
- MOU Annual Meetings w/ two separate groups of tribes

Section 106, NHPA Consultation Conducted – 26 projects

2020
- McNearny EA
- ATC Permit Reissuance

2021
- Straits EA
- Raco Airfield Impaired Lands Project
- Brunos Run Sustainable Trail Reroutes
- Carp River Bridge (3458-1.4) Replacement
- Kooiman ARPA Permit
- NCT Reroute Naomikong Overlook Area
- NCT Reroute East of H-01
- Nunn's Creek Trail Bridge Replacement

2022
- County Rd 509 Right-of-way Clearing
- Grand Island Habitat Restoration Project – including site visits with BMIC and SSM resource specialists
- Grand Island Stairway Replacement Project

2023
- Grand Island Playboy Club Relocation – including site visits with BMIC and SSM
- East Zone Toilet Replacement Project
- Manoomin Traditional Foods Restoration Project
- Merit Highline
- Point Aux Chenes Bridge Replacement
- Soldier Lake Rec Area Harvest

2024
- McKeever Trail Beginner Loop
- WZ Toilet Replacement Project
- Horseshoe Bay Trail Improvements
- NCT Reroute and New Trail near Valley Spur
- Forest-wide Stream Crossing Improvement Project and Heritage Implementation Plan
- Carp EA

- JPEMP EA

Collaborative Projects Implemented – 4 projects

2022

- Bay Mills Indian Community Easement Description Correction

2024

- Ishkode Project
- Superior Township Dump Site Cleanup and Stream Restoration.
- BMIC Fire Crew collaborative projects

Tribal Bi-lateral Agreements – 1 permit

2020

- Mawio'mi the Gathering

Partnerships Agreements - 11 agreements

2021

- CS-Point Iroquois Light House Museum upgrades
- CS-Spirit Stone Trail
- SPA -Prescribed Fire Implementation Assistance and Hazardous Tree Removal Project

2022

- CS-Lowland Conifer Forest Research

2023

- 638-TFPA The Ishkode Project – Advancing Co-Stewardship of federal lands and demonstrating relational engagement in remnant boreal forests in the EUP. Engaging Anishinaabe and western sciences in building resilience in remnant boreal forest ecological systems.
- PA- TFPA- St. Marie Chippewa Prescribed Frie Effectiveness Monitoring
- PA- TFPA-Superior Township Dump Site Cleanup & Stream Restoration *Endazhi-atoon – Putting things in their proper place*."
- PA- Point Iroquois Light House cultural inclusion and historical preservation
- GN – FY 23 BMIC GNA Timber stand improvement project
- GN-FY 24 Good Neighbor SPA with Bay Mills Indian Community

2024

- 638 -TFPA-The Ishkode Project Year 26

Memorandums of Understanding

The Forest Service shares in the United States' trust responsibility and treaty obligations to work with federally recognized Tribes on a government-to-government basis to protect the Tribes' ceded territories on lands administered by the Forest Service. As such, the policies of the Forest Service toward federally recognized Tribes are intended to strengthen relationships and further tribal sovereignty through fulfilling mandated responsibilities. Hiawatha National Forest staff outline the polices and responsibilities on tribal relations in two Memoranda of Understanding:

1) 1999 Memorandum of Understanding Regarding Tribal – USDA Forest Service Relations on National Forest Lands within the Territory Ceded in the treaties of 1836, 1837, and 1842;

2) 2006 Memorandum of Understanding Regarding Tribal – USDA Forest Service Relations on National Forest Lands within the Territory Ceded in the Washington Treaty of 1836 and any National Forest Lands Located within the Exterior Boundaries of the Reservation of any Signatory Tribe.

Forest Service leadership meets annually with the memorandum of understanding tribal signatories (in separate meetings for each memorandum of understanding) to discuss implementation, facilitate ongoing communication, and discuss issues that arise regarding the memorandum. Follow-up meetings or committees of Tribal and Forest Service staff address topics that require more information.

In furtherance of relationships, Hiawatha National Forest deciding officials lead consultation efforts on all project-level decisions. The deciding officials, along with interdisciplinary team members, make themselves available to tribal elected officials, tribal natural resources staff, and tribal historic preservation officers to discuss project proposals, solicit tribal concerns, and provide opportunities for Tribal input on projects. Some participating Tribes have the capacity for staff dedicated to serve as full members on Forest Service project Interdisciplinary Teams, providing Tribal perspective, priorities and helping to incorporate Traditional Ecological Knowledge (indigenous knowledge) into project planning.

The memorandum of understanding continues to be implemented as intended. Projects and activities have been put into place in accordance with the provisions of the memorandum. Some activities include notification of birch bark, berries, and medicine gathering opportunities, and implementation of camping fee and length of stay waivers for tribal members exercising treaty rights.

Tribal Collaboration

The Hiawatha National Forest collaborates with the Tribes in several areas, including wildlife and fire restoration projects. During the 1999-2024 monitoring period, both Sault Ste. Marie Tribe of Chippewa Indians (Sault Tribe) and Bay Mills Indian Community (BMIC) proposed Tribally led projects that were approved under the Tribal Forest Protection Act.

Sault Ste. Marie Tribe Of Chippewa Indians - *The Ishkode Project - Advancing Co-Stewardship of Federal Lands and Demonstrating Relational Engagement in Remnant Boreal Forests in the EUP: Engaging Anishinaabe and Western Sciences in building resilience in remnant boreal forest ecological systems on the Hiawatha National Forest* is the Hiawatha's first Tribal Forest Protection Act project and comes from the Sault Ste Marie Tribe of Chippewa Indians, Natural Resources Department Wildlife Program. This project builds resilience among fire adapted remnant boreal forest ecosystems, including 4,735,678 acres within the 1836 Ceded Territory in the Upper Peninsula of Michigan. This encompasses significant portions of over 900,000 acres of Forest Systems lands on the Hiawatha National Forest. This project utilizes rigorous pre-and post-monitoring ecological assessments to inform stewardship strategies and implement fuels treatment activities and northern white cedar (NWC) silvicultural treatments as part of a broader framework. It aims to build resiliency in fire adapted remnant boreal forest ecosystems in the eastern Upper Peninsula through alternative management prescription design, implementation, monitoring, and development of planning

documents, such as the *Inter-Agency Ishkode (Fire) Stewardship Plan* and "Northern White Cedar Study Design".

Collaboration and development of a shared fire stewardship plan with the Hiawatha National Forest allows the Sault Tribe the opportunity to work with the USFS on ecological restoration that meets several goals at once. These include Tribal goals for forest relations, the fuels ecological objectives for the USFS, revitalization of Anishinaabe ecosystem stewardship with ishkode across the 1836 Ceded Territory. It also addresses unique flora and fauna, which are important to the Tribe, U.S. Forest Service, and form a key component of boreal transition fire-dependent ecological systems. This project continues to build upon past and current Sault Tribe and USFS work in the Upper Peninsula of Michigan.

The importance of fire adapted boreal transition forest species and communities to Anishinaabe bimaadiziwin (lifeways) necessitates concerted efforts to protect and restore these communities and Tribal giikendaasowin (knowledge) of ishkode and fire-dependent ecosystems. Through this project, the Hiawatha National Forest staff and Sault Tribe Wildlife Program are revitalizing Anishinaabe giikendaasowin around ishkode and beginning to restore Anishinaabe ecosystem management practices within fire-dependent ecosystems.

One of the Ishkode Projects main components focuses on forest health and uses a combination of traditional ecological knowledge and a strong emphasis on management with fire, or *Ishkode* in Anishinaabemowin. Consultation with Tribal elders and knowledge holders informed the project design.

Sault Tribe conducted semi-structured interviews with community members and elders. They also held a Biboon Gathering (traditional winter story telling) where stories related to ishkode were shared with community members. These knowledge holders emphasized the importance of understanding fire/ecological relationships and history. Key points brought forward include focusing on respecting fire as a powerful, elder being; the identification of sixty-two individual wildlife and plant species that benefit from fire; identification of ten locations that could benefit from restoration of fire, including Betchler's marsh. These discussions documented Tribal perspectives on seasonality, intensity, and frequency of prescribed fire.

Sault Tribe also held field assessments with knowledge holders and harvesters to review traditional medicines and gathering sites. These events resulted in reports summarizing a community knowledge gathering process with a focus on applied prescribed fire and fuels management.

Sault Tribe Natural Resource Department's (STNRD) work to date focused on many aspects of quantifying ecological response to fire, specifically evaluating the response of small mammals and vegetation to recent fire or lack thereof. Vegetation surveys, remote camera-based multispecies occupancy surveys, ruffed grouse assessments, track surveys, gray wolf collaring, and habitat assessments have all been conducted in relation to the Ishkode project. An understanding of the

roles and relationships between people, fire, and wildlife in this system has informed and helped in the development of an *Inter-Agency Ishkode (Fire) Stewardship Plan*, co-developed by Sault Tribe and the Hiawatha Staff. The project includes actions intended to restore traditional medicines and foods, as well as to build resilience, among boreal forest species across the Upper Peninsula.

The Ishkode Project represents an integrated approach across the fire, natural resources, and silviculture programs and collaboration with Sault Tribe. It resulted in the creation of an *Inter-Agency Ishkode (fire) Stewardship Plan* that provides context and rationale for a suite of recommended options for U.S. Forest Service application of fire in specific landscape types. Implementation of this plan's ecological objectives, strategies, and monitoring will contribute to enhanced habitat health and ecosystem resilience to the effects of climate change
This collaboration has expanded coordination between the Sault Tribe and the Forest Service. Examples include sharp-tailed grouse habitat enhancement across the Forest and the 5,000-acre Betchler's Marsh Peatland Restoration Project.

Bay Mills Indian Community - Forest Service staff and Bay Mills Indian Community collaborated during the preparation of Bay Mill's TFPA proposal. The proposal is titled "Superior Township Dump Site Cleanup & Stream Restoration *Endazhi-atoon – Putting things in their proper place*." This project focuses on removal efforts and cleanup of the former Superior Township Dumpsite, located in a small stream that flows onto BMIC reservation land and into Lake Superior; and restoration of the stream. The site is in a drainage on Forest System lands, less than one quarter of a mile from BMIC Trust land. Human health and safety are of great concern for children playing in the area of this site or downstream from it, and for families who may be recreating, hunting and gathering and pursuing their lifeways near the site. The drainage flows onto the reservation and eventually makes its way to Waiska Bay in Lake Superior, so clean up of the dump site and restoration of the creek are a priority for both the Tribe and the Forest Service. BMIC will oversee this project, with support from Hiawatha National Forest.

Bay Mills Indian Community Fire Crew – Shared Stewardship with the Hiawatha - Bay Mills Indian Community Fire Crew and the Hiawatha National Forest work collaboratively to co-steward Forest System lands through implementation of projects that support forest and wildlife habitat restoration across the landscape. BMIC Fire Crew, through several interagency agreements, Stewardship projects, and Good Neighbor Authority projects, assists the Forest Service in timber stand improvement projects, site preparation work, road and trail maintenance, planting of trees, shrubs, forbs and grasses, prescribed burning, patrolling BMIC cultural resources, other NEPA approved projects on National Forest System lands, and for staffing and wildfire response on the East Zone of the Hiawatha National Forest. BMIC Fire Crew contributions increased wildland fire response capacity and supported hazardous fuels reduction efforts.

Bay Mills Indian Community – Shared Interpretation at Point Iroquois Lighthouse with the Hiawatha - The Hiawatha National Forest is unique because it is the only National Forest in the country that manages lighthouses. Point Iroquois is staffed to serve the public as an interpretive site.

Point Iroquois Lighthouse (PILH) offers visitors a maritime museum, a gift shop, tower climb, and an ADA accessible boardwalk along the beach.

There are two partnerships associated with the lighthouse from two different entities; the Eastern National Forest Interpretive Association and Bay Mills Indian Community.

Bay Mills Indian Community joined the Forest Service and started an interpretive program at PILH in 2020. They opened the Gnoozhekaaning (The Place of the Pike) Museum which illustrates the importance of Point Iroquois to the Anishinaabe people. The Gnoozhekaaning Museum collects, preserves and shares the history, artifacts, and traditions of the People of the Place of the Pike to connect the past to the present so visitors can recognize and understand who Bay Mills Indian Community is today

What is the status and trend of the monitoring indicator in relation to the target? There are no measurable targets for these monitoring indicators. Based on current indicators, the Forest's activities align with the intent of the Forest Plan.

What level of confidence is there in the accuracy and precision? There is a high degree of confidence in the accuracy and precision of the data presented.

Monitoring Discussion and Findings

Findings indicate an ongoing collaborative relationship between the Hiawatha National Forest and Tribal partners.

Adaptive Management Considerations

The Forest Plan monitoring program is meant to "enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed" (36 CFR 219.12).

Recommendations have been made to change the wording of and add additional indicators that are more quantifiable.

Table 90. Question 34 **-** Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan			X
Management activities			X
Plan monitoring program	X		

Table 91. Question 34 - Monitoring indicator status summary

Evaluation Report Year	Result*	Recommendation(s) (if applicable)	Recommendation Status
2024	**2**	Indicators broken out into types of meetings, consultations and agreements used. Previous indicators were not measurable as written.	Question #34 indicators were changed for the 2020-2024 M&E Report.

***Result:** **1)** Interval of data collection beyond this reporting cycle (*indicate date of next time this monitoring item will be evaluated*); **2)** Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired**; 3)** More time/data are needed to understand status or progress of the Plan Component(s)**; 4**) Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired**; 5)** Methods inadequate to answer monitoring question.

Monitoring Question 35. Heritage Program: How are historic properties being identified, evaluated, and protected from damage or disturbance?

Measurement frequency	Date last measured	Reporting frequency	Date last reported	Included in this report
Annually	2024	2–10 Years	2019	**Yes**

Indicators with Forest Plan Direction / Driver

Monitoring Question Indicator(s)	Forest Plan Direction / Driver
(ii) Heritage Managed to Standard Targets *(iii)Number of Acres Inventoried for Historic Properties and the Number of Newly Identified Historic Properties* ***(added 2025)*** *(iv) Number of priority heritage assets and historic properties monitored* ***(added 2025)***	Section 110 of the NHPA; 36 CFR 79; 36 CFR 800; 43 CFR 3; 43 CFR 7; 43 CFR 10. 36 CFR 800.4 Section 110 of the NHPA and 36 CFR 800
Who Collected this data?	Heritage Program
Who is responsible for analyzing the question?	Eric Drake, Heritage Program Manager

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Monitoring Results

i) Heritage Managed to Standard Targets.

Section 110 of the National Historic Preservation Act (NHPA) directs Federal agencies in conjunction with the Secretary of the Interior, to develop their own historic preservation programs for the identification, evaluation, and protection of historic properties. The Forest Service implemented the Heritage Program Managed to Standard (HPMtS) system in 2013 to meet statutory responsibilities under Section 110 and maintain compliance with Section 106."
. Section 106 of the NHPA directs Federal agencies, like the USDA-Forest Service, to consider the effects of Federal undertakings on historic properties and seek ways to avoid, minimize, or mitigate adverse effects. The system involves seven individual performance indicators, each worth up to 10 points each for a total maximum score of 70 points. The scoring system works as follows:

- A Heritage Program Plan: 10 points for the plan or 2 points for each plan element.
- Section 110 Field Survey of National Forest System Lands where cultural resources are most likely to occur: Minimum of 200 acres of survey per year for 10 pts.
- Legacy cultural resources are evaluated for eligibility to the National Register of Historic Places: 1 site listed or 20 sites determined not eligible = 10 pts.

- Annual condition assessment of Priority Heritage Assets (PHA): Each PHA must receive a condition assessment once every five years for 10 pts each fiscal year.
- Cultural resource stewardship to protect and maintain PHAs (e.g., historic preservation projects): Each undertaking = 2.5 pts.
- Opportunities for scientific study or public education and outreach (e.g., Youth Archaeology Workshops and Passport in Time projects): Every project is worth 2 pts.
- Volunteer hours: Minimum number of 400 hours to achieve 10 pts.

Forest Service Heritage Programs that earn a minimum score of 45 out of 70 possible Heritage Program Managed to Standard points are considered "Managed to Standard." Tables 1 through 4 show the projects contributing toward HPMTS target scores for Fiscal Years 2020 through 2024. The Forest did not meet the threshold in FY2020 because public education and outreach programs were not conducted that year.

Table 92. Question 35 - FY20 Heritage Program Managed to Standard Target Points by Indicator and Project

	HPMTS Indicator						
Heritage Event	**1**	**2**	**3**	**4**	**5**	**6**	**7 (hrs)**
Cultural Resource Overview	2	-	-	-	-	-	-
Predictive Model (Grand Island)	2	-	-	-	-	-	-
PHA site condition assessments	-	-	-	10	-	-	-
Sandtown stabilization	-	-	-	-	2.5	-	-
Soldier's Lake Pavilion treatment	-	-	-	-	2.5	-	-
Stone Quarry insect treatment	-	-	-	-	2.5	-	-
Bay Furnace Salvage Excavation	-	-	-	-	-	2.0	-
Sec. 110 survey (Addis Rock)	-	10	-	-	-	-	-
HPMTS Scores =	4	10	0	10	7.5	2	0
HPMTS Score =	**33.5**						

Table 93. Question 35 - FY21 Heritage Program Managed to Standard Target Points by Indicator and Project

	HPMTS Indicator						
Heritage Event	**1**	**2**	**3**	**4**	**5**	**6**	**7 (hrs)**
Cultural Resource Overview	2	-	-	-	-	-	-
Predictive Model (Grand Island)	2	-	-	-	-	-	-
PHA site condition assessments	-	-	-	7.5	-	-	-
26 DOEs for non-eligible sites	-	-	10	-	-	-	-
Sandtown stabilization	-	-	-	-	2.5	-	-
Midway Logging Camp PIT	-	-	-	-	-	2.0	320
Point Iroquois Lighthouse Masonry I	-	-	-	-	2.5	2.0	840
Round Island Rip Rap	-	-	-	-	2.5	-	-

Heritage Event	1	2	3	4	5	6	7 (hrs)
Soldier's Lake Pavilion treatment	-	-	-	-	2.5	-	-
MTU field School	-	-	-	-	-	2.0	1920
MRHC presentation	-	-	-	-	-	2.0	-
HPMTS Scores =	4	0	10	7.5	10	8	10
HPMTS Score =	**49.5**						

Table 94. Question 35 - FY22 Heritage Program Managed to Standard Target Points by Indicator and Project

	HPMTS Indicator						
Heritage Event	**1**	**2**	**3**	**4**	**5**	**6**	**7 (hrs)**
Cultural Resource Overview	2	-	-	-	-	-	-
Predictive Model (Grand Island)	2	-	-	-	-	-	-
PHA site condition assessments	-	-	-	7.5	-	-	-
Sandtown stabilization	-	-	-	-	2.5	-	-
Potato Cabin excavation	-	-	-	-	-	2.0	-
Point Iroquois Lighthouse Masonry II	-	-	-	-	2.5	2.0	800
Round Island Light Privy & Oil House Rehab	-	-	-	-	2.5	2.0	-
Soldier's Lake Pavilion treatment	-	-	-	-	2.5	-	-
BMIC Youth Archaeology	-	-	-	-	-	2.0	48
Sec. 110 survey (Mission Hill)	-	10	-	-	-	-	-
HPMTS Scores =	4	10	0	7.5	10	8	10
HPMTS Score =	**49.5**						

Table 95. Question 35 - FY23 Heritage Program Managed to Standard Target Points by Indicator and Project

	HPMTS Indicator						
Heritage Event	**1**	**2**	**3**	**4**	**5**	**6**	**7 (hrs)**
Cultural Resource Overview	2	-	-	-	-	-	-
Predictive Model (Grand Island)	2	-	-	-	-	-	-
PHA site condition assessments	-	-	-	9	-	-	-
Sandtown stabilization	-	-	-	-	2.5	-	-
Potato Cabin excavation (site 01-243)	-	-	-	-	-	2.0	-
IJHA Article						2.0	
Point Iroquois Lighthouse Masonry III	-	-	-	-	2.5	2.0	400
Round Island Lighthouse Restoration	-	-	-	-	2.5	-	-
Midwest Archaeological Conference	-	-	-	-	-	2.0	-
Thunder Lake II Excavation	-	-	-	-	2.5	2.0	-
Sec. 110 survey (Lower Indian River)	-	10	10	-	-	-	-

Heritage Event	1	2	3	4	5	6	7 (hrs)
HPMTS Scores =	4	10	10	9	10	10	10
HPMTS Score =	**53**						

Table 96. Question 35 - FY24 Heritage Program Managed to Standard Target Points by Indicator and Event

	HPMTS Indicator						
Heritage Event	**1**	**2**	**3**	**4**	**5**	**6**	**7 (hrs)**
Cultural Resource Overview	2	-	-	-	-	-	-
Predictive Model (Grand Island)	2	-	-	-	-	-	-
PHA site condition assessments	-	-	-	9	-	-	-
Farrell Cottage Floor Stabilization					2.5		
Sandtown stabilization	-	-	-	-	2.5	-	-
Potato Cabin Excavation (site 01-243)	-	-	-	-	-	2.0	-
Stone Quarry Cottage Re-roofing					2.5	2.0	400
Round Island Lighthouse Window Repair	-	-	-	-	2.5	-	-
Grand Island North Light floor joist stabilization					2.5		
Governor's Award for Historic Preservation						2.0	
Title 7, Escanaba Flint Knapping workshop	-	-	-	-	-	2.0	-
Life of Lake Superior Flint Knapping	-	-	-	-	-	2.0	-
Sec. 110 Survey (Waiska Watershed)	-	10	-	-	-	-	-
HPMTS Scores =	4	10	0	9	10	10	10
HPMTS Score =	**53**						

(ii). Number of Acres Inventoried for Historic Properties and the Number of Newly Identified Historic Properties.

In accordance with 36CFR800.4, Federal agencies are required to conduct inventory surveys on public lands managed by the agency for historic properties to analyze and assess the effects of their undertakings on historic properties. Consistent with the Secretary of the Interior Standards for Archaeology and Historic Preservation Standards, the Hiawatha National Forest has inventoried 134,800 acres of actively managed system lands between 2020 and 2024. These inventory surveys have identified and documented 108 new historic properties.

Table 97. Question 35 - Acres Surveyed and Sites Identified during planning period

Monitoring Period	Acres Surveyed	New Sites Identified & Documented
2020-2024	134,800 acres	108

(iii). Number of Priority Heritage Assets and Historic Properties Monitored.

Historic property inventory surveys conducted in-house or under contracts managed and by Forest Service Heritage Professionals between 1979 and 2024 have identified 3,445 historic properties on Federal lands managed by the Hiawatha National Forest. Of these, 67 are considered Priority Heritage Assets (PHA). The designation of a PHA is a local management decision. PHAs are assets of distinct public value requiring more active management. Historic properties that have not been designated as a PHA may have important historical or cultural significance but currently lack the need for intensive management beyond site avoidance and protection. To be designated as a PHA, a historic property must meet one or more of the following criteria:

- The significance and management priority of the property is recognized through an official designation such as listing on the National Register of Historic Places or on a State register.
- The significance and management priority of the property is recognized through prior investment in preservation, interpretation, and use.
- The significance and management priority of the property is recognized in an agency approved management plan.
- The property exhibits critical deferred maintenance needs, and those needs have been documented. Critical deferred maintenance is defined as a potential health or safety risk or imminent threat of loss of significant resource values (FSM 2360.5).

Examples of PHAs on the Forest include our six lighthouses; historic log structures; CCC constructed buildings; archaeological sites listed, or determined eligible for listing, on the National Register of Historic Places; and historic properties deemed sacred by our Tribal partners. The condition of each PHA is assessed at least once every 5 years as part of the HPMtS target system and our annual monitoring program.

Historic property monitoring involves documenting poor site conditions requiring the need for more active management, leading to actions that can elevate the status of a non-PHA historic property to a PHA. Monitoring serves four primary purposes: (1) identifying and assessing the condition of historic properties and archaeological resources most threatened by deterioration, natural disturbance, vandalism, relic hunting, recreation use, and vegetation management activities; (2) designing treatments/mitigation projects that comply with Forest Service Heritage Program standards and guidelines (see FSM2360 and FSH2309); (3) prioritize Heritage Program management activities; and (4) evaluating the effectiveness of project field methods and heritage resource treatments and/or mitigation efforts.

The Heritage Program for the Hiawatha National Forest monitors and assesses the conditions of historic properties in the context of conducting PHA site condition assessments, inventory surveys, implementing site protection measures, and general site visitations during the performance of routine duties (e.g., heritage support for timber sales, prescribed burns, and recreation events). Over 500 historic properties were visited by Heritage Professionals between 2020 and 2024. The 2020 to 2024 monitoring results show that the greatest threats to the integrity of historic properties involve unauthorized relic hunting or looting, unauthorized OHV traffic, recreational activities (e.g., camping and the digging of latrines and fire pits), and vandalism. Few instances of damage were associated

with Forest Service activities during the monitoring period, although four historic properties were damaged because of timber harvesting activities. Forest Service Heritage Professionals conducted damage assessments for all four cases. Lack of communication between the Forest Service, the Michigan DNR, the purchasers, and the operators contributed to the damage. The Hiawatha National Forest has taken the lead in improving communications between the various parties by improving data sharing and conducting pre-sale and post-sale site visits with partners, purchasers, and operators. These efforts have resulted in changes to management practices within vegetation management operations.

Table 98. Question 35 - Sites visited and threats identified

Monitoring Period	Sites Visited	Threats Identified During Monitoring	Proposed Solution to Management Activities
2020-2024	500 sites	Relic hunting and looting	Increased law enforcement, signage, and education
		Unauthorized OHV traffic	Increased law enforcement, signage, and education
		Camping – digging of latrines and fire pits	Increased law enforcement, signage, and education
		Vandalism	Increased law enforcement, signage, and education
		Poor communication between FS and contractors and State DNR	The Forest Service has taken the lead in improving communications between the parties and conducting pre-sale and post-sale site visits with partners, purchasers, and operators. Improvement occurring

Data

What is the status and trend of the monitoring indicator in relation to the target?

Table 99. Question 35 **-** Summary of monitoring evaluation trends for all indicators

Current Status	Trend Towards Target	Trend Away from Target
Within target	3	0
Outside target	0	0

What level of confidence is there in the accuracy and precision? There is a high degree of confidence in the accuracy and precision of this data.

Adaptive Management Considerations

The Forest Plan monitoring program is meant to "enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed" (36 CFR 219.12).

Historic Property Inventory surveys and use of the HPMtS target system align with the goals and objectives of the Forest Plan. The Forest Plan goals and objectives are defined as the Identification (FSM2363.1), Evaluation (FSM2363.2), and the Allocation of Cultural Resources to Management

Categories (i.e., Preservation, Enhancement, Scientific Investigation, and Release from management under the National Historic Preservation Act [FSM2363.3]).

Based on monitoring, changes to the Monitoring Program and management activities have been identified. Improved communication among partners, purchasers, and operators remains an identified need based on monitoring results. The monitoring question and indicators should be altered to address measurable indicators. **Question #35 and its indicators have been changed for this reporting period** to make them more quantifiable. Monitoring results indicate that existing Forest Plan guidelines for heritage resource protection remain adequate.

Table 100. Question 35 **-** Summary of where change may be warranted based on results

Changes may be warranted for the:	Yes	Unsure	No
Forest Plan			X
Management activities	X		
Plan monitoring program	X		

Table 101. Question 35 - Monitoring indicator status summary

Evaluation Report Year	Result *	Recommendation(s) (if applicable)	Recommendation Status
2024	**2**	Change wording of question and indicators to be measurable. Recommend 3 new indicators: *i. Heritage Managed to Standard Targets* *ii. Number of Acres Inventoried for Historic Properties and the Number of Newly Identified Historic Properties.* *iii. Number of priority heritage assets and historic properties monitored.*	Question #35 indicators were changed for the 2020-2024 M&E Report.

***Result: 1)** Interval of data collection beyond this reporting cycle (*indicate date of next time this monitoring item will be evaluated*); **2)** Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired**; 3)** More time/data are needed to understand status or progress of the Plan Component(s)**; 4**) Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired**; 5)** Methods inadequate to answer monitoring question.

Conclusion

This section is used to compile and summarize all the individual findings from the individual monitoring item sections. This section may end with a preliminary need to change the plan.

Table 102. Summary of monitoring evaluation findings for all monitoring questions.

Changes may be warranted for the:	Recommended Change:
Forest Plan	**MA 8.1** - cRNAs should be removed from this MA and incorporated into other appropriate MAs. This may need a Forest Plan amendment or wait until Forest Plan revision (see Question #9) **Timber Suitability** – Updates to mapping has resulted in the need to update the timber production suitability data layers. This may need to be a Forest Plan amendment (see Question #30). **New 2500 Watershed Guideline –** establish a 100-foot no-harvest buffer along streams and waterbodies and a 30-foot no-harvest buffer to wetlands. Establishment of a new guideline could be addressed during Forest Plan revision, but until then, through project design criteria (see Questions #2 and #4) **Edit 2500 Watershed - Objective 5 –** change to "Improve conditions on two watersheds and develop two new Watershed Restoration Action Plans every five to ten years" to make this objective more attainable. Objective currently states 10% of fifth level watersheds where classification is less than optimal. This may require a Forest Plan Amendment. (see Question #2) **Edit 2600 Wildlife, Fish and Sensitive Plant Habitat Management – Objective 3 –** Update the objective to broaden its scope to include aquatic surveys and habitat condition assessments for a wider range of native aquatic species. (see Question #4)
Management activities	**Heritage** – improve communications. **Heritage** - increase law enforcement, signage, education **Soils** – new design criteria **Silviculture** – forest assessment of red pine resource and ground accessibility. **Silviculture** – balance clearcuts, two-aged, and uneven-aged treatments for aspen and conifer management. **Silviculture** – improve FACTS database management. **Silviculture** – Reevaluate use of watershed boundaries instead of Management Areas as large vegetation project NEPA boundaries **Timber** – reevaluate timber production **Timber** – change how we cruise timber to reflect industry usage and Forest Plan Standards **TES Species** – data is not readily available to assess population trends, collect data for future reporting. **Engineering** – Improve and prioritize accomplishment reporting and database management (NRM) **Watershed/Wildlife/Aquatics/Botany** – increase use of partners during low staffing **Watershed** – continue road decommissioning in riparian and wetland areas

Changes may be warranted for the:	Recommended Change:
Management activities	**Watershed** – reduce system road densities by targeting road decommissioning project with stream crossings and/or locations in riparian and wetlands, or in watersheds exceeding the impaired open road thresholds of 2.4 miles pers square mile. **Watershed** – restrict new FS road construction in riparian and wetland areas **Watershed** – increase NNIS treatments in riparian and wetland ecosystems AND increase outreach and education to reduce spread **Watershed** – integrate stream simulation design into timber haul route and road improvement projects **Watershed -** Limitations of use are needed on the Hiawatha National Forest to prevent and reduce the amount of resource damage occurring within riparian areas and to water resources at Dispersed recreation sites, day use sites, trials, beaches and camping areas. **Watershed** – Inspect and treat all gravel pits for NNIP and AIS prior to use, and/or annually. **Watershed** – increase use of partners during low staffing **Watershed** – continue road decommissioning in riparian and wetland areas **Watershed/Facilities/SUP** – prioritize hiring of special uses staff **Watershed** - require SUP O&M plans and use physical closures on utility corridors to prevent ORV damage **Watershed** – limit the use of dozers and blading on fireline construction **Watershed** – remove riparian buffers and vernal pools from the suitable timber classification **Watershed** – implement 30-foot buffer to wetlands within harvest units intended for year-round operation **Watershed** – implement 30-foot buffer to organic wetlands for harvest units intended for winter-summer operation **Watershed** – depict RMZs and wetlands on sale-area maps and mark on the ground if not exclude from harvest units **Watershed** – limit, and reduce unauthorized ORV use and damage in wetlands, streams, and shorelines due to ineffective closures at recreation sites, utility corridors, closed wetland roads/trails, and along shorelines. **Watershed/Engineering/Recreation** – develop customizable BMP checklists and training materials for activities/protocols with the most frequent concerns. **Engineering/Recreation** – increase frequency and effectiveness of maintenance on roads, trails, and recreation sites to address BMP issues **All Resources** – ensure that R9 BMP evaluations are a multi-disciplinary effort to engage all affected programs. **All Resources** – implement a written, resource and site-specific project plan (O&M Plan) for all projects to ensure BMPs and design criteria are identified (pulled from the NEPA) prior to implementation (specifically recreation, fire/fuels, special uses, chemical uses, and roads/transportation projects), and share with field crews, project managers, and permit holders.

Changes may be warranted for the:	Recommended Change:
Plan monitoring program	**RECOMMENDED UPDATES TO MONITORING PROGRAM** **Question #1 –** Combine Questions #1 & #3, Question #3 becomes indicator (i) under Question #1; reworded indicator (ii) to match National monitoring methods and indicators **Question #2 –** Edit this monitoring question to add "watersheds and..." to be more in line with drivers. Edit indicators (i) and (ii) to match standard reporting metrics for the objectives. Remove Aquatic Ecosystems drivers and add 2500 Riparian Management Standard 1 to Indicators (i), (ii), and (iv). **Question #4 –** Drop Indicator (iii) from the Monitoring Program. Incorporate Indicator (vi) into Question #33. **Question #5 –** Drop Indicator (iii) from the Monitoring Program **Question #6 -** Data is no longer collected on Forest. Consider changing question for future reports to something that is measurable, OR dropping question **Question #7 -** Data is no longer collected on Forest. Consider changing question for future reports to something that is measurable, OR dropping question **Question #8** – data is not collected for this question. Consider changing question for future reports to something that is measurable **Question #9 –** Add Indicator (ii) and update drivers to more accurately answer the monitoring question, see recommendation in report. **Question #11** – drop indicator ii, not measurable **Question 19** - Combining Questions #17 and #19 and add indicators (ii) through (v), which will appropriately address the over-arching Monitoring Element - Status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives. Add Motorized/Non-Motorized Trails Objective 3 to the drivers. **Question #22** – Update indicator to use regionally accepted terminology **Question #24** – Add "and management implications" to the end of Question #24. Add indicator (ii). Change reporting period to every 10 years. **Question #26** - Budget modernization has made comparison of these costs near impossible. Consider how this question should be addressed in future reports or consider removing this question from the monitoring program. **Question #29-** Separate Indicators (i) and (ii) into two separate monitoring indicators. Reword Indicator (iii). Add Indicator (v). **Question #30** – Change indicator (i) to more accurately answer the monitoring question, see recommendation in report. **Question #33** – Update indicator (i) to be measurable. **Question #34** – Update indicators to reflect actual meeting, consultation and agreement types in order to make this question measurable **Question #35 – C**hange question to “How are historic properties being identified, evaluated, and protected?”; and replace one indicator with three. **REMOVE QUESTION FROM MONITORING PROGRAM** **Question #3 –** REMOVE QUESTION FROM MONITORING PROGRAM. Combine Questions #1 & #3, Question #3 becomes indicator (ii) under Question #1 **Question #15** – REMOVE QUESTION FROM MONITORING PRGRAM. The Hiawatha is not within the Lynx natural range.

Changes may be warranted for the:	Recommended Change:
	Question #16 – REMOVE QUESTION FROM MONITORING PROGRAM. This question is redundant and included in Question #14 **Question #17** – REMOVE QUESTION FROM MONITORING PROGRAM. It does not address the Monitoring Element or the Drivers. These indicators are addressed in Questions 1 & 19. Add OHV opportunities to Question 19 **Question #18 -** REMOVE QUESTION FROM MONITORING PROGRAM. Wildlife habitat damage due to snowmobile use has not been identified as an issue on Forest, not monitored.

Appendix A – Not Evaluated in this Report

Question 3. Best Management Practices

How is the Forest complying with the Clean Water Act requirements?

Stricken. Relocated. Added as an indicator under Question 1.

Question 4. Aquatic Ecosystems, Indicator vii

Indicator vii – Trends in desired native fish population.

Stricken. Insufficient data

Question 5. Maintaining or Restoring Ecological Processes, Indicator ii, iii, and iv

Indicator ii – Numbers of years since fire occurred compared to historical fire regimes for a given ELTP or biophysical setting.

Stricken. Insufficient data

Indicator iii – Plant and animal population change before and after management that emulates natural ecological processes (prescribed burning, some timber harvest, mechanical opening treatments, stream flow restoration, etc.)

Stricken. With the exception of a few rare species (TES) the Forest does not monitor population trends, therefore are unable to address this indicator. Consider changing the indicator or the indicator removing from Monitoring Program.

Indicator iv – Compare the current percent of acres measured against the 2005-2006 desired future condition by MA, ELT, early-, mid-, and late-seral condition and tree size classes.

Stricken. Due to staffing capacity

Question 6. Insect and disease

To what extent are insects and disease populations compatible with objectives for restoring or maintaining healthy forest conditions?

Stricken. The Forest no longer conducts annual insect and disease flights, therefore, there is no data to answer this question. Consider changing the indicators for future reports or removing the question from Monitoring Program.

Question 7. Insect and disease

To what extent is Forest management managing undesirable occurrences of fire, insect and disease outbreaks?

Stricken. The Forest no longer conducts annual insect and disease flights, therefore, there is no data to answer this question. Consider changing the indicators for future reports or removing the question from Monitoring Program.

Question 8. Habitat for Native and Desired Non-native Species

To what extent is the Forest management providing ecological conditions to maintain habitat of native and desired non-native species?

Stricken. There is no data collected to monitor this question. Consider changing the indicators for future reports or removing the question from Monitoring Program.

Question 14. Conservation of TES Species, Indicator iv

Indicator iv – TES Population Trends

Stricken. There is no data collected to monitor this question. Consider changing the indicators for future reports or removing the indicator from Monitoring Program.

Question 15. Canada Lynx

To what extent is the Forest maintaining the amount and juxtaposition of Canada lynx foraging and denning habitats?

Stricken-Unnecessary. Hiawatha National Forest is not in the Canada Lynx natural range. During Forest Plan revision, consider removing Goals and Guidelines for Canada Lynx from the Forest Plan. Consider removing question from Monitoring Program.

Question 16. TES Recovery Plans and Conservation Assessments

To what extent is the Forest working cooperatively with the US Fish and Wildlife Service, state and other federal agencies to update and implement recovery plans and conservation assessments for TES?

Stricken – Redundant. This monitoring question is redundant with the explanation of "Interagency cooperation for Threatened, Endangered and special status species is included in the discussion for Monitoring Element 4, Question 14". The Hiawatha National Forest is not currently working in conjunction with the USFWS on recovery plans. The Forest Plan does have standards for T&E species. Signed federal recovery plans for threaten and endangered (T&E) species are implemented. Past Recovery Plans exist for all T&E species. The US Fish and Wildlife Service, Michigan Ecological Service Field Office maintains a website that features all the listed species and their associated Recovery Plans. It provides the most accurate and current information. https://www.fws.gov/carp/office/michigan-ecological-services/species. Consider removing question from Monitoring Program.

Question 17. Effects of OHVs

What are the effects of OHVs on the physical, biological, and social environment?

Stricken – Redundant. This question does not meet with the intent of the Monitoring Element and is discussed throughout the document under other questions. The intent of this Monitoring Element is to highlight "visitor use, visitor satisfaction and progress toward meeting recreation objectives", not the effects they may have on the resources. To address the Monitoring Element more appropriately, OHV opportunities were added to Question #19, and the indicators were revised to show how the Forest is meeting Motorized Trail Objections in the Forest Plan. Consider removing question from Monitoring Program.

Question 18. Effects of Snowmobiles

What are the effects of snowmobiles on the physical, biological, and social environment?

Stricken-Unnecessary. Wildlife habitat damage due to snowmobile use has not been found to be an issue on Forest, therefore, there is no data to report. Consider removing question from Monitoring Program.

Question 26. Costs

How close are projected costs with actual costs?

Stricken- Beginning in 2021 changes in agency funding structure known as budget modernization shifted significant cost centers like salary to pooled accounting making comparison to projected costs and previous fiscal years nearly impossible. For more information on budget modernization please visit https://nafsr.org/docs/2020/BudgetModernization/Budget_Modernization%20Paper%2009282020.pdf Consider removing question from Monitoring Program.

Question 28. Public Demand for Commodity and Non-commodity Opportunities, Indicator (i)

Stricken - Due to Staffing Capacity. Only a portion of these questions (timber) were addressed in this report. The Forest Plans to potentially cover the entirety of this question in the 2025-2026 Biennial Report.

Appendix B: Supporting Documents

Supporting USFS Documents

USDA Forest Service. 2006. Hiawatha National Forest 2006 Forest Plan, U.S. Forest Service. Gladstone, Michigan. Available online in portable document format (PDF): https://www.fs.usda.gov/main/hiawatha/landmanagement/planning

USDA Forest Service. 2016. Hiawatha National Forest 2016 Revised Monitoring Plan, U.S. Forest Service. Gladstone, Michigan. Available online in portable document format (PDF): https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd501016.pdf

USDA. Forest Service. 2011 (May). Watershed Condition Framework. FS-977. Washington, DC: U.S. Department of Agriculture, Forest Service. 49 pp. Accessed at: https://www.fs.usda.gov/sites/default/files/legacy_files/media/types/publication/field_pdf/Watershed_Condition_Framework.pdf

USDA Forest Service. 2011 (July). Watershed Condition Classification Technical Guide. FS-978. Washington, DC: U.S. Department of Agriculture, Forest Service. 49 pp. Accessed at: https://www.fs.usda.gov/sites/default/files/legacy_files/media/types/publication/field_pdf/watershed_classification_guide2011FS978_0.pdf

USDA Forest Service. 2012. National Best Management Practices for Water Quality Management on National Forest System Lands. Volume 1: National Core BMP Technical Guide. FS-990a. Washington, DC: U.S. Department of Agriculture, Forest Service. 175 pp. Accessed at: https://www.fs.usda.gov/naturalresources/watershed/pubs/FS_National_Core_BMPs_April2012.pdf

USDA. Forest Service. 2018. National Best Management Practices for Water Quality Management on National Forest System Lands. Volume 2: National Core BMP Monitoring Technical Guide, version 3.2. FS-990b. Washington, DC: U.S. Department of Agriculture, Forest Service. Publicly-available box folder: https://usfs-public.box.com/s/709sayl9krpl45n45cs2nf3yi3lhfcq2.

USDA Forest Service (USFS). 2016. National Best Management Practices for Water Quality Management on National Forest System Lands: National Core BMP Monitoring Protocols Rating System Summary. 86 pp. Internal document accessed at: 2016_Ruleset_Overview.docx

Other Supporting Documents

Previous Monitoring and Evaluation Reports
https://www.fs.usda.gov/detail/hiawatha/landmanagement/planning/?cid=stelprdb5106301

DNR & EGLE. 2023. Michigan Forestry Best Management Practices for Soil and Water Quality. Michigan Department of Natural Resources and Michigan Department of Environment, Great Lakes, and Energy Drinking Water and Environmental Health Division. www.michigan.gov/dnr

Appendix C: Monitoring Discussion & Findings and Adaptive Management Findings Work Sheet

Monitoring Discussion and Findings

INSTRUCTIONS FOR THIS SECTION:
For each monitoring question (from the Plan Monitoring Program), use your monitoring results to respond to the questions below (i.e. answer all 16 questions for each monitoring plan item). Cut and paste to repeat for all monitoring items. Questions are organized to help you conclude if change is warranted in the four areas the planning rule directs this evaluation report to indicate: monitoring program, plan components, management activities, and assessment [36 CFR 219.12(d)(2)].

Use your responses to the questions and or results as summarized in the Monitoring Evaluation Discussion section to complete Tables C1 and C2 in the Adaptive Management Considerations section (each monitoring question will have its own Table).

Monitoring Program

1. Did the monitoring results provide all the information necessary to answer the monitoring question? **Yes or No?** In other words, are the monitoring indicators generating the data and insights needed to make inferences about the status, trend, achievement, or intent of the plan components that the monitoring question is addressing?
2. **If yes**, go on to question 5. (Also, mark in Tables C1 in the Adaptive Management Considerations section) that no change would be warranted to the Monitoring Program based on this monitoring question). If no, list the information that was missing, incomplete, or was needed to answer the monitoring question.
3. For those items listed in 2) above, **briefly describe why** the information was missing, incomplete, or otherwise not provided in the monitoring results?

   TIPS for Question 3:

   Considerations when describing a "no" response for 2) above:

   Indicators are appropriate, but:

   - data lacking statistical power, need more collection points or time
   - data collection methods flawed or inconsistent
   - data entry not consistent or poor quality
   - data extraction from database difficult or cumbersome

   Indicators may not be appropriate because:

   - not sensitive enough to detect change over this time period
   - data collection protocols are confusing or unachievable
   - assumptions or science has changed
   - conditions on the ground are not as expected
   - monitoring question no longer appropriate to detect achievement of the plan component intent
   - Note: Reference any relevant information from results section in the response.

4. Based on the responses to 1), 2), and 3) above, may a change be warranted for the Plan Monitoring Program?

   If change may be warranted, briefly describe the opportunities for change here, and mark the respective box in Table C1 below.

   If unsure, briefly discuss why the response was not "change may" or "change is not" warranted, and mark the respective box in Table C1 below.

   TIPS for Question 4: Delete this text for final report.

   If change may be warranted, include the specific recommended changes so the responsible official can consider all of the available options. In addition describe the time frame to best achieve the change, feasibility of the change, and any difficulties you may see in achieving the change.

   Considerations to potentially address in this response:

   - Change of indicator, measure, frequency of data collection
   - Change of roles and responsibilities around data collection
   - Change data collection protocols or methods
   - Training needs for data collection or data entry
   - Change on report or data output formats
   - Change monitoring question

   If unsure about making changes at this point in time, discuss what information or resources would be needed to make a determination. For example, describe how much more time or data would be needed.

   If change is not warranted, then the response to 1) above should have been "yes".

   Note: If the response to 1) above was "no", then carefully consider if the monitoring results are robust enough to respond sufficiently to the Forest Plan, Management Activities, and Forest Assessment evaluation questions below. Potentially, more time or a change to the monitoring program is needed to provide the information base to respond to those questions.

Forest Plan

5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated? **Yes or No?**

   TIPS for Question 5: Delete this text for final report.
   In other words, are the desired conditions, objectives, standards, guidelines, or goals that are linked with the monitoring question being achieved? And, are the related monitoring results within target and trending towards the target (i.e., green box in results section)?

6. **If yes,** briefly describe the success and go on to question 9. (Also, indicate that no change would be warranted for the Forest Plan based on this monitoring question, see Table C-1).

   TIPS for Question 6 – "yes" response: Delete this text for final report.
   Use this section to describe how the monitoring results are substantiating or validating the assumptions and anticipated outcomes of implementing the plan. Use the results to show relevant information so that it can be used to support future NEPA analysis, response to comments, response to project objections, litigation responses, and project purpose and needs. Suggest to use text from this response to highlight success in any internal or external summaries.

   If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.

7. For those items listed in 6) above, **briefly describe why** these Forest Plan components may not be progressing, trending, or maintaining as anticipated.

   TIPS for Question 7: Delete this blue text for final report.
   Considerations for this response:

   - Did the indicator meet an assessment point or alert (threshold, limit, tolerance, change rate, etc.)? These may be outlined in the unit monitoring guide, new literature, in the plan itself, or other plan content approaches documents [36 CFR 219.7(f)].
   - Rate of change for achievement towards the plan component is not progressing as desired or projected (or as new information indicates it could or should).
   - Quality of achievement of the plan component is not as desired or projected (or as new information indicates it could or should).

   Note: Reference any relevant information from results section in the response.

8. Based on the answers to 5), 6), and 7) above, may a change be warranted for the Forest Plan?

   If change may be warranted, briefly describe the opportunities for change here, and mark the respective box in Table C-1 below.

   If unsure, briefly discuss why the response was not "change may" or "change is not" warranted, and mark the respective box in Table C-1 below.

   TIPS for Questions 8: Delete this blue text for final report.
   If change may be warranted, include the specific recommended changes so the responsible official can evaluate all the available options. In addition describe the time frame to best achieve the change, feasibility of the change, and any difficulties you may see in achieving the change.

   Considerations for this response:

   To better implement plan component intent - are changes recommended in:

   - types of actions
   - rate of action
   - methodology for how action is implemented
   - quality of implementation of actions

   Are there specific geographic locations or eminent situations that actions or altering strategies are recommended?

   Is there a time frame under which recommendation needs to be acted upon to be effective in adaptive management?

   What specific changes to desired conditions or outcomes may be recommended?

   What specific changes to standards or guidelines may be recommended?

   Is there a need to adjust boundaries for Management Areas, Geographic Areas, or Designated Areas related the monitoring question?

   If unsure about making changes at this point in time, discuss what information or resources would be needed to make a determination. For example, describe how much more time or data would be needed.

   If change is not warranted, then the response to 5) above should have been "yes".

Management Activities

9. Did any USFS management activities or other events in the plan area positively or negatively influence the monitoring results? **Yes or No?**

   TIPS for Question 9: Delete this blue text for final report.
   Consider actions or events that changed conditions, such as:

   - USFS management actions, programs, or projects
   - plan components linked to the monitoring question
   - other projects or actions not identified in the monitoring question
   - stochastic naturally occurring events (earthquake, etc.)
   - system drivers (insect, disease, invasions, flooding, drought, etc.)
   - other stressors, other agency actions, authorized special uses, unauthorized activities

10. **If no**, go on to question 14. (Also, indicate that no change would be warranted for Management Activities in the plan area based on this monitoring question, see Table C-1).

    If yes, list the management activities or other events that may have influenced the monitoring results?

11. For those items listed in 10) above, **briefly describe** how those management activities or other events may have influenced the monitoring results?

    TIPS for Question 11: Delete this blue text for final report.
    For instance, how have the magnitude, intensity, frequency, or location of those activities influenced the trend, expectations, anticipated progress, or maintenance of the plan components the monitoring question was designed to address?

    Note: Reference any relevant information from results section in the response.

12. Based on the response to 9), 10), and 11) above, may change be warranted for management activities in the plan area?

    If change may be warranted, briefly describe the opportunities for change here, and mark the respective box in Table C-1 below.

    If unsure, briefly discuss why the response was not “change may” or “change is not” warranted, and mark the respective box in Table C-1 below.

    TIPS for Question 12: Delete this blue text for final report.
    If change may be warranted, include the specific recommended changes so the responsible official can evaluate all the available options. In addition describe the time frame to best achieve the change, feasibility of the change, and any difficulties you may see in achieving the change.

    If unsure about making changes at this point in time, discuss what information or resources would be needed to made a “yes” or “no” determination. For example, describe how much more time or data would be needed.

    If change is not warranted, then the response to 9) above should have been “no”.