

## Chapter 4

# Monitoring and Evaluation<sup>1</sup>

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## Introduction

Monitoring and evaluation to determine how well the Forest Plan is working is required by National Forest Management Act (NFMA) regulations. Monitoring and evaluation must be designed to answer the following basic questions:

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

The aim of monitoring is adaptive management – the ability to respond to current conditions or make appropriate changes based on new information or technology. Depending on the answers to the above questions, the Forest Plan may be amended or revised to adapt to new information or changed conditions. This chapter provides programmatic direction for monitoring and evaluating Forest Plan implementation.

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## Monitoring Strategy

Monitoring and evaluation are separate activities. Data and information are collected by various means. Then they are analyzed and interpreted to evaluate the success of Forest Plan implementation. To provide the public with timely, accurate information regarding this process, the Forest releases a biennial monitoring and evaluation report.

The monitoring program must be efficient, practical, and affordable, and not duplicate data collection already underway for other purposes.

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<sup>1</sup> Replaced in full by Administrative Change #9 to be in conformance with the 2012 Planning Rule (36 CFR 219)

Monitoring tasks are scaled to the Forest Plan, the program, or the project to be monitored. Each of these entails different objectives and requirements. Monitoring is not performed on every single activity, nor does it need to meet the statistical rigor of formal research.

Budgetary constraints will 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.

The components of this monitoring strategy are:

- Monitoring methods
- Monitoring questions related to implementation, attainment, and assumptions
- The biennial monitoring plan of operations
- The biennial monitoring evaluation report.

**Table 4-1. Monitoring Strategy**

Monitoring Methods	Monitoring Questions	Annual Monitoring Plan	Monitoring and Evaluation Report
Monitoring methods categorize how precisely and reliably monitoring items are measured.	Monitoring questions are developed by an interdisciplinary team to address Forest Plan management goals, objectives, standards, guidelines, assumptions, and science.	The annual monitoring plan of operations identifies which items will be measured and how monitoring questions are to be answered.	The monitoring and evaluation report analyzes and summarizes the monitoring results.

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## Monitoring Methods

Monitoring is divided into two methods, A and B, based on their relative precision and reliability.

### Method A

Methods generally are well accepted for modeling or measuring the resource or condition. The cost of conducting these measurements is higher than other methods. These methods are often quantitative in nature.

### Method B

Methods or measurement tools are based on a variety of techniques. Tools include project records, communications, on-site ocular estimates, or less formal measurements like pace transects, informal visitor surveys, air photo interpretation, and other similar types of assessments. Reliability, accuracy, and precision are good, but usually less than with Method A. Method B monitoring is often qualitative in nature, but can still provide valuable information on the status of resource conditions.

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## Monitoring Questions

A series of monitoring questions have been formulated to determine the effectiveness of Forest Plan implementation, attainment, and assumptions. These questions are displayed in Table 4-2. They address the Forest-wide goals and objectives found in Chapter 2. Monitoring methods used to gather information about each question will be identified in the biennial monitoring plan.

The purpose of monitoring questions is to determine what type of information to gather and how often to gather it in order to assess progress toward attaining goals and objectives. Some resources need to be monitored frequently to produce trend data. This gathered data may be analyzed periodically (4, 6, 8 or 10-year cycle), depending upon the time frame specified by each objective.

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## Monitoring Workplan of Operations

A monitoring workplan will be prepared to identify specific items for monitoring in the coming year as well as the methods to be used. The interdisciplinary team will review the monitoring items to prioritize monitoring activities and develop a monitoring workplan. The following items will be considered:

- Additional data needs identified from previous monitoring activities
- Methods and measures to provide consistent information to determine trends
- Assessment of benefits versus the cost of collecting data
- The amount of process and statistical rigor needed to obtain usable results
- The intensity, detail, and type of data needed to achieve the monitoring purpose
- The importance of the item or activity being monitored (potential for long-term or irreversible damage, local versus national risk, risk of not monitoring, etc.)
- Emerging issues and concerns that may be addressed through monitoring.

The monitoring workplan will identify and schedule various site-specific, on-the-ground monitoring activities. It should describe the purpose, methods, locations, responsible persons, and estimated costs. Each workplan must be submitted for consideration under the budget and work planning process.

The Forest Supervisor then will determine the appropriate funding for monitoring and approve implementation of the monitoring workplan.

Specific components included in the monitoring workplan of operations are:

- **Forest Plan Goal:** As identified in Chapter 2.
- **Forest Plan Objectives:** As identified in Chapter 2.
- **Monitoring Questions:** An interdisciplinary team is to review specific monitoring questions from Table 4-2. This review ensures that the information gathered answers the questions that are essential to measuring Forest Plan accomplishment and effectiveness and is consistent with budget and work plans.
- **Monitoring Items:** A monitoring item, or data element, is a quantitative or qualitative parameter that can be measured or estimated. One or more monitoring items are associated with each monitoring question. Monitoring items provide the foundation to answer the monitoring questions.
- **Monitoring Purpose:** This component indicates the monitoring item's purpose. It notes whether it is a legal requirement and/or whether it provides information for better land management decisions.

- **Methods:** Precision and reliability as well as specific techniques are described.
- **Scale:** Describes the level of analysis with respect to land size. This measure helps clarify habitat heterogeneity and viability issues. It also describes cumulative effects of management actions.
- **Frequency of Monitoring:** Describes how often information is gathered or measured.
- **Frequency of Evaluation:** Defines how often information is analyzed and reported. Depending upon the question being answered, analysis of the information may occur at intervals greater than the frequency of monitoring.

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## Biennial Monitoring and Evaluation Report

Developed by the interdisciplinary team, the biennial monitoring and evaluation report summarizes the results of completed monitoring and evaluates the data. Evaluation determines whether observed changes are consistent with the Forest Plan's desired future conditions, goals, and objectives and if adjustments may be needed. The report also makes recommendations to the Forest Supervisor who will use these findings either to certify the Forest Plan as sufficient for management in the coming year or to decide that a Plan amendment is needed.

The monitoring and evaluation report may provide summaries of data collected, but it primarily displays data evaluation, conclusions, and recommendations. Comparison of subsequent monitoring and evaluation reports provides a means of tracking management effectiveness from year to year. It also shows changes that have been made or are still needed.

Key questions to be addressed in evaluations include:

- Are management direction and standards being followed?
- How well are objectives of the Plan being achieved?
- Do management prescriptions respond to issues, concerns, and opportunities?
- Are effects of Plan implementation occurring as predicted?
- Is the Forest progressing toward its long-term goals?

In summary, the biennial monitoring and evaluation report:

- Reviews the results of monitoring

- Assesses the effectiveness of management practices in achieving goals, objectives, and desired conditions (outcomes) specified in the Plan
- Compares actual outputs, services, and costs with those estimated in the Plan
- Evaluates data for indicators of trends or effects
- Identifies any need to change, amend, or revise the Plan
- Identifies research needed by the National Forest System.

**Table 4 - 2. Monitoring Questions.**

Goal	Objective	Monitoring Questions	Monitoring Indicators	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
2.1 – Restore water quality and soil productivity to improve health of watersheds impaired by past land use practices and mining activities. Manage activities on NFS land to maintain or enhance water quality and soil productivity.	2.1a – Restore the dimension, pattern, and profile of streams where channel and floodplain morphology has been altered.	Are altered, non-functioning channels and floodplains being improved on the Forest?	How many miles of stream have been treated to improve ecological function?	Every 4 years	Every 4 years	B
	2.1b – Enhance water quality in the Monday Creek, Sunday Creek, Symmes Creek, Raccoon Creek, and Pine Creek watersheds by reducing acid mine discharges and decreasing sediment loads.	Has water quality been enhanced in watersheds on the Forest that were impaired by past land use practices or mining activities?	What is the current geo chemistry profile of these creeks?	Every 4 years	Every 4 years	A
			What geo chemistry parameters have changed by reducing and/or treating acid mine discharges?	Every 4 years	Every 4 years	A
			How many acid mine discharges have been treated?	Biennially	Every 4 years	B
			How many subsidence features have been treated?	Biennially	Every 4 years	B
			How many miles of stream have free-flowing water where surface flow was restricted?	Every 4 years	Every 4 years	B
		Is the Forest maintaining or restoring soil productivity?	How many acres of NNIS plants that alter soil chemistry were treated?	Biennially	Every 4 years	B

Goal	Objective	Monitoring Questions	Monitoring Indicators	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
			Are management activities altering the ecological functioning of the soil by creating excessive detrimental impact?	Annually monitor, report biennially	Every 4 years	B
3.1 – Promote healthy riparian and aquatic ecosystems that sustain ecological processes and functions and a variety of plant and animal communities, including viable populations of native and desired non-native species.	3.1a – Restore wetland habitat where wetland hydrology, soils, or vegetation have been modified by past land uses.	Are wetland habitats being restored on the Forest?	How many acres of wetland habitat were restored or enhanced?	Biennially	Every 4 years	B
	3.1b – Improve habitat along streams for aquatic and riparian-dependent species.	Has habitat for aquatic or riparian dependent species improved along and within streams?	How many miles of stream were treated to improve or restore habitat for aquatic and riparian-dependent species?	Biennially	Every 4 years	B
			What physical or biotic parameters have changed at monitoring sites?	Biennially	Every 4 years	A
	3.1c – Reduce sedimentation and improve passage for aquatic and semi-aquatic organisms at Forest development roads and Forest Service recreation trail crossings.	Is sedimentation reduced and passage of aquatic species improved?	How many stream crossings were improved for aquatic organism passage and/or sedimentation?	Biennially	Every 4 years	B
			How many miles of habitat were opened up for aquatic dependent species?	Biennially	Every 4 years	B
3.1d – Improve aquatic habitat in ponds and lakes.	Is habitat in ponds and lakes improving on NFS lands?	How many ponds or lakes were treated to improve aquatic habitat?	Biennially	Every 4 years	B	

Goal	Objective	Monitoring Questions	Monitoring Indicators	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
4.1 – Promote healthy terrestrial ecosystems that sustain a variety of plant and animal communities, including viable populations of native and desired non-native species.	4.1c – Encourage the establishment of all-aged hardwood forest and hardwood-pine forest communities with structurally diverse canopy layers to maintain forest health and increase structural diversity.	Are uneven-aged hardwood and hardwood-pine forests being developed on the Forest?	How many acres of hardwood or hardwood/pine forest communities were treated to encourage the establishment of uneven-aged conditions?	Biennially	Every 4 years	B
		How are management activities providing for extensive tracts of mature interior hardwood forest composed of a well-developed understory and upper-canopy layer that includes large trees and canopy gaps?	What are the trends in cerulean warbler abundance, based on species monitoring protocols?	Monitored every 3 years; reported in the following Monitoring Report	Monitored every 3 years; reported in the following Monitoring Report	A B
	4.1d – Create early successional hardwood or hardwood-pine habitat, interspersed within mid- and late-successional forest habitat to: provide breeding habit for shrubland-dependent species and increase production of wildlife foods such as soft and hard mast and insects.	How are management activities providing for a variety of structural classes (e.g. early successional forest, mid-successional forest, and late-successional forest) intermixed and dispersed in a mosaic type condition at the small and large scale?	How many acres of early successional forest habitat were created?	Biennially	Every 4 years	B
			How are those acres distributed across the Forest Shrubland Mosaic?	Biennially	Every 4 years	B
			What are the trends in ruffed grouse abundance, based on species monitoring protocols?	Monitored every 3 years; reported in the following Monitoring Report	Monitored every 3 years; reported in the following Monitoring Report	A B
	4.1e – Regenerate existing native pine and pine-hardwood mixed communities.	Are existing native pine and pine-hardwood forests being restored on appropriate sites on the Forest?	How many acres of pine or pine-hardwood communities were treated?	Biennially	Every 4 years	B

Goal	Objective	Monitoring Questions	Monitoring Indicators	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
	4.1f – Annually, improve or maintain 5 to 10 percent of the existing grassland and grassland/shrubland habitat acreage in the Grassland Management Area.	Is 5-10 percent of the grassland or grassland/shrubland habitat in the Grassland Forest Mosaic being improved annually?	How many acres of grassland habitat were improved or maintained?	Biennially	Every 4 years	B
		How are management activities providing for extensive areas of tall, dense, grass, consisting of standing dead vegetation and well developed litter with sparse to no woody shrub vegetation?	What are the trends in Henslow's sparrow abundance, based on species monitoring protocols?	Monitored every 3 years; reported in the following Monitoring Report	Monitored every 3 years; reported in the following Monitoring Report	A B
	4.1g – Establish and maintain permanent forest openings (herbaceous vegetative cover or mix of herbaceous vegetation and shrubs) on a variety of sites, including ridge tops, mid-slope benches and valley bottoms, preferably where access by machinery is possible.	Are permanent forest openings being created and maintained on a variety of sites on the Forest?	How many acres of herbaceous or herbaceous-shrub habitat were created?	Biennially	Every 4 years	B
			How many acres of herbaceous or herbaceous-shrub habitat were maintained?	Biennially	Every 4 years	B
	4.1h – Construct waterholes and ephemeral wetlands to supplement limited water sources, enhance local biodiversity, and enhance aquatic insect production.	Are waterholes and ephemeral wetlands being constructed on the Forest to enhance local biodiversity and aquatic insect production?	How many waterholes or ephemeral wetlands were constructed?	Biennially	Every 4 years	B

Goal	Objective	Monitoring Questions	Monitoring Indicators	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
	4.1i – Install artificial nesting or roosting structures to supplement natural cavities or snags when they are short in supply or to enhance wildlife-viewing.	Are artificial nesting or roosting structures being installed when there is an opportunity to enhance wildlife-viewing on the Forest?	How many artificial nesting structures were installed?	Biennially	Every 4 years	B
5.1.1 – Retain or develop Indiana bat roosting and foraging habitat; protect all known Indiana bat hibernacula.		Is the Forest using active management to develop short-term and long-term quality Indiana bat roosting and foraging habitat?	How many acres of potentially suitable Indiana bat habitat were actively improved?	Biennially	Every 4 years	B
			Are known hazard trees removed during the appropriate time of year?	Biennially	Every 4 years	B
	5.1.1a – If additional Indiana bat hibernacula are discovered on NFS land, install bat-friendly gates to prevent unauthorized entry.	Are known hibernacula being protected from unauthorized entry?	How many bat-friendly gates were installed on known Indiana bat hibernacula?	Biennially	Every 4 years	B
5.1.3 – Cooperate in efforts to reintroduce the American burying beetle.		Have reintroductions of the American burying beetle been successful?	Have American burying beetles been found?	Annually monitor, report biennially	Every 4 years	B
5.1.4 – Actively manage known populations of running buffalo clover to maintain appropriate habitat conditions.	5.1.4b – Conduct annual monitoring of known running buffalo clover populations and adjacent areas to identify potential risks or management needs.	Were there any changes to known running buffalo clover populations and were any potential risks identified and mitigated?	What are the current RBC population numbers?	Annually monitor, report biennially	Every 4 years	B
			How many risks to the RBC populations were identified and mitigated?			

Goal	Objective	Monitoring Questions	Monitoring Indicators	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
5.2.1 – Protect bald eagle communal night roosts, daytime concentration sites, and occupied breeding territories.	5.1.2a – Conduct a minimum of three annual winter searches to locate any previously unknown communal night roosts or bald eagle concentrations.	Is bald eagle habitat being protected?	How many mid-winter bald eagle searches were conducted?	Annually monitor, report biennially	Every 4 years	B
			How many bald eagles were observed?	Annually monitor, report biennially	Every 4 years	B
			How many bald eagle nests are being monitored within the Forest Proclamation Boundary and are they active?	Annually monitor, report biennially	Every 4 years	B
6.1 – Provide forest vegetation characteristics, from understory layers to the tree canopy, that meet the habitat needs of desired native and non-native plant and animal species.	6.1a - Use all available silvicultural treatments, including pre-commercial and commercial thinning, prescribed fire, shelterwood harvests, and improvement cutting to promote the maintenance and restoration of the oak-hickory ecosystem.	Are oak-hickory forests being maintained and restored on the Forest?	How many acres are being treated with varying management actions that will likely result in the maintenance and restoration of the oak-hickory ecosystem?	Biennially	Every 4 years	B
6.2 – Reintroduce fire into fire-adapted ecosystems to conserve biodiversity and promote ecosystem structure and function closer to the historic range of variability.	6.2a – Use prescribed fire to conserve fire-adapted plant and animal biodiversity and to maintain and restore mixed oak and native pine ecosystems.	Is the Forest using prescribed fire to conserve fire-adapted plant and animal biodiversity and to maintain and restore oak and native pine ecosystems?	How many acres are being treated with prescribed fire to conserve fire-adapted plant and animal biodiversity, and to maintain and restore mixed oak and native pine?	Biennially	Every 4 years	B
	6.2b – Use prescribed fire and mechanical treatments to modify current fuel composition, and fire frequency, severity and pattern.	Is the Forest using prescribed fire and mechanical treatments to improve or maintain the fire regime condition class?	How many treated acres improved fire regime condition class?	Every 4 Years	Every 4 Years	B

Goal	Objective	Monitoring Questions	Monitoring Indicators	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
	6.2c – Use prescribed fire and mechanical treatment to maintain a current fire regime condition class that represents a historic range of variability.		Has the fire regime been maintained in the desirable condition class?	Every 4 Years	Every 4 Years	B
6.3 – Provide opportunities for the collection and use of special forest products. Manage removal of special forest products and monitor this use to sustain viable populations and future yields. Increase public awareness of special forest product harvesting impacts on populations and their ecosystems.		Is the Forest providing opportunities for the sustainable collection of Special Forest Products?	How many acres of the Forest are designated suitable for collecting Special Forest Products?	Every 4 years	Every 4 Years	B
			How many Special Forest Product permits are issued per Unit and across the Forest annually?	Biennially	Every 4 Years	B
		Are viable populations of ginseng being sustained on the Forest?	What are the population trends of ginseng at monitoring plots?	Annually monitor a portion of sites, reported biennially	Every 8 Years	A
			How many ginseng permits are issued per Unit and across the Forest annually	Biennially	Every 4 years	B

Goal	Objective	Monitoring Questions	Monitoring Indicators	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
<p>7.1 – Limit the effects of insects and diseases on forest vegetation and wildlife to within the range of disturbances that occurred in forest ecosystems prior to the arrival of non-native insects and diseases. Manage non-native invasive species (NNIS) populations using prevention, suppression, and restoration techniques to protect and restore natural communities on the Forest.</p>	<p>7.1b – Cooperate with the ODNR and the State and Private Forestry Division of the Forest Service to suppress insect populations to:</p> <ul style="list-style-type: none"> <li>• Retard advance of the gypsy moth</li> <li>• Eradicate NNIS species that are present but not yet well established, such as the emerald ash borer.</li> <li>• Prevent the spread of non-native species currently lacking natural controls.</li> <li>• Protect populations of, or habitat for, endangered, threatened, or sensitive species.</li> <li>• Protect rare communities likely to be severely impacted by insect outbreak.</li> <li>• Prevent extensive tree mortality or defoliation in developed recreation areas and other areas where maintaining visual quality is a major objective.</li> </ul>	<p>Is the Forest responding appropriately to insect and disease outbreaks?</p>	<p>How many acres of insect and disease were treated and how did the populations respond to treatment?</p>	<p>Biennially</p>	<p>Every 6 years</p>	<p>B</p>

Goal	Objective	Monitoring Questions	Monitoring Indicators	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
7.2 – Manage NNIS populations using prevention, suppression, and restoration techniques to protect and restore natural communities. Emphasize prevention of spread and early detection of and rapid response to new infestations. Improve effectiveness of NNIS prevention practices through public and inter-agency NNIS awareness and education.	7.2b – Treat and reduce populations of non-native invasive plant species with high potential for spread. Implement control treatments of infestations that threaten priority resources. Prioritize treatment areas based on risk of spread, threat to resources, likelihood of successful control/containment, and partnerships.	Is the Forest successfully responding to NNIS plant populations?	How many NNIS acres were treated and how did the NNIS populations respond to treatment?	Biennially	Every 4 years	B
8.1 – Safely implement the fire and fuels program of the Wayne National Forest. Promote State and Federal interagency cooperation in wildland fire and fuels management.	8.1c – Reduce hazardous fuels within communities at risk in cooperation with local, State, and Federal agencies.	Is the Forest reducing hazardous fuels within communities at risk?	How many acres in WUI were treated for hazardous fuels reduction?	Biennially	Biennially	B
10.1 – Provide a supply of mineral commodities for current and future generations, while protecting the long-term health and biological		Has the long-term health and biological diversity of ecosystems been protected when Federal and private minerals and energy resources are accessed?	Are site-specific mitigations providing environmentally sound exploration and development of Federal and private minerals and energy resources?	Annually monitor, report biennially	Every 4 Years	B

Goal	Objective	Monitoring Questions	Monitoring Indicators	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
diversity of ecosystems. Facilitate the orderly exploration, development, and production of mineral and energy resources on land open to these activities.	10.1b – Process plans of operation/applications for permit to drill on Federal leases in a timely manner.	Is the Forest processing plans of operations/applications for permit to drill on Federal leases in a timely manner?	How many plans of operation/applications for permit to drill on Federal leases were processed in a timely manner?	Biennially	Every 4 years	B
10.2 – While respecting privately held mineral rights, negotiate operating terms and conditions and mitigation measures to protect other Forest resources.	10.2a – Process plans of operation (and applications for major modifications) for privately owned minerals (reserved and outstanding rights) within 60 days.	Is the Forest processing plans of operation for privately owned minerals in 60 days?	How many applications were processed within 60 days?	Biennially	Every 4 years	B
	10.2b – Restore lands disturbed by minerals exploration and production when the minerals activity is completed.	Are lands disturbed by minerals exploration and production being restored when the activity is completed?	How many mineral activities were adequately restored upon completion?	Annually monitor, report biennially	Every 4 years	B
	10.2c – Plug wells when producing ceases.	Are wells being plugged when production ceases?	How many wells were plugged according to state regulations when production ceases?	Annually monitor, report biennially	Every 4 years	B
11.1 – Provide a broad range of developed and dispersed outdoor recreation opportunities and experiences within the ecosystem's acceptable limits of	11.1a – By the end of this planning period, add at least one camping facility for ATV/OHM use and one for equestrian use. This could be accomplished by the Forest Service or	Is there a broad range of quality, outdoor recreation opportunities being provided and is the Forest responsive to visitor demands/needs?	What annual visitation estimates are reported (by type of visit - day use, developed, general forest area visits)?	Monitored ever 5 years; reported out in the year following	Monitored ever 5 years; reported out in the year following	A

Goal	Objective	Monitoring Questions	Monitoring Indicators	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
change. Manage recreation facilities and opportunities to respond to public demands and promote local economic development. Emphasize recreation opportunities which can be better provided on the Forest than on private or other public land.	concessionaire on NFS land or by the private sector on adjacent private property.		Why are people visiting the Forest and what are their demographics (demographics, visit descriptions, activities)?	the NVUM report	the NVUM report	
			What level of spending is reported (spending, substitute behavior, etc.)?			
			What level of visitor satisfaction is reported?			
11.2 – Construct and maintain trails and associated facilities to provide a safe and quality experience within the capabilities of the land and appropriate to the	11.2b – By the end of this planning period, relocate/re-construct five miles of the North Country Trail where the trail is currently located on roads.		How many miles of NCT have been relocated/ reconstructed off existing roads?	Biennially	Every 4 years	B

Goal	Objective	Monitoring Questions	Monitoring Indicators	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
	11.2c – Maintain and administer the Forest’s motorized trail system to provide safe/enjoyable trail riding opportunities and reduce resource impacts.		How many miles of motorized trails have been maintained to standard (annual routine and deferred maintenance)?	Biennially	Every 4 years	B
	11.2d – Where maintenance methods prove ineffective and monitoring confirms unsafe conditions or unacceptable resource damage, close and rehabilitate and/or re-locate/reconstruct sections of ATV/OHM trails.		How many miles of motorized trails have been closed and rehabilitated and/or relocated/reconstructed due to unsafe conditions or unacceptable resource damage sections from ATV/OHM use?	Biennially	Every 4 years	B

Goal	Objective	Monitoring Questions	Monitoring Indicators	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
	11.2e – Reduce and strive to eliminate illegal ATV/OHM use by: <ul style="list-style-type: none"> <li>• Prohibiting cross-country travel or riding on undesignated user-created trails.</li> <li>• Prohibit riding on trails designated for other uses.</li> <li>• Riding on designated trails during closed seasons</li> <li>• Closing at least 20 miles illegal OHV trail within the next decade to:                             <ul style="list-style-type: none"> <li>a) Protect federally listed species</li> <li>b) Protect Regional Forester's sensitive species</li> <li>c) Improve watershed health</li> </ul> </li> </ul>		Have sections of unauthorized routes on the Forest been closed and rehabilitated? What were those efforts and where did they take place?	Biennially	Every 4 years	B
	11.2f – Maintain the Forest's non-motorized trail system to provide safe/enjoyable trail hiking, horseback riding, and biking opportunities with minimal resource impacts.		How many miles of non-motorized trails have been maintained/reconstructed to standard?	Biennially	Every 4 years	B

Goal	Objective	Monitoring Questions	Monitoring Indicators	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
	11.2g – Construct new trails during the next 10 to 15 years within the ranges and densities shown in Table 2 - 1.		How many miles of new motorized and non-motorized trails have been constructed?	Biennially	Every 4 years	B
12.1 - Maintain or enhance the quality of scenic resources to provide desired landscape character.		Is the Forest maintaining or enhancing the quality of scenic resources?	Is the Forest being managed in accordance with the assigned SIOs and scenery guidelines found in the Forest Plan?	Annually monitor, report biennially	Every 4 years	B
13.1 – Provide current and future generations the opportunity to experience and appreciate the Forest’s diversity of human history and the relationship between people and the land.	13.1c – Reduce the backlog of heritage sites that require formal evaluation for eligibility to the National Register of Historic Places.	Is the Forest reducing the backlog of heritage sites needing evaluation for National Register eligibility?	How many heritage sites have been evaluated for National Register eligibility?	Biennially	Every 4 years	B
	13.1d – Develop management plans for the long-term preservation of heritage resources that are either listed on or eligible for the National Register of Historic Places.	Is the Forest developing management plans for the long-term preservation of heritage resources that are either listed on or eligible for the National Register of Historic Places?	How many management plans have been developed for heritage sites that are either eligible for or listed on the National Register of Historic Places?	Biennially	Every 4 years	B

Goal	Objective	Monitoring Questions	Monitoring Indicators	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
14.1 – Adjust land ownership within the Forest proclamation boundary to enhance public benefits and improve management effectiveness.	14.1a – Purchase, exchange, accept donations, or convey lands and mineral rights on a willing seller, willing buyer basis. Give high priority to acquisition of land that will: <ul style="list-style-type: none"> <li>• Consolidate National Forest ownership</li> <li>• Provide access to NFS lands and waters</li> <li>• Protect or enhance threatened and endangered species habitat, sensitive species, heritage resources, or other special areas</li> <li>• Permit development and management of wetlands, lakes and ponds, or recreational facilities</li> <li>• Eliminate or correct sources of water pollution</li> <li>• Consolidate surface and mineral estates</li> <li>• Enhance opportunities for community development.</li> </ul>	Does the Forest’s land-base progress toward consolidation that meets objectives by exchange, purchase or donation?	How many acres of land were acquired through exchange, purchase, or donation?	Biennially	Every 4 years	B
	14.1b – Acquire rights-of-way or property to improve access to NFS land.	Is the Forest improving access to NFS land?	How many miles of right-of-way, or parcels of land, have been acquired to facilitate access to NF tracts?	Biennially	Every 4 years	B

Goal	Objective	Monitoring Questions	Monitoring Indicators	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
14.2 – Maintain boundary lines.	14.2a – Survey and post landlines not currently marked. Maintain lines previously marked on a 10-year cycle.	Is the Forest making progress towards the eventual marking and maintaining of the entire perimeter of NFS lands against private property?	How many miles of NFS land boundary were marked to standard?	Biennially	Every 4 years	B
	How many miles of NFS boundary were maintained to standard?		Biennially	Every 4 years	B	
	14.2b – Resolve trespass/encroachment situations.	Is the Forest making progress toward resolving trespasses as they occur and are discovered?	How many trespasses were resolved?	Biennially	Every 4 years	B
15.1 – Consider authorization for special uses that: <ul style="list-style-type: none"> <li>• Serve the public</li> <li>• Promote public health and safety</li> <li>• Protect the environment</li> <li>• Cannot be reasonably accommodated on private land.</li> </ul>		Is the Forest considering and processing reasonable requests for uses on NFS lands?	How many special use permits were requested; how many of those met the criteria, and how many were issued?	Biennially	Every 4 years	B

Goal	Objective	Monitoring Questions	Monitoring Indicators	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
16 – Permit livestock grazing to: <ul style="list-style-type: none"> <li>• Facilitate land acquisition by permitting current use by livestock</li> <li>• Contribute to wildlife habitat objectives</li> <li>• Help control non-native species.</li> </ul>		Is grazing contributing to wildlife objectives or controlling NNIS?	How many acres were grazed and contributed to wildlife habitat objectives; and how many acres were grazed to control non-native species?	Biennially	Every 4 years	B
17.1 – Provide safe, efficient facilities and related structures that meet the needs of Forest visitors.	17.1a – Conduct detailed inspections of facilities every five years, more often if needed.	Is the Forest providing safe and efficient facilities that meet visitors' needs?	How many administrative and recreation facilities meet current safety, mission, niche and use requirements?	Monitored on a rotation, report out on those monitored biennially	Every 6 years	B
	17.1b – Decommission facilities that are no longer needed.					
17.2 – Maintain dams as safe and effective water storage facilities.	17.2a – Maintain dams to standard.	Is the Forest maintaining safe and effective dams?	How many Forest Dams meet current applicable regulations for dam safety?	Annually monitor for high hazard, report biennially	Annually monitor for high hazard, report biennially	A
	17.2b – Inspect high hazard dams annually.			Every 2 years for other dams	Every 2 years for other dams	
	17.2c – Decommissioned or appropriately dispose of dams no longer needed.					

Goal	Objective	Monitoring Questions	Monitoring Indicators	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
<p>17.3 – In cooperation with local, State, and Federal government agencies, provide a safe, efficient transportation system for moving people, equipment, and forest products.</p>	<p>17.3b – Decommission temporary and system roads when they are no longer needed for administration of the Forest or its resources.</p>	<p>Is the Forest decommissioning system roads when they are no longer needed and rehabilitating unauthorized routes?</p>	<p>How many miles of roads were decommissioned or rehabilitated?</p>	<p>When Mgmt. activities are planned that may impact a road</p>	<p>Every 10 years</p>	<p>B</p>
	<p>17.4c – Maintain all roads in a condition that protects the government's investment. If funds do not allow for regular preventive maintenance, close roads or restrict traffic to protect resources or investment.</p>	<p>Are Forest development roads maintained appropriately?</p>	<p>How many miles of road are maintained to the level of service required, and how often is needed maintenance performed and are the roads environmentally stable?</p>	<p>An average of 20% of level 3-5 roads inspected annually</p>	<p>Every 10 years</p>	<p>A B</p>
	<p>17.4d – Maintain at maintenance level 3, or higher, roads intended for passenger vehicles.</p>			<p>Visual review of 50% of Level 2 roads annually.</p>		
	<p>17.4e – Maintain at maintenance level 2 roads intended for high clearance vehicles.</p>			<p>Level 1 roads every 10 years.</p>		
<p>17.4f – Maintain at Maintenance Level 1 roads that are closed to public travel.</p>	<p>Report on those monitored biennially</p>					

Goal	Objective	Monitoring Questions	Monitoring Indicators	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
Standards and Guidelines Compliance (No specific enumerated Goal)		Did any project require guideline modification or a Forest Plan amendment to modify a standard?	How many modifications were required and to which standards and/or guidelines?	Biennially	Biennially	B
Climate Change impacts on the Forest		How are spring start date and growing season length changing across southeast Ohio?	When did the growing season begin?	Biennially	Every 10 years	A B
			When did the growing season end?	Biennially	Every 10 years	A B