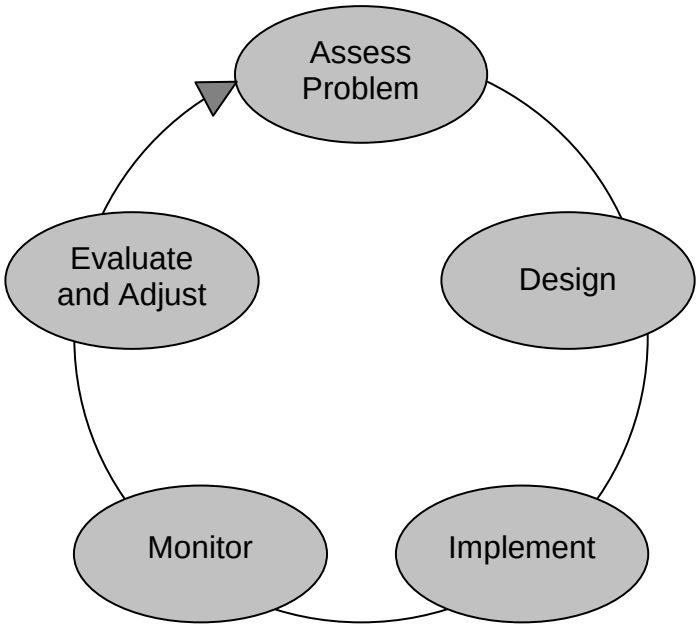
Chapter IV - Monitoring and Evaluation

Introduction

Monitoring and evaluation are separate, sequential activities required by National Forest Management Act regulations. Monitoring involves collecting data by observation or measurement. Evaluation involves analyzing and interpreting monitoring data. The information gained from monitoring and evaluation is used to determine how well the desired conditions, goals, objectives and outcomes of the Forest Plan have been met. Regular monitoring and evaluation keeps the Forest Plan current by providing the feedback mechanism for adaptive management (Figure IV-1). Monitoring and evaluation results are used to identify needed changes to the Forest Plan or implementation methods.

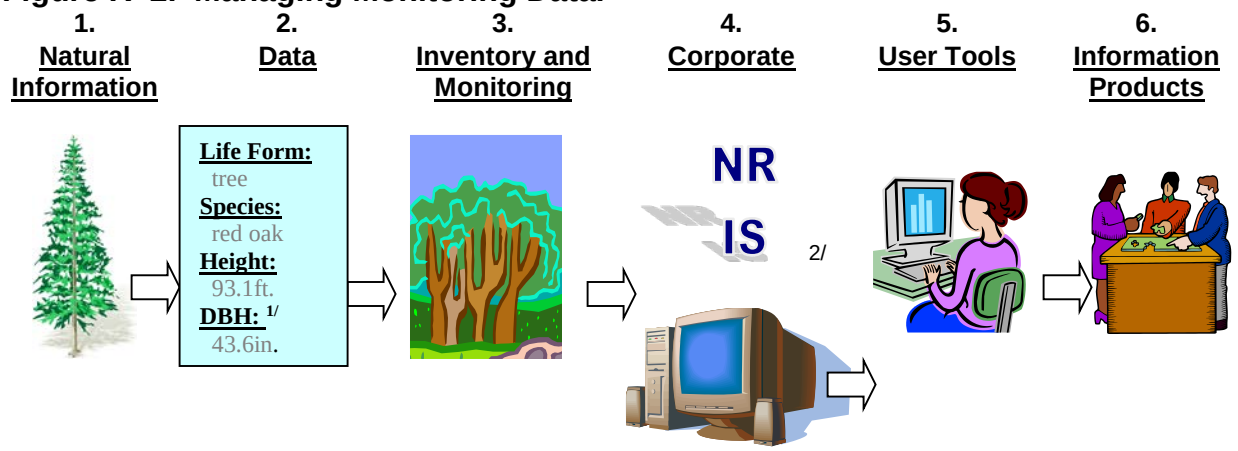
Figure IV-1. Monitoring and Adaptive Management.



Monitoring and evaluation involves more than just collecting and interpreting data. Data must be converted to useful information and stored in a form that is accessible to others. A plan for managing monitoring information over time is critical to a successful program and should be developed early in the planning process (Figure IV-2).

Data will be designed and collected according to appropriate data standards and entered into corporate databases, such as the Automated Lands Program, Natural Resource Inventory System or Geographic Information System. The information can then be accessed and analyzed to produce information products such as monitoring reports that would be available for internal and external review.

Figure IV-2. Managing Monitoring Data.



1. Natural Information	2. Data	3. Inventory and Monitoring	4. Corporate	5. User Tools	6. Information Products
-Define business requirements -Determine monitoring question -Identify item or variable to inventory or monitor	-Corporate measurements codes, definitions, methods, and protocols	-Spatial mapping -Data collection	-Corporate system -Data storage -Data sharing	-Analysis -Evaluation -Data summary -Statistics -Models and projections	-Reports and maps -Assessments -Web sites

1/ DBH = Designated breast height.
2/ NRIS = Natural Resource Inventory System Corporate Database.

Monitoring Categories

The Forest Plan addresses several types of monitoring as required in the 2012 planning regulations and monitoring attainment of Forest Plan Goals and Objectives.

- Category 1: 8 required monitoring topics.
- Category 2: Attainment of goals and objectives.

Category 1 monitoring items are mandatory components of every Forest Plan. Category 2 monitoring items are more flexible and are tailored to address issues raised through public involvement and interdisciplinary team review. A more complete description of Category 1 items is shown in the Matrix for Minimum Legal Requirements section (page IV-6).

Legal Requirements

The 2012 Code of Federal Regulations (CFR) directs the Forests to implement a monitoring and evaluation program to provide a basis for a periodic determination of the effect of management practices.

Under 36 CFR 219.12(a), The responsible official shall develop a monitoring program for the plan area and include it in the plan. Monitoring information should 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. The development of the plan monitoring program must be coordinated with the regional forester and Forest Service State and Private Forestry and Research and Development. Responsible officials for two or more administrative units may jointly develop their plan monitoring programs.

The plan monitoring program sets out the plan monitoring questions and associated indicators. Monitoring questions and associated indicators must be designed to inform the management of resources on the plan area, including by testing relevant assumptions, tracking relevant changes, and measuring management effectiveness and progress toward achieving or maintaining the plan's desired conditions or objectives. Questions and indicators should be based on one or more desired conditions, objectives, or other plan components in the plan, but not every plan component needs to have a corresponding monitoring question.

Subject to the requirements of paragraph (a)(5) of this section, the responsible official has the discretion to set the scope and scale of the plan monitoring program, after considering:

(i) Information needs identified through the planning process as most critical for informed management of resources on the plan area; and
(ii) The financial and technical capabilities of the Agency.

2012 Planning Rule Monitoring Topics: Under 36 CFR 219.12(a)(5), each plan monitoring program must contain one or more monitoring questions and associated indicators addressing each of the following:

i. The status of select watershed conditions.
ii. The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.
iii. The status of focal species to assess the ecological conditions required under §219.9.
iv. The status of a select set of the ecological conditions required under §219.9 to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.
v. The status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.
vi. Measurable changes on the plan area related to climate change and other stressors that may be affecting the plan area.
vii. Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities.
viii. The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land (16 U.S.C. 1604(g)(3)(C)).

Monitoring

Monitoring Prioritization:

Within any agency or institution, necessary or desirable work demands often exceed available funding. Forest Plan monitoring is no exception. Consequently, a prioritization process for the Monitoring and Evaluation Implementation Guide items will be developed to ensure efficient use of limited time, money and personnel. Following is a list of potential criteria that may be used in the screening process:

- Is monitoring of a particular question or resource mandated by regulation or court order?
- Is the frequency of a particular question or resource mandated by regulation or court order?
- Is the monitoring question one of the questions responding to the monitoring topics in 36 CFR 219.12(a)(5)?
- Is there a high degree of uncertainty associated with management assumptions?
- Is there a high degree of disparity between existing and desired conditions?
- Is the current trend upwards or downwards?
- How rapidly is the trend changing?
- Are proposed management activities likely to affect resources of concern?
- How do monitoring items fit into national and regional priorities?
- What are the consequences of not knowing resource conditions?

Should funding limit the ability to perform all monitoring listed, monitoring priorities will be established using the above criteria and information gained during the past year.

Information Management:

There will be a tremendous amount of monitoring information collected over time. Information is of little value if it is not documented so it can easily be retrieved, shared with the public and other stakeholders, or used by agency managers to foster better decisions. Information management will consist of: (1) Management of the collection and storage of data, (2) Evaluation and interpretation of data and (3) Sharing of information internally and externally.

- **Manage the Collection and Storage of Data:** The interdisciplinary team will work with Forest Service employees and cooperators to see that data is collected.
- **Evaluation and Interpretation of Data:** Evaluation is the process of transforming data into information. It is a process of synthesis that brings together value, judgment, and reason with monitoring information to answer selected monitoring questions. Successful adaptive management depends on this information to reach the Forests' desired conditions.

The Forests' interdisciplinary team will review the current year's monitoring and evaluation results at the end of each calendar year. Based on these findings, changes (if any) to the Forest Plan, Monitoring and Evaluation Implementation Guide, and Forest Service Manual or Handbook will be recommended to the Forests' Leadership Team.

- **Sharing of Monitoring Information and Findings:** Information gathered through monitoring will be summarized in various reports and publications, most notably the biennial Monitoring and Evaluation Report, and shared internally and externally with cooperating agencies and organizations, interest groups, policy makers and the general public.

Biennial Monitoring and Evaluation Report:

The biennial monitoring and evaluation report provides an opportunity to track progress toward the implementation of Forest Plan decisions and the effectiveness of specific management practices. The focus of the evaluation is to provide short- and long-term guidance to ongoing management. The monitoring and evaluation report should include components such as:

1) Forest accomplishments toward desired conditions and outputs of goods and services.

2) Update of research needs.

3) Whether or not a change to the plan, management activities, or the monitoring program, or a new assessment, may be warranted based on the new information.

Public Involvement:

The Forest Service mission, "Caring for the Land and Serving the People," will not be realized without public trust in the Forest Service decision-making process. Even though agency decisions will not consistently please everyone, using an open process for making decisions should foster public understanding of the rationale for individual decisions. The same principle applies to monitoring. Moreover, since the approach incorporates an adaptive strategy, frequent public feedback is necessary to facilitate monitoring activity prioritization, protocols, evaluation, and ultimately better informed decisions. The monitoring plan will be posted to the Forests' webpage and made available to anyone who requests a copy.

Table IV-2. Definition of Components in the Monitoring Matrix.

COMPONENT	DEFINITION
2012 Planning Rule Monitoring Topics	8 topics listed in 36 CRF 219.12(a)(5)
Monitoring Question	Specific monitoring question(s) developed to ensure that monitoring and evaluation addresses information essential to measuring the Forest Plan. These questions relate to the different purposes and rationales for monitoring. There may be more than one monitoring question per resource area.
Evaluation and Reporting Frequency	Identifies how often monitoring information is evaluated and reported.
Indicator	Measure used to answer monitoring questions.

Table IV-3. Monitoring Matrix.

Required 2012 Monitoring Topics (Category 1)				
Monitoring Question number	**2012 Monitoring Topic**	**Monitoring Question(s)**	**Indicator**	**Evaluation/ Reporting Frequency**
1	1	What is the status of select watershed conditions?	Watershed Condition Class Score (25 indicators) - 24 Attributes Associated With 12 Core National Watershed Condition Indicators	5 years
2	2 & 3	Does the HMNFs have adequate acres of trembling and bigtooth aspen in early successional habitat?(Early seral stage aspen with a high aspen composition)	Acres of Aspen in 0-9 age class	Annual
3	4	To what Extent is forest plan implementation contributing to the conservation of federally-listed endangered, threatened, or proposed species, and to the conservation of species of viability concern.	Number of Kirtland's warbler singing males counted in the census and estimated Karner blue butterfly abundance from surveys.	Annual
4	5	What is the status of visitor use and visitor satisfaction?	• NVUM data report o Annual Visitation Estimates (by type of visit - day use, developed, general forest area, designated wilderness visits) o Description of Visit (demographics, visit descriptions, activities) o Economic Information (spending, substitute behavior, etc.) o Visitor Satisfaction o Wilderness Visit Demographics	5 years
5	6	How are the occurrence, intensity, and distribution of pests and pathogens changing on an annual basis?	Acres infected /infested and insects and diseases found on the Forests	Annual
6	7	How close are projected outputs and services to actual?	Acres of timber harvested. Acres and volumes of timber harvested by silvicultural method and wood class (softwood vs hardwood). Acres or miles accomplished annually by management activity or practice. Compare to tables in appendix D of the Plan.	Annual

Table IV-3. Monitoring Matrix (Continued).

Required Monitoring Items (Category 1)				
Monitoring Question number	**2012 Topic**	**Monitoring Question(s)**	**Indicator**	**Evaluation /Reporting Frequency**
7	8	Are the effects of Forest management, including prescriptions, resulting in significant changes in productivity of the land?	Growth metrics of trees and remaining soil nutrient stocks following different harvest scenarios on FS land- data from LTSP study plot on Huron side of Forest.	5 years
Attainment of Goals and Objectives Monitoring Items (Category 2)				
8		Are harvested lands adequately restocked after 5 years?	Number of acres certified from stands harvested five year previous. All stands should be certified within five years or remedial actions taken to provide adequate stocking if certification has not been met. Also the number of acres where stocking surveys have been completed from harvested lands to show that monitoring of regeneration is taking place.	Annual
9		To what extent have conditions or information changed the classification of lands "not suited" for timber production to "suitable" for timber production?	Acres moved from Not suitable to suitable or vice versa.	Annual
10		To what extent has the forest used fuels treatments to reduce hazardous fuels	Acres treated by mechanical and prescribed fire by Wildfire Condition Class	Annual
11		What are the population trends of management indicator species?	Number of active bald eagle nests and nest productivity, Average number of ruffed grouse drums per stop. Brook Trout and mottled sculpin: Relative (Catch-Per-Unit-Effort), total (e.g. pounds/acre, fish/acre), or age-class abundance of brook trout and mottled sculpin. The number of Kirtland's warbler singing males. Estimated Karner blue butterfly abundance.	Annual
12		To what extent is forest management contributing or responding to populations of terrestrial / aquatic non-native invasive species of concern?	Number of acres treated and monitored for non-native invasive species by fiscal year.	Annual
13		What is the mix (product ration) of sawtimber and pulpwood produced and what is the output level of non-chargeable timber (restoration treatments), versus chargeable (ASQ)?	Total volume sold for chargeable and nonchargeable fiscal year. Ratio of sawtimber and pulpwood sold volume by fiscal year. Acres by silvicultural method by fiscal year.	Annual