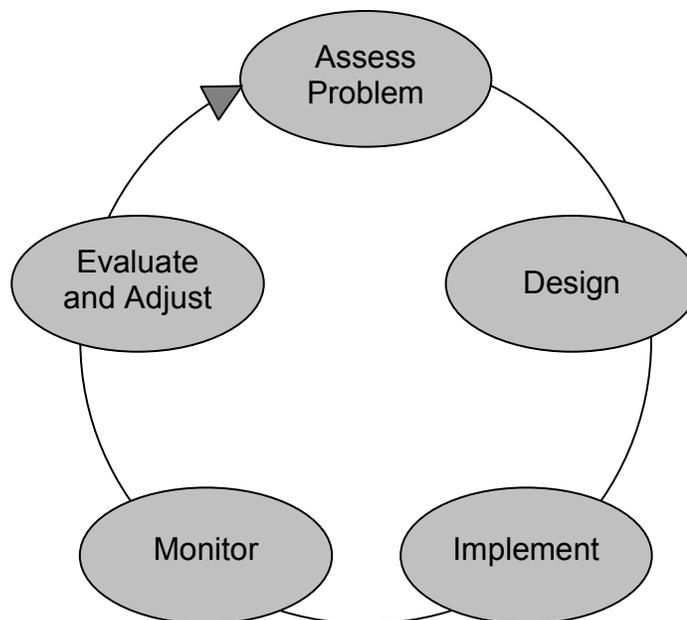


Chapter IV - Monitoring and Evaluation

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.

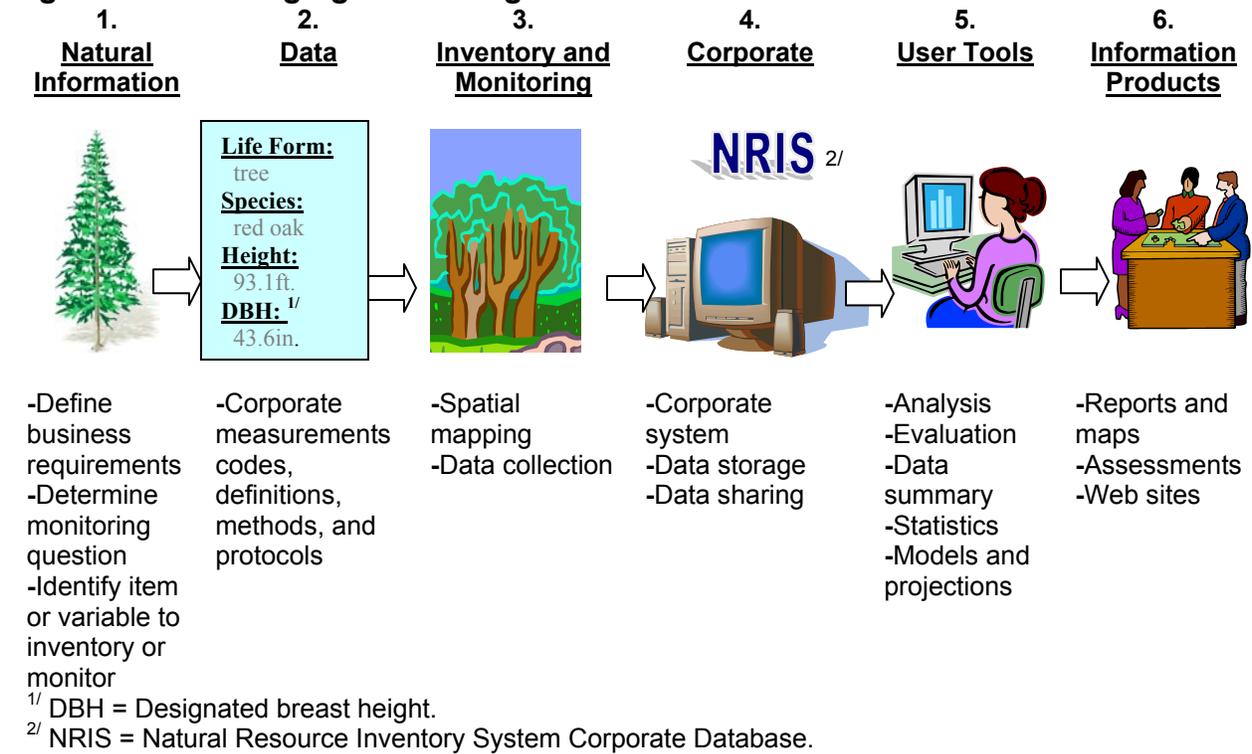
Figure IV-1. Monitoring and Adaptive Management.



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.



Monitoring Categories

The Forest Plan addresses several types of monitoring as required in the 1982 planning regulations. These requirements fall into four broad categories:

- Category 1: Required monitoring items.
- Category 2: Attainment of goals and objectives.
- Category 3: Implementation of Standards and Guidelines.
- Category 4: Effects of prescriptions and management practices.

Category 1 monitoring items are mandatory components of every Forest Plan. Categories 2, 3 and 4 monitoring items are more flexible and are tailored to address issues raised through public involvement and interdisciplinary team review. A more complete description of Categories 1 through 4 monitoring items is shown in the Matrix for Minimum Legal Requirements section (page IV-6).

Legal Requirements

The 1982 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 219.7(f), the Forests are instructed to conduct a monitoring and evaluation program that includes consideration of the effects of National Forest management on land, resources, and communities adjacent to or near the Huron-Manistee National Forests. Consideration must also be given to the effects on the National Forests' management from activities on nearby lands managed by other federal agencies, other governmental agencies or lands under the jurisdiction of local governments.

Under 36 CFR 219.10(g), the Forest Supervisor is directed to review the conditions on the land covered by the Forest Plan at least every five years to determine whether conditions or demands of the public have changed significantly.

Comparisons of outputs and services with those projected by the Forest Plan and the costs of implementing forest management prescriptions to the costs estimated in the Forest Plan are called for under 36 CFR 219.12. Monitoring of insects and diseases, site productivity, restocking of harvested areas, timber sale schedule and management indicator species are also called for in 36 CFR 219.12.

Guidelines and Components

Monitoring Framework:

Many approaches to forest plan monitoring are currently being used throughout the Agency. However, the monitoring framework must: 1) meet the legal requirements of the planning regulations, 2) be consistent with corporate data standards and protocols, and 3) be developed by an interdisciplinary team that addresses the ecological, social and economic dimensions of forest management in an integrated manner. To meet these objectives, the monitoring framework has four components:

- 1) Forest Plan direction that provides broad, strategic guidance.
- 2) A Monitoring and Evaluation Implementation Guide that provides specific, technical guidance.
- 3) An Annual Monitoring Schedule that outlines specific tasks for the current year.
- 4) An Annual Monitoring Evaluation Review that provides a forum to review current year findings and identify specific modifications if necessary.

The relationship between each monitoring component is shown in Table IV-1.

Table IV-1. Monitoring Framework.

Forest Plan Monitoring	Monitoring and Evaluation Implementation Guide	Annual Monitoring Schedule	Annual Monitoring Evaluation Review
<u>Broad and Strategic</u> Provides the monitoring requirements in the Forest Plan itself. It focuses on what is needed to monitor the Forest Plan. It provides the overall monitoring strategy including specific questions that need to be answered, what will be monitored, timetables for reporting and other information.	<u>Focused and Technical</u> Describes how, where and when to accomplish the monitoring prescribed in the Forest Plan. It provides the specific methods, protocols and analytical procedures. The guide is intended to be flexible and could be modified in response to new information, updated procedures, emerging issues, and budgetary considerations without amending the Forest Plan.	<u>Specific, Technical and Prescriptive</u> Identifies precisely what will be monitored, where, when, and by whom for the current or upcoming year. The Annual Monitoring Schedule will be tied to the Forest Plan and Monitoring Guide.	<u>Specific, Technical and Prescriptive</u> The forest interdisciplinary team will review the current year's monitoring and evaluation results at the end of each calendar year. Based on these findings, they will recommend to the Forest Leadership Team necessary changes (if any) to the Forest Plan, Monitoring and Evaluation Implementation Guide, or Forest Service Manual or Handbook.

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 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?
- How well do monitoring items fit with public comments?
- What are the consequences of not knowing resource conditions?
- Will monitoring respond to a key issue?

Monitoring priorities will be established each year using the above criteria, information gained during the past year, and budgets. The prioritization process will be elaborated within the Monitoring and Evaluation Implementation Guide.

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 using standard methods found in the Monitoring and Evaluation Implementation Guide and is entered into the appropriate databases.
- **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 annual Monitoring and Evaluation Report, and shared internally and externally with cooperating agencies and organizations, interest groups, policy makers and the general public.

Annual Monitoring and Evaluation Report:

The annual 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) Forest Plan amendment status.
- 3) Status of other agency/institution cooperative monitoring.

- 4) Summary of available information on management indicator species or comparable species.
- 5) Summary of large-scale or significant projects or programs (such as storm recovery).
- 6) Update of research needs.
- 7) Public participation/disclosure plan.

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. Subsequently, a strategy for involving the public and other agencies in Forests' monitoring planning, execution, and evaluation will be attempted each year. Partnerships with interest groups, volunteer groups other federal, state and local agencies; and universities will be part of that strategy. Public involvement such as news releases, the internet, brochures and public reports will be used.

Matrix for Minimum Legal Requirements:

The focal point for each monitoring item will be the monitoring question. Each monitoring question is derived from one or more monitoring drivers: legal requirements, desired conditions or objectives. See Table IV-2 for a full listing.

The Annual Monitoring Scheduling Process will determine which monitoring questions will be answered each year; not all monitoring drivers will be monitored each year. Table IV-3 outlines required monitoring in Category 1 (page IV-8) and the desired conditions and objectives and effects of prescriptions and management practices in Categories 2, 3, and 4 (page IV-11). The more prescriptive Standards and Guidelines will be addressed in the Monitoring and Evaluation Implementation Guide.

As previously mentioned, public involvement with Forest Plan monitoring will be sought. The intent is to continue public participation beginning with development of the Monitoring and Evaluation Implementation Guide.

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

COMPONENT	DEFINITION
Resource Area	A quantitative or qualitative parameter that can be assessed.
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.
Monitoring Driver	<p>A monitoring driver identifies the reason for monitoring a particular item. Monitoring drivers include:</p> <ol style="list-style-type: none"> 1) Legal and regulatory requirements and Forest Service Manual direction. 2) Forest Plan desired conditions, goals, objectives, Standards and Guidelines. 3) Validation of assumptions and predictions. 4) Court rulings. <p>All drivers are described in the tables, references are provided where they are known.</p>
Measurement Frequency	Identifies how often monitoring information is collected.
Evaluation and Reporting Frequency	Identifies how often monitoring information is evaluated and reported.
Precision and Reliability	<p>Two categories of precision and reliability are appropriate at the Forest Plan scale:</p> <ul style="list-style-type: none"> • <u>Class A</u>: Methods appropriate for modeling or quantitative measurement. Results have a high degree of repeatability, reliability, accuracy and precision. • <u>Class B</u>: Methods based on project records, personal communications, ocular estimates, paced transects, informal visitor surveys and similar types of assessments. The degree of repeatability, reliability, accuracy and precision are not as high as Class A methods, but they still provide valuable information.

Table IV-3. Monitoring Matrix.

Required Monitoring Items (Category 1)					
Resource Area	Monitoring Question(s)	Driver: Applicable Code of Federal Regulations (CFR)	Measurement Frequency	Evaluation/ Reporting Frequency	Precision and Reliability Class
All	Is the Forest Plan still relevant?	36 CFR 219.10(g). The Forest Supervisor shall review the conditions on the land covered by the plan at least every 5 years to determine whether conditions or demands of the public have changed significantly.	5 years	5 years	A and B
All	How close are projected outputs and services to actual?	36 CFR 219.12(k) [1]. A quantitative estimate of performance comparing outputs and services with those projected by the Forest Plan.	Annual	Annual	A
All	How close are projected costs with actual costs?	36 CFR 219.12(k) [3]. Documentation of costs associated with carrying out the planned management prescriptions as compared with costs estimated in the Forest Plan.	Annual	Annual	A
Insects and Diseases	Are insects and disease organisms increasing to potentially damaging levels following management activities?	36 CFR 219.12(k) [5] [iv]. Destructive insects and disease organisms do not increase to potentially damaging levels following management activities.	5-10 years	5-10 years	B

Table IV-3. Monitoring Matrix (Continued).

Required Monitoring Items (Category 1)					
Resource Area	Monitoring Question(s)	Driver: Applicable Code of Federal Regulations (CFR)	Measurement Frequency	Evaluation/Reporting Frequency	Precision and Reliability Class
Social and Economic Stability	What are the effects of Forest management being planned on land, resources and communities adjacent to or near the National Forest? What are the effects on National Forest management from activities on nearby lands managed by other Federal or other governmental agencies or under the jurisdiction of local governments?	36 CFR 219.7(f). A program of monitoring and evaluation shall be conducted that includes consideration of the effects of National Forest Management on land, resources, and communities adjacent to or near the National Forest being planned and the effects upon National Forest management from activities on nearby lands managed by other Federal or other government agencies or under the jurisdiction of local governments. 36 CFR 219.12(k) [1]. A quantitative estimate of performance comparing outputs and services with those projected by the Forest Plan.	Annual	Annual	A and B
Soils	Are the effects of Forest management, including prescriptions, resulting in significant changes to productivity of the land?	36 CFR 219.12 (k) [2]. Documentation of the measured prescriptions and effects, including significant changes in productivity of the land.	1-5 years	1-5 years	A and B
Timber	Are harvested lands adequately restocked after five years?	36 CFR 219.12(k) [5] [i]. Lands are adequately restocked as specified in the Forest Plan.	Annual	Annual	A

Table IV-3. Monitoring Matrix (Continued).

Required Monitoring Items (Category 1)					
Resource Area	Monitoring Question(s)	Driver: Applicable Code of Federal Regulations (CFR)	Measurement Frequency	Evaluation/ Reporting Frequency	Precision and Reliability Class
Timber	To what extent is timber management occurring on lands suitable for such production?	36 CFR 219.12(k) [5] [ii]. Lands identified as not suited for timber production are examined at least every 10 years to determine if they have become suited; and that, if determined suited, such lands are returned to timber production.	10 years	10 years	A
Timber	How much even-aged management (especially clearcutting) should be used, and in what forest types should it be used?	36 CFR 219.12(k) [5] [iii]. Maximum size limits for harvest areas are evaluated to determine whether such size limits should be continued.	10 years	10 years	A
Timber	Is the timber product mix and timber output at, or below, levels defined in the Timber Resource Sale Schedule?	36 CFR 219.16. Timber Resource Sale Schedule.	Annual	Annual	A
Wildlife: Management Indicator Species	What are the population trends of management indicator species? What are the relationships of the population trends to habitat changes?	36 CFR 219.19(a) (6). Population trends of the management indicator species will be monitored and relationships to habitat changes determined. This monitoring will be done in cooperation with state fish and wildlife agencies, to the extent practical.	Annual	1-5 years	A and B
All	What are the identified research needs?	36 CFR 219.28. Research needs for management of the National Forest System shall be identified during planning and periodically reviewed during evaluation of implemented plans.	Annual	5 years	A and B

Table IV-3. Monitoring Matrix (Continued).

Desired Condition and Objective Monitoring Items (Categories 2, 3 and 4)					
Resource Area	Monitoring Question(s)	Driver: Applicable Code of Federal Regulations (CFR), Forest Plan Desired Condition or Forest Plan Objective	Measurement Frequency	Evaluation/Reporting Frequency	Precision and Reliability Class
All	What Standards, Guidelines or objectives are not being met?	36 CFR 219.12 (k). At intervals established in the plan, implementation shall be evaluated on a sample basis to determine how well objectives have been met and how closely management standards and guidelines have been applied. Based upon this evaluation, the inter-disciplinary team shall recommend to the Forest Supervisor such changes in management direction, revision or amendments to the Forest Plan as are deemed necessary.	Annual	Annual	A and B
Wildlife and Vegetation Management	What are the amounts, distribution, and types of available habitats?	Wildlife and Rare Plants: Provide for the sustainability of terrestrial and aquatic ecosystems at multiple scales.	Annual	1-5 years	A and B
Wildlife and Vegetation Management	Are minimum viable populations of appropriate native and desirable non-native species being maintained within the planning area?	Wildlife and Rare Plants: Maintain minimum viable populations of appropriate native and desirable non-native species within the planning area.	Annual	1-5 years	A and B
Timber, Wildlife and Fire	What mix of harvest products by timber type will be produced? What is the mix as to non-chargeable versus chargeable?	Timber Management: Sell products as the result of ecosystem restoration, fire hazard reduction, and timber management.	Annual	1-5 years	A and B

Table IV-3. Monitoring Matrix (Continued).

Desired Condition and Objective Monitoring Items (Categories 2, 3 and 4)					
Resource Area	Monitoring Question(s)	Driver: Applicable Code of Federal Regulations (CFR), Forest Plan Desired Condition or Forest Plan Objective	Measurement Frequency	Evaluation/Reporting Frequency	Precision and Reliability Class
Wildlife and Watershed	How many acres of the Forest have been inventoried and classified using an approved Aquatic Ecological Classification System?	Riparian and Aquatic Resources: Base the management of the aquatic resources upon an Aquatic Ecological Classification System.	Annual	1-5 years	A and B
Wildlife and Vegetation Management	How many acres of early successional habitat in riparian areas occur on each Forest? Does this level of habitat provide adequate species viability?	Riparian and Aquatic Resources: Employ active management for early successional habitat if natural disturbance processes are not providing adequate habitat for species viability concerns.	Annual	1-5 years	A and B
Recreation	How many areas and how many acres of semiprimitive nonmotorized and motorized areas are being provided?	Recreation, Semiprimitive Areas and Access: Provide for semiprimitive nonmotorized and motorized recreational experience.	Annual	1-5 years	A

Table IV-3. Monitoring Matrix (Continued).

Desired Condition and Objective Monitoring Items (Categories 2, 3 and 4)					
Resource Area	Monitoring Question(s)	Driver: Applicable Code of Federal Regulations (CFR), Forest Plan Desired Condition or Forest Plan Objective	Measurement Frequency	Evaluation/ Reporting Frequency	Precision and Reliability Class
Fire	What is the distribution of National Forest System acres by fire hazard rating? How many acres in fire-dependent ecosystems and at-risk urban-rural interface and intermix areas have been reduced by at least one hazard rating class?	Wildland Fire and Fuel Management: Manage hazardous fuels in fire-dependent ecosystems and at-risk urban-rural interface and intermix areas.	Annual	1-5 years	A
Fire	What is the distribution of National Forest System acres by fire condition class? How many acres have been treated that result in an improvement of at least one fire condition class? What is the number and size of wildfires?	Wildland Fire and Fuel Management: Reduce wildland fire intensities and the number of catastrophic fires.	Annual	1-5 years	A
Non-Native Invasive Species	To what extent is forest management contributing or responding to populations of terrestrial/ aquatic non-native invasive species of concern?	Executive Order #13112; R-9 Non-Native Invasive Species Strategy.	1-5 years	1-5 years	A and B