

# Chapter Four:

## Monitoring and Evaluation Strategy

### Introduction

Effective Land and Resource Management Plan (LRMP) monitoring and evaluation foster improved management and more informed planning decisions, and help identify the need to adjust desired conditions, goals, objectives, standards and guidelines as conditions change. Monitoring and evaluation help the Forest, the Agency and the public determine how well a LRMP is being implemented, whether plan implementation is achieving desired outcomes and whether assumptions made in the planning process are valid.

Monitoring and evaluation are learning tools that form the backbone of adaptive management. With these tools information is collected and compiled to serve as reference points for the future; trends and changing societal values are incorporated into forest planning; and the scientific validity and appropriateness of assumptions used in the development of the forest plan are evaluated. In short, monitoring and evaluation breathe life into a static document—the LRMP—to make it dynamic, relevant and useful.

This chapter describes the strategy used to determine if the existing Forest Plan is sufficient to guide the management of the Forest. If changes are necessary, a correction or amendment to the Plan may be provided, or, in more extreme cases, the Forest Plan may be revised. This chapter has been revised to incorporate adjustments made in the Phase II Amendment.

Two overall philosophies guided the development of the monitoring strategy. First, the public has a stake in forest management and must be given timely, accurate information about Forest Plan implementation. Secondly, monitoring and evaluation must be efficient, practical and affordable. It should not duplicate efforts when data is already being collected for administering contracts or performing routine inspections.

Budget fluctuations will undoubtedly affect the amount of monitoring feasible in any particular year. If budget levels preclude the ability to perform all monitoring, items specifically required by law would be the last to be affected.

### Monitoring Implementation Guide

This chapter is considered “strategic” for purposes of the Forest’s monitoring and evaluation effort. It is strategic in that it provides a conceptual framework within which specific monitoring and evaluation criteria can be built.

Therefore, this chapter does not display specific monitoring and evaluation protocol for any particular resource. Specific protocols are found in the Monitoring Implementation Guide ( <http://www.fs.fed.us/r2/blackhills/projects/planning/index.shtml> ). Forest specialists involved in monitoring and evaluation will use this chapter to form their conceptual approach to monitoring resources, but will refer to the Guide to find the actual criteria to be used to measure or otherwise conduct monitoring and evaluation. The Guide is intended to be a flexible component that could change as new methods and techniques are developed. In that approach, monitoring techniques could adapt to the rapid changes that occur under ecosystem management philosophies. The Guide can change without amending the Forest Plan.

### Annual Evaluation Report

An annual monitoring and evaluation report will be prepared. This report will provide the Forest Supervisor with a tool for tracking the quality of Forest Plan implementation efforts. It will provide the Forest Supervisor, the public, other government agencies, and cooperators with a consolidated annual assessment of progress in implementing the Forest Plan.

The annual evaluation report could include:

- An assessment of the adequacy of Forest Plan objectives;
- A determination of need for Forest Plan amendments or revision;
- An assessment of how closely standards and guidelines have been followed and whether or not changes in implementation are needed;
- An assessment of whether or not key forest objectives are providing the desired effect, particularly with regard to vegetation condition, watershed condition and productivity;
- A comparison of outputs, services and costs with those projected in the Forest Plan; and
- Identification of research needs.

The annual monitoring and evaluation report can be obtained on the Forest’s Projects and Plans web page <http://www.fs.fed.us/r2/blackhills/projects/planning/index.shtml>

### Document Storage

The annual evaluation report will contain a summary of the information collected during monitoring. It will summarize inspection sheets, surveys and other data that will be collected and stored in the planning records in the Forest Supervisor’s

Office. Some resource and program data will also be stored on a computer in the Resource Information System (RIS) in the short term, and eventually in the Integrated Resource Inventory (IRI). Other information about accomplishments will be reported in a management attainment and reporting system. The storage and retrieval of information related to monitoring and evaluation may change over time to take advantage of new technology such as new geographic information systems (GIS).

## Frequency of Data Collection and Reporting

Monitoring data collection is an on-going effort. Data may be collected any day of the year at any level of the organization. These data reports are stored at the Supervisor's Office, and are used to help develop the Forestwide Annual Monitoring and Evaluation Report for programs listed in this chapter.

## Levels of Monitoring and Evaluation Information

The monitoring and evaluation strategy recognizes that ecosystems exist at many scales, so different monitoring items must be evaluated at different scales. This chapter identifies monitoring items at three levels:

1. **Regionwide Level:** Monitoring and evaluation at a multi-state level to answer regionwide questions, such as air quality or wildlife/habitat relationship modeling. Some information may also feed into information at the national level.
2. **Ecological Province and Section Level:** The Black Hills is a distinct ecological province and section. This level represents information that essentially monitors conditions across the Forest or management area.
3. **Local or Project Level:** This represents localized concerns specific to the area involved in a project such as a timber sale, recreation site or grazing allotment.

The three monitoring levels are interrelated. Although some local information is only relevant to how Forest Plan direction is implemented in the local area, other local information can feed upward to be aggregated with other information at the section level. In turn, section level information can be aggregated upward to the regionwide level.

## Expected Precision and Reliability

Monitoring precision and reliability are determined for each Forest program or activity.

Precision and reliability are described as follows:

- Class A:** These methods are generally well accepted for modeling or measuring the resource. The methods used produce repeatable results and are often statistically valid. Reliability, precision and accuracy are very good. The cost of

conducting these measurements is higher than other methods. These methods are often quantitative in nature.

**Class B:** These methods of measurement are valuable tools that are based on a variety of techniques. These tools include project records, communications, on-site ocular estimates, and 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 Class A. Class B methods are often qualitative in nature, but still provide valuable information on the status of resource conditions.

### Public Participation in Monitoring

The public is welcome to assist in monitoring activities. Methods used by interested parties are to be approved by the Forest Service prior to data collection. The Guide describes the acceptable techniques to be used. Other techniques that are widely used by the scientific community may also be used if they are approved by the Forest Service. All data collected is subject to field checks and verification before it is accepted for consideration.

### Research and Information Needs Assessment

The Forest has identified several research or information needs where additional information would be useful in conducting the monitoring and evaluation program. These possible topics are summarized below.

- Effects of whole tree skidding;
- Riparian areas with grazing;
  - Amounts of vegetation needed for bank stability;
  - Background levels for sedimentation;
- Management activity effects on changes in peak flow;
- Flood risk analysis model;
- How to determine site productivity over a long term;
- Habitat capability validation;
- Appropriateness of timber harvest for simulating fire effects;
- Monitoring and evaluation protocols;
- Hardwood restoration;
- Disturbance ecology.

## Monitoring Items

The following table illustrates how each program is monitored using different approaches, from reports to database screening to sampling. Further details about units of measure, indicators, sample designs, precision and reliability are provided in the Monitoring Implementation Guide.

ACTIVITY OR RESOURCE	ITEM	REFERENCE	LEVEL <sup>1</sup>	APPROACH <sup>2</sup>	P/R <sup>3</sup>	FREQ <sup>4</sup>
AIR	Air Quality	Objective 101; Clean Air Act	1,2	Coordinate with States	A	1
SOILS	Soil Productivity	Objective 104	2,3	Sample; Aggregate Project Information	B/A	5
SOILS	Revegetation	Objective 104	3	Sample; Aggregate Project Information	B	5
WATER	Watershed Health	Objectives 102, 104, 108, 217, 219, 221, Clean Water Act	2,3	Sample; Aggregate Project Information; Consult with States	A/B	2-10
WATER	Water Quantity	Objective 108	2	WRENNS	A	5-10**
RIPARIAN	Condition/Trend	Objectives 104, 213	2,3	Sample; Aggregate Project Information	A	1-5**
RIPARIAN/ WETLANDS	Restoration	Objectives 107, 214, 215	2,3	Inventory; Aggregate Project Information	A/B	1-5**
VEGETATIVE DIVERSITY	Species Composition and Structure	Objectives 201- 210, 222, 239- LVD**	2	Database	A/B	1**
**VEGETATIVE DIVERSITY	Structural Stages	Objectives 4.1- 203, 5.1-204, 5.4-206, 5.43-204, 5.6-204, 3.7-201	2	Field Exam, Database	A/B	1
**VEGETATIVE DIVERSITY	Large Trees	Objectives 4.1- 203, 5.1-204, 5.4-206, 5.43-204, 5.6-204, 3.7-201	2	Field Exam, Database	A/B	1
VEGETATIVE DIVERSITY	Snags	Objective 211)	2	Database	A/B**	1-5**
VEGETATIVE DIVERSITY**	Burned Forest Habitat	Objective 11-03	2	Research; database, GIS; sample	B	1
COMMODITY PRODUCTION	Growth Rate	Objectives 303- 305	2,3	FIA**	A	10
COMMODITY PRODUCTION	Regeneration	Objectives 303- 305	2,3	Database	A	1

## Monitoring and Evaluation Requirements

ACTIVITY OR RESOURCE	ITEM	REFERENCE	LEVEL <sup>1</sup>	APPROACH <sup>2</sup>	P/R <sup>3</sup>	FREQ <sup>4</sup>
COMMODITY PRODUCTION	Timber Production	Objectives 303-305	2	Reports	A	1
COMMODITY PRODUCTION	Rangeland Trend	Objective 302	3	Database/sampling	A	3
COMMODITY PRODUCTION	Forage Utilization/Residual	Objective 301	2,3	Database/sampling	B	1
EMPHASIS SPECIES**	Sensitive Species	Objective 221	2	Sample; GIS, research, database	A/B	1-5
EMPHASIS SPECIES**	Species of Local Concern	Objective 221	2	Sample; database, GIS, research	A/B	1-5
EMPHASIS SPECIES	Threatened and Endangered Species	Objective 220	1,2,3	Sample; database; GIS;	B	1-5**
EMPHASIS SPECIES**	Management Indicator Species (MIS)	Objective 238	2	Research; database; GIS; sample	A	1-5
NOXIOUS WEEDS	Noxious Weeds, Species; Trend	Objective 230-231	2,3	Database; coordinate with counties	B	5
INSECTS AND DISEASES	Population, Tree Mortality, and Hazard	Objectives 10-09-10-10**	2,3	Survey**	B	1
INSECTS AND DISEASES	Exotics	Objective 230	2	Survey**	B	1
FIRE	Fire Hazard in WUI and Forest Interior	Objective 10-01, 10-05	2	Database	B	1-5 ***
FIRE	Fuel Treatment	Objective 10-01, 10-04, 10-07	2	Database	A	1
FIRE	Suppression and Prevention	Objectives 10-01, 10-06, 10-07**	2	Aggregate project information; database	A/B	1
FIRE**	Non-emergency watershed condition after stand-replacing fire	Objective 11-01, 11-02	2	Assessment of watershed recovery	B	1 (until recovered)
SCENERY	Scenic Integrity	Objectives 401-402	2,3	Database; sample; aggregate project information; GIS	B	1
HERITAGE RESOURCES	Protection of Resources	Objectives 403, 405, 406	2,3	Database; sample; aggregate project information	A	1

## Monitoring and Evaluation Requirement

ACTIVITY OR RESOURCE	ITEM	REFERENCE	LEVEL <sup>1</sup>	APPROACH <sup>2</sup>	P/R <sup>3</sup>	FREQ <sup>4</sup>
<b>WILDERNESS</b>	Wilderness Ecosystem Condition; Use; and Trend	Objectives 1.1A-401; 1.1A-405	2	Database; survey	B	5
<b>RECREATION</b>	Recreation Opportunities	Objectives 407-415	2	Database; GIS	A	1
<b>RECREATION</b>	Recreation Use, Trend and Demographics	Objectives 413, 417, 419, 421, 422	2	Database; survey	A	1
<b>ACCESS</b>	Road Mileage	Objectives 309, 420, 421	2,3	Database; GIS	A	1
<b>ACCESS</b>	Off-Road Vehicle Access	Objective 422	2	Database; GIS	A	1
<b>ACCESS</b>	Trail Opportunities	Objectives 416-419	2,3	Database; GIS	A	1
<b>ACCESS</b>	Right-of-Way Acquisition	Objective 503	2	Reports	A	1
<b>REAL ESTATE</b>	Land Adjustment	Objectives 501-505	2	Reports	A	1
<b>ECONOMIC EFFICIENCY</b>	Cost	Objectives 601-602	2	Accounting Reports	A	1

<sup>1</sup>Regionwide level (1); ecological province, section level, Forest or management area (2); Local or Project Level (3)

<sup>2</sup>Techniques used to collect and store monitoring information

<sup>3</sup>Precision/Reliability - for items noted as A/B, Forest will do type 'A' when appropriate for the species, and funding is available; monitoring may be done for habitat or population levels

<sup>4</sup>Frequency of reporting in years, data compilation may be more frequent

\*\* Indicates a Phase II Amendment change

\*\*\* Protocol to be developed in 2006

