# Chapter 5
## Monitoring and Evaluation Requirements

### Introduction

Implementing the Modoc National Forest Plan requires moving from an existing management program to a new management program with the budget, goals, and objectives described in Chapter 4 of this document. This Forest Plan, used in conjunction with Forest Service Manuals, Handbooks and the Pacific Southwest Regional Guide, establishes direction for the Modoc National Forest for the next 10 to 15 years. Appendix A contains a list of existing plans superseded by this Forest Plan, incorporated by reference or needed to provide complete management direction.

Implementation will occur through identification, selection, scheduling, and execution of management practices to meet management direction provided in Chapter 4. Implementation will also involve responding to proposals by others for use and/or occupancy of National Forest System lands. Subject to valid existing rights, all outstanding and future permits, contracts, cooperative agreements, or instruments of occupancy and use of lands will be consistent with the Forest Plan.

Projects will be subject to environmental analysis and documentation in accordance with the National Environmental Policy Act. Appropriate public involvement will be a part of the analysis process. Regardless of the form of NEPA documentation (environmental impact statement, environmental assessment, or categorical exclusion), an analysis file will be maintained and available for public review.

The Forest mission, goals and objectives described in Chapter 4 are translated yearly into program budget requests. The rate of implementation (amount of goods and services produced, improvements made, etc.) will depend on actual appropriated funds. The Forest will monitor the influence of budget on meeting Forest Plan goals and objectives as discussed below.

The National Forest Management Act and other regulations require forests to monitor and evaluate their plans at established intervals. Monitoring and evaluation are separate, sequential activities designed to compare projected versus actual accomplishments of objectives; to determine if standards and guidelines are being followed; and to determine whether the initial data, assumptions, and coefficients used in developing the Forest Plan are correct. The remainder of this chapter outlines the monitoring and evaluation framework for the Forest.

### Monitoring and Evaluation Requirements

Various monitoring requirements are listed in the National Forest Management Act regulations (36 CFR 219) and are highlighted below. Numbers in parentheses refer to sections within 36 CFR 219.

- Monitoring and evaluation determine whether: (219.7(f))
  - activities on nearby lands managed by other federal, state, or local agencies are affecting management of the Forest.
  - the Forest Plan is precluding other land management agencies from realizing their stated objectives.
- Monitoring requirements shall provide for: (219.12(k))
  - a quantitative estimate of performance comparing outputs and services with those projected by the Forest Plan;
  - documentation of the measured prescriptions and effects, including significant changes in productivity of the land;
  - documentation of costs associated with carrying out the planned management prescriptions as compared with costs estimated in the Forest Plan.
  - a determination of compliance with the following standards:

    a. Lands are adequately restocked as specified in the Forest Plan.

    b. 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.

c. Maximum size limits for harvest areas are evaluated to determine whether such size limits should be continued.

d. Destructive insects and disease organisms do not increase to potentially damaging levels following management activities.

- 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 practicable (219.19(a)(6)).
- Monitoring determines (1) whether existing and emerging public issues and management concerns are adequately addressed, and (2) whether opportunities are realized.

## Monitoring Levels

Table 5-1 identifies key activities and outputs we will monitor during Plan implementation. Three kinds of monitoring identified in Table 5-1 are outlined below:

**Implementation Monitoring**—The objective of implementation monitoring is to determine if plans, programs, projects, and activities are implemented in compliance with Forest Plan objectives and management direction. Implementation monitoring answers the question, "Did we do what we said we would?"

District and Forest personnel routinely conduct implementation monitoring:

- Projects are designed using Forest Plan Standards and Guidelines. Consistency is determined when the project is approved.
- During periodic review, project administrators determine if projects are implemented in accordance with project designs and Forest Plan standards.
- Forest ID team members and the management team participate in functional assistance trips and general management reviews to determine whether projects are implemented in compliance with the Forest Plan.
- Each year districts and various branches of the Supervisor's Office file Management Attainment Reports. These accomplishments can be readily compared against projected outputs from the Forest Plan.

Implementation monitoring is an integral part of management and is largely built into current workloads and budgets.

**Effectiveness Monitoring**—Effectiveness monitoring determines if plans, prescriptions, projects and activities are effective in meeting management direction and objectives. This is a two-part objective. First, do projects implemented according to the Forest Plan meet the intent of that direction? Second, if they do meet the intent of direction, are they the most efficient methods to meet that intent? Effectiveness monitoring answers the questions, "Did our actions accomplish what we intended, and are they the most efficient way to accomplish what we intended?"

Effectiveness monitoring is directly linked to implementation monitoring. Often they can be done simultaneously. This level of monitoring is conducted by resource and/or technical specialists on a limited basis as determined by resource values and risks, and public issues. A statistical sample of projects is usually sufficient to determine effectiveness.

**Validation Monitoring**—Validation monitoring determines whether initial data, assumptions, and coefficients used in developing the Forest Plan are correct. Validation monitoring should also determine if management actions are resolving the issues and concerns identified in the Forest Plan. Validation monitoring answers the question, "Are we achieving what we intended to achieve?"

Validation monitoring is conducted when effectiveness monitoring results indicate basic data, assumptions, or coefficients are questionable. Testing and evaluating predictive models, basic resource inventories, and modeling coefficients are conducted continuously.

Validation monitoring is conducted on a limited number of projects and resources due to the high costs. The Forest will cooperate with neighboring Forests, Forest Service research, other federal, State and local agencies, and private interest groups to conduct validation monitoring.

## Monitoring Plan

Monitoring requirements for the Forest Plan are outlined in Table 5-1. These requirements will be coordinated with continuous project-level monitoring required by NEPA analysis by the reporting staff listed. The Forest planning staff provides overall coordination. The following definitions will assist in understanding the contents of the table.

**Activity, Effect or Resource to be Measured**—This is a concise description of the specific item to be measured.

**Monitoring Objective**—A statement indicating the purpose of monitoring this specific item. The monitoring level is indicated in parentheses, I = implementation monitoring, E = effectiveness monitoring, and V = validation monitoring. For some items more than one level of monitoring is indicated.

**Monitoring Technique**—Description of the specific sampling or inventory techniques, or sources of information to be employed.

**Precision and Reliability**—Precision is the exactness or accuracy with which data are collected. Reliability is the extent to which monitoring accurately reflects the Forest condition. Precision and reliability are qualitatively rated as high, moderate, or low. Data with key targets (e.g., thousand board feet and animal unit month) which have a low bias and a definable precision are very accurate with a high probability of reflecting actual conditions. Other data, such as analyzing public comments, are less precise and reliable because they are subjective and, therefore, difficult to monitor with techniques currently available.

**Monitoring Frequency**—The time frame or schedule during which the activity, practice, or effect is sampled.

**Reporting Frequency**—The frequency that results will be summarized and reported. Evaluation of results may be at a different time period.

**Standard**—The tolerance limits or standards by which the activity, practice or effect will be evaluated.

**Variation from Standard Requiring Further Action**—A statement which describes the tolerance limits within which actual performance can vary from predicted performance. When these limits are exceeded, further evaluation and monitoring are inititated. (See evaluation description.)

**Reporting Staff**—Identifies the staff area responsible for collecting, evaluating and maintaining monitoring information for this specific item.

**Annual Cost**—Estimated average annual costs for monitoring. Only includes costs which are in addition to on-going monitoring processes. Actual costs could vary depending on the Forest's ability to work cooperatively with agencies, private interests, and other forests.

## Evaluation

Regulations in 36 CFR 219 describe the purposes for evaluating the Forest Plan. They can be summarized as follows:

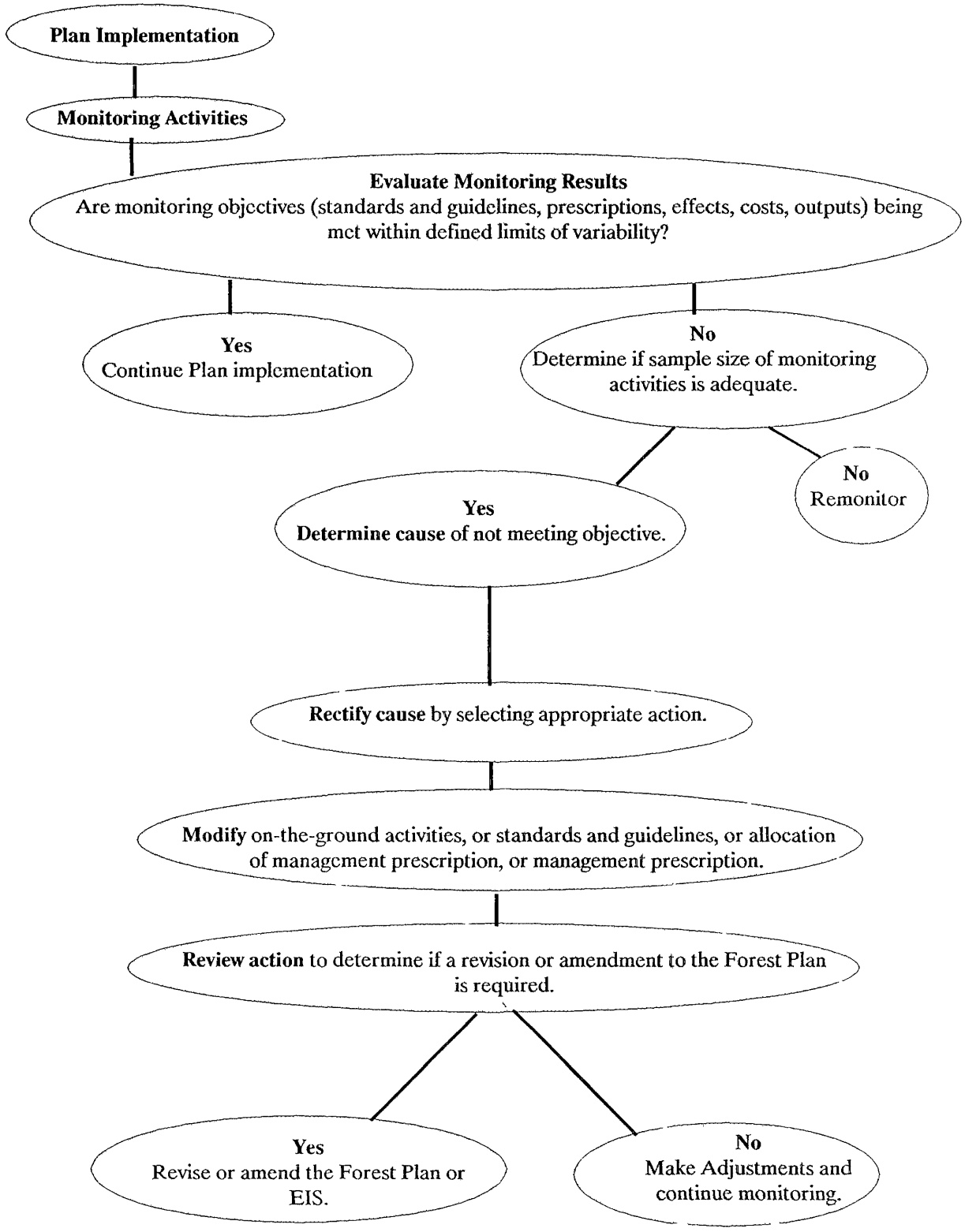
- To determine if conditions or demands in the area covered by the Forest Plan have changed significantly to require revision (219.10(g)).
- To determine if budgets have significantly changed the long-term relationships between levels of multiple-use goods and services to require amendment (219.10(e)).
- To determine how well objectives have been met (219.12(k)).
- To determine how closely management standards and guidelines have been followed (219.12(k)).
- To review research needs for management of the Forest (219.28(a)).

Evaluation is the analysis and appraisal of observations made during the monitoring process. Determining whether conditions or long-term relationships have changed significantly requires more than one year of monitoring. Consequently, some items in Table 5-1 are only reported and evaluated after 5 years of monitoring. The reporting staff prepares an annual summary of findings for other items. When monitoring results are compiled, the interdisciplinary team evaluates the data's significance and recommends further action to the Forest Supervisor. Recommendations include:

- No action needed. Monitoring indicates goals, objectives, and standards are achieved.
- Modify the management prescription as a Plan amendment.
- Modify the application of a prescription as a Plan amendment.
- Revise the projected schedule of outputs.
- Intensify monitoring where evaluation is not conclusive.
- Initiate revision of the Plan.

Figure 5-1 graphically displays the monitoring and evaluation process.

## Figure 5-1. Monitoring and Evaluation Decision Tree.



## Table 5-1. Monitoring Plan by Resource.

| Activity, Effect, or Resource to be Measured | Monitoring Objective | Monitoring Technique | Precision/ Reliability | Monitoring Frequency | Reporting Frequency | Standard | Variation from Standard Requiring Further Action | Reporting Staff | Annual Cost |
|---|---|---|---|---|---|---|---|---|---|
| **AIR QUALITY** | | | | | | | | | |
| Prescribed burning: planned and unplanned ignitions. | Assure all prescribed fires comply with air quality regulations (I) | Report of fuels burned for each project. | Low/Low | Each project | Annual | Annual R5 Smoke Management Plan; Clean Air Act; individual burn plans, State air quality standards. | Visual deterioration in smoke sensitive areas or measurements indicative of particulate levels exceeding standards. | Fire Management | $2,000 |
| Road construction | Assure dust control measures applied.(I) | Report of dust control measures applied vs. number of road miles constructed. | Low/Low | Each project | Annual | R5 Guidelines | Visual deterioration indicator of particulate levels exceeding standards. | Air | $2,000 |
| Total suspended particulate emission production from Forest activities. | – Establishing baseline data<br>– Comparison with established baseline values. (E,V) | Visibility reports from the camera installed at Likely Mtn. Lookout. | Mod/Mod | Daily from 6/1 to 9/30 | Annual | R5 | 10% change in visibility produced from baseline values | Air | $10,000 |
| Effects of Forest activities on AQRVs of Class I areas | – Identify AQRVs<br>– Establish baseline data<br>– Identify trends.<br>– Identify areas of potential impairment (I,E,V). | – Detailed inventory of Class I Wilderness areas first year for vegetation incuding lichens, rocks & soils to establish AQRVs.<br>– Inventory AQRVs annually. | Mod/Mod | Annual | Annual | Screening levels established in General Technical Report RM-165 | 10% change in screening levels. | Air | $30,000 first year & $10,000 annually thereafter. |

## Table 5-1. Monitoring Plan by Resource (continued).

| Activity, Effect, or Resource to be Measured | Monitoring Objective | Monitoring Technique | Precision/ Reliability | Monitoring Frequency | Reporting Frequency | Standard | Variation from Standard Requiring Further Action | Reporting Staff | Annual Cost |
|---|---|---|---|---|---|---|---|---|---|
| **CULTURAL RESOURCES** | | | | | | | | | |
| Effect of deterioration or destruction of cultural resources through vandalism or natural causes. | Determine effects of vandalism and natural factors on cultural resources and means to mitigate effects. (I,E) | Field review of cultural resource conditions. | Mod/Mod | Every 4 years for very significant/NRHP resources; annual for those in areas of active vandalism or natural deterioration. | Annual | FSM 2361 cultural resource guidelines | 10% | Cultural Resources | $1,800 |
| Effect of land use projects on cultural resources. | Ensure cultural resources receive adequate protection. (I) | Field review during and following projects; 25% of projects per district. | High/High | Annual | Annual | FSM 2361 cultural resource guidelines. | Any variation from standard. | Cultural Resources | $3,500 |
| **ENERGY AND FACILITIES** | | | | | | | | | |
| Building, utility, and dam function | Evaluate facility maintenance, replacement needs, and energy consumption. (I,E) | Field and office review. | Mod/Mod | Every 2 years or as stipulated by dam classification. | Every 2 years or as stipulated by dam classification. | Adequate facilities and energy consumption and R5 standards. | Inadequate facilities or excessive energy consumption. | Engineering | $10,000 |
| Road and bridge construction, reconstruction, and maintenance. | Ensure road facilities support Forest objectives, protect resources, and comply with road development guidelines. (I) | Field review all projects. | Mod/Mod | Annual | Annual | Road development guidelines and project levels commensurate with management. | Any unexplained deviation. | Engineering | $15,000 |
| Trail construction and maintenance. | Ensure adherence to the Trail system presented in Appendix L and evaluate compliance with trail standards and guidelines. (I) | Field review all projects. | Mod/Mod | Annual | Annual | Trail program and trail standards and guidelines. | Any unexplained deviation from trail standards and guidelines. | Engineering and Recreation | $2,000 |

## Table 5-1. Monitoring Plan by Resource (continued).

| Activity, Effect, or Resource to be Measured | Monitoring Objective | Monitoring Technique | Precision/ Reliability | Monitoring Frequency | Reporting Frequency | Standard | Variation from Standard Requiring Further Action | Reporting Staff | Annual Cost |
|---|---|---|---|---|---|---|---|---|---|
| **FIRE AND FUELS** | | | | | | | | | |
| Burned acres from wildfires by fire intensity class and management prescriptions | Compare actual and predicted burned acres for the Forest and for designated fire management areas (I). | Review fire reports. | High/High | Annual | Annual | Predicted acres burned. | More than 35% discrepancy within a 5-year period. | Fire | $500 |
| Fuel treatment | Evaluate compliance with management area direction for treatment of fuels (I, E). | Review all prescribed burn plans, annual fuel treatment accomplishment reports; field inspection of at least one project per district annually. | Mod/Mod | Annual | Annual | Forest Plan S&Gs | + or - 25% of planned target. | Fire | $1,500 |
| Effectiveness of fire management program | Collect and evaluate sum of costs plus net resource value change for the Forest (E). | Complete fire management financial review. | Mod/Mod | Annual | Annual | Dollars/acres protected. | + or - 20% from fire management efficiency curve from 5-year average. | Fire | $1,000 |
| **FIREWOOD** | | | | | | | | | |
| Firewood | Verify supply and use of both charge and free-use (E,V). | MAR Cut & Sold reports. | Mod/Low | Annual | Annual | None | Variable monitor trend + or - 50% from 10-year average. | Timber | $500 |
| **GEOLOGY** | | | | | | | | | |
| Geologic resource inventory | Assesss GRI when completed to determine if inventory is correct (V). | Review GRI and project proposals | Mod/Mod | Annual | Annual | Forest Plan | Incomplete or inadequate GRI. | Forest Geologist | $2,500 |

## Table 5-1. Monitoring Plan by Resource (continued).

| Activity, Effect, or Resource to be Measured | Monitoring Objective | Monitoring Technique | Precision/ Reliability | Monitoring Frequency | Reporting Frequency | Standard | Variation from Standard Requiring Further Action | Reporting Staff | Annual Cost |
|---|---|---|---|---|---|---|---|---|---|
| **LANDS** | | | | | | | | | |
| Effect of land adjustment on total Forest land base for all resources | Assure that Forest's outputs are not adversely affected by land adjustments (E). | Determine net change in acres and inventory for each land adjustment. | High/Mod | Annual | Every 5 years | Forest Plan. | -5% | Lands | $500 |
| **MINERALS** | | | | | | | | | |
| Mineral Development | Assess level of mining and mineral leasing operations to ensure operations are not unreasonably impaired (E). | Review environmental documents for Plans of Operation. | Low/Mod | Annual | Every 5 years. | Acres of high and moderate mineral potential not available or constrained. | Increase over 10% from current unavailable or constrained acres. | Minerals | $1,000 |
| Plan of Operation | Assure compliance with Plan of Operation (I). | Review operations and activities of each project. | High/High | Annual | Every 5 years. | Plan of Operation. | Any deviation | Minerals | $2,000 |
| Withdrawals | Review Forest Service initiated withdrawals to assess whether they are needed (V). | Review withdrawals. | High/High | Ongoing | Every 5 years. | FLPMA Requirement [Sec. 2041(1)] | None | Minerals | $500 |
| **FOREST PESTS** | | | | | | | | | |
| Effects of pests and damage | Early detection and evaluation of pest-related problems and damage (I). | Aerial and ground surveillance and detection suveys, resource exams, FPM evaluations. | Mod/Mod | Ongoing | Annual | Pest-related damage maintained at acceptable levels relative to management objectives. | Pest-related damage becomes unacceptable relative to management objectives. | Timber | $4,000 |

## Table 5-1. Monitoring Plan by Resource (continued).

| Activity, Effect, or Resource to be Measured | Monitoring Objective | Monitoring Technique | Precision/ Reliability | Monitoring Frequency | Reporting Frequency | Standard | Variation from Standard Requiring Further Action | Reporting Staff | Annual Cost |
|---|---|---|---|---|---|---|---|---|---|
| RANGE | | | | | | | | | |
| Range health | Determine range ecologic condition and trend. (E,V). | Photo points and C&T transects; Ecodata field observations. | Mod/Mod | Ongoing | Every 5 years. | Forest Standards and Guidelines. | Continued downward or static trend in problem areas. | Range | $46,000 |
| Permitted AUMs | Compare permitted to Forest Plan projected AUMs (I). | Annual grazing statistical report. | High/High | Annual | Annual | Forest Plan | Permitted AUMs do not meet Forest Plan estimates for 3 consecutive years. | Range | $2,000 |
| Wild horse management | Determine number of wild horses and territory expansion (I). | Aerial counts. | High/High | Annual | Annual | Forest Standards and Guidelines. | Numbers exceed 335 or fall below 275. | Range | $10,000 |
| Riparian health | Assure riparian objectives are in AMPs (I). | Review EAs and AMPs. | High/High | Annual | Annual | Forest Plan | Lack of riparian objectives in AMPs. | Range | $500 |
| Forage availability | Determine compliance with S&Gs for forage utilization and evaluate stocking to ensure available capacity is not exceeded. (I, E). | Production utilization studies; field observations; use mapping and utilization measurements. | High/High | Ongoing | Annual | Forest Standards & Guidelines. | Exceeding utilization S&Gs as specified in AMPs and AOPs. | Range | $70,000 |
| Noxious weeds | Determine if noxious weeds have increased to damaging levels. (I) | County weed inventory. | Mod/Mod | Annual | Annual | Infestation levels acceptable for management objectives. | Levels impact meeting management objectives. | Range | $1,500 |
| Developing allotment management plans. | Ensure AMPs are developed for all allotments within 10 years. (I) | Number of AMPs completed. | High/High | Annual | Every 5 years. | 8 AMPs per year. | Less than 5 per year. | Range | $100 |

## Table 5-1. Monitoring Plan by Resource (continued).

| Activity, Effect, or Resource to be Measured | Monitoring Objective | Monitoring Technique | Precision/ Reliability | Monitoring Frequency | Reporting Frequency | Standard | Variation from Standard Requiring Further Action | Reporting Staff | Annual Cost |
|---|---|---|---|---|---|---|---|---|---|
| Implementing allotment management plans | Ensure AMPs include S&Gs and are implemented. Determine effectiveness of S&Gs (I,E). | Conduct field reviews. | Mod/Mod | Annual | Annual | Forest Standards and Guidelines | Deviation from management direction. | Range | $1,000 |
| **RECREATION** | | | | | | | | | |
| Physical, social and managerial setting for recreation opportunities. | Assure that selected physical and visual attributes described in the ROS User's Guide are being protected from degradation (I,E). | Review all projects. | Mod/Mod | Every 5 years | Every 5 years | Acres not meeting desired attributes. | More than 10% change in designated ROS classes. | Recreation | $1,000 |
| Condition and use of developed and dispersed sites | Identify need for maintenance and/or regulation of sites (I,E). | Field review 20% of sites, occupancy rate samples and RIM reports. | Mod/Mod | Every 2 years | Every 5 year. | Development and maintenance standards. | Deterioration of site beyond that anticipated under normal use. | Recreation | $1,000 |
| User (visitor) needs and expectations | Identify changing needs and expectations (V). | Interview public at recreation sites; review public comments. | Low/Mod | Annual | Every 5 years | None | When more than 50% of comments indicate need for change. | Recreation | $1,000 |
| Off-highway vehicle (OHV) effects | Determine effects of OHVs on sensitive soil areas, vegetation, cultural, wildlife, and visual resources. Determine conflicts between OHV users and other recreationists (I,E). | Visual evaluation, visitor reports, other resource surveys and data observation. | Mod/Mod | Every 3 years | Every 5 years | Forest Standards and Guidelines | Excessive conflict or resource damage. | Recreation | $2,000 |

## Table 5-1. Monitoring Plan by Resource (continued).

| Activity, Effect, or Resource to be Measured | Monitoring Objective | Monitoring Technique | Precision/ Reliability | Monitoring Frequency | Reporting Frequency | Standard | Variation from Standard Requiring Further Action | Reporting Staff | Annual Cost |
|---|---|---|---|---|---|---|---|---|---|
| **RIPARIAN AREAS** | | | | | | | | | |
| Riparian areas | Evaluate compliance with Plan goals and effectiveness of BMPs and S&Gs in protecting riparian-dependent resources (I,E). | Photo points, bank stability, cover, water temperature, and fish surveys. | Mod/Mod | Annual | Annual | Baseline photos, bank stability, BMPs, Forest Standards and Guidelines. | 10% reduction in channel and riparian condition or riparian area standards. | Water, Wildlife | $4,000 |
| **SENSITIVE PLANTS** | | | | | | | | | |
| Sensitive plants | Detect changes in key populations of sensitive plants and assess management impacts on populations and habitat (I,E,V). | Techniques identified in interim or existing management guides for selected species. | High/High | Annual for specific projects. Key populations monitored according to interim or existing species management guides. | Minimum of every 5 years or as specified in species management guides. | As specified in species management guide, FSM 2670, and sensitive plant handbook. | As specified in species management guide. | Ecology | $25,000 |
| **SOILS** | | | | | | | | | |
| Soil compaction. | Assess loss in productivity; evaluate compaction on 5% of disturbed areas (E). | Nuclear gauge, penetrometer, bulk density sample, visual inspection. | Mod/Mod | Annual | Every 5 years | Porosity of soil before and after activity. | 10% or more reduction in soil porosity on 15% or more of the area. | Soils | $8,000 |
| Significant change in soil productivity | Assess compliance and effectiveness of prescribed mitigation measures and soil-related BMPs to maintain productivity (I,E). | Review EAs and contract provisions, field activity reviews, measure soil parameters. | Mod/Mod | Ongoing as part of EA and contract review process; annual activity reviews. | Every 5 years | R5 soil quality standards. | Meet soil quality standards on at least 85% of lands dedicated to producing vegetation. | Soils | $5,000 |

## Table 5-1. Monitoring Plan by Resource (continued).

| Activity, Effect, or Resource to be Measured | Monitoring Objective | Monitoring Technique | Precision/ Reliability | Monitoring Frequency | Reporting Frequency | Standard | Variation from Standard Requiring Further Action | Reporting Staff | Annual Cost |
|---|---|---|---|---|---|---|---|---|---|
| Response to fertilization | Identify which soil types respond to fertilization and their level of response at selected sites (V). | Use semi-permanent plots and existing Forest fertilization monitoring plan. | High/High | Every 5 years | Every 5 years | R5 preliminary fertilization guidelines for nitrogen fertilization. | Deviation of 10% from expected results. | Soils | $4,000 |
| Soil and water improvement projects | Accomplish projects in priority order (I). | Review attainment reports. | High/High | Annual | Every 5 years | As per project guidelines. | Scheduled projects not accomplished. | Soils | $1,000 |
| **SPECIAL INTEREST AND RESEARCH NATURAL AREAS** | | | | | | | | | |
| Natural integrity of Research Natural Areas, and Special Interest Areas. | Assess preservation of features for which the area was established (I,V). | Field inspection. | Mod/Mod | Annual | Every 5 years | Establishment report and/or area management plan. | Any encroachment or degradation. | Lands, Cultural Resources, Ecology | $500 |
| **TIMBER** | | | | | | | | | |
| Land suitability for timber | Verify classification of land as to suited or not suited for timber production (V). | EA reviews; soil survey evaluation; timber stand data; inventory. | Mod/Mod | Each project; at least once each planning period for all lands. | Every 5 years | Existing inventory. | Reclassification leading to a net change of >10% of the current suitable land. | Timber | $1,000 |
| Growth and yield projections. | Determine if growth and yield projections for silvicultural prescriptions are occurring as projected (V). | Timber inventory of plantations and untreated stands. | Mod/Mod | Every 5 years | Every 5 years | Regional and Forest inventory standards. | Unacceptable results based on an ID team review. | Timber | $1,000 |
| Reforestation and timber stand improvements | Verify consistency with scheduled acre outputs and LMP prescriptions (I,E). | Record data from all projects using SRS system. | High/Mod | Annual | Annual | Forest Plan | + or - 20% planned activity schedule on a fiscal year basis. | Timber | $1,000 |

## Table 5-1. Monitoring Plan by Resource (continued).

| Activity, Effect, or Resource to be Measured | Monitoring Objective | Monitoring Technique | Precision/ Reliability | Monitoring Frequency | Reporting Frequency | Standard | Variation from Standard Requiring Further Action | Reporting Staff | Annual Cost |
|---|---|---|---|---|---|---|---|---|---|
| Annual sale quantity and acreage. | Ensure consistency of the timber sale program with the Forest Plan (I). | Record sale quantity and acreage by Forest type regulation class and harvest method on all sales. | High/High | Fiscal year basis | Annual | TRACS | 20% deviation from Forest Plan. | Timber | $1,000 |
| Size of harvest openings | Ensure openings meet Regional policy (I). | Review timber sale EAs, project plans, and reports. | High/High | Each timber sale | Annual | Forest Standards and Guidelines | Exceeds size standard or did not follow process to obtain approval for a larger opening. | Timber | Included in project cost. |
| Dispersal of harvest openings | Ensure that spacing of harvest openings conforms to Regional policy (I). | Review timber sale EAs, projects, plans, and reports. | Mod/Mod | Each timber sale | Annual | Openings nearly surrounded by stands >5 acres (15% of periphery may be in common with other openings). | Any variation. | Timber | Included in project cost. |
| Reforestation survival | Determine success of reforestation practices, (adequately restocked within 5 years) (I,E). | Described in FSH 2409.26; minimum 1% sample. | High/High | FSH 2409.26 Currently 1st and 3rd years and thereafter until certified | Annual | Described in FSH 2409.26 each project. | More than 10% of the acreage is not reforested to standard. | Timber | Included in project cost. |
| Timber stand improvement | Determine success of release and stand improvement practices (E). | Systematic and/or random samples of project areas; 10% of projects. | High/High | Within 5 years of project completion | Annual | Stocking and growth rate that will produce the height, basal area, and volume predicted in yield tables. | More than 10% of timber units growing potentially below standard; −20% deviation from yield tables. | Timber | Included in project cost. |
| Non-chargeable and firewood quantities | Assess trend to determine how detailed management should be (E). | Record volume by species. | Mod/Mod | Fiscal year basis | Annual | TRACS | 20% deviation from Forest Plan | Timber | $1,000 |

# Table 5-1. Monitoring Plan by Resource (continued).

| Activity, Effect, or Resource to be Measured | Monitoring Objective | Monitoring Technique | Precision/ Reliability | Monitoring Frequency | Reporting Frequency | Standard | Variation from Standard Requiring Further Action | Reporting Staff | Annual Cost |
|---|---|---|---|---|---|---|---|---|---|
| Timber-forage plantations | Evaluate growth and survival of conifers and pounds of forage produced (I,E,V). | Systematic and/or random sample. | High/High | 1st and 3rd years and thereafter until certified | Annual | Stocking growth rate that produce the height, basal areas, volume and pounds predicted in yield tables. | More than 10% of unit growing below standard; or -25% deviation from yield tables. | Timber, Wildlife | $10,000 |
| **VISUAL RESOURCES** | | | | | | | | | |
| Trend of visual character | Determine if desired character stated in plan is being approached or maintained (I). | Field reviews with landscape control point method. | High/Mod | Every 5 years | Every 5 years | Forest Standards and Guidelines | Indication of trend away from the stated goal on greater than 5% of areas. | Recreation | $1,000 |
| Visual condition of Forest | Determine compliance with visual quality objectives (VQOs) (I,E). | Review and field check all projects in Retention, 50% of projects in Partial Retention, and periodic review of projects in Modification. | Mod/Mod | Annual | Every 5 years | Forest Plan VQOs. | -10% of 1 and 2 sensitivity level acreages; -33% of other acreage. | Recreation | $500 |
| **WATER** | | | | | | | | | |
| Water quality management | Assess compliance with BMPs, S&Gs direction, and State water quality objectives. Evaluate the effectiveness of BMPs (I,E). | Field inspection of BMP and S&G implementation. Evaluation of effectiveness through field data collection and analysis. | High/Mod | Annual | Annual | Full implementation of BMPs and S&Gs; maintenance or improvement of pre-project water quality. | – 10% non-implementation in any year. –20% of BMPs not effective in any year. | Water | $5,000 |

## Table 5-1. Monitoring Plan by Resource (continued).

| Activity, Effect, or Resource to be Measured | Monitoring Objective | Monitoring Technique | Precision/ Reliability | Monitoring Frequency | Reporting Frequency | Standard | Variation from Standard Requiring Further Action | Reporting Staff | Annual Cost |
|---|---|---|---|---|---|---|---|---|---|
| Watershed condition | Determine existing watershed condition and provide basis for watershed restoration program (V). | Stream reach inventory and channel stability evaluation. WIN inventory | Mod/Mod | Annual | Annual | Stable condition | Backlog of restoration needs (acres/mile) increases as a result of management activities and does not decrease in response to watershed and riparian area treatments. | Water | $5,000 |
| Cumulative watershed effects | Identify adverse cumulative impacts in specific watersheds (I). | Cumulative watershed impact analysis (FSH 2509.22, Ch. 20). Stream reach inventory and channel stability evaluation. | Mod/Mod | Annual | Annual | Stable stream channels. | Deteriorating stream channels. | Water | $4,000 |
| Cumulative watershed effects | Determine effectiveness and validity of cumulative watershed effects modeling process, and management thresholds (E,V). | Select specific projects for an administrative study. Collect baseline information. | Mod/Mod | Annual | Every 5 years | Predicted vs. actual effects. | Current process does not protect resource values or overly constrains management options. | Water | $50,000 |
| **WILDERNESS** | | | | | | | | | |
| Physical, social, and managerial setting for wilderness opportunities | Assure that wilderness attributes are maintained (I,E). | Sample field observation of heavy use areas and travel corridors. | Mod/Mod | Annual | Every 5 years | Acres not meeting Forest Standards and Guidelines. | When Forest Standards and Guidelines are not being met or a downward trend is observed. | Recreation | $5,000 |

## Table 5-1. Monitoring Plan by Resource (continued).

| Activity, Effect, or Resource to be Measured | Monitoring Objective | Monitoring Technique | Precision/ Reliability | Monitoring Frequency | Reporting Frequency | Standard | Variation from Standard Requiring Further Action | Reporting Staff | Annual Cost |
|---|---|---|---|---|---|---|---|---|---|
| User (visitor) needs and expectations | Identify changing needs and expectations. Monitor interactions of wildlife, recreationists, and livestock (V). | Interview public at trailheads, review public comments. | Low/Mod | Annual | Every 5 years | None | When more than 50% of comments indicate a need for change. | Recreation | $5,000 |
| **WILDLIFE AND FISH** | (see Appendix E for detailed discussion) | | | | | | | | |
| Bald eagle (breeding) | – Determine trend and productivity of breeding population;<br>– Evaluate trend of habitat delineated to meet Recovery Plan objectives.<br>– Assess effectiveness of S&Gs (I,E). | Aerial or ground nest surveys, habitat condition and use surveys, population surveys. | Mod/Mod | Annual and specific project reviews | Annual | USFWS Recovery Plan, nest management plans, State survey procedures, Forest Standards and Guidelines, Raptor Prescription. | Any decline in habitat or population. | Wildlife | $5,000 |
| Bald eagle (wintering) | Determine condition and trend of identified active and potential roost sites. Assess effectiveness of S&Gs (I,E). | Vegetation surveys, habitat capability analyses, and silvicultural prescriptions, population surveys. | Mod/Mod | Annual or project induced | Every 5 years | USFWS Recovery Plan, roost management plans, Forest Standards and Guidelines, Raptor Prescription. | Any significant decline in habitat capability or decline in roosting population. | Wildlife | $12,000 |
| Peregrine falcon | Verify nesting and reproductive success during and after reintroduction. Assess effectiveness of S&Gs (I,E). | Observation during reintroduction and follow-up surveys. | Mod/Mod | Annual | Annual | Success rates of other similar sites within the State. | Lower success or greater loss of birds than Statewide average. | Wildlife | $2,000 |

## Table 5-1. Monitoring Plan by Resource (continued).

| Activity, Effect, or Resource to be Measured | Monitoring Objective | Monitoring Technique | Precision/ Reliability | Monitoring Frequency | Reporting Frequency | Standard | Variation from Standard Requiring Further Action | Reporting Staff | Annual Cost |
|---|---|---|---|---|---|---|---|---|---|
| Northern spotted owl | Survey to determine if nesting pairs occur on Forest. Assess effectiveness of S&Gs (I,E). | Survey protocols and habitat surveys. | Mod/Mod | | Annual | Species recovery plan. | Noncompliance with Recovery Plan. | Wildlife | $10,000 |
| Bighorn sheep | Evaluate habitat condition, population trend and livestock or recreation interactions (I,E). | Aerial and ground surveys; composition counts; identify conflicts with other resources. | Mod/High | Annual | Annual | Wilderness Prescription, Standards and Guidelines, Bighorn Sheep Management Plan. | Any decline in population attributable to management activity. | Wildlife | $6,000 |
| Goshawk | Determine population and habitat trends; evaluate prescription effectiveness (I,E,V). | Nest surveys for occupancy and production in existing and potential habitat. | Mod/Mod | Annual for selected areas or territories or project induced | Annual | Habitat improvement; Raptor Prescription; Forest Standards and Guidelines; habitat capability models. | Any decline in a sample population over a 3-year period; consistent deviation from Standards and Guidelines, Prescription or target population. | Wildlife | $10,000 |
| Modoc Sucker | Determine condition and trend in critical habitat and populations, effectiveness of BMPs and S&Gs (I,E,V). | Stream surveys, channel profiles, photo points, population sampling, and project reviews. | Mod/Mod | Annual or project induced | Annual | Recovery Plan, Riparian Prescription, Forest Standards and Guidelines. | Any significant decline in habitat condition or population. Noncompliance with Recovery Plan | Wildlife | $10,000 |
| Lost River and shortnose suckers | Determine habitat and population trends, effectiveness of BMPs and S&Gs (I,E,V). | Stream and population surveys, photo points, project reviews. | Mod/Mod | Annual or project induced | Annual | Riparian Prescription, Recovery Plan, Forest Standards and Guidelines, BMPs | Failure to implement Riparian Prescription or meet Recovery Plan objectives. | Wildlife | $10,000 |

## Table 5-1. Monitoring Plan by Resource (continued).

| Activity, Effect, or Resource to be Measured | Monitoring Objective | Monitoring Technique | Precision/ Reliability | Monitoring Frequency | Reporting Frequency | Standard | Variation from Standard Requiring Further Action | Reporting Staff | Annual Cost |
|---|---|---|---|---|---|---|---|---|---|
| Goose Lake redband trout – Lake-run | Determine habitat and population trends, effectiveness of BMPs and S&Gs (I,E,V). | Stream and population surveys, photo points, project reviews. | Mod/Mod | Annual or project induced; population every 5 years or project induced. | Annual | Riparian Prescription, Recovery Plan, Forest Standards and Guidelines, BMPs. | Failure to implement Riparian Prescription or meet Recovery Plan objectives. | Wildlife | $6,000 |
| Fisheries (trout and largemouth bass) | Determine habitat and population trends, effectiveness of BMPs and S&Gs (I,E,V). | Stream/lake habitat and population surveys, project reviews. | Mod/Mod | Annual | Annual | Riparian Prescription, Forest Standards and Guidelines, habitat capability models, State goals. | Downward or static trend in habitat or populations. | Wildlife | $22,000 |
| Pine marten, Pileated woodpecker | Insure quantity and quality of available habitat to maintain viable populations. Assess effectiveness of S&Gs (I,E,V). | Vegetation mapping, down log and snag transects, population surveys. | Mod/Mod | Every 5 years, or project induced | Every 5 years. | Forest Standards and Guidelines, Riparian Prescription, habitat capability models, old growth acreage goals. | Reduction in acres of old growth below management area objectives; reduction in population levels. | Wildlife | $10,000 |
| Mule deer | Evaluate habitat condition, population trend and effectiveness of S&Gs (I,E). | Deer use surveys, annual CDFG composition counts, vegetation sampling and mapping. | Mod/Mod | Annual and project induced | Annual | State deer herd plans, Timber-Forage Prescription, habitat capability models. | +or-10% attainment of Forest Plan targets for each herd. Noncompliance with Forest Standards and Guidelines. | Wildlife | $10,000 |
| Pronghorn | Determine habitat condition, population trend and effectiveness of S&Gs (I,E). | State herd counts, forage surveys, type maps, range condition and trend. | Mod/Mod | Annual | Annual | Forest Standards and Guidelines, allotment management plans, State Pronghorn Management Plan. | Downward trend in habitat condition or population. | Wildlife | $10,000 |

## Table 5-1. Monitoring Plan by Resource (continued).

| Activity, Effect, or Resource to be Measured | Monitoring Objective | Monitoring Technique | Precision/ Reliability | Monitoring Frequency | Reporting Frequency | Standard | Variation from Standard Requiring Further Action | Reporting Staff | Annual Cost |
|---|---|---|---|---|---|---|---|---|---|
| Canada goose, Mallard, Sandhill crane | Verify production due to wetland improvements and evaluate habitat conditions. Assess effectiveness of S&Gs (I,E,V). | Nest survey and livestock utilization measurements. | Mod/High | Annual | Annual | Forest Standards and Guidelines, State collection agreements, wetlands objectives. | 10% decine attributable to management activity or inadequate maintenance. | Wildlife | $16,000 |
| Sage grouse | Determine trends in population and habitat. Assess effectiveness of S&Gs (I,E,V). | CDFG or FS lek and brood count, livestock use, vegetation mapping and condition and trend measurements. | Low/Mod | Annual bird counts, 5-year habitat trends | Every 5 years | Forest Standards and Guidelines, habitat capability models, State lek and brood counts. | Downward trend in populations or habitat over 5 years. | Wildlife | $6,000 |
| Western grey squirrel, Blue grouse | Monitor acres of habitat and application of S&Gs (I,E). | Vegetation mapping and sampling. | High/Mod | Annual or project induced | Every 5 years | Forest Standards and Guidelines, habitat capability models. | Failure to meet Standards and Guidelines on a Forest-wide basis. Downward trend in population over 5 years. | Wildlife | $2,000 |
| Hairy woodpecker | Verify acres of required vegetation, snag numbers and trends, and implementation of other S&Gs (I,E). | Snag and down log transects, vegetation mapping and project evaluation. | Low/Mod | Every 5 years or project induced | Every 5 years. | Forest Standards and Guidelines, habitat capability models. | Decline in old-growth acres or snag numbers due to management activities. | Wildlife | $2,000 |
| Prairie falcon, Osprey, Golden eagle | Ensure existing or potential nest territories are maintained. Assess effectiveness of S&Gs (I,E). | Nest surveys, population surveys, and habitat utilization assessment. | Mod/Mod | Every 5 years or project induced | Every 5 years. | Forest Standards and Guidelines. | Decline in population over 5 years. | Wildlife | $3,000 |

## Table 5-1. Monitoring Plan by Resource (continued).

| Activity, Effect, or Resource to be Measured | Monitoring Objective | Monitoring Technique | Precision/ Reliability | Monitoring Frequency | Reporting Frequency | Standard | Variation from Standard Requiring Further Action | Reporting Staff | Annual Cost |
|---|---|---|---|---|---|---|---|---|---|
| Swainson's hawk | Ensure existing or potential nest territories are maintained. Assess effectiveness of S&Gs (I,E,V). | Nest surveys, population surveys, and habitat utilization assessment. | Mod/Mod | Every 5 years or project induced | Annual | Forest Standards and Guidelines. | Decline in population over 5 years. | Wildlife | $5,000 |
| Riparian species: (Red-breasted and red-naped sapsuckers; willow flycatcher, yellow warbler) | Determine trends in woody vegetation and habitat capability in riparian areas. Assess effectiveness of S&Gs (I,E,V). | Vegetation sampling, photo points, point counts for birds, nesting and reproductive success surveys. | Mod/Mod | Annual to every 5 years | Every 5 years. | Riparian Prescription, Forest Standards and Guidelines, habitat capability models, baseline population or vegetation assemblages. | Decline or static trend in vegetation or populations. | Wildlife | $10,000 |
| Habitat improvements | Determine compliance with planned habitat improvement program (I). | Compare accomplishments with Forest-wide and management area direction; all planned improvements. | High/High | Annual | Annual | Forest Standards and Guidelines and management area direction. | + or - 5% of attainment targets. | Wildlife | Costs are part of program. |
| Habitat improvement success | Determine effectiveness of habitat improvements (E,V). | Pre- and post-project sampling of wildlife use; selected improvements. | Mod/Mod | Annual to every 5 years | Every 5 years | Forest-wide and management area direction. | Absence of intended habitat improvement or use. | Wildlife | $5,000 |
| Snags | Assess the numbers, distribution and characteristics of snags on each management area. Assess effectiveness of S&Gs (I,E,V) | Compartment exams, belt transects; use surveys. | High/High | Every 5 years or project induced | Every 5 years | Forest Standards and Guidelines, management area direction, and habitat capability models. | Noncompliance with S&Gs, snag longevity not attained, use rates not achieved. | Wildlife | $10,000 |

## Table 5-1. Monitoring Plan by Resource (continued).

| Activity, Effect, or Resource to be Measured | Monitoring Objective | Monitoring Technique | Precision/ Reliability | Monitoring Frequency | Reporting Frequency | Standard | Variation from Standard Requiring Further Action | Reporting Staff | Annual Cost |
|---|---|---|---|---|---|---|---|---|---|
| **DIVERSITY** | | | | | | | | | |
| | Assess the amounts, types and distribution of vegetation communities and seral stages. Assess and validate S&Gs (I,E,V) | Compartment exams, landscape analysis. | Mod/Mod | Every 5 years or project induced | Every 5 years | Forest Standards and Guidelines, management area direction. | Noncompliance with Forest Standards and Guidelines. | Wildlife, Timber | $5,000 |
| **ECONOMICS** | | | | | | | | | |
| Unit costs and values | Improve cost and value estimates for planning purposes (V). | Examine expenditure and allocation reports as needed for accuracy. | High/Mod | Annual | Annual | Costs and values in Plan formulation. | 10% variance from standard. | Planning | $1,500 |
| Budget | Determine if budgets have significantly affected the production of projected outputs (I,E,V). | Compare annual budget and output levels with Forest Plan projections. | High/Mod | Annual | Every 5 years | Forest Plan Chapter 4. | Average outputs for 5 years are + or - 10% of decade average. | Planning | $500 |
| **PLANNING** | | | | | | | | | |
| Management direction | To determine compliance with and effectiveness of Chapter 4 direction (I,E). | ID Team reviews of selected projects and districts. | Low/Mod | Annual | Annual | Forest Plan Chapter 4 | Noncompliance or documented need for change. | Planning | $5,000 |
| Management direction | To determine validity of Chapter 4 direction and the effects of the direction on sustained production of goods and services (V). | Management team review of selected projects and districts. | Low/Mod | Annual | Annual | Forest Plan Chapter 4 | Documented need for change. | Planning | $5,000 |

## Table 5-1. Monitoring Plan by Resource (continued).

| Activity, Effect, or Resource to be Measured | Monitoring Objective | Monitoring Technique | Precision/ Reliability | Monitoring Frequency | Reporting Frequency | Standard | Variation from Standard Requiring Further Action | Reporting Staff | Annual Cost |
|---|---|---|---|---|---|---|---|---|---|
| Issues and Concerns | To determine degree of issue and concern resolution and identify new issues (V). | Public involvement | Mod/Mod | Annual | Annual | Forest Plan Chapter 4 | Adverse public response. | District Rangers, Public Affairs Officer | $1,000 |