Chapter V

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Chapter V

Monitoring and Evaluation Strategy

INTRODUCTION

This chapter describes the program and process that will be used to determine, on an annual basis, if the Forest Plan is still sufficient to guide the management of the Forest. Monitoring is the key to adaptive management (the ability to change as new information or technology is developed) and is the necessary feedback mechanism for improved resource management. Monitoring and evaluation are used to determine if an amendment or revision of the Forest Plan is needed.

Monitoring and evaluation give the public and Forest managers timely information on how well the Forest is achieving the Desired Conditions. Monitoring and evaluation must also be conducted in a manner that is efficient, practical, and affordable. They should not duplicate existing data-collection efforts. The Rio Grande National Forest (RGNF) will allocate a portion of its annual budget to accomplish monitoring and evaluation of the Forest Plan.

The Forest Interdisciplinary Team developed criteria for the RGNF monitoring-and-evaluation (M&E) program. The criteria are based on national policies, Regional monitoring-program emphasis items, and Interdisciplinary Team concepts, as well as legal and other policy requirements. The criteria include:

* The M&E approach must evaluate:
    1) The Goals, Objectives, and Desired Conditions identified in the Forest Plan.
    2) The Forest management direction.
    3) Land suitability.
    4) The Management-Area Prescriptions, as well as the Forestwide and Management-Are-specific Standards and Guidelines.
    5) The Monitoring Plan.
    6) Congressional recommendations.

* The M&E approach shall be responsive to national policies, including direction to protect ecosystems; restore deteriorated ecosystems; provide benefits within the capabilities of ecosystems; and promote organizational effectiveness.

* It should be responsive to the concerns and suggestions of the research branch of the Forest Service.

* It should emphasize “outcomes” instead of “outputs.” An output is a production statistic, whereas outcomes address the condition and status of ecosystems and their sustainability after management activities.

* It shall be affordable, efficient, and practical.

* It shall meet the legal requirements for M&E.

* The annual M&E report shall be readable and understandable.

* It should be flexible, to allow for changing philosophy and methodologies in assessing resource impacts.

* M&E should be interdisciplinary and be the cornerstone of adaptive management.

PUBLIC RESPONSES TO THE DRAFT PLAN

During the period between the publication of the Draft Environmental Impact Statement and the Final, the Forest Interdisciplinary Team read through thousands of public comments on the Draft Plan and EIS. Many were directed at the Monitoring section in Chapter 5 of the Plan. The comments expressed a number of concerns, including the following:

* The two tables in the Draft Plan were difficult to understand and interpret.

* Frequency, precision, reliability, and accuracy are items required by regulation that are appealable, and cannot be included in a nonappealable section of the Forest Plan (such as Appendices).

* The RGNF must make a firmer commitment to budget (for monitoring).

* The Monitoring Plan should show legal requirements, costs, and examples of how the process would work.

* The Plan was not specific enough in describing monitoring techniques.

* The Plan did not monitor Standards and Guidelines.

The ID Team decided to rewrite the Monitoring Chapter to respond to the concerns raised by the public. The monitoring approach described in this chapter is based on many of those concerns.

THE SIX FOREST PLAN DECISIONS

The monitoring program must evaluate the six decisions made in a Forest Plan. These are:

1) The Goals, Objectives, and Desired Conditions identified in the Forest Plan.

2) The Forest management direction.

3) Land suitability.
4) The Management-Area Prescriptions, as well as the Forestwide and Management-Area-specific Standards and Guidelines.

5) The Monitoring Plan.

6) Congressional recommendations.

The monitoring plan is based on the evaluation of these six items.

MONITORING OBJECTIVES AND THE LINK TO DESIRED CONDITIONS, GOALS, AND FORESTWIDE OBJECTIVES

The purpose of the monitoring program is to establish a basis for periodic determination and evaluation of the effects of management practices (36 CFR 219.11 (d)). Desired Conditions (Forest Plan, Chapter 1) describe the conditions that the Plan is designed to achieve on the entire Forest. These broad statements are goals that the Forest will strive for over time.

Forestwide Objectives (Forest Plan, Chapter 2) are more specific statements, and describe results or conditions the Forest Service intends to achieve on the ground. Objectives are closely tied to Desired Conditions.

Monitoring Objectives (Forest Plan, Chapter 5) are statements developed from the Forestwide Objectives, and show what will be monitored and evaluated as part of the monitoring program. This linkage is important in meeting the intent of 36 CFR 219.12 (k), which says that "....implementation shall be monitored on a sample basis to determine how well objectives have been met..."

THE LEGAL REQUIREMENTS FOR MONITORING AND EVALUATION

The determination of what is legally required monitoring was made by the Forest Interdisciplinary Planning Team, with assistance from the Regional Forester's Staff in Golden. While no specific set of guidelines has been developed Regionally or nationally, the Forest Service believes that it is important to make prudent judgements about what it considers to be legally required monitoring. The following discussion explains how the IDT approached this process, and the assumptions and interpretations the team made.

Some direction is very clear concerning monitoring of the Forest Plan. In other instances, monitoring is implied, but not directly stated. The Planning regulations in 36 CFR 219.12 (k) clearly describe both broad and specific items that must, by law, be monitored and evaluated. The broad statement says that "on a sample basis...determine how well objectives have been met and how closely management standards and guidelines have been applied ." This requires that each resource area monitor and evaluate Objectives, and Standards and Guidelines. Clear and direct monitoring requirements are described in 36 CFR 219.12 (k), which addresses management prescriptions (such as timber) and other requirements.

The IDT searched through the planning regulations for key words like "monitor" and "evaluate" in order to determine other legally required monitoring items. The context of those words then determined if M&E was legally required.

Planning regulations in 36 CFR 219.27 describe management requirements. The regulations state that "These requirements guide the development ....monitoring and evaluation of Forest Plans." The RGNF's interpretation of the regulation is that the items listed subsequently under this heading could qualify as legal requirements. The Forest IDT then reviewed this section and determined which items suggested M&E, and included those as legally required.

Other laws were reviewed, in addition to Planning regulations. If other laws specifically direct or suggest M&E, then the IDT cited the applicable law and included those items as legally required M&E.

The fact that planning regulations mention a topic does not automatically mean that the topic must be a monitoring requirement. For example, 36 CFR 219.13, Resource Integration Requirement, describes the minimum requirements for integrating various resources into the Forest planning process. Unless monitoring is specifically mentioned, as in 36 CFR 219.19 (6), the monitoring of these items was determined by the IDT to be not legally required.

One very important distinction needs to be understood. That is, activities like contract administration, permit administration, inspection, enforcement, inventories, and surveys are not always considered monitoring of the Forest Plan, though at times they could overlap with monitoring efforts. These activities are considered part of routine administration, and do not respond to how well the Plan is working. As an example, hard rock mineral regulations direct inspection and compliance with the operating plan. This is not the same as Forest Plan monitoring, which by our interpretation would be the effectiveness evaluation of how well the Goals, Objectives, and Standards and Guidelines are being met. These routine administrative activities will continue to be carried out on the Forest and are generally funded by program, but may not be considered "legally required monitoring."

The following sections describe the important monitoring items that the Forest selected in meeting the intent of laws and management. The list differentiates between legally required monitoring and other important monitoring responsibilities.

Biodiversity

Providing habitat necessary to maintain viable populations is required by 36 CFR 219.27 and 36 CFR 219.19 (6). To determine if the Forest Plan is meeting this objective, we have chosen to monitor those species and/or habitats about which there are some questions as to their potential viability. These are species found on the Threatened and Endangered list, the Regional Sensitive species list, and the Colorado Natural Heritage Program's list of species of special concern and significant plant communities.

There are two different scales of monitoring detailed. The "fine-filter" scale will focus on particular plant and wildlife species that generally occupy distinct habitats that cannot be accurately monitored at the landscape level. (The exception to this involves monitoring the birds and small mammals within the spruce/fir forest.) This is part of a Regional effort to conduct work in each of the major cover types within the Region. Every Forest will eventually be assigned a cover type.

The rest of the fine-filter work is specific to the known location(s) of the particular plant or animal. The intent of the fine-filter work is to track the species' population trends over time. Ripley milkvetch will be monitored for the first five years, and then a decision will be made whether monitoring should continue and/or whether an amendment of the Forest Plan is needed.

In general, the wildlife and ecology monitoring will be coordinated with the Colorado Division of Wildlife, as well as other state and federal Agencies.

The "coarse-filter" scale focuses on tracking the changes in gross habitat conditions (e.g., cover type, structural changes) and if there have been any changes in the condition of the site location(s). The cost of the work is a mixture of Forest Service and cooperator funding.

The fine-filter work involves primarily field work and somewhat intensive efforts to gather the necessary data to be able to judge population trends. The coarse-filter work uses methods that are able to look at the landscape scale (e.g. aerial photos, GIS, satellite imagery).

Providing for and maintaining the diversity of plant and animal communities is required by 36 CFR 219.27. To ensure that the Forest is meeting this objective, we have chosen four attributes to monitor. These four were selected because they capture the key components of vegetative diversity. Two of them involve tracking changes in the amount, quantity, and pattern of the vegetation that may appear over the life of the Plan. This will be accomplished using similar landscape-scale tools as described for the coarse-filter work. The third attribute is a validation of the reference-work and landscape-scale tools. The final attribute is a progress report on how well we are gathering the data on the Forest's old-growth inventory/reconnaissance. The costs displayed are mainly Forest Service funds.

We are required by 36 CFR 219.12 (k) to complete an overall evaluation of Forest Plan Objectives and Standards and Guidelines. To accomplish this, the IDT determined that monitoring 20 % of the Forest's projects, annually, would give us the information needed to make an informed evaluation. The costs of this monitoring are for a series of field visits to the projects.

Air Quality

Maintaining air quality at a level that is adequate for protection and use of National Forest System resources is required by 36 CFR 219.27 (a) (12). The regulation and its context suggest that monitoring of air quality is required. "Air-quality-related values" are protected in Class I Wilderness Areas, which is also required by the *Clean Air Act*. The State of Colorado allows for the same level of protection in Class II Wilderness. The *Monitoring Air Resources in the Rocky Mountain Region* (USDA, 1993) identifies monitoring priorities based on potential threats. Visibility is the highest priority. Lake chemistry is second and terrestrial organisms, like lichens, is last.

To accomplish air-quality monitoring, a number of techniques are available. Visibility data are available from the National Park Service, which monitors visibility at the Great Sand Dunes National Monument. The cost of coordination has been identified. Synoptic surveys in all four Wilderness Areas have identified the lakes most sensitive to changes in acidity, and they have been selected for long-term trend monitoring. Regional protocols, and the Forest air-quality monitoring plan, direct us to monitor those lakes three times per summer. The costs needed to collect samples, analyze them, and record data are shown in the Monitoring Table section. Monitoring of terrestrial air-quality-related values would probably occur only if a major polluting facility were proposed that could adversely affect them. The cost of such a study is shown (in the Monitoring Table, page V-19) as a unit, should such monitoring become necessary.

Timber

Restocking of final-harvest areas (i.e., clearcuts, shelterwood overstory removals, group/single-tree selection cuts) is required by 36 CFR 219.12 (k) and implied in 219.27 (c). Normally, first-year surveys are on-site inspections, while third- and fifth-year surveys are statistically valid plot-inventory exams. These surveys are conducted by both forestry technicians and silviculturists.

As required by 36 CFR 219.12 (k), all Forest lands are to be examined at least once every ten years in order to determine if Unsuitable lands have become Suitable or vice-versa. It is also the intent of the RGNF to assess, through project-related field investigations, whether lands identified as Suitable do, in fact, meet suitability criteria. Various personnel will be responsible for this ongoing need, including silviculturists, sale preparation foresters, timber sale administrators, and soil scientists. Significant changes in tentatively suitable timberland acreages will prompt the Forest to perform new suitability and ASQ analysis.

36 CFR 219.12 (k) (5) (iv) requires the Forest to monitor levels of destructive insects and disease organisms following management activities. 36 CFR 219.27 (a) (3) and (7) direct the Forest to use preventive means for resource protection from insects and disease. Normally, Forest personnel trained in identifying insect/disease problems regularly monitor forest conditions before, during, and after management activities or natural disturbances. When timber-resource risk is in question, Regional insect and disease specialists are requested for help in assessment.

The monitoring of created openings ties to various legal requirements, including 36 CFR 219.12(k)(5)(iii), evaluation of maximum-size limits; and 36 CFR 219.27(d) (2), with subparts (I), (ii), and (iii), together dealing with maximum-size limits, and exceptions to those limits, for even-aged harvest areas. It also ties with Forestwide Standards and Guidelines dealing with (1) objectives for retaining uncut forest between openings, (2) thresholds when created openings have regenerated to the degree that they are no longer considered openings, (3) the avoidance of excess edge creation, and (4) biodiversity and Management-Area Prescription Standards and Guidelines that tie management activities to reference-area conditions and ranges of natural variability. In order to meet these requirements, various forms of measurement are available, including hand-held lasers, GPS units, and aerial photos.

The monitoring of silvicultural objectives is not specifically mentioned or implied by the regulations, though items such as regeneration, restocking levels, openings, and other items are. The Forest IDT has included this item as an important assessment of projects involving timber stand manipulation. Forest personnel can accomplish this objective prior to, during, and after harvesting.

Fire and Fuels Management

Monitoring of the Fire and Fuels Management program is not required by the regulations, but is considered important to the RGNF. Regarding resource protection, however, 36 CFR 219.27(a)(2) states: “Consistent with the relative resource values involved, minimize serious or long-lasting hazards from flood, wind, erosion, wildfire, or other natural physical forces, unless specifically excepted, as in Wilderness.” In order to address this requirement, a determination of “relative resource values” must be made. This is done in consultation with the various resource specialists (IDT), technicians, and program leaders. Then the “serious or long-lasting hazard” potential from wildfire must be determined, and is done through ocular or eyeball estimates, fuel transects, on-site inspections, and/or surveys. This will be done by Ranger District or Forest Fire/Fuels personnel.

Additionally, the Fire Program is monitored yearly through the National Fire Management Analysis System. This economic-analysis program addresses the "relative resource value" determination through a relatively complex cost/benefit evaluation of the fire suppression program for the Forest.

Range

The monitoring of suitable rangelands for condition and trend is not required directly by regulations, though we consider it very important. Per the Rocky Mountain Region's *Rangeland Management and Training Guide* (RAMTG), inventory information will yield baseline data to determine Desired Conditions of rangelands. These data can then be used in determining restoration and carrying-capacity efforts on individual allotments. Inventory will be conducted on each allotment once every 15 years, and monitoring of selected transects will be conducted per direction in the RAMTG.

Range-suitability monitoring is not required by regulation, though we deem this information important to carrying out Forest Goals and Objectives. While range suitability has been addressed in the Forest Plan, any management decision which would change Management Prescription allocation should be analyzed as to range suitability. Site-specific determinations of range suitability will be made during the development of the EA and AMP for each allotment.

Range utilization is an important monitoring item, to determine whether present grazing strategies are meeting Forest and AMP Standards and Guidelines. Monitoring will look at key areas of the rangeland resource. Those allotments where capacity determinations are in question may require a more in-depth inventory.

The costs cover the expense of range conservationists doing these monitoring activities prior to and after AMP implementation, and preparing reports for the project file and Monitoring and Evaluation Report. These reports include data entry into GIS systems. These costs also include evaluation of Standards and Guidelines.

Noxious Weeds

Noxious-weed monitoring is not required by regulations; however, monitoring procedures will evaluate control methods and find noxious-weed infestations on the Forest. This level of monitoring will enable us to complete an inventory and evaluate control methods, by species, within the life of the Forest Plan. Costs are projected for an individual to accomplish this monitoring, prepare reports, and enter data into GIS systems.

Watersheds, Including Soil, Water, and Riparian and Aquatic Ecosystems

Water-resource monitoring is also suggested as a legal requirement in regulation 36 CFR 219.27 Item (a) (1), which states, "Conserve soil and water resources and not allow significant or permanent impairment of the productivity of the land." Items (2) and (4) contain specific references to protecting streams, streambanks, shorelines, and wetlands, and minimizing erosion and flood hazards.

The Forest selected a number of monitoring tools. Monitoring of watershed disturbances would identify disturbances from past, present, and proposed activities; relate severity of disturbances to an

equivalent roaded area; compare total disturbance to a concern level, to measure relative risk; vary the concern level, based on watershed sensitivity; and consider amount of disturbance in close proximity to stream channels. These are Level I watershed assessments, and are based on existing information and experienced field people. They direct attention to specific streams that are at risk, for more detailed monitoring. Time needed to collect data and analyze them is expressed as a cost, and includes Ranger District time to compile data.

Monitoring and evaluation of stream health, water quality, and riparian conditions are suggested by 36 CFR 219.27(a). These Level III watershed assessments are completed on at least one stream and riparian area per Analysis Area for each land-disturbing EA. They identify stream and riparian condition before projects begin, to verify robust conditions or require additional protection measures, as part of project implementation. They evaluate the function of aquatic and riparian systems, and the sensitivity of areas to proposed impacts. The parameters measured depend on evaluation needs for the particular stream and project being assessed, but can include channel features, stream biology, vegetation, and chemistry. Comparisons are made with reference streams. The costs needed to complete this work cover work done primarily by a hydrologist or fisheries biologist, or individuals directed by them. Costs are based on 2.5 days per site to find appropriate stream reaches for monitoring, collect data, compare with reference streams, and record results.

Monitoring of streams within watersheds that have been identified as “at risk” is needed to follow up on results from Level I assessments. These will be referred to as Level II assessments. We estimated that two such streams will need monitoring per year. This will again be accomplished by comparisons to reference streams. The time needed per stream is estimated at 2.5 days.

In addition, long-term assessments are identified in the Monitoring Plan for six streams (two streams per year), to evaluate improvement over time of streams that have been damaged by past management. These will verify whether current management is restoring damaged stream and riparian systems. Time needed for a team of specialists (soils, water, ecology, and fisheries) to evaluate these streams every third year is identified. The methods used will include those outlined in the range analysis handbook for vegetation, standard soil-analysis tools, and stream-health metrics (measurements) identified above. Methods will include the assessment of proper functioning condition of riparian areas.

The protection of soil productivity is a Monitoring Objective that is legally required by 36 CFR 219.12 (k)(2), which states that "Monitoring requirements shall provide for documentation of the measured prescriptions and effects including significant changes in productivity of the land." This requires the Forest to make an evaluation of soils, since soils are fundamental resources for land productivity. Regulation 36 CFR 219.27 item (a)(1) states, "Conserve soil and water resources and not allow significant or permanent impairment of the productivity of the land." This also suggests monitoring of soils as a legal requirement.

The RGNF has selected a number of different soil-monitoring measurement tools. We may use one or all of them to respond to the monitoring objective. The most scientific measurements involve collecting core soil samples and doing laboratory analysis. This monitors soil quality using techniques as described in technical papers such as Hazard and Geist, or other appropriate methods. Analysis leads to quantifiable soil results. Because of the high cost of doing this, we would do these only periodically, such as every third year during the Plan. Erosion modeling helps predict erosion from management activities. It uses state-of-the-art computer models and is helpful in predicting conditions where erosion might become excessive. Ocular estimates, transects, investigations, and professional

judgement are techniques that are fairly low-cost and very good at monitoring and protecting soil productivity. These would be done on all of the ground-disturbing projects where high soil-erosion or mass-movement hazards exist. The costs for achieving the objectives are primarily estimates for salaries, lab analysis, and some vehicle expenses.

Minerals

Minerals regulations require considerable inspection and enforcement by the Forest Service, which we will responsibly carry out. Inspection and enforcement are not the same as Forest Plan monitoring, however, though there could be some small overlap. With that in mind, we reviewed the regulations to see if there are specific or suggested monitoring requirements in them.

Only one regulation suggests that we are legally required to monitor mineral activities. The verification process is a feedback mechanism in the Leasing Reform Act regulations (36 CFR Subpart E, 228.102, (e) (1)(2) and (3)) which determines if the Forest Plan is still valid and whether oil and gas operations could be allowed somewhere on a proposed lease tract. The verification process is also a monitoring process, to determine if the conditions in the Forest Plan are still valid and whether oil and gas operations could be allowed somewhere on a proposed lease tract.

For locatable minerals, monitoring is not specifically required or suggested, but remains an important item that the Forest should conduct. It should be noted that we still would uphold our responsibility to do inspection and enforcement of operation plans, to assure the conditions of the plans are met. The Forest considers inspection and enforcement as routine administration of contracts, permits, and plans, but not necessarily as monitoring.

Unroaded Areas

The evaluation of the Forest's identified unroaded areas is not legally required. Monitoring of representative backcountry areas will, however, assess resource-management activities (motorized/nonmotorized trail use, levels and type of use, recreation settings). Also, it will evaluate conflicts, identify areas of concentrated use, and measure other resource impacts, to determine if significant effects on the area's natural character or values are occurring; and will evaluate the Forest Plan's Management Area Prescription Objectives and Standards and Guidelines. Different representative backcountry areas will be monitored each year. The Forest's recreation specialist and core team (includes Ranger District recreation personnel, range conservationists, and biologist; and the Forest soil scientist, hydrologist, and ecologist) will be responsible for the monitoring of these representative backcountry areas. Cost includes salary of personnel, travel, and preparing reports.

Wild and Scenic Rivers

The monitoring of eligible Wild and Scenic Rivers is not legally required. It is important, however, to assess resource-management activities that occur within the river corridor, and future proposed activities, in order to protect the values associated with the eligible rivers.

Monitoring of a river corridor will assess resource-management activities (recreation uses, range conditions, riparian areas, and fisheries) to determine if significant effects on the river corridor's natural character or ecological processes are occurring. Also, it will evaluate the Forest Plan's Management Area Prescription Objectives and Standards and Guidelines. One river corridor will be

monitored every three years. The Forest's recreation specialist and core team (includes Ranger District recreation personnel, range conservationist, and biologist; and the Forest's hydrologist and fishery biologist) will be responsible for the monitoring of the selected river corridor. Costs include salary for personnel, travel, and preparing reports.

Wilderness

Regulation 36 CFR 293.2 directs that management of Wilderness "...preserve and protect its Wilderness character." We believe this suggests that monitoring be done in designated Wilderness. Wilderness Implementation Schedules for each Wilderness Area have been written and approved. Wilderness funds will be used for coordination purposes; monitoring of recreation uses; and needs assessment, capacities, and Guidelines. Monitoring of Wilderness items will be the responsibility of the Wilderness coordinators and Wilderness rangers. Costs include salary for personnel, travel, and preparing reports.

Special Interest Areas

Monitoring is not legally required, though the Forest considers it important. To accomplish this, the Forest would conduct on-site inspections of designated Special Interest Areas every five years, to determine if protection measures and interpretation efforts are adequate. Costs reflect on-site visits; follow-up costs are on-site visits and follow-up GIS work.

Research Natural Areas

Monitoring RNAs is not legally required in the regulations, though the Forest considers it important. Monitoring would be done once every five years on each RNA, which would give us the information needed to make an informed evaluation. The costs cover visits to each RNA.

Heritage Resources

After reviewing the pertinent laws, we determined that the monitoring of heritage resource sites is not specifically required by law. The Forest is dedicated to protection of these important resources, however, and would monitor those heritage resources specifically identified for protection during a project. The heritage-resource sites identified for protection (in the initial inventory report sent to the Colorado Historic Preservation Officer for review) have the potential to be impacted by a Forest Service project. Monitoring will be done by an archaeologist or Ranger District personnel physically inspecting the site. Costs incurred include the daily salary of the individuals and travel expenses to the area.

Monitoring of consultations with American Indian nations, concerning areas of cultural importance, is not legally required. In order to assure that the Forest is faithful in considering the importance and protection of sites of cultural importance to American Indians, however, required consultations will be monitored. A representative sample of environmental-analysis reports and other decision documents will be inspected each year, to determine if required consultations were completed. Some projects of limited scope, such as a toilet relocation in a campground or trail maintenance activities, may not require a formal consultation, and will not be reviewed. Monitoring will be done by an archaeologist or Ranger District personnel. Costs are the daily salary and travel expenses of the person conducting the monitoring.

Developed Recreation

The monitoring of developed recreation sites is not legally required. The Forest will continue to do routine inspection and maintenance, however, to assure the protection and safety of these facilities. Routine administration of these sites is not considered Forest Plan monitoring.

It is important to assess visitor expectations, and trends; manage developed sites consistent with the natural setting; and have quality and safe facilities. Monitoring will include:

* Customer surveys to determine visitor expectations, use trends, demographics, and visitor satisfaction with facilities and service.

* Inventories of Forest campground occupancy rates and use.

* Evaluation of our standards for developed sites, dispersed areas, trails, and permit administration.

* Documented campground hazard inspections and corrective action when needed.

Ski areas will be monitored for compliance with their approved Master Plan, permit clauses, and approved summer and winter operating plans. Holders of special-use permits will be monitored for compliance with permit clauses and approved operating plans. Monitoring will be done annually with the exception of the customer survey, which will be every five years. Costs of these monitoring items include salary for personnel, travel, and preparing reports.

Dispersed Recreation

The monitoring of dispersed-recreation opportunities is not legally required. It is important to inventory and evaluate trail conditions in order to allocate trail dollars effectively for trail maintenance and reconstruction work. It is also important to monitor our capacity-study determination; to assess our Forestwide needs and baseline capacity information; and determine if adjustments of calculations, allocations, and service days are needed. The trails inventory will be the responsibility of our Forest trails specialists, in conjunction with Ranger District trails coordinators. The capacity-determination monitoring will be the responsibility of the Forest recreation specialist and core team (includes Ranger District recreation personnel and outfitter-guide administrators). Costs of these monitoring items include salary for personnel, travel, and preparing reports.

The effects of use by specific types of vehicles off roads on National Forest System lands will be monitored (36 CFR 295.5). Monitoring of our ATV game-retrieval areas and snowmobile-use areas will be assessed to determine if significant resource impacts are occurring, and to evaluate public safety, adequacy of signing, and research needs. The Forest's recreation specialist and core team (includes Ranger District recreation personnel, and biologist; and Forest's travel management coordinator, soil scientist, hydrologist, and ecologist) will monitor selected areas. Costs include salary for personnel, travel, and preparing reports.

Scenic Resources

The monitoring of scenic resources is not a legal requirement, but monitoring-and-evaluation efforts will help the Forest landscape architect and the public determine the amount and duration of changes of the existing landscape character, and will help us to determine if the landscape’s appearance is progressing toward the desired goal.

Scenic Integrity Objectives will be measured by determining the amount of disturbance after project implementation. Photographs, on-site inspections, and aerial photographs will be used to help determine if Scenic Integrity Objectives have been met after project implementation. There is a two-year natural-rehabilitation period for all activities affecting scenic resources. Activities are expected to come into compliance with mapped Scenic Integrity Objectives within this period. After the two-year period, the landscape architect will monitor remaining disturbance levels, using on-site inspections and "before” and “after” photographs, to determine if Scenic Integrity Objectives have been met.
In addition, visitor feelings, values, expectations, desires, preferences, and acceptable levels of quality will help determine appropriate changes in the Scenic Integrity Objectives. Visitors are the primary source of information when helping to determine the level of importance (or unimportance) of

National Forest scenery. This will be determined through visitor surveys, observations, interviews, and public participation from a cross-section of Forest visitors that will include all activities that take place on the RGNF.

The costs of Scenic Resource Monitoring include the amount of time the Forest landscape architect will spend in the field taking photographs; doing on-site inspections; entering data; performing computer analysis; preparing evaluation reports; and conducting visitor interviews, surveys, and observations.

General Infrastructure

This section includes dams, facilities, drinking-water sources, road and trail bridges, and Forest Development Roads. All of these items are inspected and maintained on regular schedules that comply with Forest Service policies and/or state and federal regulations. For the purpose of Forest Plan monitoring, we have concluded that a portion of the inspection and maintenance is considered Forest Plan monitoring and evaluation.

Dams - The inspection of the Forest's jurisdictional dams is required by the State of Colorado. The State Engineer conducts these safety and maintenance inspections on a 1-to-3-year rotation cycle, depending on the hazard classification of the dam. Forest Service engineers accompany the State inspectors and are also responsible for coordinating and overseeing repairs of dams that fall under Forest Service control or permit. Forest Engineers conduct inspections of the non-jurisdictional low-hazard dams on the Forest on a five-year rotation, and schedule/perform any required repair work accordingly. Inspection reports will be maintained on file, and annual findings summarized in the monitoring report.

Facilities - The monitoring of facilities is not legally required by regulations. However, Forest Service Manual direction requires us to inspect RGNF structures for health, safety, and maintenance annually, which we intend to accomplish. These inspections are conducted by the Forest facilities engineer, in conjunction with Ranger District personnel. Repair and upgrade projects are then planned from these inspections. Inspection reports will be maintained on file; findings will be summarized in the annual monitoring report.

Drinking Water - The Safe Drinking Water Act (SDWA) requires suppliers of public drinking water to monitor and test supply systems in accordance with the procedures set forth in the Act, to ensure users are supplied with clean, safe drinking water. The Forest will continue to comply with these frequency, reporting, and follow-up requirements.

Forest Engineers will manage this testing, which is normally contracted through local state-certified testing laboratories. Results will be forwarded to the State Department of Health, as required. They will also be maintained on file on the Forest and summarized in the annual monitoring report. Positive test results will be handled immediately, in accordance with the SDWA.
The Forest will also conduct periodic Sanitary Survey Inspections of its potable-water systems, to determine needs for maintenance and improvements. These inspection reports will also be maintained on file.

Road Bridges - The Federal Highway Administration (FHWA) requires that all bridges under the jurisdiction of the Highway Transportation Safety Act be inspected for safety, maintenance, and load rating every two years, in accordance with national Bridge Inspection Standards. Inspections must be conducted by certified inspectors and critical deficiencies handled immediately, or the bridge must be closed. Maintenance requirements are programmed and budgeted for follow-up work. The Forest will continue to comply with this inspection requirement, with contracted inspections or internal certified engineering inspectors. Inspection reports will be filed with the FHWA, with copies maintained on file on the Forest. Findings will also be summarized in the annual monitoring report.

Trail Bridges - Monitoring trail bridges is not legally required, though Forest Service Manual policy suggests the Forest's trail bridges be inspected for safety and maintenance on a four-year-rotation basis. Inspections will be done by Forest Engineering personnel. Inspection reports will be maintained on file and will be summarized in the annual monitoring report.

Forest Development Roads - Monitoring of Forest Development Roads is not specifically required by regulations. However, Forest Service Manual and Handbook direction suggests monitoring and evaluation of Forest Development Roads for safety and maintenance, to ensure compliance with the Transportation Safety Act, and to protect the investment in these travelways. This includes monitoring construction, reconstruction, obliteration, use patterns, service and maintenance levels, travelway surfaces, signage, drainage, and resource impacts from roads.

The Forest road maintenance manager, in conjunction with Ranger District personnel, will conduct this monitoring. The requirements of the Transportation Safety Act and the Manual of Uniform Traffic Control Devices will be used to assist in this effort. Inspection frequencies vary, depending on maintenance levels and use. Inspection reports, in the form of Road Management Objective Worksheets and maintenance worksheets, will be maintained on file, and the general condition and findings will be reported in the annual monitoring report.

Travel Management

Monitoring of travel management is not legally required. Monitoring of off-road travel is required, however, and is a portion of overall travel management administration. That portion has already been described, in the Dispersed Recreation section. The Forest will monitor and evaluate the Travel Management Plan for compliance with the Forest Plan, to ensure the general infrastructure is meeting the needs of Forest users for access and multiple-use management. This will be done through user surveys and contacts, on-the-ground inspections, and employee observations. This will be completed by the Forest travel management coordinator, in conjunction with Ranger District personnel. Findings and recommendations will be summarized in the annual M&E Report.

Road-Construction Closures

Monitoring and evaluation of closures of roads used for timber sales and oil and gas exploration for compliance with the Forest Plan and individual project EAs is not a legal requirement, though very important. This will be completed by timber sale administrators and the oil and gas coordinator, in conjunction with Forest engineers. Costs cover field visits and reports.

Health and Safety

This monitoring objective focuses on meeting the intent of National Health and Safety Codes and Occupational Safety and Health Administration guidelines. While it is the Forest's policy to meet the intent of safe work practices, there is no legal requirement for monitoring of those items. The Forest will meet the intent of those laws and regulations through normal inspection and maintenance of public facilities.

Research and Information Needs

There is no legal requirement to monitor progress on research and information needs. The Forest believes it is prudent to track these items, however, for public information. Monitoring this item would be included in the Annual Monitoring Operation Plan (AMOP), and is optional.

ANNUAL MONITORING OPERATION PLAN AND THE ANNUAL MONITORING AND EVALUATION REPORT

Annual monitoring work is most efficiently accomplished if an Annual Monitoring Operation Plan(AMOP) is developed. The AMOP details the monitoring work expected to be completed in the upcoming year. The AMOP is developed by the IDT and approved by the Forest Supervisor. It describes reasons, methods, locations, responsible persons, and estimated costs. The Forest will then allocate part of the annual budget to assure that the AMOP is accomplished.

An Annual Monitoring and Evaluation Report (M&E Report) will be prepared by the Forest Interdisciplinary Team. This report will contain recommendations to the Forest Supervisor regarding the effects and outcomes of Forest Plan implementation. This information is available to the public, Forest Service Research Division, other government agencies, and individuals.

The M&E Report will summarize data and make evaluations in response to the Six Management Decisions. If responses support the existing Forest Plan, then no changes are needed and the Plan will continue to direct management. If there are inconsistencies, then appropriate amendment or revisions may be necessary.

Research and Information Needs Assessment

The Forest has identified a number of research or information needs where additional information would be useful in conducting the Monitoring and Evaluation program. These topics are summarized below.

* Range conditions baseline data.
* Improvement of the data on composition, structure, and processes for Landtype Associations.
* Old-Growth Inventory based on Region 2 (Mehl, 1992) criteria.
* Habitat relationships.
* More accurate road inventory.
* Constituent survey information.
* Update of Scenery Management System as new information becomes available; for example, new roads and trails.
* Riparian classification and mapping.
* Ethnographic studies to help determine where and what type of American Indian traditional cultural properties exist on the Forest.
* Additional data on the flora and fauna on the Forest.
* Recreation impacts on wildlife.
* Nutrient-cycling information specific to our area.

The Forest IDT believes it is important to the public that we track these items over the life of the Plan. We have added a Monitoring Objective for that purpose.

Features and Assumptions of the Monitoring Table

A number of respondents to the Draft Plan expressed the need for an example of how the monitoring process would work. Here is a brief one:

Step 1: The IDT identifies monitoring priorities and develops the Annual Monitoring Operation Plan. This would include, as a minimum, legally required monitoring items, as well as any important additional items. The IDT develops a proposal of monitoring objectives, tools, costs, and needs. As an example, one monitoring need might be to monitor Ripley milkvetch, with an estimated annual cost of about $2,500 (shown as 2.5 (A)).

Step 2: The Forest Management reviews the numerous proposed monitoring items and allocates funds as appropriate. The IDT or specialists conduct monitoring. In our example, the Ripley milkvetch monitoring is approved and funded.

Step 3: The monitoring is implemented and completed, and results are summarized in the Annual M&E Report. The Report also evaluates the Six Planning Decisions.

Costs of Completing the Legally Required Monitoring Program

The estimated annual costs of the legally required monitoring program range from about $200,000 to $220,000, comprising about 3.5 % of the Forest's budget ($5,666M). This cost assumes all the tools

listed under a required Monitoring Objective would be used in a given year. The costs are only estimates, and efficiencies may create monitoring opportunities.

A fully budgeted monitoring program, whereby both legally required and non-required objectives are monitored, would cost about $397M, or 7.0 % of the budget. The year-to- year monitoring program costs would vary, depending on monitoring issues, expected budgets, and Forest priorities.

Monitoring Table

This table outlines the Forestwide Desired Conditions, Monitoring Objectives, and specific monitoring methods that would be conducted at specified frequencies. The monitoring Methods would determine whether Desired Conditions are being achieved and whether the Six Forest Plan Decisions are still appropriate or in need of amendment. The table begins with an Objective for a particular resource. Below that are the various monitoring tools that could be used in addressing that Objective.

The Monitoring Objective may include a Code of Federal Regulations citation, such as (36 CFR 219.12 (k)), or other citation. This means that the Monitoring Objective is required by regulation or law. Any of the tools listed below that Objective may be used singly or in combination to respond to the legal requirement. If there is no legal citation, then the Monitoring Objective is not legally required and would be done only when the annual Operation Plan includes it.

“Tools/Method ” describes how measurement would be made. “Precision Class” describes the general precision, accuracy, and reliability that apply to the tools/method. “Frequency” describes how often the particular tool would be used to measure resource conditions. “Report Method” describes in what form the monitoring would be reported. “Responsible Person/Group” is the one responsible for incorporating the information into the necessary reports. “Estimated Annual Cost” are shown as "annual cost"(A) in thousands of dollars. All monitoring, legally required or not, is estimated at the minimum level.

The next column shows “Which of the 6 decisions are addressed” by this monitoring method. The Six Plan Evaluations are:

1) Are the Goals, Objectives, and Desired Conditions of the Plan still appropriate?
2) Evaluate whether Forest Direction is still appropriate.
3) Evaluate land suitability.
4) Evaluate whether Management Area Prescriptions allocations and Standards and Guidelines are still appropriate.
5) Evaluate the monitoring approach.
6) Evaluate whether there need to be recommendations to Congress.

Table V -1. Monitoring

DESIRED-CONDITION CATEGORY, MONITORING-OBJECTIVE STATEMENT, AND CFR CITATION IF LEGALLY REQUIRED

Tool/ Method	Class	Precision	Frequency Method	Method	Report Person/Group	Responsible Annual Cost	Estimated Decisions are (A) $M	Which of 6 Addressed
Desired Condition for Biodiversity								
Objective: Viability - Monitor the change in occurrence of selected native species (Fine Filter). 36 CFR 219.27 and .19 (6)								
a) Ripley milkvetch Plots/transects		A		Annually for first 5 yrs.	M&E Report	Ecologist	2.5 (A)	1,2,4,5
b) Rio Grande cutthroat (RGC) stream stocking		A		10% of RGC 327H streams annually.	M&E Report	Fish Biologist/DOW	1.5 (A)	1,2,4,5
c) Boreal toad Ocular surveys		B		All known and historic sites	M&E Report	Wildlife Biologist/ DOW	4.5 (A)	1,2,4,5
d) Peregrine falcon Ocular surveys of nests		A		All known nests annually.	M&E Report	Wildlife Biologist/ DOW	1.2 (A)	1,2,4, 5
e) SW willow Flycatcher Transects		A		10% of SWFC habitat annually	M&E Report	Wildlife Biologist/ DOW	1.5 (A)	1,2,4, 5
f) Black swift ocular surveys of nests		A		All known nests every 3 years	M&E Report	Wildlife Biologist/ DOW	1.5 (A)	1,2,4
g) Bats ocular visit of roosts		A		All known roosts every 5 years	M&E Report	Wildlife Biologist/ DOW	1.5 (A)	1,2,4
h) Birds associated with Spruce/Fir Forests. Point counts, nest search, mist netting		A		Annually	M&E Report	Wildlife Biologist/ DOW	30.5 (A)	1,2,4
Objective: Viability -- monitor the change in selected species habitat (Coarse Filter). 36 CFR 219.27)								
a) Plants listed in EIS (Sensitive Plants, Special Concern Plants, and Significant Plant Communities section) other than Ripley milkvetch. Photo interp/site visits/ GIS/satellite imagery		B		All occurrences every 10 years	M&E Report	Ecologist	0.2 (A)	1,2,4,5
b) Snag-dependent species. Aerial mapping of current insect, disease, and fire events.		B	3 years	Once every	M&E Report	Wildlife Biologist	3.3 (A)	1,2,4

Tool/ Method Class	Precision Method	Frequency Method	Report Person/Group	Responsible Annual Cost	Estimated Decisions are (A) $M	Which of 6 Addressed
c) Animals listed in EIS (Threatened, Endangered, and Sensitive Animals/ Viability section) except those species addressed above and those which can be covered under the Riparian/Wetland Objective.	B	Once every 10 years	M&E Report	Wildlife Biologist	0.5 (A)	1,2,4
Objective: Diversity -- monitor change in composition, structure, and pattern for each Landtype Association. (36 CFR 219.27)						
Photo Interp./GIS/ Satellite imagery/ spatial analysis	B	Once every 10 years.	M&E Report	Ecologist/Wildlife Biologist	0.5 (A)	1,2,4
Objective: Diversity -- validate the vegetative composition and structure of LTA 1 reference landscapes. (36 CFR 219.27)						
Photo Interp./GIS/ Satellite imagery/ site visit.	B	Once every 10 years.	M&E Report	Ecologist/Wildlife Biologist	0.7 (A)	1,2,4,5
Objective: Diversity -- Monitor changes in CNHP Significant Plant Communities listed in EIS (Sensitive Plants, Special Concern plants, and Significant Plant Communities section). (36 CFR 219.27)						
Photo Interp./ site visits/GIS/ satellite imagery	B	Once every 10 years.	M&E Report	Ecologist	0.2 (A)	1,2,4,5
Objective: Diversity -- Monitor the progress of old-growth (Mehl, 1992) inventory/reconnaissance on the Forest.						
Ocular/Plots/GIS/ Satellite imagery	B	Annually	M&E Report	Ecologist/Wildlife Biologist/Forester	1.0 (A)	1,2,4
Objective: Evaluate biodiversity and wildlife related to: a) Forestwide Goals, Objectives, and Standards & Guidelines, b) Management-Area Prescription Objectives, Desired Conditions, and Standards & Guidelines; and c) Management-Area Prescription allocations and monitoring methods. (36 CFR 219.12 (k).						
Ocular/Plats/ Transects	B	20% of projects annually	M&E Report	Ecologist/Wildlife Biologist	10.0 (A)	1,2,4,5
DESIRED CONDITIONS FOR AIR QUALITY						
Objective: Monitor and evaluate visibility, lake chemistry, and terrestrial systems as described in the Forest Air Monitoring Plan. (36 CFR 219.27 (a)).						
Photographic documentation of visibility	B	Coordinate with NPS every year	M&E Report	Hydrologist	1.0 (A)	1,2,4
Chemistry of most sensitive Wilderness lakes	A	3 times/year at each of 8 lakes	M&E Report	Hydrologist	11.0 (A)	1,2,4
Tool/	**Precision**	**Frequency**	**Report**	**Responsible**	**Estimated**	**Which of 6**

Method Class	Method	Method	Person/Group	Annual Cost	Decisions are (A) $M	Addressed
Health of terrestrial systems such as lichen communities	B/A	Projects that could alter terrestrial AQRVs	EA and M&E Report	Hydrologist	1.5 (A)	1,2,4
Objective: Monitor and evaluate implementation and effectiveness of burn plan conditions to protect air quality. (36 CFR 219.27 (a))						
Visual verification of smoke dispersal	B	20% of burn projects/year	M&E Report	District Project Leader	0.5 (A)	1,2,4
Objective: Assess Air Resources-related: a) Goals/Objectives/Desired Conditions; b) Forestwide Standards and Guidelines; c) Management-Area Prescription allocations, and Standards and Guidelines, and d) monitoring approaches. (CFR 219.12)						
Comparative evaluations	B	Annually	M&E Report	TCE Team	0.5 (A)	1,2,3,4,5
DESIRED CONDITIONS - TIMBER						
Objective: Monitor and evaluate restocking of harvest areas. (36 CFR 219.12)						
Stocking surveys	A	1st/3rd/ 5th year after final harvest	Silvicultural Report	Silviculturist	8.5 (A)	1,2,3,4
Objective: Assess timber suitability. (36 CFR 219.12; 219.27)						
Standard suitability-determination methods, planning (Forestwide) level.	A	Year 10 of 10-year plan.	M&E Report	Analyst/ Silviculturist	2.0 (A)	1,2,3,4
On-site inspections, inventory growth/ yield exams, soil sampling	B	On going	Project/M&E Report	Silviculturist/ Forester/TSA/ Soil Scientist	1.0 (A)	1,2,3,4
Objective: Assess insect and disease infestations relative to endemic levels. (CFR 219.12)						
On-site inspections, with surveys.	B/A	On going	Inspection/Risk assessment reports	Silviculturist/Prep/ Admi. Foresters & R2 I/D Specialists	9.0 (A)	1,2,4
Objective: Monitor the size of harvest openings. (CFR 219.27)						
Traverses, A stocking surveys, and site inspections	By project	Project Reports	Silviculturist/Prep	2.0 (A) Forester		1,2,3,4
Objective: Assess implementation of silvicultural objectives during pre-sale, harvesting, and post-sale periods.						
On-site inspections, photo points, density measurements	B	By Project	Cutting Unit cards inspection/ M&E Report/Photos	Silviculturist/ Prep Forester, ID Team	8.0 (A)	1,2,3,4

Tool/ Method Class	Precision Method	Frequency Method	Report Person/Group	Responsible Annual Cost	Estimated Decisions are (A) $M	Which of 6 Addressed
Objective: Assess output performance of timber sale program quantity components as compared with projected outputs (CFR 219.12)						
Comparative evaluations	A	Annually	M&E Report Staff	Analyst/Timber	3.0 (A)	1,2,4
Objective: Assess Timber-related: a) Goals/Objectives/Desired Conditions, b) Forestwide Standards and Guidelines, c) Management-Area Prescription allocations and Standards and Guidelines, and d) monitoring approaches. (CFR 219.12)						
Comparative evaluations	B	Annually	M&E Report	TCE Team	2.0 (A)	1,2,3,4,5
DESIRED CONDITIONS FOR FIRE AND FUELS MANAGEMENT						
Objective: Assess Fire and Fuels Management Program related to: a) Forestwide Standards & Guidelines, Objectives, and Desired Conditions; b) Management-Area Prescription Objectives, and Standards & Guidelines; and c) monitoring approaches.						
Ocular/transects on-site inspections and surveys	B	Annually	M&E Report Fire Mgt. Action Plan	FMO/Ecologist Silviculturist	1.0(A)	1,2,4,5
DESIRED CONDITIONS FOR RANGE						
Objective: Evaluate range program related to: a) Forestwide Goals, Objectives, and Standards & Guidelines; b) Management-Area Prescription Objectives, Desired Conditions and Standards & Guidelines; and c) Management-Area Prescription allocations and monitoring methods. (36 CFR 219.12 (k)).						
Comparative evaluations	B	Annually	M&E Report	Range Team	0.5 (A)	1,2,3,4,5
Objective: Monitor and evaluate the rangeland seral stage to ensure the Desired Conditions.						
Evaluate suitable acres for desired conditions per *R2 Rangeland Analysis & Management Training Guide* (RAMTAG).	A	Approximately 35,000 acres per year	M&E Report	Range Conservationist	16.0 (A)	1,2,4,5
Monitor Desired Condition transects for trend.	A	per R2 (RAMTAG)	M7E Report	Range Conservationist	12.0 (A)	1,2,4,5
Objective: Assess the suitability of rangelands.						
Evaluate suitability of Forest Plan Rangelands	A	Annually	M&E Report	Range Conservationist	0.2 (A)	3,4

Tool/ Method Class	Precision Method	Frequency Method	Report Person/Group	Responsible Annual Cost	Estimated Decisions are (A) $M	Which of 6 Addressed
Evaluate suitability of rangelands at AMP level	A	By AMP	M&E Report	Range Conservationist	0.4 (A)	3,4
Objective: Monitor utilization of rangelands.						
Monitor utilization of suitable acres per RAMTG	A	Annually	M&E Report	Range Conservationist	20.0 (A)	1,2,4
DESIRED CONDITIONS FOR NOXIOUS WEEDS						
Objective: Evaluate noxious weeds related to: a) Forestwide Goals, Objectives, and Standards & Guidelines; b) Management-Area Prescription Objectives, Desired Conditions, and Standards & Guidelines; and c) Management-Area Prescription allocations and monitoring methods. (36 CFR 219.12 (k)).						
Comparative Evaluations	B	Annually	M&E Report	Range Conservationist	0.5 (A)	1,2,3,4,5
Objective: Assess the extent of infestation and control methods of noxious weeds.						
Monitor noxious-weed infestations and control methods by using on-the-ground surveys.	B	Annually	M&E Report	Range Conservationist	5.0 (A)	1,2,4
DESIRED CONDITION FOR AQUATIC RESOURCES						
Objective: Monitor and evaluate disturbances watershed by watershed, to ensure watershed health is protected. (36 CFR 219.27)						
Total & connected disturbance, past, present, & foreseeable future actions, watershed by water-shed, compared to concern levels Level I assessment.	B	Each surface-disturbing project	EA and M&E Report	Hydrologist	10.0 (A)	1,2,4
Objective: Monitor and evaluate stream and riparian health and associated habitat by comparing impacts to reference areas (36 CFR 219.27a)						
Stream Health: Physical, chemical, and biological metrics compared to reference streams. Includes riparian/ floodplain function and condition. Level III assessment	A	1 stream for each EA	EA and M&E Report	Hydrologist/Fish Biologist	8.0 (A)	1.2.4

Tool/ Method Class	Precision Method	Frequency Method	Report Person/Group	Responsible Annual Cost	Estimated Decisions are (A) $M	Which of 6 Addressed
Long-term recovery of damaged streams (priority given to watersheds of concern). Metrics mentioned above used. Mostly Level III assessment.	A 2 Streams Rec 2 streams Tim	2 streams Rng every 3rd year	M&E Report	Hydrologist/Fish Biologist	3.5 (A)	1,2,4
Monitor streams within identified watersheds of concern to see if streams have been damaged. Level II assessments.	A/B	at least 2 per year	M&E Report	Hydrologist/Fish Biologist	1/1 (A)	1,2,4
Objective: Assess Aquatic Resources-related: a) Goals/Objectives/Desired Conditions, b) Forestwide Standards and Guidelines, c) Management-Area Prescription allocations and Standards and Guidelines, and d) monitoring approaches. (CFR 219.12)						
Comparative evaluations; implementation *Watershed Conservation Practices Handbook*	B	Annually	M&E Report	Hydrologist/Soil Scientist	6.5 (A)	1,2,3,4,5
DESIRED CONDITIONS FOR SOILS						
Objective: To assure that land productivity is maintained or improved, monitor and evaluate soil disturbances in activity areas. (36 CFR 219.12 (k) and .27 (A) (1)						
Monitor soil-quality standards using techniques such as Hazard/ Geist or other method.	A	One study every 3 years	M&E Report Tech. Report	Soil Scientist	4.0 (A)	1,2,3,4,5
Use state-of-art erosion model to predict erosion or to analyze projects after completion.	A	On projects where high Erosion Hazard exists or if soils are key issue.	Project file/ M&E Report	Soil Scientist	4.0 (A)	1,2,3,4,5
Ocular estimates, pace transects, on-site investigations, professional judgement Monitor fertility and organic-matter relationships	B	On Projects where high erosion hazard or mass-move-. ment potential exist or soils are key issue	Project files, M&E Report	Soil Scientist	10.0 (A)	1,2,3,4,5
Mass-movement evaluation. Monitor existing problem areas and also potential problem areas	B	On projects where mass-movement potential is moderate to high	Project file, M&E Report	Soil Scientist/ Geotechnical Engineer	1.5 (A)	1,2,5

Tool/ Method Class	Precision Method	Frequency Method	Report Person/Group	Responsible Annual Cost	Estimated Decisions are (A) $M	Which of 6 Addressed
Objective: Monitor and evaluate reclamation and revegetation efforts.						
On-site inspections and/or random transects, District project records. Also, erosion models.	B	At least 2 projects per year	M&E Report	Soil Scientist Hydrologist	2.0 (A)	1,2,5
Objective: Evaluate soil productivity related to: a) Forestwide Goals, Objectives, and Standards & Guidelines; b) Management-Area Prescription Objectives, Desired Conditions and Standards & Guidelines; and c) Management-Area allocations and monitoring methods. (36 CFR 219.12 (k))						
Based on project results, field reviews data analysis, and modeling results	B	On projects where soils issues were raised.	M&E Report	Soil Scientist	1.5 (A)	1,2,3,4,5
DESIRED CONDITIONS FOR MINERALS						
Objective: Monitor and evaluate oil and gas activities so that resource effects do not exceed those predicted in the RFD and EIS by more than 10 %.						
Compare annual and cumulative oil and gas activity to assure that oil and gas effects do not exceed those described in EIS by more than 10%	B	Annually	M&E Report	Minerals Specialist	0.5 (A)	1,2
Objective: Verify that specific areas proposed for lease are compatible with Forest Plan Stipulations and that environmental effects have been adequately described in the EIS. Assess whether occupancy could be allowed somewhere on the lease tract proposal. (36 CFR 228.1.2 (e) 1,2,3						
Use the verification form to assure that lease Stipulations are appropriately attached to leases.	B	Each Lease	Each Lease, M&E Report	Minerals Specialist and IDT	7.0 (A)	1,2,3
Objective: Evaluate minerals program related to: a) Forestwide Goals, Objectives, and Standards & Guidelines; b) Management-Area Prescription Objectives, Desired Conditions, and Standards & Guidelines; and c) Management-Area allocations and monitoring methods. (36 CFR 219.12 (k)						
On-site inspections of mineral activities, reports, field visits, Report Summary	B	By project	Project file & Communication M&E Report	Minerals Specialist and IDT	2.0 (A)	1,2,3,4,5,6

Tool/ Method	Class	Precision Method	Frequency Method	Report Person/Group	Responsible Annual Cost	Estimated Decisions are (A) $M	Which of 6 Addressed
DESIRED CONDITION FOR UNROADED AREAS							
Objective: To ensure the unroaded areas' natural characteristics and resource values are protected, monitor and evaluate resource activities within selected backcountry areas.							
Monitor resource-management activities within two representative backcountry areas.		B	Annually	M&E Report	Forest Recreation Staff, Specialist and Core team	8.0 (A)	1,2,4
Objective: Evaluate backcountry areas related to: a) Forestwide Goals, Objectives, and Standards & Guidelines; b) Management-Area Prescription Objectives, Desired Conditions, and Standards & Guidelines; and c) Management-Area Prescription allocations and monitoring methods. (36 CFR 219.12 (k))							
Comparative evaluations		B	Annually	M&E Report	Forest Recreation Specialist and Core Team	1.5 (A)	1,2,4,5
DESIRED CONDITIONS FOR WILD AND SCENIC RIVERS							
Objective; To protect the eligible Wild and Scenic River values, evaluate resource activities within a selected river corridor.							
Monitor resource-management activities within one river corridor		B	Every 3 years or when project is proposed	M&E Report	Forest Recreation Specialist and Core Team	6.0 per study or 2.0 (A)	1,2,4,6
Objective: Evaluate eligible Wild and Scenic River corridors related to: a) Forestwide Goals, Objectives and Standards & Guidelines; b) Management-Area Prescription Objectives, Desired Conditions, and Standards & Guidelines; and c) Management-Area Prescription allocations and monitoring methods. (36 CFR 219.12 (k))							
Comparative evaluations		B	Every 3 years	M&E Report	Forest Recreation Specialist and Core Team.	0.3 (A)	1,2,4,5
DESIRED CONDITIONS FOR WILDERNESS							
Objective: To preserve and protect values for which Wilderness was created, monitor and evaluate visitor-use levels and other Wilderness resources. (36 CFR 293.2)							
Coordinate and schedule for implementation those Priority 1 recreation items outlined in the WIS.		B	Annually	Wilderness Report	District Wilderness Coordinators & Rangers	9.0(A) /Wilderness	1,2,4

Tool/ Method	Class	Precision Method	Frequency Method	Report Person/Group	Responsible Annual Cost	Estimated Decisions are (A) $M	Which of 6 Addressed
Objective: Evaluate Wilderness related to: a) Forestwide Goals, Objectives, and Standards & Guidelines; b) Management-Area Prescription Objectives, Desired Conditions and Standards & Guidelines; and c) Management-Area Prescription allocations and monitoring methods. (36 CFR 219.12 (k))							
Comparative evaluations		B	Annually	M&E Report	District Wilderness Coordinators & Rangers	1.0 (A)	1,2,4,5
DESIRED CONDITIONS FOR SPECIAL INTEREST AREAS							
Objective: Protection measures and interpretive efforts will be assessed.							
Ocular surveys/ Plots/Transects		B	Once every 5 years on all SIA's	M&E Report	Ecologist/ Archeologist/ District	0.3 (A)	1,2,4,5
Objective: Evaluate special interest areas related to: a) Forestwide Goals, Objectives, and Standards & Guidelines; b) Management- Area Prescription Objectives, Desired Conditions and Standards & Guidelines; and c) Management-Area Prescription allocations and monitoring methods. (36 CFR 219.12 (k))							
Summarize reports or information from Districts		B	Once every 5 years	M&E Report	Forest Archeologist	0.3 (A)	1,2,3,5
DESIRED CONDITIONS FOR NATURAL AREAS							
Objectives: Evaluate RNAs related to: a) Forestwide Goals, Objectives, and Standards & Guidelines; b) Management-Area Prescription Objectives, Desired Conditions and Standards & Guidelines; and c) Management-Area Prescription allocations and monitoring methods. (36 CFR 219.12 (k))							
Ocular/Plots/ Transects/GIS		B	Once every 5 years on all RNAs	M&E Report	Ecologist	0.4 (A)	1,2,4,5
DESIRED CONDITIONS FOR HERITAGE RESOURCES							
Objective: Monitor and evaluate projects to assure heritage resources have been appropriately protected.							
On-site inspection of each National Register-eligible heritage resource identified for protection from project activities (as identified in the report to State Historic Preservation Officer)		B	By qualifying project	M&E Report	Archeologist or District	6.0 (A)	1,2,5

Tool/ Method Class	Precision Method	Frequency Method	Report Person/Group	Responsible Annual Cost	Estimated Decisions are (A) $M	Which of 6 Addressed
Objective: Monitor and evaluate consultations with American Indians concerning areas of cultural importance.						
Assess proposed management activities to determine if American Indian consultation was accomplished.	B	By project	Annual Report	Archeologist or District	1.0 (A)	1,2
Objective: Heritage Resources related to: a) Forestwide Goals, Objectives, and Standards & Guidelines; b) Management-Area Prescription Objectives, Desired Conditions and Standards & Guidelines; and c) Management-Area Prescription allocations and monitoring methods. (36 CFR 219.12 (k))						
Summarize Reports	B	Annually	M&E Report	Archeologist	0.5 (A)	1,2,5
DESIRED CONDITIONS FOR DEVELOPED RECREATION						
Objective: Assess developed sites for: a) visitor expectations, trends, and customer satisfaction; and b) quality and safe facilities.						
A. Developed sites conduct customer survey	B	Every 5 years	Customer Survey report	Forest & Ranger District personnel	15.0/survey or 1.5 (A)	1,2,4
Hazard inspections	B	Annually	Site Record M&E Report	I&D specialist District Recreation timber personnel	2.5 (A)	1,2,4
B. Ski Area Monitor ski area summer and winter activities	B	Annually	Compliance Report	District Winter Sports Personnel & Forest Specialist	10.0 (A)	1,2,4
C. Special-Use Permits. Monitor 30% of Special-Use Permits	B	Annually	Compliance Report	Forest & Ranger District Recreation personnel	10.0 (A)	1,2,4
Objective: Assess developed-site actual use compared with projected outputs in the Plan. (36 CFR 219.12 (k) (1)).						
Monitor developed-site rates and use.	B	Annually	MM Evaluation Report	Forest & Ranger District Recreation Personnel	1.5 (A)	1,2,4,5
Objective: Evaluate developed sites related to: a) Forestwide Goals, Objectives, and Standards & Guidelines; b) Management- Area Prescription Objectives, Desired Conditions and Standards & Guidelines; and c) Management-Area Prescription allocations and monitoring methods. (36 CFR 219.12 (k))						
Evaluate Meaningful Measure Recreation component Standards	B	Annually	MM Evaluation Report	Forest & Ranger District Recreation Personnel	1.0 (A)	1,2,4,5

Tool/ Method Class	Precision Method	Frequency Method	Report Person/Group	Responsible Annual Cost	Estimated Decisions are (A) $M	Which of 6 Addressed
Comparative Evaluation	B	Annually	M&E Report	Forest & Ranger District Recreation Personnel	1.0 (A)	1,2,4,5

DESIRED CONDITIONS FOR DISPERSED RECREATION

Objective: Evaluate the traditional and nontraditional recreational opportunities consistent with Needs Assessment and Management-Area Objectives.

A. Trails Schedule trail-log inventory on 10-15% of Forest trails using GPS.	A	Annually	Update GIS & trail inventory	Forest Trails Specialists & District Trail Coordinators	25.0 (A)	1,2,4
B. Capacity Allocation. Monitor 2-3 representative watersheds	B	Annually for 5-years then every 2 years	Capacity Study	Forest Recreation Specialist & Core Team	7.0 (A)	1,2,4

Objective: Monitor effects of off-road-vehicle use off forest roads and trails. (36 CFR 295.5)

Monitor selected ATV game-retrieval and snowmobile areas	B	Annually	M&E Report	Forest Recreation Specialist & Core Team	8.0 (A)	1,2,4

Objective: Evaluate dispersed recreation areas related to: **a) Forestwide Goals, Objectives, and Standards & Guidelines; b) Management- Area Prescription Objectives, Desired Conditions and Standards & Guidelines; and c) Management-Area Prescription allocations and monitoring methods. (36 CFR 219.12 (k))**

Comparative evaluation	B	Annually	M&E Report	Forest Recreation Specialist	1.5 (A)	1,2,4,5

DESIRED CONDITION FOR SCENIC RESOURCES

Objective: To determine if Scenic Integrity Objectives have been met during project implementation: Assess changes in Scenic Integrity with respect to ROS classes.

On-site scenic inspections and/ or photo-point monitoring	B	2nd year after timber harvesting, and/or by project	As needed	Landscape Architect	17.0 (A)	1,2,4

Objective: To determine if Scenic Integrity Objectives have been met based on visitors'/users' desires and expectations: Assess Constituent Survey information.

Constituent surveys, visitor observations, Constituent interviews, & public participation	B	Annually	Constituent Survey Report Summary	Landscape Architect	13.0 (A)	1,2,4

Tool/ Method	Class	Precision Method	Frequency Method	Report Person/Group	Responsible Annual Cost	Estimated Decisions are (A) $M	Which of 6 Addressed
Objective: Evaluate scenic resources related to: a) Forestwide Goals, Objectives, and Standards & Guidelines; b) Management- Area Prescription Objectives, Desired Conditions and Standards & Guidelines; and c) Management-Area Prescription allocations and monitoring methods. (36 CFR 219.12 (k))							
Summarize Report		B	Annually	M& E Report	Landscape Architect	0.5 (A)	1,2,3,5

DESIRED CONDITIONS FOR INFRASTRUCTURE

Objective: Assess dams, bridges, facilities, drinking water, roads, travel management, and planned road closures for compliance with state and federal laws and requirements and Forest Plan and Forest Service Manual/Handbook direction. (Safe Drinking Water Act, Highway Transportation Safety Act.)

Dams - State Engineer and Forest Engineer inspect for safety and maintenance.	A	High-hazard annually. Medium-hazard every 3 years. Low-hazard every 5 years.	Inspection Reports M&E Report	Engineering	2.0 (A)	1,2
Facilities - Forest Facilities Engineers safety and maintenance inspections	A	Annually	Inspection Reports M&E Reports	Engineering	6.0 (A)	1,2
Drinking Water Test IAW Safe Drinking Water Act (SDWA) Inspect for health and safety	A	Varies-as required by SDWA.	Test Reports Pos Results handled per SDWA M&E Report	Engineering	3.0 (A)	1,2,5
Road Bridges- Inspect for safety and maintenance as required by Federal Highway Administration (FHWA)	A	50% of all road bridges Annually	Inspection Engineering Reports M&E Report	8.0 (A)	1,2	
Trail Bridges - Inspect for safety and maintenance	A	25% per Year	Inspection Reports M&E Report	Engineering	1.0 (A)	1,2
Forest Development Roads - inspect for safety and maintenance. IAW FSM/FSH direction.	A/B	Per FSM and FSH.	Engineering Study Reports. Road Management Objective Worksheets. M&E Report	Engineering	8.0 (A)	1,2

Tool/ Method Class	Precision Method	Frequency Method	Report Person/Group	Responsible Annual Cost	Estimated Decisions are (A) $M	Which of 6 Addressed
Travel Management - Monitor compliance with travel management plan. User surveys and on-the-ground inspections.	B	Annually	Summarized in in annual M&E Report	Recreation/ Engineering	5.0 (A)	1,2,4
Road Closures - Assess planned road closures through on-site inspections.	B	Annually/at close of projects	M&E Report	Sale Administration Engineering	1.0 (A)	1,2,4
Objective: Evaluate Infrastructure related to: a) Forestwide Goals, Objectives, and Standards & Guidelines; b) Management- Area Prescription Objectives, Desired Conditions and Standards & Guidelines; and c) Management-Area Prescription allocations and monitoring methods. (36 CFR 219.12 (k))						
Summarize inspection	B	Annually	M&E Report	Engineering	0.5 (A)	1,2,4,5
DESIRED CONDITIONS FOR HEALTH AND SAFETY						
Objective: Monitor and evaluate Forest activities with respect to National Health and Safety Codes and Occupational Safety and Health Administration guidelines.						
Review and monitor guidelines on public safety and health	B	Annually	Annual Report	Forest Planning Team Leader and Rangers	1.0 (A)	1,2
DESIRED CONDITIONS FOR RESEARCH AND INFORMATION NEEDS ASSESSMENTS						
Objective: Determine progress on various items identified in that section of the Plan.						
Evaluate and assess progress	B	Annually	M&E Report	Forest Planning Team Leader	0.5 (A)	1,5