

This section of the DLMP provides programmatic direction for monitoring and evaluating DLMP implementation. Monitoring is the process of taking periodic observations in order to detect changes and/or trends in resources and environment. Evaluation is defined as interpreting or judging information collected from monitoring.

The purpose of this section is to provide direction in order to facilitate successful monitoring and evaluation. In brief, the steps to monitoring are:

- **Establish Monitoring Priorities:** As part of the annual program budgeting process, priorities are established in order to conduct monitoring. This is due to the fact that it is not possible to address all of the questions related to management issues or programs. The Monitoring Strategy described at the end of this section describes priorities related to collecting, managing, and evaluating data (and forms the plan of what data is to be collected). Criteria from the LMP are used to establish annual priorities for monitoring.
- **Identify Responsible Parties, and Potential Cooperators:** Resource program managers accept responsibility for ensuring that monitoring is completed, and identify ways to gather and evaluate data in conjunction with other agencies or with other interested parties.
- **Evaluate the Data:** Resource managers will evaluate the data collected, with the goal of answering the monitoring questions, and determine if changes are needed in plan direction or outputs.
- **Publish and Distribute the Annual Monitoring Report:** Resource managers will write, acquire approval by the SJPLC Supervisor, and distribute the annual monitoring report. This report will summarize the information collected and the relevant evaluations.

MONITORING PURPOSE

Effective land use plan monitoring and evaluation improve both management and planning decisions. Monitoring and evaluation are components of adaptive management. As resource conditions change, on-going monitoring and evaluation help identify the need to adjust desired conditions, goals, objectives, standards, and guidelines. This process would help the SJPLC, and the public, determine how the LMP is being implemented, whether or not plan implementation is achieving desired outcomes, and whether or not assumptions made in the planning process are valid. Monitoring and evaluation allows the SJPLC to incorporate new understanding and technology; changes in law, policy, and resource conditions; and growing concerns, trends, and changing social values into land management planning.

Under the direction of the LMP, monitoring and evaluation are separate, sequential activities designed to determine how well objectives are being met, as well as how closely management standards and guidelines have been applied. Monitoring necessarily includes the collection of data and information, either by observation or by measurement. Evaluation entails the analysis of the data and information collected during monitoring. The evaluation results are used in order to:

- answer the monitoring questions;
- determine whether or not a LMP revision or amendment was warranted; and
- ascertain whether or not LMP implementation should be modified.

Evaluation results form a basis for adaptively managing the public lands within the planning area. Monitoring and evaluation keep the LMP up-to-date and responsive to changing issues. This process accomplishes these goals by verifying the effectiveness of the standards and guidelines and other LMP direction by anticipating program and project impacts on resources, and by providing information for LMP amendments. Three types of monitoring are discussed in this section:

- **Effectiveness Monitoring:** This determines whether or not LMP strategies and objectives are being met.
- **Implementation Monitoring:** This determines whether or not projects are implemented according to LMP direction (standards and guidelines).
- **Validation Monitoring:** This verifies whether or not assumptions and models used in LMP implementation are appropriate, and determines whether or not implementing the direction and desired conditions in the LMP is effective at achieving the goals and objectives.

As the SJPLC plans and implements its monitoring and evaluation program, there are several important guidelines to consider. Under the direction of the LMP, monitoring should:

- be purposeful and conducted in order to answer specific questions;
- be done at the appropriate spatial and temporal scale (typically not at the project scale) in order to answer the questions;
- be done in collaboration with others (including local, State, Native American tribal, and other Federal agencies; the interested public; researchers; and non-profit organizations) in order to share the workload (including obtaining data from other sources), gain expertise, and build credibility and trust;
- use the best available science and established protocols in order to collect and evaluate the data;
- use modern information management techniques and tools;
- apply stringent selection criteria so that a monitoring activity is only conducted if it is feasible, realistic, and affordable; and
- emphasize evaluation as much as the collection of the data.

The National Forest Management Act (NFMA) requires the USFS to do specific monitoring tasks (36 CFR 219). The Federal Land Policy and Management Act (FLPMA), as codified in BLM planning regulations (43 CFR 1601.0-5(k)(8) and 43 CFR 1610.4-9) require that BLM land use plans establish intervals and standards for monitoring and evaluations (based on the sensitivity of the resource decisions involved). The level and intensity of any additional monitoring is dependent on available staffing, funding, and agency priorities. (See Appendix Z for a listing of high and very high priority monitoring strategies for biodiversity conservation developed in conjunction with The Nature Conservancy for BLM lands at lower elevations. This level of monitoring goes beyond the needs of plan-level monitoring and is useful for monitoring biodiversity over a broader mix of ownerships.)

INFORMATION MANAGEMENT

Under the direction of the LMP, monitoring and evaluation involve more than just collecting data. These processes encompass the full range of information management steps, and include the appropriate recording in corporate information systems.

Once the purpose, or reasoning, for monitoring has been determined (including seeking answers to a particular monitoring question), careful consideration goes into identifying what feature or variable needs to be measured, as well as how it will be measured (protocol). If no protocols exist to acquire the needed information, research staff will be consulted in order to assist in developing the necessary protocols.

After the SJPLC determines how information will be gathered, data collection begins. Using data from other sources saves the SJPLC the cost of collecting the information. Once data are obtained and have been edited to established quality standards, the data is stored in a corporate electronic database with a spatial context. The data is then analyzed and interpreted.

The interpreted information is evaluated by the Interdisciplinary (ID) Team in order to answer the monitoring question, and to give it meaning within the context of the LMP. A variety of analytical tools and evaluation procedures are available in order to effectively interpret the data. The results are reported to the SJPLC Leadership Team (for them to consider and to take appropriate action based upon). The results are also documented in the annual monitoring and evaluation report. Monitoring data, evaluation results, and the annual report should be electronically accessible to the public.

USFS MANAGEMENT INDICATOR SPECIES (MIS) MONITORING

Management Indicator Species (MIS) are species which are monitored in order to assess the effects of management activities on their populations and on the habitats with which they are associated. Changes in MIS populations or their habitats could indicate that current management is adversely affecting the composition structure, or function of those habitats, resulting in Plan direction and desired conditions not being met and the need for adaptive management. MIS motivate development of plan objectives, analysis of plan direction, and monitoring of plan implementation. The five species selection categories are described under the Species section of this Plan. No MIS were selected for species viability issues. Species with viability concern are identified as Threatened, Endangered, or Sensitive (TES) and managed through the TES programs within the context of this Plan. MIS is not part of the BLM directives system and not implemented on BLM lands.

Forest Service regulations and policies establish the need to evaluate MIS population trends at the forest scale and to relate those trends to changes in habitats resulting from land management across the Forest (36 CFR 219.19 (a) (6)). To conform with the requirements and intent of these regulations, the San Juan National Forest will monitor the status and trend of MIS populations and the condition and trend of their habitats across the Forest at spatial and temporal scales' generally at the Forest plan scale or larger. Monitoring will occur within the context of Forest Plan direction and according to monitoring approaches described in the monitoring section of the Forest Plan.

When forest-level monitoring indicates identified levels of change, follow-up analysis is initiated to investigate the root cause of the change. If cause/effect determinations are related to identified management issues and actions, then adaptive management strategies will be implemented to correct deficiencies.

At the more site-specific project scale, analysis will relate changes expected from proposed project activities to forest-wide trends in MIS habitat status and condition, and relate how those changes would contribute to forest-wide population trends and Forest Plan direction. Where it will aid analysis and project planning, localized data may be collected but is not necessary to meet forest monitoring objectives. Population and habitat trend monitoring are inappropriate at the project level due to the dynamics of scale relating to populations and supporting habitat.

Trout are identified as a MIS to plan and monitor management activities that could adversely affect aquatic habitats. Management activities that could adversely affect aquatic ecosystems include hard-rock mining, livestock grazing, timber harvesting, road construction, water-development projects, and the introduction of non-native fish species. Trout are also identified as MIS in order to address water quantity issues associated with water depletions due to reservoirs, diversions, and oil and gas development and to address water quality issues associated with soil erosion and sedimentation due to ground-disturbing activities. Specific habitat features to be monitored include water quantity and quality, and key habitat components for fisheries including bank stability, width-to-depth ratio, pool/riffle ratio, pool depth, and substrate. Trout population trends will be monitored periodically and summarized on a five-year basis. Monitoring will occur cooperatively with CDOW based on an established protocol.

Abert's squirrel is identified as a MIS to plan and monitor management activities that could affect the structure and function of ponderosa pine forest habitats, not because of specific concerns for the viability of this species. Management activities that could affect ponderosa pine habitats include timber harvesting, oil and gas development, fuels reduction projects, livestock grazing, and road construction. Specific habitat features to be monitored include the size, density, and connectivity of ponderosa pine trees. Abert squirrel populations will be monitored periodically and summarized on a five-year basis by sampling within suitable habitat using established methods. Initially monitoring will employ an established, tested protocol employing a feeding sign index (Dodd, N. L., S. S. Rosenstock, C. R. Miller, and R. E. Schweinsburg. 1998. Tassel-eared squirrel population dynamics in Arizona: index techniques and relationships to habitat conditions. Arizona Game and Fish Department, Research Branch, Technical Report 27. Phoenix, AZ.).

American marten is identified as a MIS to plan and monitor management activities that could affect the structure and function of spruce-fir and cool-moist mixed conifer forest habitats, not because of specific concerns for the viability of this species. Management activities that could affect these habitats include timber harvesting, recreation, fuel reduction projects, and road construction. Specific habitat features to be monitored include the density and connectivity of conifer trees, the amount and distribution of large wood on the forest floor, and the degree of fragmentation due to roads and trails. Marten populations will be monitored periodically and summarized on a five-year basis by sampling within suitable habitat. Initially, winter track surveys will be used to build on the foundation of monitoring data gathered in the past through cooperation with other agencies.

Mountain bluebird is identified as a MIS to plan and monitor management activities that could affect the structure and function of aspen forest habitats, not because of specific concerns for the viability of this species. Management activities that could affect aspen habitats include clearcut timber harvests. Specific habitat features to be monitored include the size and density of aspen trees, and the size of aspen clearcuts. Mountain bluebird population trends will be sampled periodically and summarized on a five-year basis. Initial monitoring will continue to build on the well established Monitoring Colorado Birds cooperative program.

Elk is identified as a MIS to plan and monitor management activities that occur in winter range habitats (pinyon-juniper woodlands, sagebrush shrublands, mountain shrublands, and ponderosa pine forests), and to contribute to the Forest Service meeting state objectives for these species. Management activities that occur in winter range habitats include timber harvesting, oil and gas development, fuels reduction projects, and recreation activities. Over the planning period of 1983 to 2003, elk population trends did not correlate with elk habitat trends and changes in elk habitat on the Forest do not appear to affect elk numbers (SJNF MIS Species Assessment). However, elk are behaviorally and physiologically affected by many management activities which will be the focus of monitoring. Specific features to be monitored are human activities that affect habitat quality, effectiveness, and fragmentation from roads and trails. Elk population trends will be monitored annually using data collected by the CDOW.

General Guidance for MIS monitoring include (see also Appendix N):

- **Wildlife, Fish, and Plant Species and Habitat Trends:** MIS population and habitat trends are intended to determine habitat capability trends and the relationship to habitat change. These would be summarized on a 5- to 10-year basis. Precision of data would vary, based on the data sources (including, but not limited to, population estimates by State wildlife agencies, USFS and BLM monitoring, informed judgment of USFS and BLM Ecologists and Wildlife/Fisheries Biologists, habitat inventory assessments, resource information system databases, program reviews, activity reviews, annual program reporting, and species and habitat assessments).
- Variability that may initiate evaluation include, but are not limited to, species viability being jeopardized, a 20% change in species habitat distribution, and changes in species emphasis by State wildlife agencies.

Additional Referenced Guidance

Hayward et al. 2004); 36 CFR 219.19; USFS Manual FSM 2600.

Evaluation Process

Under the direction of the LMP, the SJPLC evaluates data and information collected through monitoring. The objective or “desired condition” that prompted the development of the monitoring question is typically associated with one or more monitoring items. Where the desired condition may be conceptual or visionary in nature, the monitoring items are a measurable aspect of the desired condition.

Evaluation involves the process of transforming the collected data into information that is useful for future management decisions. It synthesizes values, judgments, and reasoning with monitoring information in order to answer questions about the effects (impacts) of management actions.

There are four components that would contribute to effective evaluation:

- **Evaluation Context:** A sense of the history of the place or the circumstances (temporal and special context) is important to the evaluation of management activities.
- **Evaluation Baseline and/or Reference Information:** This describes the change from a baseline or reference condition, either toward or away from a desired condition. The desired condition may, or may not, ever be fully achieved; however, it is important to know if management activities are proceeding in the desired direction.
- **Evaluation Information Used to Infer Outcomes and Trends:** Conclusions will be drawn from an interpretation of monitoring information.
- **Evaluation Results Documented in an Annual Monitoring and Evaluation Report:** The SJPLC will use the Annual SJPLC Monitoring Report as a tool in order to initiate changes in management activities.

ANNUAL MONITORING AND EVALUATION REPORT

Under the direction of the LMP, the SJPLC will document its monitoring and evaluation process in an Annual Monitoring and Evaluation Report that allows for output target reporting. In addition to target reporting, the report serves several additional purposes, including:

- documenting monitoring and evaluation accomplishments;
- providing an assessment of the current state of ecological conditions on the public lands within the planning area;
- providing adaptive management feedback to responsible officials of any needed changes to the LMP, or of any needed adjustments to management actions; and
- providing the public with relevant information about the management of the public lands within the planning area.

The Annual Monitoring and Evaluation Report is based on data and information gathered the previous fiscal year (from October 1 through September 30). It evaluates implementation of the LMP and provides an overview of resource conditions and trends as they relate to indicators and criteria for sustainability (with specific attention on the impacts of management actions on ecological system structure and function). The Monitoring and Evaluation Report is organized into the following sections:

- **The Introduction:** This section contains a description of the types of monitoring and evaluation occurring on the public lands, a brief discussion of LMP revision and amendments, a comparison of projected and actual outputs, and a section describing the impact of budget on achieving LMP objectives.
- **The Monitoring Results:** This section describes the results of monitoring efforts for the following resource disciplines: water, air quality, minerals, soils, fish and riparian areas, fire, insects and disease, forested vegetation and timber, range, rare plants, wildlife, heritage, lands and special uses, recreation, facilities, and wilderness.
- **Recommendations:** This section includes a list of actions proposed by SJPLC specialists for their individual resources. The list includes a disposition component for each recommendation.

Monitoring Meetings

Under the direction of the LMP, bi-annual monitoring and evaluation meetings with cooperating agencies (including the State of Colorado, County Commissioners, and non-government cooperators) will be offered. The meetings would be open to the public, with ground rules similar to those used in LMP revision working group meetings.

Community members will be encouraged to help SJPLC personnel in monitoring LMP implementation; evaluating biological, social, and economic impacts; and identifying amendment needs and proposed solutions. Maintaining the knowledge base and relationship with State agencies and local elected officials will provide continuity in the adaptive management cycle (from the development of the LMP; to the implementation, monitoring, evaluation, and amendment process, through to the next LMP revision).

Monitoring Strategy

Under the direction of the LMP, the monitoring strategy (see Table 40) would outline the elements where monitoring would be used in order to evaluate plan components. Monitoring elements are organized into 3 categories: 1) effectiveness, 2) validation, and 3) implementation (as previously described). The list of elements was developed in order to provide guidance in determining annual monitoring requirements and accomplishments. Land managers may need to prioritize what would be monitored in any given year. This would be based on monitoring drivers, monitoring priorities, the previous year's accomplishments, and/or the urgency of a monitoring question, as described below.

Monitoring Driver

The monitoring driver relates monitoring questions back to specific items found in the revised LMP.

Monitoring Questions

Specific monitoring questions will be developed in order to ensure that monitoring and evaluation addressed the information essential to measuring the accomplishments and effectiveness of land management activities. These questions help identify issues of concern and determine whether or not observed changes were consistent with LMP desired conditions, goals, and objectives.

Monitoring Priorities

The priority of a monitoring item or issue, may affect the intensity and/or extent of associated monitoring activities. The monitoring strategy includes three classifications (designed to indicate priority):

- **High Priority:** This indicates that the monitoring element is required by law and/or by regulation.
- **Medium Priority:** This indicates that the monitoring element is directed by the LMP, as developed in the objectives and strategies section (which may or may not be directly associated with required laws or regulations).
- **Low Priority:** This indicates that the monitoring element involves questions of a more indirect nature, or that it does not fall under one of the above classifications.

Potential Monitoring Items

A monitoring item may be a quantitative or qualitative parameter that is measured or estimated. One or more monitoring items are selected in order to answer a monitoring question. Each monitoring item has an associated quantitative unit of measurement, or, in some cases, a narrative is specified. Any change to the list of potential monitoring items will be reflected in the annual monitoring report.

Monitoring Precision/Reliability

The precision and reliability with which a monitoring item is collected is dependent upon the activity and associated issue(s). There are two classes of precision and reliability considered in the monitoring guide:

- **Class A:** In this case, the methods are generally well accepted for modeling or measuring the resource or condition. They produce repeatable results and are often statistically valid. Reliability, precision, and accuracy are very good. The cost of conducting these measurements is higher than other methods. These methods are often quantitative.
- **Class B:** In this case, the methods are based on project records, communication, on-site ocular (visual) estimates, and/or less formal measurements (including paced transects, informal visitor surveys, air photo interpretation, or other similar types of assessments). Reliability, accuracy, and precision are good; however, they are less than those for Class A methods. Class B methods are often qualitative; however, they still provide valuable information on the status of the resource.

Scale

Scale describes the level of analysis with respect to land size. This measure is important in describing impacts dealing with habitat heterogeneity and viability issues, as well as describing cumulative impacts related to, or resulting from, management actions (examples include 6th-level watersheds or geographic areas).

Frequency of Reporting

Frequency of reporting describes the timing of monitoring and evaluation efforts. Most data is collected annually, with reporting or evaluation of the data conducted at specific times (such as annually or every 5 years).

Table 40 - Monitoring Strategy

Monitoring Driver	Monitoring Question	Monitoring Priority	Potential Monitoring Items	Precision and Reliability	Scale	Frequency of Reporting
Effectiveness Monitoring – Are plan objectives and desired conditions being achieved?						
A. AIR RESOURCES OBJECTIVES						
A 1. By the next planning period, improve three flora and fauna air-quality-related values that are at risk (including lichens, amphibians, aquatic organisms, etc.) to a level that is within the limits of acceptable change (compared to natural conditions).	Are Class I Areas being managed in order to protect AQRVs within the limits of acceptable change?	High	The changes, as monitored by sensitive receptors – lichen, diatoms, plankton, amphibians, subalpine fir, and mosses.	A	Regional and SJPL-wide	Annually
A 2. Over the implementation-life of the LMP, prevent or reduce visibility impairment and allow no more than a 5% change in contrast, a 5% change in extinction and visual range, or a change in color difference index ≥ 2 compared to natural conditions for the Weminuche Wilderness Class 1 Area.	Are Class I Areas being managed in order to protect AQRVs within the limits of acceptable change?	High	The Engineer and Shamrock AQ monitoring stations, IMPROVE aerosol sampling, and digital photography.	A	Regional and SJPL-wide	Annually
A 3. Over the implementation-life of the LMP, prevent or reduce acidic deposition and allow no more than a 10% change from established baseline for lakes with an acid neutralizing capacity (ANC) ≥ 25 $\mu\text{eq/L}$, and no change for lakes with an ANC < 25 $\mu\text{eq/L}$.	Are Class I Areas being managed in order to protect AQRVs within the limits of acceptable change?	High	High lakes water quality sampling, NADP sampling at Molas Pass and Wolf Creek Pass	A	SJPL-wide	Annually (sampling weekly)
A 4. Over the implementation-life of the LMP, prevent or reduce airborne nutrient and mercury deposition impairment of sensitive high-elevation lakes in the Weminuche Wilderness Class I Area, and allow no mercury concentrations, no more than 2 $\mu\text{eq/L}$ of ammonium, and no late summer nitrate.	Are Class I Areas being managed in order to protect AQRVs within the limits of acceptable change?	Medium	High lakes long-term sampling, NADP Mercury Deposition Network at Molas Pass	A	Regional and SJPL-wide	Annually

Monitoring Driver	Monitoring Question	Monitoring Priority	Potential Monitoring Items	Precision and Reliability	Scale	Frequency of Reporting
Effectiveness Monitoring – Are plan objectives and desired conditions being achieved?						
B. SOILS OBJECTIVES						
B 1. Within 10 years, restore or improve soil productivity on 20 miles of road that will be closed or decommissioned.	Has soil productivity been improved on closed or decommissioned roads?	Medium	The miles of closed or decommissioned roads.	B	SJPL-wide	Annually

Table 40 - Monitoring Strategy, continued

Monitoring Driver	Monitoring Question	Monitoring Priority	Potential Monitoring Items	Precision and Reliability	Scale	Frequency of Reporting
Effectiveness Monitoring – Are plan objectives and desired conditions being achieved?						
C. WATER RESOURCE PROGRAM OBJECTIVES						
C 1. Water Quality Protection						
C.1.1 Annually, rehabilitate or restore 20 or more acres of disturbed land on saline soils in order to reduce salt delivery to the upper Colorado River Basin.	Are rehabilitation measures effective, and is salinity actually being reduced to the upper Colorado River?	Medium	Water quality sampling, long-term trend photography, BMP implementation and effectiveness monitoring, and project effectiveness monitoring.	B	Project level and sub-watershed level	Every 5 years
C.1.2 Annually, rehabilitate or restore 10 or more acres in State 303(d) listed water body watersheds or watersheds with Total Maximum Daily Load plans in order to reduce pollutant delivery if the pollution is related to non-point source activities.	Are rehabilitation measures effective, and is water quality actually being improved in State 303(d) watersheds?	Medium	Water quality sampling, long-term trend photography, BMP implementation and effectiveness monitoring, project effectiveness monitoring, macroinvertebrate sampling, and channel substrate sampling.	B	Project level and sub-watershed level	Every 5 years
C 2. Maintain or Improve Watershed Condition and Stream/Floodplain Function						
C.2.1 Annually, treat approximately 20 acres of priority restoration watersheds, improving watershed conditions so that they move from the category of most highly impacted watersheds (80th percentile most impacted) to a lower category, as determined by the San Juan Aquatic Assessment (USFS 2006) or other priority watershed ranking methodology.	Are rehabilitation measures effective, and is water quality and aquatic/channel conditions actually being improved?	Medium	PFC monitoring, stream surveys, channel substrate surveys, road decommissioning and BMP effectiveness and implementation monitoring, and comparisons to reference condition analysis.	B	Project and sub-basin scale	Every 5 Years
C 3. Manage Water Uses						
C.3.1 Over the implementation-life of the LMP, all SJPLC-administered water rights are put to beneficial use, and that use can be documented. Performance Measure: Record and document water use for the San Juan Public Lands water rights and file required documentation with the State Engineer’s Office.	Are water rights being beneficially used as required by associated water court decrees?	Medium	Livestock use reports, range administration documents, facilities use reports, and field inventories.	A	SJPL-wide	Annually

Table 40 - Monitoring Strategy, continued

Monitoring Driver	Monitoring Question	Monitoring Priority	Potential Monitoring Items	Precision and Reliability	Scale	Frequency of Reporting
<i>Effectiveness Monitoring – Are plan objectives and desired conditions being achieved?</i>						
D. AQUATIC ECOSYSTEMS AND AQUATIC SPECIES OBJECTIVES						
D 1. Annually, enhance or restore 5 to 15 miles of stream habitat in order to maintain or restore structure, composition, and function of physical habitat for fisheries.	Is the structure, composition and function of physical habitat for fisheries being enhanced by management actions?	Medium	The miles of stream habitat treated.	A	SJPL-wide	Every 5 years
D 2. Over the implementation-life of the LMPn, connect 10 to 15 miles of fragmented stream habitat in order to provide for aquatic species migration and the establishment of aquatic meta-populations.	Are streams providing for aquatic species migration and establishment of aquatic meta-populations?	Medium	The miles of streams connected.	A	SJPL-wide	Every 5 years
D 3. Over the implementation-life of the LMP, establish 5 new additional populations of Colorado River cutthroat trout, in cooperation with CDOW.	Have new populations of Colorado River Cutthroat trout been established by the CDOW on potential streams?	Medium	The populations of Colorado River cutthroat trout established by CDOW.	A	Streams identified by CDOW	Every 5 years

Monitoring Driver	Monitoring Question	Monitoring Priority	Potential Monitoring Items	Precision and Reliability	Scale	Frequency of Reporting
<i>Effectiveness Monitoring – Are plan objectives and desired conditions being achieved?</i>						
E. RIPARIAN AND WETLANDS ECOSYSTEMS OBJECTIVES						
E 1. Within 10 years, determine the functional condition of 50 to 100 miles of riparian areas.	Has the functional condition been determined on any San Juan Public Lands riparian areas?	Medium	The miles of riparian areas with a functional condition rating.	B	SJPL-wide	Bi-annually

Monitoring Driver	Monitoring Question	Monitoring Priority	Potential Monitoring Items	Precision and Reliability	Scale	Frequency of Reporting
<i>Effectiveness Monitoring – Are plan objectives and desired conditions being achieved?</i>						
F. TERRESTRIAL ECOSYSTEMS DESIRED CONDITIONS						
F 1. All rangelands display satisfactory rangeland conditions.	Are rangelands showing characteristics of satisfactory rangeland conditions?	Medium	The abundance and distribution of perennial native bunchgrasses and native hydrophytic species, the amount of bare soil and soil compaction, and the amount of invasive plant species.	B	SJPL-wide	Annually

Table 40 - Monitoring Strategy, continued

Monitoring Driver	Monitoring Question	Monitoring Priority	Potential Monitoring Items	Precision and Reliability	Scale	Frequency of Reporting
Effectiveness Monitoring – Are plan objectives and desired conditions being achieved?						
G. PLANT SPECIES DESIRED CONDITIONS						
<p>G 1. R2 Regional Forester’s Sensitive Plant Species and those BLM Special Status Plant Species not currently listed as endangered or threatened are not trending toward Federal listing under the Endangered Species Act; and the abundance, distribution, and habitat of these plant species across San Juan Public Lands improves to a point where their recognition as R2 Regional Forester’s Sensitive Species, BLM Special Status Species, and San Juan Public Lands highlight species is no longer warranted.</p>	<p>Are R2 Regional Forester’s Sensitive Plant Species and those BLM Special-Status Plant Species not currently listed as endangered or threatened trending toward Federal listing under the Endangered Species Act?</p>	<p>High</p>	<p>The abundance and distribution of 10 to 20% of R2 Regional Forester’s Sensitive Plant Species and those BLM Special-Status Plant Species not currently listed as endangered or threatened and their habitat.</p>	<p>A</p>	<p>SJPL-wide</p>	<p>Bi-annually</p>
<p>G 2. <i>Festuca arizonica</i> is abundant and well-distributed in the mid-elevation mountain grassland and ponderosa pine forest types, and it’s photosynthetic and reproductive abilities are intact throughout the growing season.</p>	<p>Is <i>Festuca arizonica</i> abundant and well-distributed in the mid-elevation mountain grassland and ponderosa pine forest types, and is its photosynthetic and reproductive abilities intact throughout the growing season?</p>	<p>Medium</p>	<p>The abundance and distribution of <i>Festuca arizonica</i>.</p>	<p>B</p>	<p>SJPL-wide</p>	<p>Annually</p>
<p>G 3. All rangelands display satisfactory rangeland conditions (see Monitoring Drivers for Livestock Grazing).</p> <p>Rangeland bunchgrasses are abundant and well-distributed throughout the planning area, and their photosynthetic and reproductive abilities are intact throughout the growing season.</p> <p>Conduct annual prescribed monitoring activities on at least 10% of active allotments, and use the information to make adaptive changes to management.</p>	<p>Are <i>Festuca arizonica</i> and <i>Festuca thurberi</i> increasing or decreasing in abundance or remaining stable in the mountain grasslands that they occur in?</p>	<p>Medium</p>	<p>The abundance of <i>Festuca arizonica</i> and <i>Festuca thurberi</i>; the amount of utilization by cattle of <i>Festuca arizonica</i> and <i>Festuca thurberi</i>.</p>	<p>B</p>	<p>SJPL-wide</p>	<p>Annually</p>
<p>G 4. All rangelands display satisfactory rangeland conditions (See Monitoring Drivers for Livestock Grazing).</p> <p>Riparian areas have vegetation that is vigorous and self-perpetuating with a diverse composition of desirable native plant species that display multiple-age classes.</p> <p>Forest and shrubland riparian areas types display native hydrophytic trees and shrubs in a variety of size classes.</p> <p>Conduct annual prescribed monitoring activities on at least 10% of active allotments, and use the information to make adaptive changes to management.</p>	<p>Are native willow species increasing or decreasing in abundance or remaining stable in the riparian areas and wetland ecosystems that they occur in?</p>	<p>Medium</p>	<p>The abundance of native willows; the amount of utilization by cattle of native willows.</p>	<p>A</p>	<p>SJPL-wide</p>	<p>Annually</p>

Table 40 - Monitoring Strategy, continued

Monitoring Driver	Monitoring Question	Monitoring Priority	Potential Monitoring Items	Precision and Reliability	Scale	Frequency of Reporting
Effectiveness Monitoring – Are plan objectives and desired conditions being achieved?						
H. TERRESTRIAL ECOSYSTEMS AND PLANT SPECIES OBJECTIVES						
H 1. Within the next 20 years, increase the amount of young spruce-fir forests and young cool-moist mixed-conifer forests throughout the planning area from their current status of 1.5% and 0.5%, respectively, to 15% primarily by allowing wildland fire use (and, to a much lesser extent, timber harvest) to occur in the mature development stage of spruce-fir and mature cool-moist mixed-conifer forests.	Has there been an increase in the amount of young spruce-fir and young cool-moist mixed-conifer forests?	Medium	The acres of young spruce-fir and young cool-moist mixed-conifer forests.	A	SJPL-wide	Every 5 years
H 2. Within the next 20 years, increase the amount of young aspen forests throughout the planning area from their current status of 1% to 25% by clear-cutting mature aspen forests, and by allowing wildland fire use to occur in the mature development stage of aspen, spruce-fir, and cool-moist mixed-conifer forests. Timber harvest will primarily occur adjacent to aspen clear-cuts that were cut within the last 15 years, in order to increase the patch size of young aspen forests and better mimic the large aspen patches that were common during the reference period (HRV conditions).	Has there been an increase in the amount of young aspen forests?	Medium	The acres of young aspen forests.	A	SJPL-wide	Every 5 years
H 3. Within the next 20 years, increase the amount of ponderosa pine forests that have open canopies by changing 20,000 to 40,000 acres of ponderosa pine forests (excluding old-growth forests) from development stage mature-closed to development stage mature-open using timber harvest treatments (including thinning and allowing wildland fire).	Has there been an increase in the amount of ponderosa pine forests that have open canopies?	Medium	The acres of ponderosa pine forests with development stage mature-open.	A	SJPL-wide	Every 5 years
H 4. Within the next 20 years, increase the amount of warm-dry mixed-conifer forests that have open canopies by changing 10,000 acres of warm-dry mixed-conifer forests (excluding old-growth forests) from development stage mature-closed to development stage mature-open by using restoration (improvement) harvest treatments that target white fir for removal, and by allowing wildland fire use to occur.	Has there been an increase in the amount of warm-dry mixed-conifer forests that have open canopies?	Medium	The acres of warm-dry mixed-conifer forests with development stage mature-open.	A	SJPL-wide	Every 5 years
H 5. Within the next 15 years, use low-intensity prescribed fire or wildland fire use on 30,000 acres of ponderosa pine or warm-dry mixed-conifer forests that have been without fire for decades in order to improve the composition, structure, and function of those forests.	Has the composition, structure, and function of ponderosa pine or warm-dry mixed-conifer forests changed due to low-intensity prescribed fire or wildland fire use?	Medium	The acres of low-intensity prescribed fire or wildland fire use.	A	SJPL-wide	Every 5 years
H 6. Increase the amount of old-growth ponderosa pine and old growth warm-dry mixed-conifer forests by 400% and 100%, respectively. This is a long-range objective that can only occur over decades, as current ponderosa pine and old-growth warm-dry mixed-conifer forests need time to succeed from their current condition to the old-growth condition).	Has there been an increase in the amount of old-growth ponderosa pine and warm-dry mixed-conifer forests?	Medium	The acres of old growth ponderosa pine and old growth warm-dry mixed-conifer forests.	A	SJPL-wide	Every 5 years
H 7. Within 15 years, increase the abundance and distribution of perennial native warm and cool season bunchgrasses and biological soil crusts on 3,000 acres of semi-desert shrublands or semi-desert grasslands on the Dolores geographical area.	Has there been an increase in the amount of perennial native warm and cool season bunchgrasses and biological soil crusts on the semi-desert shrublands or semi-desert grasslands on the Dolores geographic area?	Medium	The amount of perennial native warm and cool season bunchgrasses and biological soil crusts in semi-desert shrublands or semi-desert grasslands on the Dolores geographic area.	B	SJPL-wide	Every 5 years

Table 40 - Monitoring Strategy, continued

Monitoring Driver	Monitoring Question	Monitoring Priority	Potential Monitoring Items	Precision and Reliability	Scale	Frequency of Reporting
<i>Effectiveness Monitoring – Are plan objectives and desired conditions being achieved?</i>						
I. WILDLIFE PROGRAM OBJECTIVES						
I 1. Wildlife species are well distributed in suitable habitat with functional genetically diverse populations. Important habitats are resilient, have high integrity, and are adequately connected within the capabilities of the land.	What are the habitat/ population trends for MIS on USFS lands within the planning area?	High	Trends in MIS population and habitat are intended to determine trend in habitat capability, and the relationship to habitat change at the national forest scale. The data sources include, but not limited to, population estimates by State wildlife agencies, monitoring studies by USFS personnel, informed judgment of USFS and BLM Ecologists and Wildlife/Fisheries Biologists, habitat inventory assessments, resource information system databases, program reviews, activity reviews, annual program reporting, and species and habitat assessments.	Variable	USFS lands within San Juan Public Lands	Every 5 years

Monitoring Driver	Monitoring Question	Monitoring Priority	Potential Monitoring Items	Precision and Reliability	Scale	Frequency of Reporting
<i>Effectiveness Monitoring – Are plan objectives and desired conditions being achieved?</i>						
J. FIRE AND FUELS MANAGEMENT PROGRAM OBJECTIVES						
J 1. Annually, over the next 10 years, complete, on average, 8,000 acres of hazardous fuels reduction in the wildland urban interface (WUI). J 2. Annually, over the next 10 years, complete, on average, 5,000 acres of fuels reduction and resource enhancement on San Juan Public Lands.	Are affected landscapes trending toward their desired vegetation composition and structure?	Medium	The change in the condition class ratings on high priority and high-risk areas identified in Community Wildfire Protection Plans.	A	Admin. Unit	Every 5 years

Table 40 - Monitoring Strategy, continued

Monitoring Driver	Monitoring Question	Monitoring Priority	Potential Monitoring Items	Precision and Reliability	Scale	Frequency of Reporting
<i>Effectiveness Monitoring – Are plan objectives and desired conditions being achieved?</i>						
K. RECREATION OBJECTIVES						
K 1. Over the implementation-life of the LMP, deferred maintenance is reduced to under \$500,000.	Are recreation sites being maintained to standard?	Medium	The reduction in the amount of deferred maintenance.	A	SJPL-wide	Every 5 years
K 2. Within 5 years, all motorized and mechanized recreation travel is on designated routes or in designated areas.	Are plan designations for travel management implemented?	High	The miles of routes and acreage with designations	A	SJPL-wide	Annually

Monitoring Driver	Monitoring Question	Monitoring Priority	Potential Monitoring Items	Precision and Reliability	Scale	Frequency of Reporting
<i>Effectiveness Monitoring – Are plan objectives and desired conditions being achieved?</i>						
L. HERITAGE AND CULTURAL OBJECTIVES						
L 1. Over the implementation-life of the LMP, protect/preserve/stabilize at least 15 eligible heritage/cultural resources.	Which eligible heritage/cultural resources are in critical need of being protected/ preserved/ stabilized?	Medium	The number of sites protected/preserved/ stabilized.	A	SJPL-wide	Annually
L 2. Implement site-stewardship monitoring for Falls Creek, McPhee Reservoir, and the Mesa Verde Escarpment.	Is the site-stewardship program adequately supported in order to monitor sensitive heritage/cultural resources?	Medium	The number of sites monitored.	A	SJPL-wide	Annually
L 3. Develop appropriate interpretive materials for Falls Creek, McPhee Reservoir, and the Mesa Verde Escarpment.	Does the interpretive material convey information to the public in an effective and accurate manner?	Medium	The number of heritage/cultural resources interpreted.	A	SJPL-wide	Annually
L 4. Within 5 years, stabilize and preserve the Chimney Rock Great House.	What are the stabilization priorities for the Chimney Rock Great House, and is adequate funding available to conduct these priorities?	Medium	The completed stabilization work.	A	Chimney Rock Archaeological Area	First 5 years of the Plan

Table 40 - Monitoring Strategy, continued

Monitoring Driver	Monitoring Question	Monitoring Priority	Potential Monitoring Items	Precision and Reliability	Scale	Frequency of Reporting
<i>Effectiveness Monitoring – Are plan objectives and desired conditions being achieved?</i>						
M. TRANSPORTATION AND ACCESS OBJECTIVES						
M 1. Within 10 years of LMP implementation, transfer 5 miles of road jurisdiction to other entities.	Do system roads, or segments of system roads, serve primarily as private access rather than as public land access?	Medium	The miles of road transferred to other jurisdictions annually.	A	San Juan Public Lands by District/Field Office	Annually
M 2. Annually, perform maintenance activities on 75% of roads maintained for passenger vehicles (maintenance level 3, 4, and 5).	Does the road system meet public safety and management needs for passenger vehicles while, at the same time, protecting resources?	High	The percentage of level 3, 4 and 5 roads maintained to standard.	A	San Juan Public Lands by District/Field Office	Annually
M 3. Within 15 years of LMP implementation, decommission 100 linear miles of unneeded routes (which may consist of roads and trails).	To what extent have those roads and trails, identified through travel analysis as unneeded, been decommissioned?	Medium	The miles of roads and trails decommissioned.	A	San Juan Public Lands by District/Field Office	Annually
M 4. Every 5 years, conduct condition surveys for each system road and trail.	Does the road system and trail system meet public safety and management needs while, at the same time, protecting resources?	High	The percentage of system roads and trails surveyed from deferred maintenance annual report.	B	San Juan Public Lands by District/Field Office	Annually

Table 40 - Monitoring Strategy, continued

Monitoring Driver	Monitoring Question	Monitoring Priority	Potential Monitoring Items	Precision and Reliability	Scale	Frequency of Reporting
<i>Effectiveness Monitoring – Are plan objectives and desired conditions being achieved?</i>						
N. TIMBER PROGRAM OBJECTIVES						
N 1. Over the next 20 years, utilize restoration (improvement cut) and thinning harvests in the ponderosa pine and warm-dry mixed-conifer vegetation types in order to reduce stand densities, improve stand composition and structure, and develop fuel profiles that achieve or maintain stand conditions more resilient to disturbance while, at the same time, providing forest products to local industry on approximately 30,000 to 40,000 acres.	Are density, composition, structure, and fuel profiles of stands more resilient to disturbance and providing forest products to industry?	Medium	The acres treated.	A Acre	SJPL-wide	Every 5 years
N 2. Over the next 20 years, emphasize selective harvests in cool-moist mixed-conifer and spruce-fir vegetation types in order to maintain or achieve desired stand conditions, reduce hazardous fuels, and provide forest products to local industry, on approximately 5,000 to 10,000 acres.	Are mixed conifer and spruce-fir vegetation types maintaining or trending toward desired stand structure and reduced hazardous fuels, as well as providing products to local industry?	Medium	The acres treated.	A Acre	SJPL-wide	Every 5 years
N 3. Over the next 20 years, utilize coppice harvest (clear-cut with regeneration by sprouting) in aspen vegetation types on approximately 8,000 to 10,000 acres in order to maintain or develop desired age class diversity and patch size, regenerate declining aspen stands, and provide forest products to local industry.	Are aspen vegetation types maintaining or developing desired age class diversity and patch size, regenerating declining aspen stands, and providing forest products to local industry?	Medium	The acres treated.	A Acre	SJPL-wide	Every 5 years

Table 40 - Monitoring Strategy, continued

Monitoring Driver	Monitoring Question	Monitoring Priority	Potential Monitoring Items	Precision and Reliability	Scale	Frequency of Reporting
<i>Effectiveness Monitoring – Are plan objectives and desired conditions being achieved?</i>						
O. LIVESTOCK-GRAZING OBJECTIVES						
O 1. Complete NEPA on all active BLM and USFS allotments by the end of FY 2009 and FY 2010, respectively, as per BLM permit-renewal schedules and the USFS Rescissions Act. Conduct periodic reviews of those analyses and decisions to ensure that NEPA-based decisions stay current and sustainable for all permitted livestock grazing.	What is the NEPA sufficiency of grazing allotments? Are NEPA-based decisions for grazing allotments current and sustainable?	High	The number of NEPA-sufficient allotments. The number of allotment decisions each year	A	San Juan Public Lands by District/Field Office	Every 5 years
O 2. Implement adaptive management principles through allotment management planning decisions. Annually, conduct prescribed monitoring activities on at least 10% of active allotments, and use the information to make adaptive changes to management.	Are adaptive management decisions being used to make changes to management on grazing allotments?	High	The number of key areas monitored by specific protocol.	A	San Juan Public Lands by District/Field Office	Annually
O 3. Annually, administer 50% of active grazing allotments to in order to meet public land health standards.	Are grazing allotments meeting standards for public land health?	Medium	The acres meeting public land health standards.	A	San Juan Public Lands by District/Field Office	Annually
O 4. Within 15 years, all suitable rangelands within the planning area have satisfactory rangeland conditions.	Are rangeland health conditions trending toward satisfactory rangeland health conditions?	Medium	The acres meeting /moving toward desired conditions.	B	San Juan Public Lands by District/Field Office	Annually

Monitoring Driver	Monitoring Question	Monitoring Priority	Potential Monitoring Items	Precision and Reliability	Scale	Frequency of Reporting
<i>Effectiveness Monitoring – Are plan objectives and desired conditions being achieved?</i>						
P. INVASIVE SPECIES OBJECTIVES						
P 1. Within 15 years, eradicate spotted knapweed, diffuse knapweed, Dalmatian toadflax, scentless chamomile, scotch thistle, and leafy spurge throughout the planning area.	Are treatment actions trending priority invasive species toward eradication?	Medium	The acres of priority noxious weeds.	A Acre	SJPL-wide	Every 5 years
P 2. Within 15 years, increase annual treated acres of noxious weeds to 25% of known acres infested.	Are treatment actions increasing on areas infested with noxious weeds?	Medium	The acres of noxious weeds.	A Acre	SJPL-wide	Every 5 years
P 3. Within 15 years, annual backcountry treatments (including Wilderness Areas), will be 25% of the total annual noxious weed treatment target.	What portion of areas treated for infestations of noxious weeds are in backcountry areas?	Medium	The acres of noxious weeds.	A Acre	SJPL-wide	Every 5 years

Table 40 - Monitoring Strategy, continued

Monitoring Driver	Monitoring Question	Monitoring Priority	Potential Monitoring Items	Precision and Reliability	Scale	Frequency of Reporting
<i>Effectiveness Monitoring – Are plan objectives and desired conditions being achieved?</i>						
Q. LANDS AND SPECIAL USES PROGRAM OBJECTIVES						
Q 1. Annually, survey and post 5 miles of boundary of special areas (including Wilderness Areas).	Are special area boundaries surveyed and posted?	Medium	The miles of surveyed line recorded on Master Title Plat/LR2000/ALP.	A	RD/FO	Every 5 years
Q 2. Annually, survey and post 5 miles of property line adjacent to private land and boundaries where trespass or encroachment is most likely.	Is trespass or encroachment being reduced by efforts to survey and post boundaries?	Medium	The miles of surveyed line recorded in County and on Master Title Plat/LR2000/ALP.	A	RD/FO	Annually
Q 3. Annually, acquire 2 new road and trail ROWs for high-priority access or to fill gaps in existing access to public lands.	Are gaps in existing high priority access to public land being filled?	Medium	The number of easements/ROW deeds recorded in County and on Master Title Plat/LR2000/ALP.	A	RD/FO	Annually
Q 4. Review 100% of existing withdrawals by non-SJPLC agencies, and resolve resulting “need to continue,” “modify,” or “revoke” withdrawals.	Are existing withdrawals being continued, modified or revoked appropriate to identified withdrawal needs of other agencies?	Medium	The number of case files reviewed and recommended for action.	A	RD/FO	Every 5 years
Q 5. Within 5 years, cooperate in improvement of, and convey to appropriate county jurisdiction, 1 high-priority SJPL road identified as dominantly non-SJPL access use.	Are high-priority roads under the jurisdiction of the appropriate governing authority?	High	The easement/ROW deeds recorded in County and on Master Title Plat/LR2000/ALP.	Validation	RD/FO	Every 5 years

Table 40 - Monitoring Strategy, continued

Monitoring Driver	Monitoring Question	Monitoring Priority	Potential Monitoring Items	Precision and Reliability	Scale	Frequency of Reporting
VALIDATION MONITORING						
Design criteria and guidelines	Are guidelines effective in mitigating impacts of activities?	Medium	Conduct interdisciplinary review of implemented project for implementation and effectiveness of design criteria and guidelines.	B	SJPL-wide	Annually

Monitoring Driver	Monitoring Question	Monitoring Priority	Potential Monitoring Items	Precision and Reliability	Scale	Frequency of Reporting
IMPLEMENTATION MONITORING						
NFMA/FLPMA; multiple goals, objectives, and strategies	Are projects implemented according to LMP goals, objectives, and strategies?	High	Select at least one NEPA project, and conduct a thorough review of all resource areas to see if LMP goals, objectives, and strategies have been followed, and if the treatment/project was effective to improve land management.	A/B	Varies according to project scale	Annually
Suitable Wild and Scenic Rivers (WSRs)	Are WSR candidate waters being managed for the protection of outstandingly remarkable values (ORVs)?	Medium	Monitor ORVs from the suitability analysis.	B	Suitable WSRs	Every 5 Years
Wilderness/Wilderness Recommendations/Wilderness Study Areas (WSAs)	Are areas being managed for the desired Wilderness characteristics?	High	Monitor the opportunities for solitude, amount and types of human use, and of evidence of human use.	B	SPLC-wide	Annually