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## CHAPTER 4 – MONITORING PLANS

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### 4.1 San Juan National Forest Monitoring Plan

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#### 4.1.1 Forest Plan Monitoring Under the 2012 Planning Rule

The NFMA requires “continuous monitoring and assessment in the field” to evaluate “the effects of each management system to the end that it will not produce substantial and permanent impairment of the productivity of the land” (16 USC 1604(g)(3)(C)). The 2012 Rule includes a three-part iterative cycle of assessment, planning, and monitoring in a continuous feedback loop. Monitoring is meant to support the assessment process and evaluate plan implementation over time. This planning framework is designed to “inform integrated resource management and allows the Forest Service to adapt to changing conditions, including climate change, and improve management based on new information and monitoring” (§ 219.5 (a)).

#### Specific Requirements for Monitoring under the 2012 Rule

A monitoring plan will consist of “monitoring questions and associated indicators” which “must be designed to inform the management of resources on the plan area, including by testing relevant assumptions, tracking relevant changes, and measuring management effectiveness and progress toward achieving or maintaining the plan’s desired conditions or objectives” (219.12 (a)(2)). The monitoring program must also be “coordinated with the regional forester and Forest Service State and Private Forestry and Research and Development” (§ 219.12 (a)(1)) and support and align with a broader-scale monitoring program, to be developed at the regional level, that will address monitoring questions at a geographic scale broader than one plan area (§ 219.12 (b)). Furthermore, in developing the monitoring plan, the responsible official should also provide opportunities for public participation, “taking into account the skills and interests of affected parties”, as well as the scope, methods, forum and timing of those opportunities (§ 219.4 (a)).

Monitoring may involve evaluating: if standards and guidelines are implemented (implementation monitoring); if management actions and standards and guidelines are effective in achieving goals and objectives (effectiveness monitoring); the long term trend and condition of key resources (condition or surveillance monitoring). At a minimum, the plan monitoring program must contain one or more monitoring questions and associated indicators addressing the following eight items (see §219.12[a][5][i-viii]):

- (i) The status of select watershed conditions;
- (ii) The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems;
- (iii) The status of focal species to assess the ecological conditions required under § 219.9;
- (iv) The status of a select set of the ecological conditions required under § 219.9 to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern;
- (v) The status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives;
- (vi) Measurable changes on the plan area related to climate change and other stressors that may be affecting the plan area;
- (vii) Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities;

- (viii) The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land (16 U.S.C. 1604(g)(3)(C)).

As happens with many aspects of resource management, these eight categories are often interrelated. So, in some cases, a monitoring question may fit under more than one category. However, in the interest of brevity, each question is only listed once.

### **Biennial Monitoring Report**

A monitoring evaluation report is to be produced and made available to the public every two years (§ 219.12 (d)). It “must indicate whether or not a change to the plan, management activities, or the monitoring program, or a new assessment, may be warranted based on the new information... [and] must be used to inform adaptive management of the plan area” (§ 219.12 (d)(2)). The monitoring program and evaluation report are part of the administrative record (§ 219.14 (b)) and the Forest Supervisor must document “how the best available scientific information was used to inform planning, the plan components, and other plan content, including the plan monitoring program” (§219.13 (a)(4)).

### **Monitoring Plan Components**

The following section details the specific components of the monitoring plan. Specific monitoring items are organized by the required categories of monitoring questions identified in the planning rule (§ 219.12), with at least one monitoring question and indicator for each category.

The San Juan National Forest considered several factors when selecting appropriate monitoring questions and indicators. In line with the 2012 Planning Rule, questions and indicators were chosen because they: (1) test relevant assumptions made in the plan, (2) track relevant changes within the planning area, and/or (3) measure management effectiveness and progress toward achieving or maintaining the plan’s desired conditions or objectives. Many of the questions involve major underpinning assumptions made in the plan, so that monitoring can be an efficient and effective tool to inform the need for changes in the plan. Time scale was also considered when selecting monitoring questions. The monitoring plan focuses on indicators where meaningful change can be detected in a relatively short amount of time and can therefore indicate whether changes are needed in the plan in a relatively rapid manner and be reported in the biennial monitoring report. Indicators that may take a longer time to show meaningful change are also important and will be monitored and considered using formats other than the monitoring plan.

For each question, there will be a brief description of the desired condition or objective each monitoring item is associated with, followed by the question, a description of the specific indicator or metric used to answer or evaluate the monitoring question, the data source or measurement protocol associated with the monitoring item, and finally, a rationale or justification for the specific monitoring indicator and protocol (using the numbers above). This will ensure that the requirements for best available science are met.

**i. Status of Select Watershed Conditions**

Monitoring Question	Desired Conditions and Objectives	Indicators	Scale	Frequency of Reporting	Sources and/or Partners
<p>Are conditions improving in priority watersheds within the planning area as defined by the Watershed Condition Framework?</p>	<p><b>DC 2.6.1</b> State water quality standards and anti-degradation rules are met and State-classified water uses are supported for all water bodies</p> <p><b>DC 2.6.2</b> Water quality for impaired water bodies on the State’s 303(d) list move toward fully supporting State-classified uses.</p> <p><b>DC 2.6.3</b> State “Outstanding Waters” within the planning area maintain the high levels of water quality necessary for this status.</p> <p><b>DC 2.6.5</b> Water from SJNF lands will meet applicable drinking water standards when given adequate and appropriate treatment. Management activities throughout the planning area protect and/or enhance the water quality of municipal supply watersheds (as defined in FSM 2542). Enhancement may be achieved by watershed restoration or by other activities.</p> <p><b>Obj 2.6.19</b> Every 5 years rehabilitate 10 or more acres to reduce erosion and sedimentation delivery to water bodies on both BLM and USFS lands. For USFS lands, do the work in priority watersheds, including those with water bodies listed for sediment impairment or that have TMDLs established for sediment.</p> <p><b>Obj 2.6.20</b> Over the implementation-life of the LRMP, actively participate in the development of all of the TMDL determinations and/or other appropriate options for the restoration of State 303(d)-listed impaired water bodies within the planning area (both BLM and USFS lands).</p>	<p>Acres restored. TMDLs completed. BMPs implemented and effective.</p> <p>Completion of essential projects identified in the Watershed Restoration Action Plan.</p> <p>Essential projects should improve overall watershed condition rating and 12 watershed condition indicators.</p> <p>Majority of work should occur in designated priority watersheds.</p>	<p>Project or watershed</p>	<p>5 years</p>	<p>CDPHE, EPA</p>

**i. Status of Select Watershed Conditions**

Monitoring Question	Desired Conditions and Objectives	Indicators	Scale	Frequency of Reporting	Sources and/or Partners
<p>How many miles of roads prioritized for decommissioning have been decommissioned in the planning area?</p>	<p><b>2.13.8</b> Roads and trails within the SJNF that are identified for closure are decommissioned and reestablished with native vegetation cover.</p> <p><b>Obj 2.13.19</b> Travel management plans are developed in accordance the designation criteria in 36 CFR 212, Subpart B, for NFS lands. Routes that are not included in the designated motorized transportation system will be evaluated for their resource impact potential. Those with high potential for resource impacts will be prioritized for decommissioning as part of the implementation plan for each individual travel management plan decision. Each implementation plan will identify those routes prioritized for decommissioning, the method(s) that may be used, and a schedule for completion.</p>	<p>Miles of roads decommissioned</p>	<p>SJNF</p>	<p>Annually</p>	<p>NRMS database - roads and trails</p>
<p>Are streams that are on the State 303D list improving?</p>	<p><b>DC 2.6.1</b> State water quality standards and anti-degradation rules are met and State-classified water uses are supported for all water bodies.</p> <p><b>DC 2.6.2</b> Water quality for impaired water bodies on the State’s 303(d) list move toward fully supporting State-classified uses.</p> <p><b>Obj 2.6.20</b> Over the implementation-life of the LRMP, actively participate in the development of all of the TMDL determinations and/or other appropriate options for the restoration of State 303(d)-listed impaired water bodies within the planning area (both BLM and USFS lands).</p>	<p>TMDLs completed                      Number of streams removed from the 303D List.</p>	<p>SJNF</p>	<p>2-3 years</p>	<p>CDPHE</p>

## ii. Status of Select Ecological Conditions

Monitoring Question	Desired Conditions and Objectives	Indicators	Scale	Frequency of Reporting	Sources and/or Partners
What are the status and trends of insects and disease in and around the plan area, including old growth stands, and are they moving us toward desired conditions?	<p><b>DC 2.2.6</b> All development stages of the forested terrestrial ecosystems are well represented at the landscape scale and occur within the ranges identified in Table 2.2.1.</p> <p><b>DC 2.2.7</b> Old growth ponderosa pine, old growth pinyon-juniper and old growth warm-dry mixed conifer forests are more abundant, occupy more acreage, and are well distributed on SJNF and TRFO lands.</p> <p><b>DC 2.2.9</b> Terrestrial ecosystems, including habitat for special status plant species, are productive, sustainable, and resilient, and provide goods and services over the long-term.</p>	<p>Trends in fire, insect and disease mortality; acres of natural regeneration</p> <p>Trends in habitat structural stages</p>	SJNF	<p>Every 2 years report on forest-wide status of mortality, natural regeneration and planting via forest-wide surveys such as Aerial detection and status from localized surveys</p> <p>Every 5 years for habitat structural stages or as needed</p>	Aerial photo series (Aerial Detection Survey done annually by RO) and field sampling, natural regeneration surveys, planting survival surveys, stocking surveys; FACTS; old growth surveys; RSAC vegetation updates
Are Forest Plan implementation actions allowing us to effectively protect/maintain/promote healthy, resilient riparian and wetland ecosystems including soils?	<p><b>DC 2.4.9</b> Soil productivity is intact on all riparian area and wetland ecosystems.</p> <p><b>DC 2.4.12</b> Management-induced soil erosion, soil compaction, soil displacement, puddling, and/or severely burned soils are rare on all riparian and wetland ecosystems of the SJNF. Long term impacts to soils (e.g. soil erosion, soil compaction, soil displacement, puddling and/or severely burned soils) from management actions are rare on all riparian area and wetland ecosystems of the SJNF.</p>	BMPs implemented and effective	Site or reach--BMP monitoring is annual; burn monitoring only after a burn occurs	5 years	
What are the status and trends of invasive species and aquatic invasive species on the unit?	<p><b>DC 2.8.3</b> Invasive species, both terrestrial and aquatic, are absent or rare within the planning area, and are not influencing native populations or ecosystem function</p> <p><b>Obj 2.8.6</b> Within 15 years, contain priority Class B invasive species identified in the Invasive Species Action Plan within the SJNF.</p>	<p>Acres of noxious weeds inventoried, treated, and monitored</p> <p>Acres treated for Class A and Class B species</p> <p>Distribution and spread maps of quagga mussel</p>	SJNF	Annually	PAS, cooperators, contractors, FACTS, CPW

### iii. Focal Species

Monitoring Question	Desired Conditions and Objectives	Indicators	Scale	Frequency of Reporting	Sources and/or Partners
<p>Are management activities providing for ecological integrity and maintaining or restoring ecological conditions as indicated by the status of focal species?</p>	<p><b>DC 2.3.20</b> Abert's squirrel (<i>Sciurus aberti</i>) - Ponderosa pine habitats provide interconnected structure in mature conifer stands that produce abundant foraging (cone crops and above- and belowground fungi) and reproductive habitat.</p> <p><b>DC 2.3.21</b> American marten (<i>Martes americana</i>) - Habitat connectivity for spruce-fir and cool-moist mixed conifer forests is maintained at broad spatial scales. These forests contain a diverse array of structural stages (including mature and old growth) and habitat attributes (snags and downed logs) to provide effective foraging, breeding and dispersal habitat for marten.</p> <p><b>DC 2.3.22</b> Hairy Woodpecker (<i>Picoides villosus</i>) - Snags occur in numbers, size, and quality in and adjacent to aspen, ponderosa pine, and mixed conifer forests to provide effective habitat for foraging and reproduction.</p> <p><b>Obj 2.3.31</b> Abert's squirrel - Over the life of the LRMP, restore approximately 3,000 acres of ponderosa pine forest to improve habitat quality as defined in the <i>Abert's Squirrel Species Assessment San Juan National Forest</i> (USFS 2004a, 2003).</p> <p><b>Obj 2.3.32</b> American marten - Over the life of the LRMP, treat approximately 2,000 acres of spruce-fir and cool-moist mixed conifer forests to increase age class diversity and provide future foraging, breeding and dispersal habitat as defined in the <i>American Marten Species Assessment San Juan National Forest</i> (USFS 2004b).</p> <p><b>DC 2.5.11</b> Abundant Colorado River cutthroat trout populations are maintained and other areas are managed for increased abundance.</p> <p><b>DC 2.5.12</b> Threats to Colorado River cutthroat trout and its habitat are eliminated or reduced to the greatest extent possible.</p> <p><b>DC 2.5.13</b> The distribution of Colorado River cutthroat trout is increased where ecologically, sociologically, and economically feasible.</p> <p><b>Obj 2.5.17</b> Over the life of the LRMP, establish two self-sustaining meta-populations on NFS lands, each consisting of five separate but interconnected sub-populations. In addition, establish one new population in each Geographic Management Unit within the historic range (Colorado River Cutthroat Trout Task Force 2001).</p>	<p>Monitor status of focal species at the appropriate geographic scale.</p> <p><b>Indicators:</b> Status of Focal Species (Abert's squirrel, American marten, hairy woodpecker; cutthroat trout)</p> <p>Number of acres of live ponderosa pine treated</p> <p>Number of acres of live mature spruce-fir and cool-moist mixed conifer treated</p> <p>Miles of stream habitat enhanced</p> <p>Number of self-sustaining metapopulations of Colorado River cutthroat trout established</p> <p>Number of threats to Colorado River cutthroat trout that are reduced or eliminated</p>	<p>SJNF</p>	<p>Biennially</p>	<p>Unit reporting, CPW, Bird Conservancy of the Rockies</p>

**iv. Threatened and Endangered Species and Species of Conservation Concern**

Monitoring Question	Desired Conditions and Objectives	Indicators	Scale	Frequency of Reporting	Sources and/or Partners
<p>Do management actions maintain or improve habitat conditions for special status species, contributing to the stability and/or recovery of these species?</p> <p>Are management actions maintaining viable bighorn herds on SJNF lands?</p>	<p><b>DC 2.3.1</b> Wildlife populations are viable on SJNF lands. Wildlife populations are self-sustaining, connected, and genetically diverse across SJNF lands.</p> <p><b>DC 2.3.12</b> Populations are conserved by maintaining or improving habitat availability and quality through the incorporation of conservation strategies and species’ habitat needs during project development and implementation.</p> <p><b>DC 2.3.14</b> Disturbances from management activities occur at levels that support critical life functions and sustain key habitat characteristics for wildlife special status species.</p> <p><b>DC 2.3.15</b> Areas identified as critical habitat or proposed critical habitat for special status wildlife species have the characteristics to support sustainable populations, promoting recovery of the species.</p> <p><b>DC 2.3.16</b> The alpine and subalpine willow (<i>Salix</i> sp.) dominated riparian areas, providing crucial winter habitat for white-tailed ptarmigan (<i>Lagopus leucura</i>) and snowshoe hare (<i>Lepus americanus</i>), do not bioaccumulate heavy metals above historically occurring background levels which enter the food chain. Areas of contamination do not become limiting factors for wildlife population sustainability.</p> <p><b>DC 2.3.17</b> Management actions maintain or improve habitat conditions for special status species, contributing to the stability and/or recovery of these species.</p> <p><b>Obj 2.3.23</b> Bats: Over the life of the LRMP, all mine closures for human safety at sites supporting bat populations include structures (such as bat gates) designed to provide for continued use as bat habitat.</p> <p><b>Obj 2.5.15</b> Annually enhance or restore at least 3 miles of stream habitat to maintain or restore the structure, composition, and function of physical habitat for USFS sensitive species or MIS species.</p>	<p>The number of conservation actions or recovery actions completed for TES</p> <p>Number of projects implemented that have an overall beneficial effect to TES</p> <p>Number of threatened, endangered, and sensitive species occurring and trends (if known)</p> <p>Number of AML Projects that are implemented with the intent of reducing heavy metals</p> <p>Number of mine closure projects that implement effective bat access</p> <p>Bighorn herd population data from CPW, USFS and other sources including, but not limited to, aerial surveys, coordinated ground counts, hunter harvest data</p>	<p>SJNF</p>	<p>Annually and Biennially</p>	<p>Unit reporting, CPW, USFWS, NGO partners (Trout Unlimited, Rocky Mountain Bighorn Society, etc.)</p>

**iv. Threatened and Endangered Species and Species of Conservation Concern**

Monitoring Question	Desired Conditions and Objectives	Indicators	Scale	Frequency of Reporting	Sources and/or Partners
Are management actions in accordance with the 2013 Lynx Conservation Assessment and Strategy?	<b>DC 2.3.5</b> Large predator species contribute to ecological diversity and ecosystem functioning.	Number of lynx screens used for project analysis  Reporting as required by Southern Rockies Lynx Amendment  Periodic review and update of forest-wide lynx habitat map, accounting for changes from large scale disturbances.	SJNF	Annually	Unit Reporting. CPW, USFWS.

**v. Visitor Use and Recreation**

Monitoring Question	Desired Conditions and Objectives	Indicators	Scale	Frequency of Reporting	Sources and/or Partners
What is the level and trend of recreational visitor use satisfaction on the unit?	<p><b>DC 2.14.1</b> Activities are regulated primarily in order to protect the quality of the recreation settings and benefits</p> <p><b>DC 2.14.28</b> In developed recreation sites, the USFS and BLM provide a wide range of visitor information, education, and interpretation consistent with their interpretive and conservation education strategy.</p>	<p>National Visitor Use Monitoring Report</p> <p>Number of condition surveys completed</p>	SJNF	<p>5 years</p> <p>2 years</p>	National Visitor Use Monitoring Report
What is level and trend of visitor use satisfaction on the unit related to the type, amount, and condition of roads and trails?	<p><b>DC 2.13.1</b> The transportation system within the SJNF planning area consists of roads, high-clearance or primitive roads, trails, and bridges that are fiscally sustainable and safe as appropriate for the designated use or desired user experience; they allow for the use of, and enjoyment by, the public, and they meet resource management objectives. Sufficient condition surveys and inspections are conducted to promote road safety and to prioritize road maintenance expenditures.</p> <p><b>DC 2.13.2</b> The SJNF transportation system provides reasonable and legal access for resource management and recreation; it is dynamic and adaptable to resource and user needs.</p> <p><b>DC 2.13.5</b> The road and trail system within the SJNF has adequate destination signage, mapping, and route markers to assist transportation system users in navigating throughout the planning area.</p> <p><b>DC 2.13.6</b> The public has access to information about the SJNF transportation systems (including specific travel route designations, available recreational opportunities, environmental stewardship guidelines, and safe travel information).</p>	National Visitor Use Monitoring Report	SJNF	5 years	National Visitor Use Monitoring Report

### vi. Climate Change and Other Stressors

Monitoring Question	Desired Conditions and Objectives	Indicators	Scale	Frequency of Reporting	Sources and/or Partners
<p>Is visibility and air quality improving and/or protected on the SJNF?</p>	<p><b>DC 2.12.1</b> Air quality in the Weminuche Wilderness Class I Area maintains natural conditions. Indicators of natural conditions include air quality–related values of visibility, water and snow chemistry, precipitation/atmospheric chemistry, soils chemistry, and aquatic/terrestrial biota.</p> <p><b>DC 2.12.2</b> Air quality for the Class II Areas within the planning area are maintained or improved with respect to pollutant concentrations so that human health and the integrity of associated aquatic and terrestrial ecosystem components are protected.</p> <p><b>DC 2.12.5</b> Visibility in the Weminuche Wilderness continues to improve, so that best natural conditions are achieved.</p> <p><b>Obj 2.12.8</b> For the Weminuche Wilderness Class 1 Area, improve air quality so that flora and fauna AQRVs that are at risk (including lichens, amphibians, and aquatic organisms) recover to a level that is within the limits of acceptable change (compared to natural conditions) by the next planning period so that there is no humanly perceptible change in visibility (visual range, contrast, coloration) from that which would have existed under natural conditions (conditions substantially unaltered by humans or human activities).</p> <p><b>Obj 2.12.9</b> Over the implementation-life of the LRMP on both BLM and USFS lands, prevent or reduce the atmospheric deposition of nitrogen and sulfur and allow no more than a 10% change from established baseline for lakes with an ANC <math>\geq 25</math> <math>\mu\text{eq/L}</math>, and for lakes with an ANC <math>&lt; 25</math> <math>\mu\text{eq/L}</math> allow no more than 1 <math>\mu\text{eq/L}</math> decrease in ANC.</p> <p><b>Obj 2.12.10</b> Over the implementation-life of the LRMP, prevent or reduce airborne nutrient and mercury deposition impacts to sensitive high-elevation lakes in the Weminuche Wilderness Class I Area; allow no detectable mercury, no more than 2 <math>\mu\text{eq/L}</math> of ammonium, and no late summer nitrate.</p>	<p>AQRVs; these include water quality, visibility, lichens, soils, aquatic organisms, flora, etc., within limits of acceptable change. Air quality maintained at better than State air quality standards.</p> <p>Deciview graph displaying trend data for visibility.</p> <p>Ozone and Nitrogen Dioxide measurements at Shamrock Mines air monitoring station</p>	<p>SJNF</p>	<p>5 years</p>	<p>CDPHE, National Park Service, BLM, EPA, IMPROVE, NADP</p> <p>Shamrock Mines, Engineer, Molas Pass, and Wolf Creek Pass air monitoring station data</p> <p>USFS Rocky Mountain Region Office (for Deciview graph)</p>

**vi. Climate Change and Other Stressors**

Monitoring Question	Desired Conditions and Objectives	Indicators	Scale	Frequency of Reporting	Sources and/or Partners
<p>Are Forest Plan implementation actions allowing us to effectively adapt to climate change and maintain/promote healthy, resilient ecosystems?</p>	<p><b>DC 2.2.2</b> Non-climate ecosystem stresses (e.g., high road densities, water depletions, air and water pollution) are reduced to improve the resilience and resistance of ecosystems to the future dynamics of a changing climate.</p> <p><b>DC 2.2.15</b> Forested terrestrial ecosystems have stand structures and tree species compositions that offer resistance and resilience to changes in climate, including extreme weather events or epidemic insect and disease outbreaks.</p> <p><b>DC 2.2.16</b> Non-forested terrestrial ecosystems have community structure and species composition that offer resistance and resilience to changes in climate, including extreme weather events or epidemic insect and disease outbreaks.</p>	<p>Forest road density</p> <p>Species composition reports</p> <p>Stand exams</p> <p>Extent of insect and disease outbreaks</p> <p>Vegetation monitoring</p> <p>Tree line monitoring</p>	<p>SJNF</p> <p>Select locations</p> <p>Select locations</p> <p>SJNF</p> <p>8 weather stations</p> <p>SJNF</p>	<p>2-4 years</p> <p>2-4 years</p> <p>Prior to project</p> <p>Annually</p> <p>3 years</p> <p>10 years</p>	<p>Aerial detection survey; FSveg; CDPHE</p>

**vii. Desired Conditions and Objectives Including Multiple Use**

Monitoring Question	Desired Conditions and Objectives	Indicators	Scale	Frequency of Reporting	Sources and/or Partners
Are rangelands providing diverse, healthy, and sustainable plant communities and are they conserving soil quality?	<b>DC 2.7.5</b> Rangelands provide diverse, healthy, and sustainable plant communities and conserve soil quality.	Long-term monitoring plots  Acres meeting or moving toward desired conditions	SJNF	5 years	
Is water on the Forest being managed in a way that maintains physical features of perennial streams, habitat for aquatic species and communities, and population viability of certain species in streams where they occur?	<p><b>DC 2.5.5</b> An adequate range of stream flow provides for the long-term maintenance of physical habitat features. Channel features, including bank stability, width-to-depth ratio, pool/riffle ratio, pool depth, slope, sinuosity, cover and substrate composition, are commensurate with those expected to occur under natural ranges of stream flow.</p> <p><b>DC 2.5.6</b> Water flow conditions in streams, lakes, springs, seeps, wetlands, fens, and aquifers support functioning habitats for a variety of aquatic and semi-aquatic species and communities.</p> <p><b>Obj 2.5.14</b> Annually, evaluate five streams on NFS lands for adequacy of instream flows sufficient to maintain population viability and otherwise achieve LRMP direction.</p>	Number of regulated or flow-impacted streams evaluated for consistency with standard 2.5.18.	Stream-reaches forest wide	2-3 streams per year	CO Department of Water Resources, CPW
How is vegetation management contributing to the local economy?	<p><b>DC 2.9.1</b> Forest vegetation management supports, at least, the current level of economic activity in the local timber industry; provides economic or social support to local communities; ensures current and future needs for Native American tribal use, including that associated with special forest products (e.g., teepee poles)</p> <p><b>Obj 2.9.6</b> Meet or exceed average annual timber product offerings from SJNF lands, to local timber industries, publics, and other users (including Native Americans), as displayed in Tables 2.9.1 and 2.9.2 over the life of the LRMP.</p>	<p>Sales data for timber products; associated volumes (e.g., CCF), or numbers, for non-convertible products (e.g., Christmas trees)</p> <p>Sales data for timber products</p>	SJNF	Annually	TIM

**vii. Desired Conditions and Objectives Including Multiple Use**

Monitoring Question	Desired Conditions and Objectives	Indicators	Scale	Frequency of Reporting	Sources and/or Partners
Is wildland fire being effectively utilized to achieve desired conditions?	<p><b>DC 2.11.3</b> Wildland fire management maintains a balance between fire suppression and use of wildland fire (including both prescribed fire and natural ignitions) to regulate fuels and maintain forest ecosystems in desired conditions.</p> <p><b>DC 2.11.7</b> Planned and unplanned fire ignitions are used to increase resiliency and diversity across all forest and rangeland vegetation types.</p> <p><b>Obj 2.11.11</b> Annually, for the next 10 years, complete an average of 4,000 acres of fuels reduction and resource enhancement, utilizing fire managed for resource benefit on SJNF lands.</p>	<p>Number of naturally ignited wildfires managed for resource benefit</p> <p>Number of naturally ignited wildfire acres managed for resource benefit</p> <p>Number of acres of prescribed fire</p>	SJNF	Annually	FIRESTAT, FACTS
How many significant heritage/cultural resources in danger of being lost have been protected/preserved/stabilized?	<p><b>DC 2.16.1</b> Significant heritage and cultural resources, such as USFS Priority Heritage Assets and sites on the NRHP, are maintained in good to excellent physical condition. Significant cultural values are protected or preserved. Heritage and cultural sites are preserved and stabilized, and may be available for interpretation and research; they may have site-specific management plans. Sites are protected from physical damage and excessive wear and tear resulting from visitor use.</p> <p><b>Obj 2.16.13</b> Over the implementation-life of the LRMP, protect/preserve/stabilize at least seven significant heritage/cultural resources that have identified deferred maintenance needs that if not addressed will result in loss of the resource.</p> <p><b>Obj 2.16.16</b> Over the implementation life of the LRMP, implement the Anasazi National Register District Monitoring Plan and new site monitoring plans for the Lost Canyon and Spring Creek National Register Districts.</p>	Heritage program managed to standard and Secretary's report to Congress: Number of heritage/cultural sites stabilized	SJNF	10 years	Colorado State Historic Preservation Office, Tribes, volunteers, schools, State Historical Fund, grants

**vii. Desired Conditions and Objectives Including Multiple Use**

Monitoring Question	Desired Conditions and Objectives	Indicators	Scale	Frequency of Reporting	Sources and/or Partners
<p>Is oil and gas leasing and development occurring in an orderly manner, including timely reclamation, colocation, centralization, and optimization of facilities to reduce ground disturbance, minimize impacts, and obtain maximum efficiency for well fields?</p>	<p><b>DC 2.19.3</b> Ground disturbance from development of oil and gas fields is minimized by centralizing facilities, requiring multiple wells per pad, and minimizing the road system required to access facilities.</p> <p><b>DC 2.19.4</b> Reclamation of mineral exploration, development, and production activities is stable, long term, and implemented as soon as is reasonably possible in order to minimize impacts to other resources</p> <p><b>DC 2.19.5</b> All oil and gas well fields starting at the field development stage and all other established well fields where practicable maximize the collocation of facilities to minimize construction footprints and reduce tailpipe emissions.</p> <p><b>DC 2.19.6</b> Oil and gas leasing and development activity on the SJNF occurs in an orderly manner to minimize impacts to lands and resources and increase efficiency of operations</p> <p><b>Obj 2.19.7</b> Over the next 20 years, centralize facilities and engines to minimize the number of well head engines and optimize well engines so they use the minimum cumulative horsepower to obtain the maximum efficiency for all well fields beginning at the field development stage and all other established well fields where practicable.</p>	<p>Number of facilities permitted; number of colocated/centralized/optimized facilities permitted; acres of initial disturbance for facilities (including roads); acres of interim and final reclamation for (including roads); number of leases issued; number of leases issued consistent with SJNF Orderly Leasing Strategy</p>	<p>Forest wide</p>	<p>2-4 years</p>	<p>AFMSS, Work Plan</p>
<p>How many mine safety closures have been completed on the Unit?</p>	<p><b>DC 2.21.3</b> Mine waste repositories are protected and physical safety closures are protected or replaced during any USFS-authorized actions.</p> <p><b>Obj 2.21.9</b> On all SJNF lands, close or mitigate high-priority sites over the life of the LRMP. On SJNF lands, newly discovered sites will be prioritized for closure or mitigation based on hazard.</p>	<p>Number of safety closures</p>	<p>SJNF</p>	<p>5 years</p>	<p>Colorado Division of Reclamation Mining and Safety</p>

**viii. Management and the Productivity of the Land (soils)**

Monitoring Question	Desired Conditions and Objectives	Indicators	Scale	Frequency of Reporting	Sources and/or Partners
<p>What are the status and trends of soil productivity and hydrologic function?</p>	<p><b>DC 2.2.35</b> Soil productivity is maintained at site potential, or is trending towards site potential.</p> <p><b>DC 2.2.36</b> Long-term levels of soil organic matter and soil nutrients (including soil carbon) are maintained at sustainable levels.</p> <p><b>DC 2.2.38</b> Management-induced soil erosion, soil compaction, soil displacement, puddling, and/or severely burned soils are rare on terrestrial ecosystems of the SJNF lands.</p> <p><b>DC 2.2.39</b> Upland soils exhibit infiltration and permeability rates that minimize surface run-off and allow for the accumulation of the soil moisture necessary for plant growth and ecosystem function.</p> <p><b>Obj 2.2.45</b> Within 10 years, restore or improve soil productivity and soil carbon on at least 20 miles of routes that will be closed or decommissioned on the SJNF.</p> <p><b>Obj 2.2.59</b> Within 5 years, utilize locally produced biochar to sequester carbon, to reduce erosion, and to enhance soil productivity and water retention on a minimum of 0.5 acre per year on the SJNF.</p>	<p>Soil penetrometer readings (before and after treatment), soil chemistry, and soil carbon results and comparisons with baseline values</p>	<p>Select locations forest-wide</p>	<p>Every 5 years</p>	<p>Project monitoring; TEAMS; Soil Disturbance Filed Guide</p>