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APPENDIX H

INVENTORY AND MONITORING STRATEGY

Goals and Objectives of Wilderness Monitoring

1) Monitor key variables to understand the conditions, risks and the threats to the wilderness resource. Establish benchmark or reference monitoring. Develop reporting and documentation techniques and protocol.

2) Monitor for change in conditions over time. Identify unacceptable adverse impacts. Determine when, where, and why changes are occurring.

3) Conduct inventory and monitoring with an integrated resource approach, to the best extent possible.

4) Provide information to improve management decisions, policies, actions and evaluate for effectiveness. Inform decisions that have an effect on the wilderness resources.

5) Monitor management strategies and actions, and assess the benefits and costs, in time, money, and effectiveness and to the wilderness character.

6) Engage in collaboration amongst managers, scientists, public, and academic institutions. Communicate with local, regional, and national agencies and all interested publics. Describe, communicate, and demonstrate the effects of management and use on the wilderness resource.

Monitoring Framework

Framework for Measuring Wilderness Quality

The Wilderness Act provides broad goals for management. In the Act and subsequent agency policy and direction, overriding themes include character, naturalness, experiential and social values and restraint. These are qualities that are difficult to define and measure. For the purposes of designing a monitoring framework, three primary attributes represent these components of wilderness quality: (1) wilderness character, (2) recreation/experiential and social, and (3) the biophysical components. Under these primary components are attributes, or variables that can be measured. This is then outlined to correlate with management direction, thus composing a framework for monitoring wilderness quality.

Table H.1. Indicators and Key variables

Biophysical	Recreation/Experiential and Social	Wilderness Character
Water Quality*	Solitude while camping	Recreation Use Trends
Soil Quality*	Campsite Density	Resource conditions and concerns (Limiting Factors)
Firewood availability	Day Use	User Trail Density/condition
Yosemite Toad*	Use patterns	Managerial presence
Bighorn Sheep disturbance*	Visitor Experience	Campsite condition density
Presence of TES and Petitioned for listing species*		
Key Benchmark Forage Utilization	Heritage Site conditions	
Key Benchmark Meadows Ecological State		
Range Readiness		

** These attributes are not specific to wilderness, but are monitored as a part of on-going monitoring for other programs and are significant resources in these wildernesses.*

Table H.2. Monitoring Framework

Variable	Management Direction	Monitoring Objective	Monitoring Technique	Frequency / Reporting Period
Campsite Condition	Monitor for trends and changes in conditions and conduct periodic assessments. If condition class deteriorates more than one class, contain the site, mitigate impacts and maintain site character.	Inventory sites and detect changes in site conditions over time.	Campsite inventory and monitoring protocol.	% of sites annually, five year rotation
Campsite Density	Category 3: Density of sites will not exceed 4 sites per acre. Category 2 - Density of sites will be moderate, not to exceed 3 sites per acre. Category 1 - Density of sites will be low, not to exceed 1 site /acre.	Detect resource conditions and experiential conditions of campsites	GPS point data associated with campsite inventory	% of sites annually
Firewood availability	Monitor impacted areas biannually for change, when 50 percent of campsites change from a "1", "2", or "3" to "4" rating for firewood availability, consider for closure to campfires. Consider campfire closure in areas where more than half of the duff, litter, and fine woody material is removed to meet the intent of the regional soil quality standards for nutrient cycling.	Determine health of soils and vegetation, detect trends.	Rating system included in campsite inventory	% of sites annually
Occupied Campsite	Identify benchmark points for monitoring occupied campsites. Do not exceed standards more than 20% of the sample or 3 times a season.	Monitor for compliance with standards for occupied campsites.	Counts on sites occupied either through ranger reports and/ or visitor reporting mechanisms	Annual data collection
Visitor Experience	Assess changes in visitor use patterns over time to insure that permitting mechanisms do not influence patterns and that low use areas remain low use. If total use in any area increases by 50%, assess impacts associated with the use and make determination if further management actions may be needed to maintain desired characteristics.	Determine trends in visitor acceptance wilderness conditions and character	Visitor trip report	Periodic
User Trail Density	Allow a low density of user-created travel routes where suitable and where it meets management objectives.	Inventory for baseline conditions and for assessment	Forest Protocols	
User Trail Condition	Evaluate the need to allow, eliminate, stabilize, or add the user-created trail to the Forest Trail System.	Determine if adverse impacts to soil and/or water quality are occurring.	Forest Protocols	% of trails every 5 years
Limiting Factors/ Threats	Identify limiting factors that may lead to site-specific restrictions, mitigations, or reductions in use.	Detect trends in resource concerns	Specialist field data and documentation of observations	On-going

Variable	Management Direction	Monitoring Objective	Monitoring Technique	Frequency / Reporting Period
Yosemite toad	Yosemite toad populations are located, survey the site to assess recreational impacts	Monitor for compliance with standards. Gather data on population locations and detect changes and effects on use over time	Specialist field data and documentation of observations protocol	Annual, follow recovery plan if/when listed
Bighorn Sheep disturbance	Monitor bighorn sheep populations to identify changes in occupied habitat and implement changes in management as necessary. Monitor human recreational use within bighorn sheep habitat to determine if additional management measures are necessary in areas outside the California Bighorn Sheep Zoological Areas.	Documentation of human caused effects and predation by cougar		Follow Recovery Plan
Heritage Site conditions	Implement the PA in order to 1) identify, monitor, and manage significant heritage resources; 2) continue consultation with affected tribes; and 3) coordinate heritage resource management activities with other interested parties.	Inventory of sites and condition of site. Detect change over time.	Monitoring protocol will be developed in consultation with affected Native American tribes	
TES and Petitioned for listing aquatic species	Determine effects of human activities on populations and habitat, the trends of TEPS species populations, and indicate the need for protective management and mitigation measures.	Gather data on population locations and detect changes and effects on use over time	MYLF, Lahonton and Paiute CTT	Annual, follow recovery plan when listed
Sensitive Plant species	Threatened, Endangered, Proposed and Sensitive species (TEPS) will be monitored to ensure protection. Where appropriate, management actions will be developed to help ensure their protection.	Gather data on population locations; determine effects from visitor use.	Specialist field data; documentation of observations on high priority species	Every 5-10 years, depending on species.
Noxious weeds	Prevent or minimize the introduction and establishment of weeds as a result of pack and saddle stock and erosion control projects.	Detect new occurances	Specialist and wilderness ranger data; documentation of population locations.	On-going
Key Benchmark Meadows Ecological State and Function	Determine ecological status on all key areas monitored for grazing utilization prior to establishing utilization levels. Use regional ecological scorecards and range plant list in regional range handbooks to determine ecological status.	Measure ecological state and transition and hydrologic function on key meadows and riparian areas.	Nested frequency, photo points, greenline, and PFC.	10% annually
Key Benchmark Meadows Forage Utilization	See Table under Rec Stock Forage: Maximum Allowable Utilization Standards for Key Species on Key Areas by Ecological State	Measure utilization	Percent use by weight on key forage species	30% annually
Range Readiness	Use “range readiness” criteria as a primary technique to establish grazing start dates for the annual season of packstock use on key areas.	Forecast grazing start dates	Plant phenology Soil firmness	Annually

Variable	Management Direction	Monitoring Objective	Monitoring Technique	Frequency / Reporting Period
Recreation Use Trend Recreation Use Trend	Monitor total use levels. If total use in any area increases by 50% or more, assess impacts associated with the use and make determinations if further management actions are needed to maintain desired characteristics.	Use levels and trends over time	Wilderness Permits	Annually
Commercial use trends	Review and adjust commercial allocations every five years.		Special use permitee tally sheets	Annually
Day Use	Consider evaluation of day use levels when changes of more than 20% occur.	Day use levels and trends	Registration and trail counters	5 years
Use patterns	Consider allowing quotas to limit party size if use patterns change in low use areas due to accommodation of party size.	Detect areas of crowding and congestion and trends over time	Post trip reporting	5 years
Water Quality	Meet or exceed State Water Quality Standards.	Compliance with Best Management Practices and evaluation of BMP effectiveness	Use regional protocols for BMP Evaluation Program	% of sites annually
Soil Quality	Take actions to limit soil displacement and erosion that results from human activity and authorized uses to a rate similar to natural erosion.	Compliance with R5 soil quality standards and guidelines	Compliance as proxied by Campsite condition protocol	% of sites annually

Informing Decisions

Provide assessments for project level NEPA. Use status and trends information from indicators above.

Assess if adverse impacts are occurring to wilderness character variables for categorically excluding the extraordinary circumstance of wilderness. Mitigate all actions that may affect wilderness values.

Where possible, display and demonstrate monitoring information that is pertinent to decision making.

Insure that proposed actions demonstrate no harm to the wilderness character and other ecological and social values of wilderness.

Evaluation

Annually, assess effectiveness of management activities, including monitoring accomplishments.

Every five years assess the effectiveness of trailhead quotas.

Appraise key indicators, determine costs and measure against benefits.

Evaluate administrative actions using minimum tool and minimum requirement assessments.

Communication

Summarize results of monitoring and effectiveness annually.

For the next five years, provide at least one public forum a year to present findings and results from the wilderness program, including data from monitoring and management activities and state of the effectiveness assessment. After five years, determine if this vehicle for informing the public brings value to the wilderness program.