



Appendix C

Wilderness
Character
Monitoring

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View from Forester Pass

NPS Photo

APPENDIX C:
WILDERNESS CHARACTER MONITORING STRATEGY

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WILDERNESS CHARACTER MONITORING STRATEGY

The wilderness character monitoring strategy at Sequoia and Kings Canyon National Parks (parks) is based on the interagency framework established in *Keeping it Wild: An Interagency Strategy to Monitor Trends in Wilderness Character Across the National Wilderness Preservation System* (Landres et al. 2008), of which the National Park Service (NPS) is a signatory. This monitoring strategy was developed specifically in support of the Sequoia and Kings Canyon National Parks Wilderness Stewardship Plan (WSP) and draft environmental impact statement (DEIS), but is expected to evolve over time as additional information is collected and analyzed and NPS guidance is developed. The Wilderness Character Assessment (Frenzel, E. and G. Fauth 2014) serves as the foundational background for this strategy by articulating what is special about the wilderness of Sequoia and Kings Canyon National Parks and what actions or issues degrade wilderness character.

This strategy was developed by the parks' WSP Interdisciplinary Planning Team (IDT) and other staff of the parks, the NPS, and other cooperating agencies. It was completed in conjunction with the development of a Wilderness Character Map. The Wilderness Character Mapping project was led by Aldo Leopold Wilderness Research Institute staff, Dr. Peter Landres and James Tricker (both of U.S. Forest Service), with significant involvement of park staff and cooperators. The final report of the mapping project was published as a NPS Natural Resource Technical Report in spring 2014 (Tricker et al. 2014).

LAW AND POLICY

The 1964 Wilderness Act established the National Wilderness Preservation System (NWPS) “for the protection of these areas, the preservation of their wilderness character” (Section 2(a)). Congress (United States Congress 1983) and legal scholars (McCloskey 1999; Rohlf and Honnold 1988) confirmed that the primary affirmative legal mandate is to preserve the wilderness character of all areas designated as wilderness. Howard Zahniser (1962), principal author of the Wilderness Act, emphasized this when he wrote, “The purpose of the Wilderness Act is to preserve the wilderness character of the areas to be included in the wilderness system, not to establish any particular use.” Likewise, the NPS *Management Policies 2006, Chapter 6, Wilderness Preservation and Management*, states that “The purpose of wilderness in the national parks includes the preservation of wilderness character.” Director’s Order and Reference Manual 41: Wilderness Stewardship (NPS 2013) states: “each wilderness park will integrate the concept of wilderness character into park planning, management, and monitoring in order to preserve the enduring benefits and values of wilderness for future generations.” The Director’s Order also references the NPS Wilderness Character User Guide (NPS 2014b) for additional direction.

Monitoring Goal and Objectives: The overall goal of wilderness character monitoring at Sequoia and Kings Canyon National Parks is to preserve or potentially improve wilderness character now and in the future.

The objectives of this monitoring strategy are to:

- Evaluate and select a set of measures that are relevant, cost-effective, and tied to preserving wilderness character;
- Periodically compile existing data and/or collect new data at reasonable frequencies to determine trends in these measures;
- Use these trends to assess the status of wilderness character and report that status to the park superintendent, Pacific West Regional Office, and Washington Office; and,

- Where applicable, compare measure outputs and/or trends with the standards established in the WSP (or other plans) and implement prescribed management actions as necessary to achieve desired conditions.

FUNCTIONAL DEFINITIONS

Keeping it Wild (KIW) (Landres et al. 2008) defines the following key terms which are included here for ease of reference. This interagency monitoring framework is based on hierarchically dividing wilderness character into successively finer elements. These elements, starting from wilderness character, are:

Qualities: Primary elements of wilderness character that link directly to the statutory language of the 1964 Wilderness Act. In this framework, all four primary qualities (and the "features of value," or other quality) are necessary to assess trends in wilderness character and each wilderness would be required to report the trend for each quality.

Monitoring Questions: Major elements under each quality that are significantly different from one another. Established framework monitoring questions shape the monitoring actions in order to answer particular management questions. In this context, monitoring questions are similar to monitoring goals. Each wilderness and agency would be responsible for reporting on the trend for all eight monitoring questions. Note: these are established and set per *Keeping It Wild* (Landres et al. 2008).

Indicators: Distinct and important elements within each monitoring question. In nearly all cases, there is more than one indicator under a monitoring question. Each wilderness and agency would be responsible for reporting on the trend for all 13 indicators. Note: these are established and set per *Keeping It Wild* (Landres et al. 2008).

Measures: A specific aspect of wilderness for which data are collected to assess trend of an indicator. In nearly all cases, there is more than one measure to provide each agency (and potentially each wilderness within an agency) a range of options for assessing trend in the indicator. Some of these measures are more accurate and precise but costly, while others are less accurate and precise but easier and less expensive to monitor.

SELECTION OF MEASURES

Measures were identified and developed in two work efforts. The first was the result of the parks Wilderness Character Mapping project. Starting in November of 2012 and extending into early 2014, several meetings of parks interdisciplinary staff, along with multiple phone calls, were conducted to develop a comprehensive list of ongoing monitoring efforts, to define how those efforts might inform wilderness preservation, and to identify areas where monitoring is not occurring but would prove informative to wilderness stewardship actions.

Potential measures and data sources were also discussed with the staff of the Sierra Nevada Network Inventory and Monitoring Program (SEIN I&M) and the US Geological Survey Sequoia-Kings Canyon Field Station staff (USGS) to identify opportunities to use existing monitoring efforts without having to start new programs.

Over the time span of the Wilderness Character Mapping project, numerous preliminary measures were identified for all four primary qualities (untrammled, undeveloped, natural, and outstanding opportunities for solitude or primitive and unconfined recreation). Note that the cultural component has been included in the specialized fifth "other features of value" quality. These numerous measures were then tested to ensure that they could be spatially expressed and that their supporting data were of good

quality and preferably had been collected for a number of years, e.g., three to ten. The measures were also tested for relevance and feasibility of application. The datasets that support these measures will continue to be collected, summarized, and analyzed periodically to assess trends in wilderness character. The measures are listed and summarized in table C-1 below (from Tricker et.al. 2014). Note also that the Keeping It Wild measures do not always directly correlate or have a parallel measure from these parks” mapping project.

A second and more targeted set of measures was developed as a direct result of the WSP process. In May 2012, a three-day workshop was conducted in the parks, led by the NPS Denver Service Center Visitor Use Team (Kerri Cahill, lead). The purpose of the workshop was to look at properly incorporating visitor use management techniques and wilderness character preservation into the WSP. The workshop focused on indicators and measures that were related to visitor use, namely influences of visitors on other visitors, or visitors on resources. The workshop was attended by multiple park staff, many of whom continued with involvement in the parks’ WSP process, including the members of the WSP IDT. A subgroup of the IDT and select park staff continued to work on visitor use and capacity issues through the remainder of 2012 and into 2014. This subgroup specifically examined visitor capacity, both for ways to monitor it as well as approaches to mitigate impacts through management actions. In order to focus the new monitoring actions on those that are realistic to implement through the WSP, the working group proposed two primary aspects of visitor use to monitor: trail encounters and campsite conditions. Standards for these two measures have been established for all action alternatives of the WSP and would be applied in the future. It was also determined to continue to analyze wilderness permit data as this pertains to overall use levels at specific locations to assist in identifying use trends (See “Appendix A - Visitor Capacity”).

The WSP IDT also evaluated past efforts to monitor stock use and has determined to continue a series of monitoring actions that have been occurring over the past two to three decades. These are more fully explained in appendix D - Stock Use and Meadow Monitoring and Management Strategy. These measures have been included as part of an overall Wilderness Character Monitoring Strategy in table C-2 below. These would continue to be monitored over time, analyzed regularly, and results reported to park management with recommendations to ensure the preservation of wilderness character.

The IDT also determined that a series of measures should be examined and analyzed on a regular basis in order to detect trends in all qualities of wilderness character. The additional measures selected and summarized in table C-2 have been chosen from among the myriad monitoring efforts being conducted in the parks to better inform park management of trends in wilderness character qualities. It is envisioned that some of these measures may also become part of future geospatial re-mapping of wilderness character. At this time, no standards have been developed for these measures.

Table C-1: Wilderness Character Qualities, Indicators, Measures, and Mapping Measures from Sequoia and Kings Canyon National Parks' Geospatial Mapping Activity

Quality	KIW WC Indicator ¹	KIW WC Measures	WC Mapping Measures for SEKI ²
Untrammeled	Actions authorized by the federal land manager that manipulate the biophysical environment	Number of actions to manage plants, animals, pathogens, soil, water, or fire	Non-native plant removal/ control Restoration of disturbed lands
		Percent of natural fire starts that received a suppression response	Naturally ignited fires that received a suppression response Prescribed fires (management ignited)
		Number of lakes and other water bodies stocked with fish	Non-native fish removal
	Actions not authorized by the federal land manager that manipulate the biophysical environment	Number of unauthorized actions by agencies, citizen groups, or individuals that manipulate plants, animals, pathogens, soil, water, or fire	Marijuana grow sites
Natural	Plant and animal species and communities	Abundance, distribution, or number of indigenous species that are listed as threatened and endangered, sensitive, or of concern	Bighorn sheep unoccupied former habitat
		Number of extirpated indigenous species	Absence of frogs in former habitat
		Number of nonindigenous species	Presence of non-native fish in naturally fishless water bodies
		Abundance, distribution, or number of invasive non-indigenous species	Magnitude of invasion by non-native plants
		Number of acres of authorized active grazing allotments and number of animal unit months (AUMs) of actual use inside wilderness	Number of animal unit nights (AUNs) in meadows with stock grazing
		Change in demography or composition of communities	Presence of blister rust
	Physical resources	Visibility based on average deciview and sum of anthropogenic fine nitrate and sulfate	Nitrogen deposition
		Ozone air pollution based on concentration of N100 episodic and W126 chronic ozone exposure affecting sensitive plants	Ozone concentrations
		Acid deposition based on concentration of sulfur and nitrogen in wet deposition	Night sky darkness

Quality	KIW WC Indicator ¹	KIW WC Measures	WC Mapping Measures for SEKI ²	
Natural	Physical resources	Extent and magnitude of change in water quality	No corresponding measure identified	
		Extent and magnitude of disturbance or loss of soil or soil crusts	No corresponding measure identified	
		Departure from natural fire regimes averaged over the wilderness	Departure from historic fire regime	
	Biophysical resources	Extent and magnitude of global climate change	No corresponding measure identified	
		Area and magnitude for pathways for movement of non-indigenous species into the wilderness	Effects of human infrastructure on natural	
		Area and magnitude of loss of connectivity with the surrounding landscape	No corresponding measure identified	
		Index of authorized physical development	Wilderness buildings	
Undeveloped	Nonrecreational structures, installations, and developments	Index of authorized physical development Index of unauthorized (user-created) physical development	Long-term monitoring/ science equipment	
			Administrative support equipment	
			Benchmarks	
			Authorized non-NPS infrastructure	
	Inholdings	Inholdings Area and existing or potential impact of inholdings	Inholdings	
	Use of motor vehicles, motorized equipment, or mechanical transport	Type and amount of administrative and nonemergency use of motor vehicles, motorized equipment, or mechanical transport	Administrative helicopter use	
		Type and amount of emergency use of motor vehicles, motorized equipment, or mechanical transport	Emergency helicopter use	
		Type and amount of motor vehicle, motorized equipment, or mechanical transport use not authorized by the federal land manager	Administrative 4(c) authorized through a minimum requirement analysis (MRA)	
	Loss of statutorily protected cultural resources *	Amount of visitor use	Number and severity of disturbances to cultural resources.*	No corresponding measure identified
			Visitor use nights/ quota information/ party size	

Quality	KIW WC Indicator ¹	KIW WC Measures	WC Mapping Measures for SEKI ²
Solitude or Primitive and Unconfined Recreation	Remoteness from sights and sounds of people inside the wilderness	Amount of visitor use	Outfitter use nights
		Number of trail contacts	No corresponding measure identified
		Number and condition of campsites	Campsite inventories
		Area of wilderness affected by access or travel routes that are inside the wilderness	Travel time
			Viewshed
		Area of wilderness affected by access or travel routes that are adjacent to the wilderness	No corresponding measure identified
	Remoteness from occupied and modified areas outside the wilderness	Night sky visibility averaged over the wilderness	Viewshed outside of wilderness
		Extent and magnitude of intrusions on the natural soundscape	Soundscapes
		Extent and magnitude of intrusions on the natural soundscape	Overflights/ low flyers
		Type and number of agency-provided recreation facilities	Trail class
	Facilities that decrease self-reliant recreation	Type and number of agency-provided recreation facilities Type and number of user-created recreation facilities	Toilets for visitors
			Designated campsites
			Food storage boxes
			Bearpaw Meadow High Sierra Camp and Pear Lake Ski Hut
			No corresponding measure identified
		Type and extent of management restrictions	Access/ use restrictions
Management restrictions on visitor behavior	Type and extent of management restrictions	Recreational stock restrictions	

SEKI = Sequoia and Kings Canyon National Parks

¹KIW WC" refers to the publication *Keeping it Wild* (KIW) and wilderness character (WC).

²WC Mapping Measures for SEKI refers to those incorporated in the Wilderness Character Mapping project, 2012-2014, led by the Aldo Leopold Wilderness Research Institute, Dr. Peter Landres and James Tricker.

* = In *Keeping it Wild* (2008), Landres et.al. placed cultural resources in the undeveloped quality. However, in 2012, the NPS Wilderness Character Integration Team proposed that such values be considered as an "Other Quality" to be determined by the parks and the team proposed indicators and measures for use with cultural and paleontological resources. These indicators and measures would be used where these resources have been determined to be integral to wilderness character. During the geospatial modeling process in 2013, a determination, consistent with the above national direction, was made to not include cultural resources in the Undeveloped quality. It was also excluded from the geospatial modeling activity due to sensitivity and lack of knowledge of resources in a spatial context. Current national trends are to consider cultural resources, along with "other features of value," as a fifth quality of wilderness character.

Table C-2: Monitoring Actions to Preserve of Wilderness Character in Sequoia and Kings Canyon National Parks as Part of the Implementation of the Wilderness Stewardship Plan

Quality	Indicator	SEKI Measure	Frequency and data source
Untrammeled	Actions authorized by the federal land manager that manipulate the biophysical environment	Number of actions taken that manipulate the wilderness environment as represented by MRAs completed and approved and research permits approved.	Annual review from completed MRAs and research permits.
	Actions not authorized by the federal land manager that manipulate the biophysical environment	Number of incidents of unauthorized action, e.g., marijuana grow sites.	Annual review of case incident reports and wilderness ranger end of season reports.
Natural	Plant and animal species and communities	Meadow conditions – see appendix D (Stock Use and Meadow Monitoring and Management Strategy)	Annual residual biomass, species composition, and bare ground monitoring data – See appendix D.
	Physical resources	Concentrations of nutrients and other water chemistry parameters in lakes	Annual, SIEN I&M lake monitoring
		Wet deposition – acid and mercury	Annual, National Atmospheric Deposition Program
	Biophysical resources	Campsite condition with metric of Weighted Value per Campable Mile (WVCM) within designated travel subzones	Periodic (every 5 years) campsite inventory and condition assessment for designated sampling areas.
Undeveloped	Nonrecreational structures, installations, and developments	Number of nonrecreational structures, e.g., food storage boxes, ranger stations, radio repeaters (non-historic).	Periodic (every 5 years) re-inventory and count of structures and installations.
		Number of research/science installations, e.g., tree tags, plot markers, samplers, meteorological devices	Periodic (every 5 years) inventory and count of science-based installations.
	Inholdings	Acreage of inholdings	Periodic, every 5 years, compilation of acres of inholdings.
	Use of motor vehicles, motorized equipment, or mechanical transport	Number of actions taken that involve the use of motor vehicles, motorized equipment, mechanical transport, or landing of aircraft as represented by MRAs completed and approved, research permits approved and helicopter use.	Annual review from MRAs, research permits, Annual Aviation Report, and helicopter landing tracking data.

Quality	Indicator	SEKI Measure	Frequency and data source
Opportunities for Solitude or primitive and unconfined recreation	Remoteness from sights and sounds of people inside the wilderness	Numbers of trail encounters on designated trails or routes measured as number of people encountered per hour	Annual encounter sampling in designated areas. Data to be compiled for analysis every 5 years.
		Overall visitor use nights per year	Annual compilation from wilderness permit data. Analyzed every 5 years.
		Overall stock use nights per year	Annual compilation from stock reporting cards, administrative reporting, commercial use authorizations reports, wilderness ranger end of season reports, and wilderness permits. Analyzed every 5 years.
	Remoteness from occupied and modified areas outside the wilderness	Low-flying aircraft reports.	Annual compilation from submitted field reporting and response from Edwards Air Force Base (AFB) air traffic control (TRACON). Analyzed every 5 years.
	Facilities that decrease self-reliant recreation	Number of agency-provided recreation facilities (e.g., privies/restrooms, bridges).	Periodic (every 5 years) re-inventory and count of recreational facilities/installations/structures.
	Management restrictions on visitor behavior	Type and extent of management restrictions in wilderness (e.g., campfire and night limits)	Compiled annually from the Superintendent's Compendium.
Other	Deterioration or loss of cultural resources integral to wilderness character	Number of unauthorized actions that result in disturbances to cultural resources (e.g., looting, vandalism)	Annual review of case incident reports and wilderness ranger end of season reports.

ADDITIONAL MONITORING ACTIVITIES TO INFORM WILDERNESS CHARACTER PRESERVATION

Sequoia and Kings Canyon National Parks have a robust and diverse array of monitoring activities occurring. The parks' division of Resource Management and Science (RMS) regularly conducts monitoring on a variety of resources. This is supported by other formal monitoring efforts of the NPS Sierra Nevada Network Inventory and Monitoring Program, by the in-park USGS Field Station, by independent researchers, and by the efforts of other park operations, primarily the Division of Visitor, Fire and Resource Protection, and the Division of Maintenance and Construction. Below is a list of regularly occurring formal and informal monitoring efforts that relate to wilderness character preservation.

NPS, Sequoia and Kings Canyon National Parks

Division of Resource Management and Science

- Mountain Yellow-legged Frog (MYLF) Monitoring: Assess effects of management actions in restoring MYLF populations
- Little Kern Golden Trout Monitoring: Document and assess annual and long-term changes in populations
- Long-term Fish Population Monitoring: Evaluate effects of human access and angling regulations on populations
- Bear Incident Monitoring: Track temporal and spatial trends of bear activities and assess effectiveness of management and educational efforts
- Long-term Alpine Vegetation and Temperature Monitoring: Discern trends in species diversity and temperature to assess and predict trends/losses in biodiversity and other threats to alpine ecosystems
- Wilderness Meadow Repeat Photography: Document long-term changes in meadow vegetation and morphology
- Fire and Giant Sequoia Forest Structure, Regeneration, and Fuels Monitoring: Detect and examine changes in forest vegetation following reintroduced fire and subsequent fires
- Fire and Red Fir Forest Dynamics Monitoring: Document conditions and trends in red fir forest dynamics, including fuels, forest tree size and age structure, regeneration, and mortality. Also changes in vegetation and fuels after recently reintroduced fire.
- Fire Effects Monitoring: Measurements in a variety of forest types determine whether vegetation fuel loads, fire severity, and forest structure (such as tree density and size) targets are being met.
- Exotic Plant Management and Monitoring: (1) Document location and abundance of exotic plant infestations, (2) document management actions, (3) document exotic plant taxa and their priorities for management, (4) summarize yearly accomplishments, (5) monitor effectiveness of control actions over time.
- Hydrologic Benchmark Network: Provide long-term measurements of streamflow and water quality in areas that are minimally affected by human activities. These data are used to study long-term trends in surface water flow, water chemistry, aquatic biology, and soil chemistry and serve as a benchmark against which to compare changes in flow and chemistry in developed watersheds.

- Impact of grazing on ten meadows – long-term (occasional): Initially (1965) to examine ten selected meadows in Sequoia and Kings Canyon National Parks to determine as much as possible their current condition, trends in condition, potential causes of such trends, and to make recommendations for future management of the meadows. Subsequent visits to these sites document changes in vascular plant species composition within selected meadows over time.
- Vegetation Change – (occasional): Initially (1969) to quantitatively describe the woodlands and forests, and to qualitatively describe vegetation changes resulting from fire suppression and grazing. Revisits to determine how the vegetation had changed over a 27-year period.
- Vascular Plant Inventory (baseline data, 1985): A plot-based parkwide survey of vascular plants using a randomized systematic sampling design based on 1 km grid intersections. In addition to a suite of vegetation measurements, data were collected on vertebrates either observed from the plots or detected through scat or other sign. A limited amount of small mammal, reptile and amphibian trapping was conducted on a subset of plots. The purpose of this systematic, plot-based inventory was to detect and describe the distribution of vascular plants, vertebrate animals, and soils throughout the parks. It has limited, occasional revisits.
- Western Pond Turtle (adjacent to wilderness): Populations are monitored on the North Fork of Kaweah River and a tributary of the Middle Fork of the Kaweah to determine condition of the population and long-term trends in body condition, age structure, and operating sex ratios.
- Wet Deposition – acid precipitation – (partially in wilderness): To determine spatial patterns and temporal trends in chemical deposition in support of effects research, particularly impacts on aquatic and terrestrial ecosystems. To produce the long-term data necessary to determine temporal trends and inform our understanding of the effects of this stressor on ecosystems.
- Visibility (adjacent and overlooking wilderness): Repeat photography to document visibility events and trends as an important aspect of evaluating existing or potential impairment in Class 1 and other visibility-sensitive areas.
- Wet deposition – mercury – (adjacent to wilderness): To monitor mercury, which can reach toxic levels in organisms at the top of the food web, like predatory fish and birds. The data are used to develop information on spatial and seasonal trends in mercury deposited to surface waters, forested watersheds, and other sensitive receptors.

Other Park Divisions

- Visitor, Fire, and Resource Protection: Wilderness and trailhead rangers monitor the effects of visitors and administrative actions on wilderness quality and resources. Report findings by direct contact with managers or through end of season reports. To identify trends in use, and to detect and mitigate impacts.
- Snowpack Monitoring: Assess changes in water availability (in partnership with the State of California)
- Maintenance and Construction: Trails maintenance staff conduct field work to monitor effects of use on trails and associated resources. Report findings to park management through supervisory chain. To identify trends in use, and to detect and mitigate impacts.

NPS – Sierra Nevada Network Inventory and Monitoring Program

- Landbird Monitoring: Assess bird population trends and changes in distribution

- **Lake Monitoring:** Assess trends in ecosystem health by monitoring water chemistry, lake level, and amphibians
- **Forest Dynamics Monitoring:** In whitebark pine and foxtail pine forests, determine status and trends in (1) Tree species composition and structure; (2) Tree species birth, death, and growth rates; (3) Incidence of white pine blister rust and level of crown kill; (4) Incidence of pine beetle and severity of tree damage; (5) Incidence of dwarf mistletoe and severity of tree damage; and (6) Cone production.
- **Wetlands Ecological Integrity Monitoring:** Provide basic information on the condition of targeted wetlands (wet meadows and fens), and evaluate long-term trends in vegetation composition and structure, macroinvertebrates, and groundwater level.
- **White pine blister rust:** More than 150 plots were established from 1995-1999 to measure and map white pine species for long-term monitoring, and evaluation for white pine blister rust (*Cronartium ribicola*) infection to estimate the incidence and severity of effect of blister rust upon the populations of these species within the parks' boundaries. These permanent plots were established as a baseline and can be re-surveyed as funds are available.

U.S. Geological Survey -- Sequoia-Kings Canyon Field Station

- **Forest Demography Monitoring:** Assess changes in forest structure and population dynamics related to mortality, recruitment, disease, insect and weather for a variety of forest types

NPS Cooperative Efforts

- **Christmas Bird Count:** Assess trends in bird populations and species composition (conducted by non-government entities)
- **Bighorn Sheep Monitoring:** Assess sheep populations to aid in recovery (California Department of Fish and Wildlife is lead agency)
- **Peregrine Falcon (adjacent to wilderness):** Traditional nesting sites are monitored at Chimney Rock by U.S. Forest Service and Moro Rock (in the parks) annually to observe any potential conflicts between peregrine falcons and rock climbers during the breeding season. Occupancy, nesting activity, number of young, and successful fledglings are monitored to determine peregrine activity and nesting success.

IMPLEMENTATION OF MONITORING STRATEGY

In order to ensure that monitoring and other reported data and information are analyzed, reviewed and used to implement changes in wilderness stewardship, the wilderness coordinator will facilitate at least one annual meeting of the wilderness IDT, generally referred to as the annual Wilderness Operations Meeting, to review monitoring results and other wilderness stewardship issues. The wilderness coordinator, in cooperation with the parks' plant ecologist will also facilitate an annual Meadow Management Meeting to review monitoring results specific to meadows and stock management. Any proposed changes in management that arise from these meetings will result in a proposal for change(s) in wilderness operations to the park superintendent

Wilderness Coordinator: This position has the primary responsibility to oversee the wilderness character monitoring program, including soliciting data and assistance from other programs in a timely fashion, compiling the supporting documentation from existing data sources, validating the results of the monitoring effort, and generating reports periodically for submission to the park superintendent and other

NPS offices, as requested. The wilderness coordinator will regularly review this strategy every 5 years and work with the wilderness IDT to update it as necessary to keep in step with NPS policy requirements.

Wilderness Interdisciplinary Team: The parks' wilderness IDT will serve as the primary review body for the monitoring of results and will also be the forum for discussions regarding appropriate use of and access to databases needed to monitor trends in wilderness character. This group will also be charged with analyzing any negative trend in any quality of wilderness character and making recommendations for management actions to correct the trend, drawing from the actions articulated in the WSP and from current best management practices. The wilderness IDT will also review the on-the ground monitoring program and identify any additional measures needed for effective monitoring.

For the purposes of the Annual Wilderness Operations Meeting, the wilderness coordinator will facilitate, and participants will include: park division chiefs; public affairs specialist; district rangers; sub-district rangers; RMS branch chiefs; ecologist (science coordinator); Geographic Information System (GIS) specialist; plant ecologist; biological science technician (meadows); facility manager for roads and trails; trails supervisors (Kings and Sequoia); fire management officer; aviation officer (Sequoia FMO); fuels specialist; telecommunications manager; Wilderness Office staff; and environmental protection specialist. If scheduling precludes the attendance of the above, they may delegate a proxy for participation. Invitees will include: park superintendent, management assistant; and other park staff that work in or have an interest in wilderness management.

For the purposes of the Annual Meadow Management Meeting, the plant ecologist and the wilderness coordinator will facilitate. Participants will include park division chiefs (Maintenance and Construction; Visitor, Fire and Resource Protection; and Resources Management and Science); district rangers; sub-district rangers; RMS branch chiefs (Biological and Ecological Diversity and Vegetation Management); biological science technician (meadows); facility manager for roads and trails; trails supervisors (Kings and Sequoia); and Wilderness Office staff. If scheduling precludes the attendance of the above, they may delegate a proxy for participation. Invitees will include: park superintendent, management assistant, and park staff that work in or have an interest in meadow management.

Park Superintendent: The superintendent, or at their delegation the parks' Leadership Team, will be the recipient of monitoring results and is responsible for taking action as necessary to preserve or improve the qualities of wilderness character.

REFERENCES

Frenzel, E. and G. Fauth

- 2014 Wilderness Character Assessment: An examination of the characteristics and conditions of designated and proposed wilderness in Sequoia and Kings Canyon National Parks. National Park Service, Sequoia and Kings Canyon National Parks. Unpublished internal document.

Landres P., C. Barns, J. G. Dennis, T. Devine, P. Geissler, C. S. McCasland, L. Merigliano, J. Seastrand, and R. Swain

- 2008 Keeping It Wild: An Interagency Strategy to Monitor Trends in Wilderness Character Across the National Wilderness Preservation System. General Technical Report RMRS-GTR-212. Rep. General Technical Report RMRS-GTR-212, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, CO.

McCloskey, M.

- 1999 Changing views of what the wilderness system is all about. *Denver University Law Review* 76:369–381.

National Park Service (NPS)

- 2013 Directors Orders #41: Wilderness Stewardship. U.S. Department of Interior, National Park Service.
- 2014a Wilderness Stewardship Plan Handbook, Planning to Preserve Wilderness Character. U.S. Department of Interior, National Park Service. WASO 909 122875; January 2014.
- 2014b Keeping it Wild in the National Park Service: A User Guide to integrating Wilderness Character into Park Planning, Management, and Monitoring. U.S. Department of Interior, National Park Service. WASO 909/121797; January 2014.

Rohlf, D., and D. L. Honnold

- 1988 Managing the balance of nature: The legal framework of wilderness management. *Ecology Law Quarterly* 15:249–279.

Tricker, J., P. Landres, G. Fauth, P. Hardwick, and A. Eddy

- 2014 Mapping wilderness character in Sequoia and Kings Canyon National Parks. Natural Resource Technical Report NPS/SEKI/NRTR—2014/872. National Park Service, Fort Collins, Colorado.

Zahniser, H.

- 1962 Hearings before the Subcommittee on Public Lands of the Committee on Interior Affairs, House of Representatives, 87th Congress, 2nd session, 7–11 May, serial no. 12, part IV.

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