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California



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FRONT COVER
Bubbs Creek Canyon
Photo Courtesy of Rick Cain

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Appendix A

Visitor Capacity

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Bridge in the Rae Lakes area
NPS Photo

APPENDIX A:
VISITOR CAPACITY

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VISITOR CAPACITY

Visitor capacity concerns the type and amount of recreation and other public use that can be accommodated while sustaining the desired resource and visitor experience conditions, that is, the preservation of wilderness character. This appendix addresses visitor capacity in compliance with the Wilderness Act and NPS Management Policies 2006 (8.2.1, 8.2.2ff). This appendix describes how the Sequoia and Kings Canyon National Parks' Wilderness Stewardship Plan (WSP) will address visitor capacity in the parks' wilderness.

The alternatives presented in chapter 2 differ with regard to the types and amounts of use the wilderness in Sequoia and Kings Canyon National Parks (the parks) could receive and the management actions and infrastructure needed to support that use. The alternatives address management of visitor use and visitor capacity in wilderness by specifying the types and maximum levels of use that would occur under each alternative. Some alternatives may provide greater emphasis of certain wilderness character qualities and other resources, as described below. In addition, some alternatives would provide for public visitation and use at amounts higher than allowed in other alternatives in order to provide the public with a range of options regarding visitation levels and related visitor experiences. Under each alternative, however, wilderness character would be fully protected from impairment.

A discussion of visitor capacity is provided below, along with a description of how visitor capacity was determined for each management alternative described in chapter 2. Additionally, this appendix summarizes the actions that would be taken with each alternative to ensure that wilderness character is protected based on the types and amounts of use proposed.

REQUIREMENTS OF THE WILDERNESS ACT AND IMPLEMENTING GUIDELINES

The Wilderness Act requires that designated, federally managed wilderness areas "shall be administered for **the use and enjoyment of the American people** in such manner as will leave them **unimpaired for future use and enjoyment as wilderness**, and so as to provide for the protection of these areas, [and] **the preservation of their wilderness character**…" (bold added).

The Wilderness Act does not have a specific requirement to determine or establish visitor capacity; however, NPS *Management Policies* 2006 states: "The wilderness management plan will identify desired future conditions, as well as establish indicators [i.e., measures], standards, conditions, and thresholds beyond which management actions will be taken to reduce human impacts on wilderness resources" (6.3.4.2), and "Visitor carrying capacity is the type and level of visitor use that can be accommodated while sustaining the desired resource and visitor experience conditions in the park. . . . Superintendents will identify visitor carrying capacities for managing public use. . . . [and] will also identify ways to monitor for and address unacceptable impacts on park resources and visitor experiences" (8.2.1). Visitor capacity includes managing all components of visitor use (amounts or levels, types, behavior, timing, and distribution). It is also worth noting that any use comes with some level of impact. It is the responsibility of the managing agency to determine what level of impact is acceptable and what actions are needed to keep impacts within acceptable limits.

PROCESS TO ADDRESS VISITOR CAPACITY

The parks' Wilderness Stewardship Plan Interdisciplinary Team addressed visitor capacity using the process described below. Their efforts were approved by the parks' Leadership Team and Pacific West Region leadership. Development of the parks' WSP included several steps to determine the types and

amounts of visitor and other public use that the Sequoia-Kings Canyon and John Krebs wildernesses and proposed wilderness in the parks could sustain without unacceptable impacts to its wilderness character. An explanation of each step in the establishment of visitor capacity in the wilderness-stewardship planning process follows.

Step 1. Define Wilderness Character: These parks have used several key documents that clarify the meaning of wilderness character and provide guidance for its integration into wilderness stewardship and planning. These include: *Keeping It Wild: an Interagency Strategy to Monitor Trends in Wilderness Character Across the National Wilderness Preservation System* (Landres et al. 2008; referred to as *Keeping It Wild*), *Wilderness Stewardship Plan Handbook, Planning to Preserve Wilderness Character* (NPS 2014b), and *Keeping it Wild in the National Park Service: A User Guide to Integrating Wilderness Character Into Park Planning, Management, and Monitoring* (NPS 2014a). Following law and policy, these documents provide a framework to ensure that public use, and the facilities to support that use, do not have unacceptable impacts on wilderness character (qualities are defined in "Chapter 1: Purpose and Need").

Step 2. Identify Issues: In this step, the NPS documented the baseline condition of the parks' wilderness character, and summarized it in the *Wilderness Character Assessment: An examination of the characteristics and conditions of designated and proposed wilderness in Sequoia and Kings Canyon National Parks* (E. Frenzel and G. Fauth, 2014). This assessment was based on an overview of existing research, monitoring information, and a series of targeted workshops and interviews with subject-matter experts. An important component of this assessment is the identification of foreseeable trends for each of the qualities that define wilderness character.

Step 3. Analyze Types and Levels of Use: Under the Wilderness Act, the NPS is to provide for public use and enjoyment of wilderness in a manner that is consistent with the preservation of wilderness character. Allowed uses involve "primitive" types of recreation and others "which are proper for realizing the recreational or other purposes of the areas." The public purposes are defined as: recreational, scenic, scientific, educational, conservation, and historical use (Wilderness Act §4(b)). Recreational use is the most significant subset of public use that occurs in the parks' wilderness.

During scoping for the plan, NPS planners asked the public to describe their experiences and preferences for their use and enjoyment of the wilderness. The parks' staff conducted two series of public meetings in conjunction with WSP public comment periods, in spring 2011 and fall 2012, to gather public input on wilderness issues, concerns, and preferences. The comments were grouped and consolidated in specific public comment summary reports (NPS 2012a and 2013a) and provided important feedback to the NPS regarding the level of public interest in different activities. This information provided feedback and awareness to planners on those wilderness uses that members of the public would like to see preserved as well as uses that the public may choose to see changed. The parks commissioned researchers to conduct a targeted visitor survey (S. Martin and J. Blackwell 2013), conducted other data-gathering and reviewed the findings of social research completed in similar settings for its relevance to wilderness use (G. Fauth and B. Tarpinian 2011; A. Watson et al. 1993; and B. Kantola 1975) in order to understand use patterns. These efforts provided additional insight into the types of activities and experiences visitors are engaged in and prefer and informed the decisions of the parks' management in the planning process.

Step 4. Develop Draft Alternative Concepts: NPS planners developed a draft set of concepts on which to base alternatives consistent with legal requirements, management issues, resource constraints, and public comments identified during the previous steps. These concepts were designed to continue proper types of use, per the Wilderness Act, and to preserve wilderness character by specifying the types and amounts of use that could occur while meeting established management standards and desired conditions that had been determined for wilderness character through the planning process.

A) Management Measures and Standards — In order to control the effects of public use on biophysical resources and experiential aspects of wilderness, the parks' staff adopted visitor-use *indicators* and *measures* to be monitored and identified *standards*:

- *Indicators* are distinct and important elements within each quality of wilderness character, which have measurable attributes that can be the focus of wilderness character monitoring. These function as categories that have one or more measures within them, and are established and defined in Keeping it Wild (Landres, et al. 2008). The indicators that are associated with this visitor capacity framework are:
    - Biophysical resources (as measured by campsite condition and meadow condition under the natural quality)
    - Remoteness from sights and sounds of people inside the wilderness (as measured by encounter frequency under the solitude or primitive and unconfined type of recreation quality)
- *Measures* are quantifiable aspects of wilderness resources or character; the NPS will periodically monitor measures. Measures for this visitor capacity framework are:
    - Weighted Value per Campable Mile (WVCM) for selected monitoring sites (and extrapolated across wilderness); these vary by travel/use zone and alternative. Weighted Value per Campable Mile is a metric that considers three factors of a travel subzone: length of shoreline of water courses and lakes; the number of campsites; and the condition class of the campsites. The final WVCM number is the result of a formulaic calculation of these three factors (per Cole and Parsons 2013; Parsons and Stohlgren 1987). [See page A-25 for a more detailed definition of WVCM.]
    - Grazing capacities (expressed as stock use nights) reflecting maximum utilization rates for all the parks' meadows open to grazing are presented in appendix D. Utilization rates vary according to meadow type and established management goals for each meadow. Grazing capacities (allowable stock use nights) are also adjusted to take into consideration factors that affect a given site's response to grazing, including susceptibility to erosion (measured as the amount of bare ground as well as observed trampling and streambank impacts).
    - Number of encounters with individuals per hour on 90% of peak season (quota season) days – these vary by use/trail class category and by alternative.
- Management *standards* are the minimum acceptable condition of a wilderness resource or an aspect of wilderness character (based on Manning 2007). If the *standard* is exceeded, then specific management actions will be taken to address the situation to ensure that the wilderness resource/character is protected and any deterioration of condition of wilderness resources and experiences is arrested and controlled. One such management action would be adjusting daily trailhead-entry quotas (see table A-3 on page A-15). *Standards* have been established at points that will maintain desired conditions and ensure the preservation of wilderness character. An out-of-standard condition does not imply that wilderness character is impaired, but rather that the desired condition identified in the WSP/FEIS is not being fully achieved. Standards vary by alternative and by subzone within alternatives. These are summarized in table A-4 on page A-26.

The parks also monitor the conditions of a wide variety of social, natural, and cultural resources. These measures inform management decisions about visitor capacity and serve as a source of information about wilderness character conditions, but they do not necessarily have explicit standards that trigger

management action (see definitions in chapter 1, and "Appendix C: Wilderness Character Monitoring Strategy"). Measures of wilderness character condition include:

- overall visitor use days (VUD) recorded from wilderness-permit data – these vary by alternative;
- low-flyers / overflights (affecting the wilderness quality of *solitude*);
- lake, forest, and/or other inventory-and-monitoring program elements (affecting the *natural* quality);
- minimum-requirement analyses (MRA) and reports (affecting the *undeveloped* and *untrammeled* qualities);
- fire-management actions and reports (affecting the *natural* and *untrammeled* qualities);
- aquatic ecosystem re-establishment / mountain yellow-legged frog actions (the *natural* and *untrammeled* qualities); and
- work-crew actions and support (affecting the *undeveloped* and *solitude* qualities).

Table A-1 lists the five wilderness-character qualities that define wilderness character and some of the conditions and activities that will be monitored and assessed over time to ensure their preservation.

B) Management Actions to Preserve Wilderness Character (control use levels) — For each established measure described above, the NPS has identified a variety of management actions that could or would be taken to ensure that wilderness character is preserved.

Using a number of the following management strategies and tools (i.e., actions) is usually the most-effective approach to addressing problems. Options include: collection of additional data to fully inform any decision; providing visitors with information and education; establishing and enforcing regulations of visitor activities, such as party-size limits; manipulating sites and designing infrastructure to accommodate use, such as trails or boardwalks; rehabilitating impacted areas; and implementing restrictions on use levels and access, such as trailhead quotas for wilderness use. There are many other management options. Management strategies and tools employed to protect wilderness character would differ, to some degree, between measures.

Step 5. Establish Visitor Capacities: The next step in the process involved establishing visitor capacities for each of the action alternatives (alternatives 2 through 5).

Overnight use – This category includes staying overnight in the parks' wilderness. It is expressed in terms of annual visitor-use days (VUD). VUDs are calculated from the visitor-use nights (VUN) reported on wilderness permits. As an overnight stay involves part of two days, one VUN is generally calculated as 1.25 VUD (based on the average stay of nearly four nights, which would equate to being in wilderness for five days). Annual overnight-use levels represent the total number of people added to the total number of VUNs in wilderness that year. VUDs are only calculated for overnight visits; not for day-use. Also, past permit data indicates that wilderness campsites and trailhead quotas will seldom be used to full capacity.

Day-use – This category involves people who visit the parks' wilderness only for the day; they spend the night outside the parks wilderness. Much of this use is concentrated near the trailhead (within five miles), although some day-use visitors hike up to 10 or more miles into wilderness to visit lakes or climb peaks. Some popular day-use destinations include Mist Falls, the Watchtower and Heather Lake (via Lakes Trail), Alta Peak, Mounts Langley and Whitney, Sawtooth Peak, and lake basins in the Mineral King area.

Table A-1: Monitoring of Wilderness Character Qualities

Monitoring	Wilderness Quality				
	Natural	**Untrammeled**	**Undeveloped**	**Opportunities for Solitude or Primitive and Unconfined Recreation**	**Other Features (Cultural Resources)**
Measures that include explicit standards for management action	- Campsite conditions (Weighted Value per Campable Mile by management sub-zone) - Grazing capacities (expressed as stock use nights) reflecting maximum utilization rates and site-specific factors for all the parks' meadows (appendix D).	N/A	N/A	- Trail Encounters (encounters per hour on 90% of quota-season days, by trail-class)	N/A
Measures that do not include explicit standards for management action but provide valuable information about visitor use and Wilderness Character condition	- Wilderness ranger end-of-season reports - Snow/precipitation data gathering - Wildlife surveys - Fire-ecology monitoring - NPS Inventory and Monitoring program; lakes, high-elevation forests, wetlands, birds, climate, and rivers - Air quality and pollutant deposition - Park-sponsored and independent research on: water quality, hydrology, forest health, fire, wildlife, climate, plant and animal invasives, caves, etc.	- Minimum Requirement Analyses (MRA) preparation and approval, specifically as they relate to manipulative actions (for both NPS and permitted researchers) to remove non-natives, introduce natives, remove specimens (sampling), and provide restoration actions. - Unauthorized actions (e.g., marijuana grow sites)	- Facility numbers and condition (FMSS - database) - Research installation numbers - Actions to remove unneeded facilities - Helicopter use inventories and assessments - Climbing installations (future) - Motorized tool use assessments	- Visitor Use Days (from permits) - Stock use nights - Full-quota events - Wilderness ranger end-of-season reports - Commercial Use Authorizations / Concession Use - Low-flyer reports - Visitor comment letters (may relate to other qualities as well) - Soundscapes and night-sky research and monitoring - Agency recreation structures - Use restrictions - Social trail observations	- Cultural-resource inventories/ assessments - Wilderness ranger end-of-season reports - Law-enforcement actions for cultural-resource violations

Day-use limits are not being established directly by this plan at this time. Use levels will be monitored at key locations and assessed in the future to determine if a change in management policy or action may be needed to preserve wilderness character. Management action, applied on a site-specific or a wider basis, may consist of targeted educational efforts; day-use quotas or permits; reduction in parking; or other management actions to reduce use to acceptable levels. Such future restrictions could be informed by a number of accepted methodologies for measuring use levels, such as the people-at-one-time (PAOT) measure, which refers to the total number of people at a single point in time within a specified area.

Step 6. Monitor to Ensure Standards Are Being Achieved: The final step in the process to implement visitor capacity includes monitoring and assessing data regarding the condition of wilderness character. While NPS staff designed each alternative to preserve wilderness character, some degree of impact will always result from visitor use (Cole 1990; Cole and Stankey 1997; Marion 1998; Hammit and Cole 1998; Cole et al. 2005, Manning 2007, McCool et al. 2007). It is therefore important to monitor conditions to ensure that impacts associated with public use do not degrade wilderness character.

Those measures which have established standards (campsite conditions and trail encounters, as well as stock use thresholds [see appendix D, table D-6]), would have annual reviews of data collected from monitoring efforts. If data indicates a trend leading to an out-of-standard condition, then corrective actions would be considered and recommended to park management.

For monitoring, review, and analysis of data and conditions related to stock use and meadows, see appendix D.

FACTORS LIMITING VISITOR CAPACITY

This section discusses the factors used to establish overall maximum amounts of use that may be allowed in the parks' wilderness without unacceptable impacts on wilderness character, whether biophysical or experiential. In determining maximum visitor capacity for each alternative, the parks' management took into account the variety of existing constraints that could affect both types and amounts of use.

Some alternatives would allow more people to visit the parks' wilderness, and some would allow fewer. The use levels reflect different possible visions for providing visitors a wilderness experience. These visions are based in large part on public comments received in the scoping phase of this process and in related research and findings (NPS 2012a and 2013a; Martin and Blackwell 2013; Fauth and Tarpinian 2011; Watson et al. 1993; and Kantola 1975). For example, alternative 4 envisions a visitor experience characterized by high levels of self-reliance and self-determination in the wilderness, while keeping access near present levels. In alternative 5, the total number of people allowed in the wilderness at any one time would be noticeably reduced from existing amounts to allow visitors even greater opportunities for solitude and remoteness, but this would also result in decreased visitor access. The level of visitor use that would be allowed under alternative 3 would be substantially more than that currently allowed under the no-action alternative 1 or the other action alternatives, resulting in greater visitor access but reduced opportunities for solitude. These represent different trade-offs in terms of values that have been expressed as important through public outreach and social-science research (Martin and Blackwell 2013).

The maximum visitor capacity of the parks' wilderness differs in each alternative and is limited by the following several factors:

- **Constraints on level of development:** The level of development that can be provided in wilderness is constrained by wilderness designation. Federally designated wilderness is described by the Wilderness Act as: "an area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation" (16 *United States Code* [USC] 1131-1136, Section 2(c)). This legal designation has the direct effect of constraining the level of developed infrastructure that may be provided. Agencies have authority, through provisions in Section 4(c), to add "developments" but only if they are determined necessary for the administration of the area. Thus an increase in development over that present in the wilderness at the time of designation is considered a degradation of the *undeveloped* quality.
- **Resource constraints and site suitability:** These constraints include topography, meadow and riparian areas, rare and sensitive plant and animal populations, scenic vista points, and cultural-resource sites. Generally, planning for visitor use and access in wilderness seeks to avoid excessive levels of use in these sensitive resource areas in order to prevent unacceptable impacts. The Wilderness Act speaks to this by stating that wilderness "generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable" and "may also contain other features of scientific, educational, scenic, or historical value" (16 *United States Code* [USC] 1131-1136, Section 2.(c)). Considering these mandates and factors, the WSP proposes various alternatives that allow different use levels with varying controls on locations, behaviors, and types of use while still preserving wilderness character and allowing reasonable access to the visiting public.
- **Wilderness experience:** Wilderness is to be a place where solitude and intimacy with nature play a key role in shaping the human experience. Observing too many other visitors can reduce a person's ability to access these wilderness experiences and thus might have a limiting effect on the amount of use that could be provided. Therefore, a constraint for visitor capacity is the ability of visitors to achieve "outstanding opportunities for solitude or a primitive and unconfined type of recreation" (16 United States Code [USC] 1131-1136, Section 2(c)). The Wilderness Act does not require that solitude be omnipresent in wilderness, but requires that there are "outstanding opportunities" to achieve the experience of solitude.

The visitor capacities proposed in the WSP are within the constraints discussed above because all known site constraints were factored into the development of each alternative. In every alternative, visitors could have a wilderness experience where they can view a naturally functioning environment (i.e., land with a primeval character), and have easily obtained opportunities to experience solitude or a primitive and unconfined type of recreation.

DETERMINING ALTERNATIVE VISITOR CAPACITIES

To address visitor capacity, all aspects of use and the effects of use on wilderness character must be considered, including the need for additional regulations or developments to provide for resource protection and preservation. For example, alternative 3 allows for an increase in visitor-use levels above those in alternative 1 (i.e., current levels). Alternative 3 therefore requires retaining or adding to existing recreational infrastructure, such as food-storage boxes and privies, and increasing regulations, such as adding night limits in specific locations, in order to preserve the natural quality of wilderness given the higher potential amounts of visitor use. While each alternative emphasizes different factors related to visitor use and enjoyment and wilderness character, all would preserve wilderness character in an unimpaired condition. A summary of each alternative's proposed visitor capacity is described in the Alternative Visitor Capacities section below. While use levels would be allowed to reach the established capacities for each alternative, there are social, economic, and other factors that may lead to actual use being below capacity.

ALTERNATIVE VISITOR CAPACITIES

This section provides a summary of the proposed visitor capacities for each alternative analyzed in the WSP/FEIS, including a description of the types and levels of use each alternative would allow, as well as the actions necessary to protect wilderness character from the impacts of these uses over time. The implications of the proposed capacities and related management actions are also discussed.

ALTERNATIVE 1: NO-ACTION / STATUS QUO

As described in chapter 2, the no-action alternative provides a baseline from which to compare the environmental and other impacts of the action alternatives. For visitor capacity, this includes the current types and amounts of use available and occurring in the parks' wilderness. These are addressed in "Chapter: Affected Environment" and below.

Summary of the Types and Amounts of Use: Current use of the parks' wilderness is oriented toward myriad recreational experiences. Recreational activities include day hiking, backpacking, camping, swimming, fishing, stock trips, day rides, river running, educational programs, mountaineering and rock climbing, skiing and snowshoeing, and similar activities.

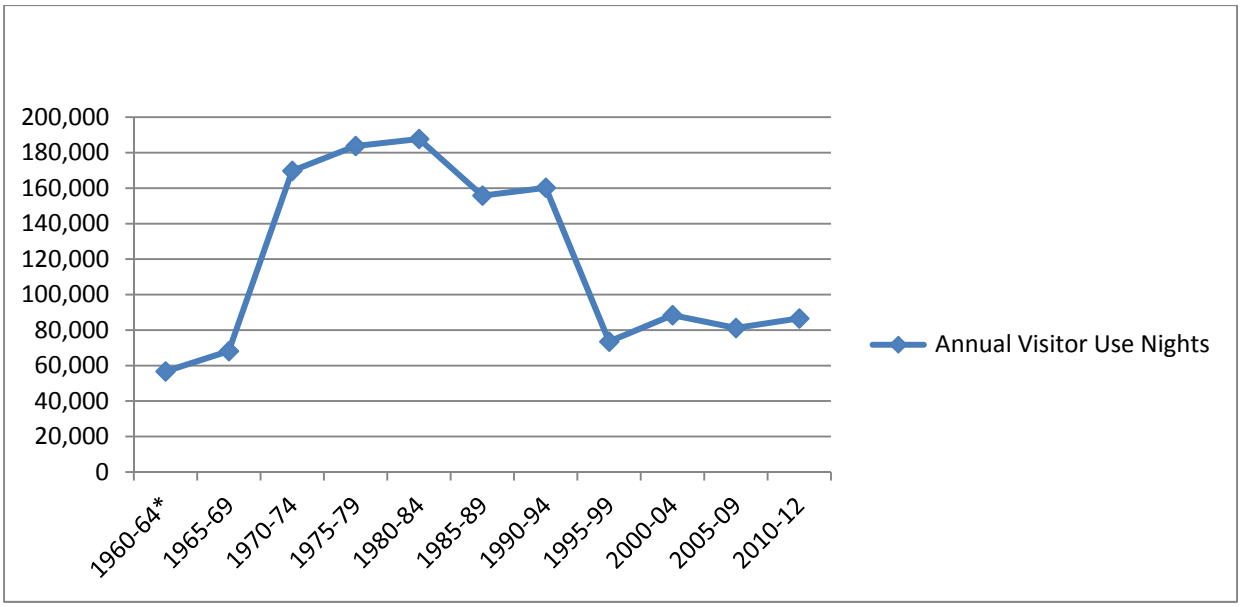
Table A-2: Current Use Levels of the Parks' Wilderness

Activity Type	Number of Overnight Visitors/Year (3-year average)	Number of Visitor Use Days (3-year average)	Number of Day-use Visitors (estimates; not used in setting capacities)
Hiking, backpacking, riding and packing with stock, fishing, river running, skiing, snowshoeing, etc.	23,000	111,000	75,000- 90,000 (approximation)

In table A-2, the average number of overnight wilderness visitors for a recent 3-year period (2010 - 2012) is approximately 23,000, accounting for an average of approximately 111,000 visitor-use days (VUD) per year. These figures are compiled from permits issued by the parks, Inyo National Forest (NF), Sequoia NF, and Sierra NF. This does not include Pacific Crest National Scenic Trail (PCT) users coming from south of Sequoia NF, from north of Inyo and Sierra NFs, or John Muir Trail (JMT) users from Yosemite NP or other points north of Sierra NF. It is estimated that these additional 3,500 users account for an additional 28,000 VUDs (based on projected numbers of hikers and nights of use – estimates of VUDs in these parks per trip per person for PCT and JMT users is eight). For the purposes of the WSP, only the VUDs calculated from wilderness permits are used. The estimates from PCT/JMT long-distance use have not been included, though they have been considered in visitor capacity decision making.

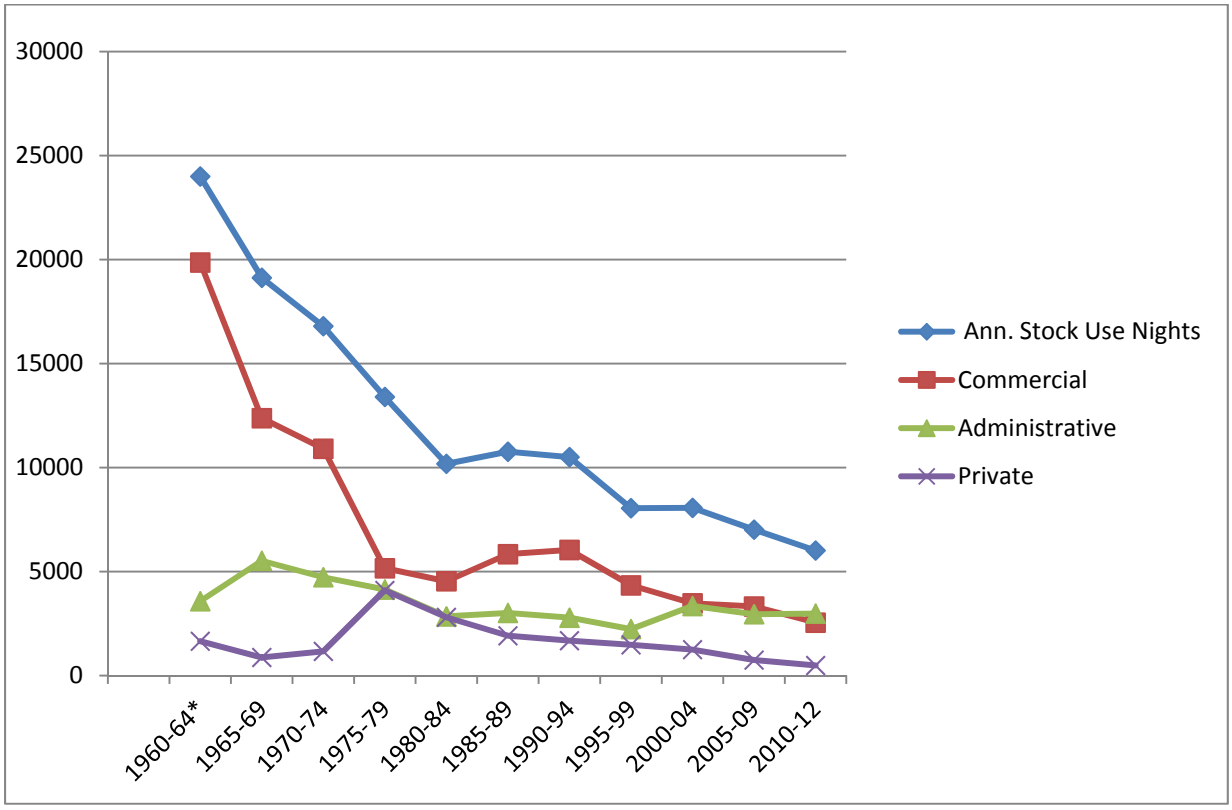
Use levels vary significantly by season. The majority of use, nearly 90%, occurs in the four summer months, June through September. The busiest month of the year, August, alone accounts for one-third of the year's total. The six months of the winter season, November through April, account for less than 4% of annual wilderness visitation.

Overall use levels for the past 15 years have been generally steady. There was a notable drop in use from the historic high levels of the 1970s and 1980s – the period of wilderness designation – to the relatively low-use levels of the mid-to-late 1990s (see figure A-1 for use level trends). Recreational stock use in wilderness has continued to decline to less than half of the relatively high levels of the late 1980s and early 1990s, and less than a quarter of the levels prior to the 1960s, while administrative stock use has remained relatively steady (see figure A-2 for stock use-level trends).



Data from the parks and local USFS permits only; does not include JMT/PCT use from other permitting agencies. One visitor-use night (VUN) equals approximately 1.25 visitor-use days (VUD)

Figure A-1: Annual Visitor Use Nights – Averages by 5-year Periods



*- Data is missing and averages have been calculated for only those years where data is present (in figures A-1 and A-2).

Figure A-2: Annual Stock Use Nights – Averages by 5-year Periods

Existing Controls on Visitor Capacity: Current use levels of visitors are controlled through several methods. Primary among these is the control through a quota system on daily entries for overnight use from individual trailheads. This method is in place at almost all park-managed trailheads and at most trailheads managed by the Inyo, Sierra, and Sequoia National Forests. Additional methods include the existence of limited designated campsites and areas, group-size limits, and night-stay limits in specific areas. Many of these controls were put in place in the 1970s and 1980s (specifically with the 1986 *Backcountry Management Plan*) to control the historically high use levels, and the subsequent impacts of use, of that time period.

If all trailhead entry quotas filled and average length of stay (3-4 nights) was met, on the busiest days of the season there would be approximately 3,500 people overnight camping on a given night in the parks' wilderness. This is undoubtedly high and is likely to happen on only very rare occasions, if ever. At this level, annual visitation would be in excess of 350,000 VUDs, more than triple current observed use levels. The highest observed level of annual use was approximately 290,000 VUDs (occurring in ca. 1974-76). Currently, if all quotas filled and estimates of use at non-quota trailheads was met, approximately 1,100 overnight visitors could enter SEKI wilderness per day during peak season (though it would be lower as many visitors entering on USFS trailheads remain on USFS lands and do not enter SEKI).

Using current statistics, it is reasonable to estimate that on an average night in the parks during peak season (June 20 to September 10) there are approximately 1,000 to 1,500 wilderness campers at a given time, with the weekend periods (Fri-Sun), especially in later-July and August, accounting for the highest use in the range.

ALTERNATIVE 2: PROTECT WILDERNESS CHARACTER BY IMPLEMENTING SITE-SPECIFIC ACTIONS (NPS PREFERRED ALTERNATIVE)

As explained in detail in chapter 2, alternative 2 would in large part retain existing types and amounts of use that would be allowed in the parks' wilderness in an attempt to retain opportunities for visitor use and enjoyment of wilderness, with limited and targeted controls applied only in those areas where current amounts and types of use may be leading to the relative highest level of impacts on wilderness character. The emphasis on retaining existing experiences is supported by data that show current wilderness character is being preserved or even improved. Monitoring and research show improvement in, among other things, campsite conditions, and residual biomass in meadows. Survey research and public input suggest strong general visitor satisfaction with their park wilderness experiences, and reveals little support for major changes to the existing wilderness management systems. There are a few areas, the Mount Whitney area in particular, where visitor-use levels and subsequent impacts may need to be reduced in order for conditions to be within standards and to ensure continued preservation of wilderness character.

The planning objective for visitor use for alternative 2 is:

> Visitor use and enjoyment of wilderness would be promoted while ensuring the preservation of wilderness character. In this alternative, visitor use levels would be reduced in some popular areas to preserve opportunities for solitude or other wilderness-character qualities.

Summary of the Types and Amounts of Use: Uses under alternative 2 include day hiking, backpacking, camping, swimming, fishing, stock overnight trips and day rides, river running, educational programs, mountaineering and rock climbing, skiing and snowshoeing, and other similar activities.

Under this alternative, some commercial visitor services, primarily in the Mount Whitney area, would be reduced to improve wilderness character.

Based on the desired conditions and foundational concept of this alternative to retain wilderness character at near current status, (i.e. types and amounts of use would be similar to the existing situation (see above)), the advisory maximum visitor capacity wilderness-wide for alternative 2 is established at approximately 134,000 visitor use days (VUD), with ten-year averages to be near 108,000-114,000 VUD. While use levels would be allowed to reach the established capacities for this alternative, there are social, economic, and other factors that may lead to actual use being below capacity.

Management of Visitor Capacity Proposed in Alternative 2

Visitor Overnight Use – Levels of overnight use in wilderness would continue to be managed through a system of trailhead quotas for daily entry for overnight use. Daily quotas would remain the same as in alternative 1 for all trailheads (see table 46, page 245 in chapter 2). The NPS would retain oversight of entry quotas from in-park entries and work with the USFS on oversight of entries from non-park trailheads. The NPS would also work within the 1998 Concessions Management Act and Commercial Use Authorization authorities to control use levels of commercial-service activities. Some limited and existing designated campsites and camp areas would continue in order to control use in those specific areas. Overnight wilderness permits, from NPS, USFS, and approved cooperators would continue to be available through a reservation system and on a first-come, first-served basis.

Visitor Day-Use – Day-use levels would not receive any new controls such as permits or quotas. Day use would be required to comply with off-trail party-size limits. Day use would continue to be monitored and may be the subject of *people at one time* (PAOT) or other monitoring methodologies to ensure that biophysical resources and wilderness experiences are not adversely impacted. If monitoring were to indicate degradation of wilderness character, management actions would be taken. These could consist of increased education, controls on parking, or other actions to deal with site-specific problems (table A-3).

Table A-3: Management Actions to Return Out-of-Standard Measures to Within Standard

Campsite Conditions	Trail Encounters	Grazing
Increase education – to the visiting public at large (via multiple media) and to specific area users which may include enforcement actions, and may include signage	Re-sample the area in question using developed sampling protocols to check/verify preliminary sampling results (initial to WSP implementation)	Various changes to meadows open to grazing
Rehabilitate impacted areas	Increased education – to the visiting public at large (via multiple media) and to specific area users which may include enforcement actions, and may include signage	See appendix D
Site specific actions, such as modifying sites to render them uninviting to camping, or site-specific closures (short or long-term) to camping	Change party size, night limit and or campfire restrictions	
Area wide closures to camping (short or long-term)	Discuss cross-boundary actions with USFS, including quotas	
Increased patrols to achieve compliance	Reduce use supported by commercial services	
Change party size, night limit and or campfire restrictions	Change trailhead quotas	
Reduce use supported by commercial services	Build additional trails to disperse use	
Change trailhead quotas	Require day-use or special-use-zone permits	
Require special-use-zone permits		

Administrative Use – Current levels and types of administrative use would continue similar to those of alternative 1. Administrative users would work with sensitivity toward not impeding public wilderness use or experiences.

Actions to Preserve Wilderness Character Given the Types and Amounts of Use Proposed in Alternative 2: Under alternative 2, wilderness character would be preserved based on the kind and amounts of use proposed because the associated capacities would be within the constraints for the protection of biophysical resources and visitor experiences. Further, the following describes the actions that would ensure use levels would remain within established capacities and not increase to the point where they might degrade wilderness character over time.

Campsite Condition: The measure of campsite condition would be adopted to ensure that the number of campsites and their condition does not exceed standards. The metric of Weighted Value per Campable Mile (WVCM), derived from Parsons and Stohlgren, 1987, would be used. For this measure, three areas of general use categorization have been established in the parks' wilderness: high use; moderate use; and low use, see figure A-3 on page A-31 (Note: these areas, or sub-zones, are based on long-established wilderness Travel Zones, of which each are comprised of several sub-zones. Measures are applied at the sub-zone level). Each has a specified WVCM that serves as a standard: 1000 for high use sub-zones; 500 for moderate use sub-zones; and 250 for low use sub-zones. A monitoring plan will be developed to establish protocols and schedule monitoring frequencies to ensure that sub-zones remain within their applied standard. Currently two sub-zones (83-1 Guitar Lake and 86-1 Kern Hot Spring) are out of standard in the high use category, and one sub-zone (80-3 Shepherd Pass Lake) is out of standard in the moderate category. All other sub-zones are currently within standard.

Trail Encounters: The measure of trail encounters would be adopted to ensure that encounters of other people by hikers/stock users on trails does not exceed standards. The metric of people encountered per hour (EPH), adopted from the generally applied groups per hour, would be used (Note: people per hour was chosen over groups per hour due to the difficulty of determining which people encountered actually constitute a group). For this measure, four areas of general use categorization have been established in the parks' wilderness: very high use (primarily Mount Whitney and day-use areas); high use (generally Class 3 trails, with some exceptions); moderate use (generally Class 2 trails, with some exceptions); and low use (generally Class 1 trail areas, with some exceptions), see figure A-4 on page A-36. Each has a specified EPH that serves as a standard: 45 for very high use; 25 for high use; 15 for moderate use; and 6 for low use**.** A monitoring plan will be developed to establish protocols and schedule monitoring frequencies to ensure that areas remain within their applied standard.

Current areas out of standard, based on the preferred alternative, are:

- Moderate category: Evolution Basin and Valley, McClure 1 and 5 segments

Other areas with measures out of standard (or near standard), but requiring more data collection to establish a 90% confidence level, are:

- Very High category: Mount Whitney, Crabtree 3 segment and Roads End, Cedar Grove 4 segment
- Moderate category: Rae Lakes/John Muir Trail, Rae Lakes 2 segment; Crabtree Ranger Station to Trail Crest, Crabtree 2 segment
- Low category: Sixty Lake Basin Trail, Rae Lakes 3 segment

Total Annual Visitor Use: The measure of total annual visitor use days (VUDs) in the parks' wilderness will be adopted. This will be determined from compiling information from the parks and local USFS wilderness permits. Other available data (e.g., John Muir Trail permits from Yosemite NP) will also be considered in evaluating capacity, but will not be used as critical data at this time (if this data becomes more readily available, it will be included in future assessments). The metric of VUDs, whereby one person spending one night in the parks' wilderness as part of an overnight trip constitutes one VUD, would be used. For this measure, the parks' wilderness is considered a whole. For this alternative, a maximum expected visitor use-level wilderness-wide would be 134,000 annual VUDs, with expected ten-year averages near 108,000-114,000 VUDs. Each year, total annual VUDs would be discussed and analyzed by an interdisciplinary group at an annual meeting on wilderness management. If the observed values exceeded these expected values, action would be taken to better understand the sources and consequences of this change in total use.

Other Measures of the Natural Quality of Wilderness: A wide variety of monitoring and inventorying of natural conditions occurs in the parks on an annual and long-term basis (see above). The results of these efforts would be used to inform the parks' interdisciplinary wilderness-management team. Results of monitoring, and possible management actions to ensure the preservation of wilderness character, would be discussed and developed as a result of annual meetings. Recommendations for changes to address problems would be made to the parks' superintendent as needed. Though these efforts would not have identified standards, they would inform management of trends and issues that require actions, both proactive and reactive.

Measures of the Undeveloped and Untrammeled Qualities of Wilderness Character: The preservation of wilderness character as it relates to the undeveloped and untrammeled qualities is primarily a function of management and administrative actions and practices, with little to no relation to visitor capacity. Though high levels of use may equate to a need for more development to protect the natural quality and potential other effects, those discussions and actions are detailed in chapter 2. In order to ensure the preservation of the undeveloped and untrammeled qualities, the parks would be diligent in conducting thorough and thoughtful minimum requirement analyses before undertaking any actions that could degrade the undeveloped or untrammeled qualities (as well as NEPA compliance as needed). These analyses would need to consider the benefits and detriments of actions to all wilderness character qualities and make decisions based on what is best for wilderness character as a whole. (See Wilderness Character discussion in chapter 3).

Measures of the Other Quality of Wilderness, or Cultural Resources: Monitoring and inventorying of cultural resources occurs in the parks on an annual and long-term basis (see above). The results of these efforts would be used to inform the parks' interdisciplinary wilderness-management team. Results of monitoring, and possible management actions to ensure the preservation of wilderness character, would be discussed and developed as a result of annual meetings. Recommendations for changes to address problems would be made to the parks' superintendent as needed. Though these efforts would not have identified standards, they would inform management of trends and issues that require actions.

ALTERNATIVE 3: PROVIDE MORE OPPORTUNITIES FOR PRIMITIVE RECREATION

As explained in greater detail in chapter 2, alternative 3 would expand the amounts of use within the constraints described above and using the measures to protect wilderness character listed below. This alternative presents the highest use levels that would be accommodated across the range of action alternatives. This alternative would allow increased opportunities for people to access and participate in primitive recreation (a part of the "Solitude or a primitive and unconfined recreation quality of wilderness character"), without undue impacts to the *natural* and *solitude* qualities of wilderness.

The planning objective for visitor use for alternative 3 is:

> Visitor use and enjoyment of wilderness would be promoted while ensuring the preservation of wilderness character. In this alternative, opportunities for visitor use and enjoyment of wilderness would be increased by permitting more visitor use.

Summary of the Types and Amounts of Use: The various types of use proposed under alternative 3 would remain the same as in alternative 2, above. The levels, or amounts, of use would be allowed to increase in order to provide additional opportunities for more visitors to obtain wilderness permits (through increased trailhead quotas) with this alternative.

Based on the desired conditions and foundational concept of this alternative of allowing additional opportunities for primitive recreation, through types and amounts of use, and in consideration of the constraints described earlier in this appendix, the estimated maximum visitor use days for the parks' wilderness for alternative 3 is established at approximately 175,000 visitor use days, with ten-year averages to be near 141,000-147,000 VUD. While use levels would be allowed to reach the established capacities for this alternative, there are social, economic, and other factors that may lead to actual use being below capacity. Also while the potential level of use proposed in this alternative is the highest among the alternatives, it would still be as much as 50% below peak historic use levels of the mid-1970s.

Management of Visitor Capacity Proposed in Alternative 3

Visitor Overnight Use – Levels of overnight use in wilderness would continue to be managed through a system of trailhead quotas for daily entry for overnight use. The NPS would retain oversight of the entry quotas from in-park entry and work with the USFS on oversight of out-of-park entries, (i.e., east-side and others). Some trailhead quotas would be increased for certain trailheads (see table 46, page 245 in chapter 2). The NPS would also work within the Concessions Act and Commercial Use Authorization authorities to control use levels of commercial service activities. Some limited and existing designated campsites and camp areas would continue in order to control use in those specific areas. Overnight wilderness permits, from NPS and USFS, and approved cooperators would continue to be available through a reservation system and on a first-come, first-served basis.

Visitor Day Use – Day use levels would not receive any new controls, such as permits or quotas. Day use would be required to comply with off-trail party size limits. Day use would continue to be monitored and may be the subject of *people at one time (PAOT)*, or other monitoring methodologies to ensure that biophysical resources and wilderness experiences are not adversely impacted. If monitoring were to indicate degradation of wilderness character, management actions would be taken. These could consist of increased education, controls on parking, or other actions to deal with site-specific problems (table A-3).

Administrative Use – Current levels and types of administrative use would generally continue. Trail maintenance activities would increase in order to ensure trail integrity with increased use and the "upgrading" of some trails or trail segments to higher classes. Administrative users would work with sensitivity toward not impeding on public wilderness use or experiences.

Actions to Preserve Wilderness Character given the Types and Amounts of Use Proposed in Alternative 3: Under alternative 3, wilderness character would be preserved based on the types and levels of use proposed because the associated capacities would be within the constraints for the protection of biophysical resources and visitor experiences. Further, the following describes the actions that would ensure use levels would remain within established capacities and not increase to the point where they might degrade wilderness character over time.

Campsite Condition: The *measure* of campsite condition would be adopted to ensure that the number of campsites and their condition does not exceed standards. The metric of Weighted Value per Campable Mile (WVCM), derived from Parsons and Stohlgren, 1987, would be used. For this measure, three areas of general use categorization have been established in the parks' wilderness: high use; moderate use; and low use, see figure A-3 on page A-31 (Note: these areas, or sub-zones, are based on long-established wilderness Travel Zones, of which each are comprised of several sub-zones. Measures are applied at the sub-zone level). Each has a specified WVCM that serves as a *standard*: 1300 for high use sub-zones; 650 for moderate use sub-zones; and 325 for low use sub-zones. A monitoring plan will be developed to establish protocols and schedule monitoring frequencies to ensure that sub-zones remain within their applied standard. Currently one sub-zone (83-1 Guitar Lake) is out of standard in the high use category, and one sub-zone (80-3 Shepherd Pass Lake) is out of standard in the moderate category. All other sub-zones are currently within standard.

Trail Encounters: The *measure* of trail encounters would be adopted to ensure that encounters of other people by hikers/stock users on trails does not exceed standards. The metric of people encountered per hour (EPH), adopted from the generally applied groups per hour, would be used (Note: people per hour was chosen over groups per hour due to the difficulty of determining which people encountered actually constitute a group). For this measure, four areas of general use categorization have been established in the parks' wilderness: very high use (primarily Mount Whitney and day-use areas); high use (generally Class 3 trails, with some exceptions); moderate use (generally Class 2 trails, with some exceptions); and low use (generally Class 1 trail areas, with some exceptions), see figure A-4 on page A-36. Each has a specified EPH that serves as a *standard*: 59 for very high use; 33 for high use; 20 for moderate use; and 8 for low use**.** A monitoring plan will be developed to establish protocols and schedule monitoring frequencies to ensure that areas remain within their applied standard.

No current areas are out of standard based on a 90% confidence level under alternative 3. Areas with measures out of standard, but requiring more data collection to establish a 90% confidence level, are:

- Very High category: Roads End, Cedar Grove 4 segment
- Moderate category: Evolution Basin and Valley, McClure 1 segment
- Low category: Sixty Lake Basin Trail, Rae Lakes 3 segment

Total Annual Visitor Use: The *measure* of total annual visitor-use days (VUDs) in the parks' wilderness will be adopted. This will be determined from compiling information from the parks and local USFS wilderness permits. Other available data (e.g., John Muir Trail permits from Yosemite NP) will also be considered in evaluating capacity, but will not be used as critical data at this time (if this data becomes more readily available, it will be included in future assessments). The metric of VUDs, whereby one person spending one night in the parks' wilderness as part of an overnight trip constitutes one VUD, would be used. For this measure, the parks' wilderness is considered a whole. For this alternative, a maximum expected visitor use-level wilderness-wide would be 175,000 annual VUDs, with expected ten-year averages near 141,000-147,000 VUDs. Each year, total annual VUDs would be discussed and analyzed by an interdisciplinary group at an annual meeting on wilderness management. If the observed values exceeded these expected values, action would be taken to better understand the sources and consequences of this change in total use.

Other Measures of the Natural Quality of Wilderness: A wide variety of monitoring and inventorying of natural conditions occurs in the parks on an annual and long-term basis (see above). The results of these efforts would be used to inform the parks' interdisciplinary wilderness-management team. Results of monitoring, and possible management actions to ensure the preservation of wilderness character, would

be discussed and developed as a result of annual meetings. Recommendations for changes to address problems would be made to the parks' superintendent as needed. Though these efforts would not have identified standards, they would inform management of trends and issues that require actions, both proactive and reactive.

Measures of the Undeveloped and Untrammeled Qualities of Wilderness Character: The preservation of wilderness character as it relates to the *undeveloped* and *untrammeled* qualities is primarily a function of management and administrative actions and practices, with little to no relation to visitor capacity. Though high levels of use may equate to a need for more development to protect the *natural* quality and potential other effects, those discussions and actions are detailed in chapter 2. In order to ensure the preservation of the *undeveloped* and *untrammeled* qualities, the parks would be diligent in conducting thorough and thoughtful minimum-requirement analyses (MRAs) before undertaking any actions that could degrade the *undeveloped* or *untrammeled* qualities (as well as NEPA compliance as needed). These analyses would need to consider the benefits and detriments of actions to all wilderness-character qualities and make decisions based on what is best for wilderness character as a whole (see the "Wilderness Character" discussion in chapter 3).

Measures of the Other Quality of Wilderness, or Cultural Resources: Monitoring and inventorying of cultural resources occurs in the parks' wilderness on an annual and long-term basis (see above). The results of these efforts would be used to inform the parks' interdisciplinary wilderness-management team. Results of monitoring and inventorying, and possible management actions to ensure the preservation of wilderness character, would be discussed and developed as a result of annual meetings. Recommendations for changes to address problems would be made to the parks' superintendent as needed. Though these efforts would not have identified standards, they would inform management of trends and issues that require actions.

ALTERNATIVE 4: EMPHASIZE UNDEVELOPED QUALITY AND NON-COMMERCIAL RECREATION

As explained in greater detail in chapter 2, alternative 4 would remove many developments in wilderness, restrict the level of provided commercial services, and nominally reduce wilderness use levels from those of alternative 1. Some restrictions on the levels of visitor use, services, and reductions in overnight capacities are proposed in order to improve the *undeveloped* and *solitude* qualities of wilderness character, while still allowing near current levels of use and opportunities for a primitive and unconfined recreation.

The planning objective for visitor use for alternative 4 is:

> Visitor use and enjoyment of wilderness would be promoted while ensuring the preservation of wilderness character. In this alternative, increased emphasis on self-reliance and reduced development would be accompanied by a slight decrease in visitor numbers.

Summary of the Types and Amounts of Use: The majority of the current kinds of use in the parks' wilderness would be retained with alternative 4. However, some proposed changes could affect the kinds and amounts of use in specific areas. For example, commercial lodging and meal service at Bearpaw Meadow High Sierra Camp would be eliminated, and multiple wilderness developments (e.g., privies and food-storage boxes) would be removed. Similarly, commercially provided day rides and other commercially provided day trips for any purpose (e.g., photography, fishing, hiking, or climbing) would be eliminated. The overnight capacities would be lowered slightly with alternative 4, by reducing daily entry quotas at specific trailheads.

Based on the desired conditions and foundational concept of this alternative of moderately reducing use and increasing self-reliance by removing facilities and reducing commercial service levels, and consideration of the constraints described earlier in this appendix, the advisory maximum visitor capacity for the parks' wilderness for alternative 4 is established at approximately 127,000 visitor use days, with ten-year averages to be near 102,500-108,500 VUD. While use levels would be allowed to reach the established capacities for this alternative, there are social, economic, and other factors that may lead to actual use being below capacity.

Management of Visitor Capacity Proposed in Alternative 4:

Visitor Overnight Use – Levels of overnight use in wilderness would continue to be managed through a system of trailhead quotas for daily entry for overnight use. The NPS would retain oversight of the entry quotas from in-park entries and work with the USFS on oversight of out-of-park entries, (i.e., east-side and others). Some trailhead quotas would be reduced for certain trailheads (see table 46, page 245 in chapter 2). The NPS would also work within the Concessions Act and Commercial Use Authorization authorities to control use levels of commercial service activities. Existing designated campsites and camp areas would be eliminated, allowing more self-reliant experiences. The operation of the Pear Lake Ski Hut (winter) would be discontinued. Overnight wilderness permits, from NPS, USFS, and approved cooperators would continue to be available through a reservation system and on a first-come, first-served basis.

Visitor Day Use – Day use levels would not receive any new controls, such as permits or quotas. Day use would be required to comply with off-trail party size limits. Day use would continue to be monitored and may be the subject of *people at one time* (PAOT), or other monitoring methodologies to ensure that biophysical resources and wilderness experiences are not adversely impacted. If monitoring were to indicate degradation of wilderness character, management actions would be taken, such as the establishment of day use permits and quotas for higher use areas. Management actions could also consist of increased education, controls on parking, or other actions to deal with site-specific (table A-3).

Administrative Use – Current levels and types of administrative use would generally continue. Trail-maintenance activities would be reduced from those of alternatives 1 and 2, with some trail segments being abandoned and some trail classes lowered to meet the desired condition of increased self-reliance. Administrative users would work with sensitivity toward not impeding on public wilderness use or experiences.

Actions to Preserve Wilderness Character given the Types and Amounts of Use Proposed in Alternative 4: Under alternative 4, wilderness character would be preserved based on the types and amounts of use proposed because the associated capacities would be within the constraints for the protection of biophysical resources and visitor experiences. Further, the following describes the actions that would ensure use levels would remain within established capacities and not increase to the point where they might degrade wilderness character over time.

Campsite Condition: The *measure* of campsite condition would be adopted to ensure that the number of campsites and their condition does not exceed standards. The metric of Weighted Value per Campable Mile (WVCM), derived from Parsons and Stohlgren, 1987, would be used. For this measure, three areas of general use categorization have been established in the parks' wilderness: high use; moderate use; and low use, see figure A-3 on page A-31 (Note: these areas, or sub-zones, are based on long-established wilderness Travel Zones, of which each are comprised of several sub-zones. Measures are applied at the sub-zone level). Each has a specified WVCM that serves as a *standard*: 950 for high use sub-zones; 475 for moderate use sub-zones; and 235 for low use sub-zones. A monitoring plan will be developed to

establish protocols and schedule monitoring frequencies to ensure that sub-zones remain within their applied standard. Currently two sub-zones (83-1 Guitar Lake and 86-1 Kern Hot Spring) are out of standard in the high use category, and two sub-zones (80-3 Shepherd Pass Lake and 90-6 Hockett Meadow) are out of standard in the moderate category. One low use sub-zone, 47-1 Amphitheater Lake, is at standard. All other sub-zones are currently within standard.

Trail Encounters: The *measure* of trail encounters would be adopted to ensure that encounters of other people by hikers/stock users on trails does not exceed standards. The metric of people encountered per hour (EPH), adopted from the generally applied groups per hour, would be used (Note: people per hour was chosen over groups per hour due to the difficulty of determining which people encountered actually constitute a group). For this measure, four areas of general use categorization have been established in the wilderness: very high use (primarily Mount Whitney and day-use areas); high use (generally Class 3 trails, with some exceptions); moderate use (generally Class 2 trails, with some exceptions); and low use (generally Class 1 trail areas, with some exceptions), see figure A-4 on page A-36. Each has a specified EPH that serves as a *standard*: 43 for very high use; 24 for high use; 14 for moderate use; and 5 for low use**.** A monitoring plan will be developed to establish protocols and schedule monitoring frequencies to ensure that areas remain within their applied standard.

Current areas out of standard based on alternative 4 are:

- Moderate category: Evolution Basin and Valley, McClure 1 and 5 segments

Other areas with measures out of standard (or near standard), but requiring more data collection to establish a 90% confidence level, are:

- Very high category: Mount Whitney, Crabtree 3 segment and Roads End, Cedar Grove 1 and 4 segments
- Moderate category: Rae Lakes/John Muir Trail, Rae Lakes 2 segment and Crabtree Ranger Station to Trail Crest, Crabtree 2 segment
- Low category: Sixty Lake Basin Trail, Rae Lakes 3 segment

Total Annual Visitor Use: The *measure* of total annual visitor-use days (VUDs) in wilderness will be adopted. This will be determined from compiling information from parks and local USFS wilderness permits. Other available data (e.g., John Muir Trail permits from Yosemite NP) will also be considered in evaluating capacity, but will not be used as critical data at this time (if this data becomes more readily available, it will be included in future assessments). The metric of VUDs, whereby one person spending one day in the parks' wilderness as part of an overnight trip constitutes one VUD, would be used. For this measure, the parks' wilderness is considered a whole. For this alternative, a maximum expected visitor use-level wilderness-wide would be 127,000 annual VUDs, with expected ten-year averages near 102,500-108,500 VUDs. Each year, total annual VUDs would be discussed and analyzed by an interdisciplinary group at an annual meeting on wilderness management. If the observed values exceeded these expected values, action would be taken to better understand the sources and consequences of this change in total use.

Other Measures of the Natural Quality of Wilderness: A wide variety of monitoring and inventorying of natural conditions occurs in the parks on an annual and long-term basis (see above). The results of these efforts would be used to inform the parks' interdisciplinary wilderness-management team. Results of monitoring, and possible management actions to ensure the preservation of wilderness character, would be discussed and developed as a result of annual meetings. Recommendations for changes to address

problems would be made to the parks' superintendent as needed. Though these efforts would not have identified standards, they would inform management of trends and issues that require actions, both proactive and reactive.

Measures of the Undeveloped and Untrammeled Qualities of Wilderness Character: The preservation of wilderness character as it relates to the *undeveloped* and *untrammeled* qualities is primarily a function of management and administrative actions and practices, with little to no relation to visitor capacity. However, this alternative has as a desired condition a wilderness with a significantly improved *undeveloped* quality. Though higher levels of use may equate to a need for more development to protect the *natural* quality and potential other effects, those discussions and actions are primarily detailed in chapter 2. In order to ensure the preservation of the *undeveloped* and *untrammeled* qualities, the parks would be diligent in conducting thorough and thoughtful minimum requirement analyses before undertaking any actions that could degrade the *undeveloped* or *untrammeled* qualities (as well as NEPA compliance as needed). These analyses would need to consider the benefits and detriments of actions to all wilderness-character qualities and make decisions based on what is best for wilderness character as a whole (see the "Wilderness Character" discussion in chapter 3).

Measures of the Other Quality of Wilderness, or Cultural Resources: Monitoring and inventorying of cultural resources occurs in the parks on an annual and long-term basis (see above). The results of these efforts would be used to inform the parks' interdisciplinary wilderness-management team. Results of monitoring and inventorying, and possible management actions to ensure the preservation of wilderness character, would be discussed and developed as a result of annual meetings. Recommendations for changes to address problems would be made to the parks' superintendent as needed. Though these efforts would not have identified standards, they would inform management of trends and issues that require actions.

ALTERNATIVE 5: EMPHASIZE OPPORTUNITIES FOR SOLITUDE

As explained in greater detail in chapter 2, alternative 5 would reduce the amounts of use within the constraints described above and using the measures to protect wilderness character listed below. This alternative proposes the lowest use levels across the range of alternatives and as such strongly emphasizes the *solitude* quality of wilderness character. This would lead to reductions in opportunities for primitive recreation by limiting use levels and access.

The planning objective for Visitor Use for alternative 4 is:

> Visitor use and enjoyment of wilderness would be promoted while ensuring the preservation of wilderness character. In this alternative, increased opportunities for solitude would be achieved with a decrease in visitor numbers.

Summary of the Types and Amounts of Use: The majority of the current types of use in the parks' wilderness would generally be retained with alternative 5. However, some proposed changes could affect the types and amounts of use in specific areas. Levels of use would be notably reduced and levels of development would be somewhat reduced from that of alternative 1. The lower levels of use would also provide for the reduction of some controls, or restrictions on visitor behavior (e.g., fewer night limits). Commercial services would be reduced proportionally with overall visitor use levels. The overnight capacities would be lowered considerably with alternative 5, by reducing daily-entry quotas at the majority of trailheads.

Based on the desired conditions and foundational concept of this alternative of emphasizing the *solitude* quality by notably reducing use levels, and consideration of the constraints described earlier in this appendix, the advisory maximum visitor capacity for the parks' wilderness for alternative 5 is established at approximately 93,300 visitor use days, with 10-year averages to be near 74,700-84,700 VUD. While use levels would be allowed to reach the established capacities for this alternative, there are social, economic, and other factors that may lead to actual use being below capacity.

Management of Visitor Capacity Proposed in Alternative 5

Visitor Overnight Use – Levels of overnight use in wilderness would continue to be managed through a system of trailhead quotas for daily entry for overnight use. The NPS would retain oversight of the entry quotas from in-park entry and work with the USFS on oversight of out-of-park entries (i.e., east-side and others). Many trailhead quotas would be reduced for identified trailheads (see table 46, page 245 in chapter 2). The NPS would also work within the Concessions Act and Commercial Use Authorization authorities to control use levels of commercial service activities. Existing designated campsites and camp areas would be eliminated, and no new designated sites or areas would be established. Destination quotas at Emerald and Pear Lakes would be discontinued, though new destination quotas may be implemented in the future if impacts increase in specific areas. The operation of the Pear Lake Ski Hut (winter), as an overnight facility, would be discontinued. Overnight wilderness permits, from NPS, USFS, and approved cooperators would continue to be available through a reservation system and on a first-come, first-served basis.

Visitor Day Use – A day-use permit and quota system would be implemented to control day use in specific areas (e.g., Lakes Trail, Mist Falls, and Monarch Lakes). Day use would be required to comply with off-trail party size limits. Day use would continue to be monitored and may be the subject of *people at one time* (PAOT) or other monitoring methodologies to ensure that biophysical resources and wilderness experiences are not adversely impacted. If monitoring were to indicate degradation of wilderness character, management actions would be taken, such as increased education, controls on parking, or other actions to deal with site-specific problems (table A-3).

Administrative Use – Current levels and types of administrative use would be similar to that of alternative 1. Trail maintenance activities would also be similar to slightly greater than those of alternatives 1 and 2, with some trail segments "upgraded" in class to meet the desired condition. Administrative users would work with sensitivity toward not impeding on public wilderness use or experiences.

Actions to Preserve Wilderness Character given the Types and Amounts of Use Proposed in Alternative 5: Under alternative 5, wilderness character would be preserved based on the kind and amounts of use proposed because the associated capacities would be within the constraints for the protection of biophysical resources and visitor experiences. Further, the following describes the actions that would ensure use levels would remain within established capacities and not increase to the point where they might degrade wilderness character over time.

Campsite Condition: The *measure* of campsite condition would be adopted to ensure that the number of campsites and their condition does not exceed standards. The metric of Weighted Value per Campable Mile (WVCM), derived from Parsons and Stohlgren, 1987, would be used. For this measure, three areas of general use categorization have been established in the parks' wilderness: high use; moderate use; and low use, see figure A-3 on page A-31 (Note: these areas, or sub-zones, are based on long-established wilderness Travel Zones, of which each are comprised of several sub-zones. Measures are applied at the sub-zone level). Each has a specified WVCM that serves as a *standard*: 700 for high use sub-zones; 350

for moderate use sub-zones; and 175 for low use sub-zones. A monitoring plan will be developed to establish protocols and schedule monitoring frequencies to ensure that sub-zones remain within their applied standard. Currently six sub-zones (39-4 LeConte Ranger Station, 42-2 Middle Dusy Basin, 42-5 Lower Dusy Lakes, 80-7 Lakes above Tyndall, 83-1 Guitar Lake, and 86-1 Kern Hot Spring) are out of standard in the high use category, and six sub-zones (39-7 JMT-Simpson Jct., 42-3 11393 Lakes, 42-4 South Dusy Lakes, 80-3 Shepherd Pass Lake, 90-1 Atwell-Hockett Trail, and 90-6 Hockett Meadow) are out of standard in the moderate category. One sub-zone, 47-1 Amphitheater Lake, is out of standard in the low use sub-zone. All other sub-zones are currently within standard.

Trail Encounters: The *measure* of trail encounters would be adopted to ensure that encounters of other people by hikers/stock users on trails does not exceed standards. The metric of people encountered per hour (EPH), adopted from the generally applied groups per hour, would be used (Note: people per hour was chosen over groups per hour due to the difficulty of determining which people encountered actually constitute a group). For this measure, four areas of general use categorization have been established in the parks' wilderness: very high use (primarily Mount Whitney and day-use areas); higher use (generally Class 3 trails, with some exceptions); moderate use (generally Class 2 trails, with some exceptions); and low use (generally Class 1 trail areas, with some exceptions), see figure A-4 on page A-36. Each has a specified EPH that serves as a *standard*: 25 for very high use; 18 for high use; 11 for moderate use; and 4 for low use**.** A monitoring plan will be developed to establish protocols and schedule monitoring frequencies to ensure that areas remain within their applied standard. Current areas out of standard based on alternative 5 are:

- Very High category: Mount Whitney, Crabtree 3 segment; and Roads End, Cedar Grove 1 and 4 segments
- Moderate category: Rae Lakes/John Muir Trail, Rae Lakes 1 and 2 segments, Charlotte Lake 1 segment, LeConte 4 segment, and Tyndall 1 segment; Crabtree Ranger Station to Trail Crest, Crabtree 2 segment; and Evolution Basin and Valley, McClure 1 and 5 segments
- Low category: Sixty Lake Basin Trail, Rae Lakes 3 segment

Other areas with measures out of standard (or near standard), but requiring more data collection to establish a 90% confidence level, are:

- High category: Mineral King Valley, Mineral King 6 segment;
- Moderate category: Rae Lakes Loop-Lower Portion, Cedar Grove 3 and 5 segments; Mount Langley approach, Rock Creek 1segment; and West Side of Kearsarge Pass, Charlotte Lake 3 segment

Total Annual Visitor Use: The *measure* of total annual visitor use days (VUDs) in the parks' wilderness will be adopted. This will be determined from compiling information from the parks and local USFS wilderness permits. Other available data (e.g., John Muir Trail permits from Yosemite NP) will also be considered in evaluating capacity, but will not be used as critical data at this time (if this data becomes more readily available, it will be included in future assessments). The metric of VUDs, whereby one person spending one night in wilderness as part of an overnight trip constitutes one VUD, would be used. For this measure, the parks' wilderness is considered a whole. For this alternative, a maximum expected visitor use-level wilderness-wide would be 93,300 annual VUDs, with expected ten-year averages near 74,700-84,700 VUDs. Each year, total annual VUDs would be discussed and analyzed by an interdisciplinary group at an annual meeting on wilderness management. If the observed values exceeded these expected values, action would be taken to better understand the sources and consequences of this change in total use.

Other Measures of the Natural Quality of Wilderness: A wide variety of monitoring and inventorying of natural conditions is occurring in these parks on an annual and long-term basis (see above). The results of these monitoring and inventorying efforts would be used to inform the parks' interdisciplinary wilderness-management team. Results of monitoring, and possible management actions to ensure the preservation of wilderness character, would be discussed and developed as a result of annual meetings. Recommendations for changes to address problems would be made to the parks' superintendent as needed. Though these efforts would not have identified standards, they would inform management of trends and issues that require actions, both proactive and reactive.

Measures of the Undeveloped and Untrammeled Qualities of Wilderness Character: The preservation of wilderness character as it relates to the *undeveloped* and *untrammeled* qualities is primarily a function of management and administrative actions and practices, with little to no relation to visitor capacity. However, this alternative has as a desired condition a wilderness with an improved *undeveloped* quality. Though higher levels of use may equate to a need for more development to protect the *natural* quality and potential other effects, those discussions and actions are primarily detailed in chapter 2. In order to ensure the preservation of the *undeveloped* and *untrammeled* qualities, the parks would be diligent in conducting thorough and thoughtful minimum requirement analyses before undertaking any actions that could degrade the *undeveloped* or *untrammeled* qualities (as well as NEPA compliance as needed). These analyses would need to consider the benefits and detriments of actions to all wilderness-character qualities and make decisions based on what is best for wilderness character as a whole (see the "Wilderness Character" discussion in chapter 3).

Measures of the Other Quality of Wilderness, or Cultural Resources: Monitoring and inventorying of cultural resources occurs in the parks on an annual and long-term basis (see above). The results of these efforts would be used to inform the parks' interdisciplinary wilderness-management team. Results of monitoring and inventorying, and possible management actions to ensure the preservation of wilderness character, would be discussed and developed as a result of annual meetings. Recommendations for changes to address problems would be made to the parks' superintendent as needed. Though these efforts would not have identified standards, they would inform management of trends and issues that require actions.

Table A-4: Summary of Measures and Standards to Ensure Desired Level of Visitor Capacity

Measure	Standards				
	Alt 1	Alt 2	Alt 3 (Alt 2 x 1.3)	Alt 4 (Alt 2 x .95)	Alt 5 (Alt 2 x .7)
Campsite Condition – Weighted Value Per Campable Mile (WVCM) - by sub-zone	n/a	High - 1000 Mod - 500 Low - 250	High - 1300 Mod – 650 Low – 325	High - 950 Mod - 475 Low - 235	High - 700 Mod - 350 Low - 175
Trail Encounters – People Encountered Per Hour (EPH) – by area	n/a	Very High - 45 High -25 Mod-15 Low - 6	Very High - 59 High - 33 Mod - 20 Low - 8	Very High - 43 High - 24 Mod - 14 Low - 5	Very High - 25 High - 18 Mod - 11 Low - 4
Grazing capacities (expressed as stock use nights) reflecting maximum utilization rates and site-specific factors for all park meadows.	n/a	Meadow specific grazing capacity (see appendix D)	Meadow specific grazing capacity (see appendix D)	N/A – grazing not allowed	Meadow specific grazing capacity (see appendix D)

WEIGHTED VALUE PER CAMPABLE MILE

The measure Weighted Value per Campable Mile (WVCM) is used to characterize the condition of areas that contain campsites. It is derived by first assigning a condition class, ranging from 1 to 5, to each campsite in a defined wilderness travel sub-zone. Condition class is assigned based on the following attributes: vegetation density, vegetation composition, total area of campsite, area of barren core of campsite, developments, litter and duff, social trails, and mutilations (Parsons and Stohlgren 1987). The number of sites within each condition class is then tallied, and multiplied by a weighting factor specific to each condition class to create a weighted value for each condition class. These five weighted values are then summed to create a total weighted value for the camping area. This total weighted value is then divided by the length of campable areas along water bodies (i.e., not including areas of talus, steep slopes, or other properties that make it unusable for camping) to create a WVCM measurement.

Condition class is assigned based on the following attributes: vegetation density, vegetation composition, total area of campsite, area of barren core of campsite, developments, litter and duff, social trails, and mutilations (Parsons and Stohlgren 1987). Note that because of the use of weighted value factors, a few high-class sites (most heavily impacted) can greatly outweigh many low-class sites (least impacted).

Here is an example for a given sub-zone:

Sub-zone has:	15 Class 1 sites	–	multiplied by weighted value factor of 1	=	15
	8 Class 2 sites	–	multiplied by weighted value factor of 6	=	48
	4 Class 3 sites	–	multiplied by weighted value factor of 30	=	120
	1 Class 4 site	–	multiplied by weighted value factor of 75	=	75
	0 Class 5 sites	–	multiplied by weighted value factor of 150	=	0
			Total weighted value	=	258

This sub-zone has 6 miles of water courses/shoreline, of which 40% is campable. The number of campable miles is derived by multiplying the 6 miles times 0.4 (or 40%) resulting in 2.4 campable miles in the sub-zone. The WVCM of the sub-zone is then determined by dividing the total weighted value (258) by the campable miles (2.4). This imaginary sub-zone has a WVCM of 107.5.

$$\frac{258 \text{ (total weighted value)}}{2.4 \text{ (campable miles)}} = 107.5 \text{ WVCM}$$

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CAMPSITE CONDITIONS:

Table A-5a: Visitor Capacity Monitoring – High Use Campsite Sub-zones

Zone -Subzone	Name	Rating / Use Level	Monitoring Frequency*	Comments	Patrol Area	WVCM ca. 1980	Alt 1 WVCM (from 2006-07 survey)	Standards for High Use Areas			
								Alt 2 WVCM	Alt 3 WVCM	Alt 4 WVCM	Alt 5 WVCM
28-1	Piute Creek Bridge	ML	M		McClure	1305	277	1000	1300	950	700
33-4	McClure Meadow	ML	M		McClure	825	183	1000	1300	950	700
34-1	Evolution Lake	H	H		McClure	386	138	1000	1300	950	700
39-2	Big Pete Meadow	ML	M		LeConte	1665	433	1000	1300	950	700
42-1	Upper Dusy Basin	H	H	Not done in '06-07, done in 2012	LeConte	39	598	1000	1300	950	700
42-2	Middle Dusy Basin	H	H	Not done in '06-07, done in 2012	LeConte	1033	834	1000	1300	950	700
42-5	Lower Dusy Lakes	H	H	Not done in '06-07, done in 2012	LeConte	1489	720	1000	1300	950	700
46-7	Lake Marjorie	ML	M		LeConte/Bench	280	48	1000	1300	950	700
58-1	Woods Creek Crossing	H	H	Not done in '06-07	Rae Lakes	1460	TBD	1000	1300	950	700
58-2	Castle Domes Meadow	H	H		Rae Lakes	879	105	1000	1300	950	700
62-6	South Rae Lake 2	H	H		Rae Lakes	1402	147	1000	1300	950	700
64-3	Lower Kearsarge Lake	H	H		Charlotte	2348	460	1000	1300	950	700
64-4	Kearsarge Lakes 1 & 2	H	H		Charlotte	1871	314	1000	1300	950	700
64-5	Kearsarge Lake 3	H	H		Charlotte	1778	156	1000	1300	950	700
65-3	JMT - Below Center Basin	H	H		Charlotte	1439	557	1000	1300	950	700
66-4	Junction Meadow	ML	M	Not done in '06-07	Charlotte	3360	TBD	1000	1300	950	700
73-4	Ranger Lake	H	H		Roaring/LPTH	1475	147	1000	1300	950	700
74-1	Silliman Lake	ML	M		LPTH	107	28	1000	1300	950	700
77-1	Panther Gap - Alta	ML	M		LPTH/Pear	773	453	1000	1300	950	700
78-1	Hamilton Lake	H	H	Not done in '06-07	Pear/LPTH	2086	TBD	1000	1300	950	700
80-1	Lakes below Forester Pass (S)	ML	M		Tyndall	325	535	1000	1300	950	700
80-7	Lakes Above Tyndall	ML	M		Tyndall	2235	810	1000	1300	950	700
83-1	Guitar Lake	H	H		Crabtree	2808	1398	1000	1300	950	700
84-1	Guyot Creek	ML	M		Rock Creek	720	100	1000	1300	950	700
84-2	Lower Rock Creek	H	H		Rock Creek	382	124	1000	1300	950	700
85-3	Soldier Lake	H	H		Rock Creek	1262	184	1000	1300	950	700
86-1	Kern Hot Spring	H	H		Little 5/Kern	1495	1170	1000	1300	950	700
86-2	Upper Funston	ML	M		Little 5/Kern	748	340	1000	1300	950	700
87-1	Upper Big Arroyo	ML	M		Little 5	114	61	1000	1300	950	700
92-2	Monarch Lakes	H	H	Not done in '06-07	MKTH/Little 5	3935	TBD	1000	1300	950	700

WVCM = Weighted Value per Campable Mile [from Cole (2013), and specific Dusy Basin Survey (2012) – those not surveyed in 2006-07, or 2012 would have the first read/survey serve as baseline – noted as TBD in Alt. 1]; WVCM is calculated by a formula that includes miles of campable area (which consists of lakeshores and water-course banks) and the numbers and class conditions of existing campsites. The higher the WVCM number, the higher the level of impact in the subzone.

* Monitoring frequency for the subset in the table above: High = once/6 years; Moderate = once/12 years; Low = once/30 years

CGTH = Cedar Grove Trailhead Ranger; LPTH = Lodgepole Trailhead Ranger; MKTH = Mineral King Trailhead Ranger

All (or nearly all, depending on site-by-site circumstances) sub-zones not included above would be monitored once every 30 years. There are 273 sub-zones. Sub-zones are geographically based divisions of the Wilderness Travel Zones, and were referred to in Parsons (1987) as Management Areas.

All sub-zones not listed above have had a standard applied for each alternative and are subject to the same campsite condition standard, based on whether they have been determined to be a High, Moderate, or Low use area. Not all sub-zones are included in the monitoring protocol. The same standard applies to all High Use areas, Moderate Use areas, and Low Use areas, as they are categorized (e.g., all High Use areas in alternative 1 have a standard WVCM of 1000).

Table A-5b: Visitor Capacity Monitoring – Moderate Use Campsite Sub-zones

Zone -Subzone	Name	Rating/ Use Level	Monitoring Frequency*	Comments	Patrol Area	WVCM ca. 1980	Alt 1 WVCM (from 2006-07 survey)	Standards for Moderate Use Areas			
								Alt 2 WVCM	Alt 3 WVCM	Alt 4 WVCM	Alt 5 WVCM
33-2	Darwin Canyon	ML	M		McClure	834	76	500	650	475	350
54-1	Granite Lake	ML	M		CGTH/Monarch	540	47	500	650	475	350
57-1	Woods Lake	ML	M	Not done in '06-07	Rae	551	TBD	500	650	475	350
70-3	Cement Table	ML	M		Roaring	435	47	500	650	475	350
72-1	Sugarloaf Valley	ML	M		Roaring	353	171	500	650	475	350
80-3	Shepherd Pass Lake	ML	M		Tyndall	210	950	500	650	475	350
83-7	Hitchcock Lakes	ML	M		Crabtree	45	53	500	650	475	350
83-10	Crabtree Lakes	ML	M		Crabtree	185	18	500	650	475	350
85-2	Upper Rock Creek	ML	M		Rock Creek	311	51	500	650	475	350
88-3	Middle-Upper Little Five	ML	M		Little 5	707	192	500	650	475	350
90-6	Hockett Meadow	ML	M		MKTH/Hockett	2207	480	500	650	475	350
90-11	South Fork Meadows	ML	M	Not done in '06-07	MKTH/Hockett	249	TBD	500	650	475	350

WVCM = Weighted Value per Campable Mile [from Cole (2013), and specific Dusy Basin Survey (2012) – those not surveyed in 2006-07, or 2012 would have the first read/survey serve as baseline – noted as TBD in Alt. 1]; WVCM is calculated by a formula that includes miles of campable area (which consists of lakeshores and water-course banks) and the numbers and class conditions of existing campsites. The higher the WVCM number, the higher the level of impact in the subzone.

* Monitoring frequency for the subset in the table above: High = once/6 years; Moderate = once/12 years; Low = once/30 years

CGTH = Cedar Grove Trailhead Ranger; LPTH = Lodgepole Trailhead Ranger; MKTH = Mineral King Trailhead Ranger

All (or nearly all, depending on site-by-site circumstances) sub-zones not included above would be monitored once every 30 years. There are 273 sub-zones. Sub-zones are geographically based divisions of the Wilderness Travel Zones, and were referred to in Parsons (1987) as Management Areas.

All sub-zones not listed above have had a standard applied for each alternative and are subject to the same campsite condition standard, based on whether they have been determined to be a High, Moderate, or Low use area. Not all sub-zones are included in the monitoring protocol. The same standard applies to all High Use areas, Moderate Use areas, and Low Use areas, as they are categorized (e.g., all High Use areas in alternative 1 have a standard WVCM of 1000).

Table A-5c: Visitor Capacity Monitoring – Low Use Campsite Sub-zones

Zone -Subzone	Name	Rating/ Use Level	Monitoring Frequency*	Comments	Patrol Area	WVCM ca. 1980	Alt 1 WVCM (from 2006-07 survey)	Standards for Low Use Areas			
								Alt 2 WVCM	Alt 3 WVCM	Alt 4 WVCM	Alt 5 WVCM
45-1	Barrett Lakes	ML	M		LeConte	129	68	250	325	235	175
61-1	Lower Sixty Lake Basin	ML	M		Rae	167	29	250	325	235	175

WVCM = Weighted Value per Campable Mile [from Cole (2013), and specific Dusy Basin Survey (2012) – those not surveyed in 2006-07, or 2012 would have the first read/survey serve as baseline – noted as TBD in Alt. 1]; WVCM is calculated by a formula that includes miles of campable area (which consists of lakeshores and water-course banks) and the numbers and class conditions of existing campsites. The higher the WVCM number, the higher the level of impact in the subzone.

* Monitoring frequency for the subset in the table above: High = once/6 years; Moderate = once/12 years; Low = once/30 years

CGTH = Cedar Grove Trailhead Ranger; LPTH = Lodgepole Trailhead Ranger; MKTH = Mineral King Trailhead Ranger

All (or nearly all, depending on site-by-site circumstances) sub-zones not included above would be monitored once every 30 years. There are 273 sub-zones. Sub-zones are geographically based divisions of the Wilderness Travel Zones, and were referred to in Parsons (1987) as Management Areas.

All sub-zones not listed above have had a standard applied for each alternative and are subject to the same campsite condition standard, based on whether they have been determined to be a High, Moderate, or Low use area. Not all sub-zones are included in the monitoring protocol. The same standard applies to all High Use areas, Moderate Use areas, and Low Use areas, as they are categorized (e.g., all High Use areas in alternative 1 have a standard WVCM of 1000).

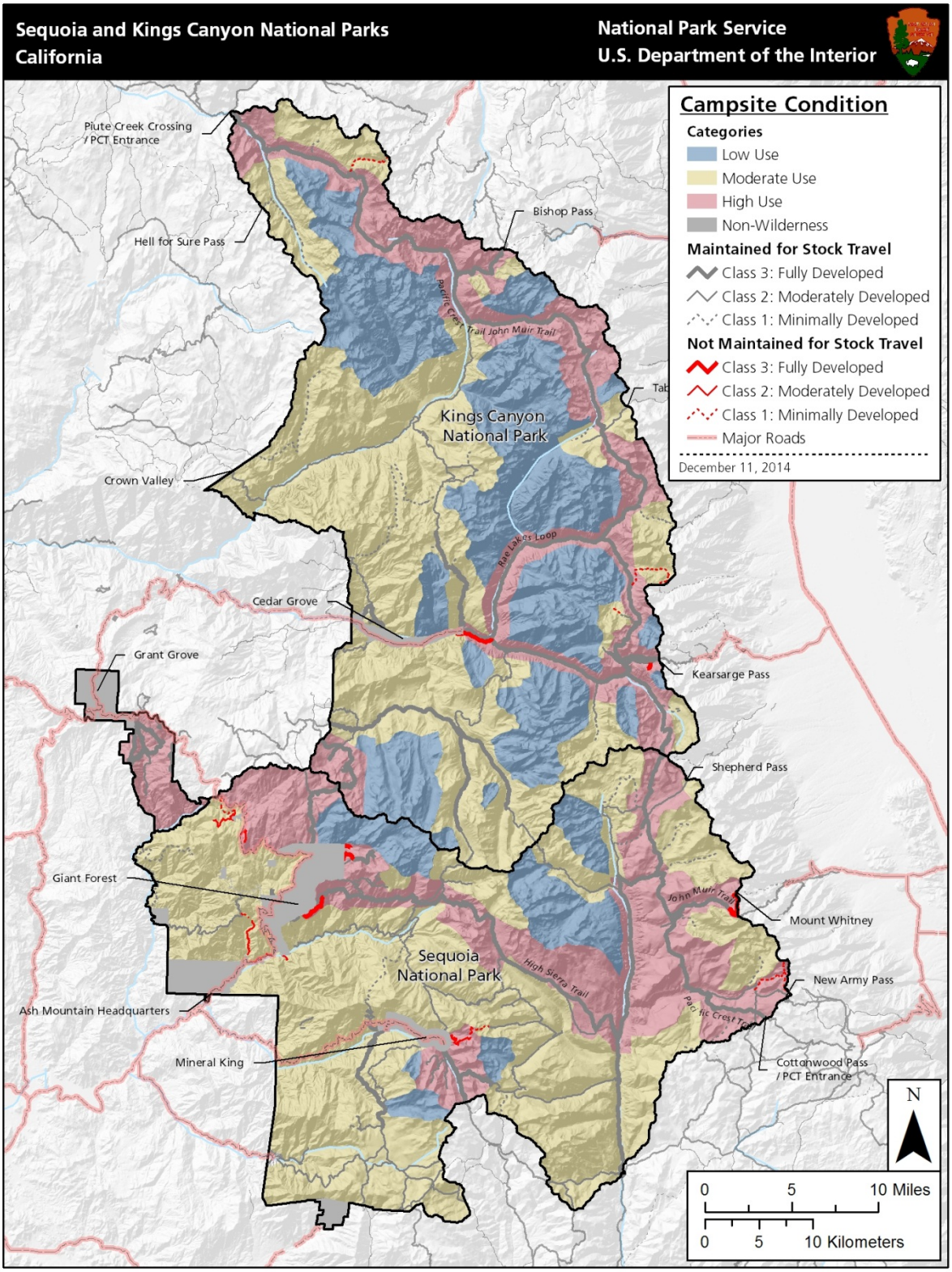


Figure A-3: Campsite Condition Categories by Wilderness Travel Subzone (Alternatives 2 through 5)

TRAIL ENCOUNTERS:

Table A-6 contains trail encounter standards for four encounter categories (very high, high, moderate, and low) and analysis area status for each action alternative that is evaluated in the WSP/FEIS (see figure A-4). Analysis area status is obtained by comparing the analysis area encounter rate component to the 90th quantile estimates from the three years of aggregated data (2012-2014) using a 90% confidence interval.

Confidence intervals (90%) for the 90th quantile estimates were calculated using bootstrapping methods. For a given 90th quantile estimate, the confidence interval can be interpreted as a 90% probability that the real population parameter falls within the upper and lower bounds of the confidence interval.

Therefore, when a trail segment's encounter rate component falls below the lower bound of the confidence interval, it is considered out of standard (red). When it falls above the upper bound of the confidence interval, it is considered in standard (green). When it falls within the upper and lower bounds of the confidence interval, it is considered near standard (yellow), and more data is required to establish its status with a 90% confidence level.

Table A-6: Visitor Capacity Monitoring - Encounter Categories, Standards and Initial Monitoring Data

Analysis Area	Encounter Category	Encounter Rate Standard*				Aggregated Sample Size (2012-2014) per Segment**	90th quantile estimate and 90% confidence interval***
		Alternative 2 (NPS Preferred)	Alternative 3	Alternative 4	Alternative 5		
Mt. Whitney (trail crest to summit)	Very High	45	59	43	32	38 (Crabtree-3)	44.0 (33, 57.3)
Roads End	Very High	45	59	43	32	66 (Cedar Grove-1) 26 (Cedar Grove-4)	43.7 (28.3, 47.2) 62.2 (35.7, 84.1)
High Sierra Trail (Crescent Meadow to Wolverton Cutoff Junction)	Very High	45	59	43	32	4 (Bearpaw-1)	24.7 (0, 28)
Lakes Trail	High	25	33	24	18	49 (Pear Lake-3) 38(Pear Lake-4)	17.4 (14.3, 20.4) 15.7 (10.7, 32.1)
Mineral King Valley	High	25	33	24	18	13 (Mineral King-1) 20 (Mineral King-2) 14 (Mineral King-3)	3.7 (0, 12.4) 9.3 (6.3, 15.3) 6.7 (3.5, 12)

Analysis Area	Encounter Category	Encounter Rate Standard*				Aggregated Sample Size (2012-2014) per Segment**	90th quantile estimate and 90% confidence interval***
		Alternative 2 (NPS Preferred)	Alternative 3	Alternative 4	Alternative 5		
						31 (Mineral King-4) 1 (Mineral King-5) 43 (Mineral King-6) 18 (MineralKing-7) 14 (Mineral King-8)	9.4 (8, 12) 4.6 (N/A) 18.8 (15.8, 21) 9.4 (6.9, 14.4) 4.2 (2.8, 6)
Little Baldy Trail Paradise Creek Trail Redwood Canyon Trails	High	25	33	24	18	N/A	N/A
Evolution Basin and Valley (JMT/PCT) Trail	Moderate	15	20	14	11	26 (McClure-1) 4 (McClure-2) 9 (McClure-3) 9 (McClure-5)	21.1(17.6, 38.8) 6.5 (0, 9.1) 9.3 (5.2, 13.6) 19.7 (9.5, 40.5)
Rae Lakes / John Muir Trail	Moderate	15	20	14	11	35 (Rae Lakes-1) 33 (Rae Lakes-2) 31 (CharlotteLake-1) 35 (Crabtree-4) 21 (LeConte-1) 31 (LeConte-4) 21 (Tyndall-1) 29 (Tyndall-2)	14.2 (11.3, 16.7) 16.4 (13.8, 23.7) 13.9 (9.2, 17.8) 10.6 (8, 15.2) 8.2 (5.5, 10.5) 11.1(8.4, 13.9) 13.2 (9.6, 25.1) 8.9 (6.3, 11)
Mt Langley approach	Moderate	15	20	14	11	12 (Rock Creek-1)	12.8 (4, 40.6)
Crabtree R.S. to Trail Crest	Moderate	15	20	14	11	38 (Crabtree-2)	16.7 (13.9, 26.1)
Rae Lakes Loop — Lower Portion	Moderate	15	20	14	11	31 (Cedar Grove-2) 27 (Cedar Grove-3) 7 (Cedar Grove-5)	9.0 (7.2, 13.5) 11.5 (9.2, 14.3) 13.4 (6, 14.9)
West Side of Kearsarge Pass	Moderate	15	20	14	11	27 (Charlotte Lk-2) 15 (Charlotte Lk-3)	9.5 (7.1, 15.6) 12.7 (6.5, 48)

Analysis Area	Encounter Category	Encounter Rate Standard*				Aggregated Sample Size (2012-2014) per Segment**	90th quantile estimate and 90% confidence interval***
		Alternative 2 (NPS Preferred)	Alternative 3	Alternative 4	Alternative 5		
Dusy Basin	Moderate	15	20	14	11	48 (LeConte-2) 26 (LeConte-3)	8.5 (6.7, 11.6) 9.0 (6, 11)
Twin Lakes Trailhead to Silliman Creek	Moderate	15	20	14	11	28 (Lodgepole-1)	9.0 (6.6, 13.2)
High Sierra Trail (Wolverton Cutoff Junction to JMT Junction)	Moderate	15	20	14	11	15 (Little Five-5) 15 (Bearpaw-3) 8 (Bearpaw-4) 15 (Tyndall-4)	7.7 (3.5, 18) 5.2 (3.7, 10.7) 8.2 (3.7, 17) 8.2 (4.7, 8.8)
Rock Creek	Moderate	15	20	14	11	19(Rock Creek-3) 41 (Rock Creek-4) 47 (RockCcreek-5) 8 (Rock Creek-6)	3.9 (2.9, 13.5) 2.2 (2, 4) 9.2 (4.9, 12.4) 1.8 (.9, 2.6)
Little Five	Moderate	15	20	14	11	20 (Little Five-1) 22 (Little Five-2) 36 (Little Five-3) 8 (Little Five-4)	6.2 (3.3, 7.6) 5.3 (4.6, 12.1) 4.7 (2.8, 7.1) 5.0 (3.2, 6.7)
Sugarloaf area Hockett area Granite Pass to State Lakes Jct Copper Creek Crossing Kern RS to Rattlesnake	Low	6	8	5	4	10 (Roaring River-1) 3 (Roaring River-2) 8 (Hockett 1) 8 (Hockett-2) 2 (Hockett 3&4) 6 (Cedar Grove-7) 12 (Cedar Grove-6) 10 (Kern-1) 4 (Kern-2)	0.8 (0, 1) 2.6 (.9, 3) 1.2 (0, 1.5) 0 (0, 0) 0 (N/A) 1.2 (0, 1.3) 2.6 (1.9, 2.7) 2.0 (1, 2) 2.3 (.7, 2.4)
Sixty Lake Basin Trail	Low	6	8	5	4	20 (Rae Lakes-3)	9.2 (4.4, 12.2)
Crabtree Lakes	Low	6	8	5	4	24 (Crabtree-1)	1.9 (.5, 8.3)
All other trails not identified above	Low	6	8	5	4	N/A	N/A

*- The encounter rate standard should be interpreted as the number of people encountered per hour that should not be exceeded on 90% of quota season days.

**- Sample size is the number of sampling events. Samples collected during 2012-14 were aggregated to achieve the stated sample sizes. Encounters are all normalized to people encountered per hour (EPH).

***- The 90^{th} quantile is provided as the first figure, and the lower and upper bounds of the 90% confidence interval are provided in parentheses.

[Note: trail encounter data from 2012-2014 and detailed above, was collected opportunistically by park staff and volunteers. As a result, a larger proportion of samples occurred on weekend days and mid-day times than would be expected from a random or structured sample. A standardized sampling protocol will be developed on completion of the WSP, and areas that are shown as out-of-standard (in red above), and may be out-of-standard, above, would be prioritized for re-sampling.]

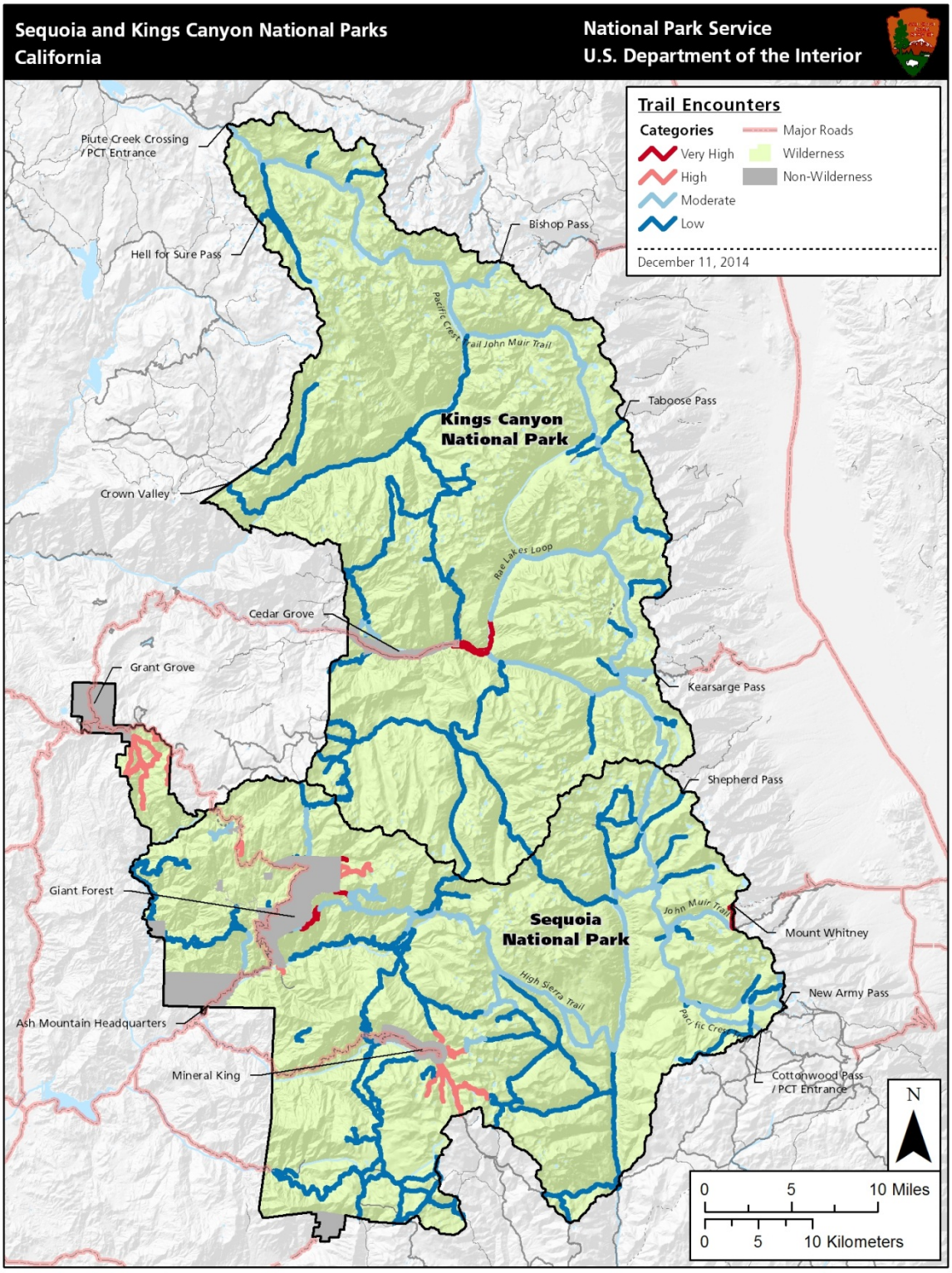


Figure A-4: Map of Encounter Categories

REFERENCES

Boyers, L., M. Fincher, and J. van Wagtendonk

2000 Twenty-Eight Years of Wilderness Campsite Monitoring in Yosemite National Park, USDA Forest Service Proceedings RMRS-P-15-VOL-5: 2000.

Broom, T. J., & Hall. T. E.

2010 An assessment of indirect measures for the social indicator of encounters in the Tuolumne Meadows area of Yosemite National Park. Report for Yosemite National Park. Moscow: University of Idaho, College of Natural Resources, Department of Conservation Social Sciences

Broom, T.J., and T.E. Hall

2009 A Guide to Monitoring Encounters in Wilderness, Prepared for Dept. of Agriculture, US Forest Service by University of Idaho, College of Natural Resources, Department of Conservation Social Sciences.

Cole, D.N.

2005 Monitoring and Management of Recreation in Protected Areas: the Contributions and Limitations of Science, Working papers of the Finnish Forest Research Institute 2.

Cole, D., and T. Carlson

2010 Numerical Visitor Capacity: A Guide to Its Use in Wilderness, Rocky Mountain Research Station, General Technical Report RMRS-GTR-247: October 2010.

Cole, D.N. and D.J. Parsons

2013 Campsite Impact in the Wilderness of Sequoia and Kings Canyon National Parks, Thirty Years of Change, Aldo Leopold Wilderness Research Institute, USDA Forest Service, and Natural Resource Technical Report NPS/SEKI/NRTR-2013/665: January 2013.

Fauth, G. D., and B. Tarpinian

2011 Unpublished. Summary of responses to the Wilderness Planning Workbook (May 1998), Sequoia and Kings Canyon National Parks, March 2011.

Fincher, M.

2012 Humans Apart From Nature? Wilderness Experience and the Wilderness Act, USDA Forest Service Proceedings RMRS-P-88: 2012.

Haas, G.E.

2001 Visitor Capacity in the National Park System, Social Science Research Review, U.S. Department of Interior, National Park Service, Volume 2, Number 1, Spring 2001.

Haas, G.E.

2002 Visitor Capacity on Public Lands and Waters: Making Better Decisions. A Report of the Federal Interagency Task Force on Visitor Capacity on Public Lands. Submitted to the Asst. Secretary for Fish and Wildlife and Parks, U.S. Department of the Interior, Washington, D.C. May 1, 2002. Published by the National Recreation and Park Association, Ashburn, Virginia.

Hendee, J.C., and C.P. Dawson

2002 Wilderness Management, Stewardship and Protection of Resources and Values (Third Edition), International Wilderness Leadership Foundation and Fulcrum Publishing.

Kantola, B.

1975 Unpublished. A Survey of Backcountry Visitors in Kings Canyon National Parks, prepared for Superintendent, Sequoia and Kings Canyon National Parks, December, 1975.

Manning, R. E.

2007 Parks and Carrying Capacity, Commons Without Tragedy, Island Press.

2011 Studies in Outdoor Recreation, Search and Research for Satisfaction (Third Edition), Oregon State University Press.

National Park Service

1995 Visitor Experience and Resource Protection Implementation Plan, Arches National Park, U.S. Department of Interior, National Park Service, Denver Service Center; June 1995.

1997 VERP, The Visitor Experience and Resource Protection (VERP) Framework, A Handbook for Planners and Managers, U.S. Department of Interior, National Park Service, Denver Service Center; September 1997.

1998 Concessions Management Improvement Act of 1998 (PL 105-391)

2012a Sequoia and Kings Canyon National Parks. Public Scoping Comment Summary Report for the Sequoia and Kings Canyon National Parks Wilderness Stewardship Plan/EIS - April 2012.

2012b Sequoia and Kings Canyon National Parks, Unpublished. Visitor Use Management and User Capacity Workshop Meeting Minutes, May 2012.

2013a Sequoia and Kings Canyon National Parks. Preliminary Draft Alternatives Public Comment Summary Report. March 2013.

2013b Yosemite National Park, Draft Tuolumne Wild and Scenic River Plan 2013

2013c Devil's Postpile National Monument, Draft General Management Plan 2013

2014a Keeping it Wild in the National Park Service, A User Guide to Integrating Wilderness Character into Park Planning, Management, and Monitoring, Office of Park Planning and Special Studies and the Wilderness Stewardship Division, U.S. Department of Interior, National Park Service, WASO 909/121797; January 2014.

2014b Wilderness Stewardship Plan Handbook, Planning to Preserve Wilderness Character, Office of Park Planning and Special Studies and the Wilderness Stewardship Division, U.S. Department of Interior, National Park Service, WASO 909/122875; January 2014.

Parsons, David J., and T.J. Stohlgren

1987 Impacts of Visitor Use on Backcountry Campsites in Sequoia and Kings Canyon National Parks, California, Cooperative National Park Resources Studies Unit, University of California at Davis, Institute of Ecology, and National Park Service, Technical Report No. 25: January 1987.

Stankey, G.H., D.N. Cole, R.C. Lucas, M.E. Petersen, and S.S. Frissell

1985 The Limits of Acceptable Change (LAC) System for Wilderness Planning, Intermountain Forest and Range Experiment Station, General Technical Report INT-176; January 1985.

U.S. Forest Service

1985 Proceedings – National Wilderness Research Conference: Issues, State-of-Knowledge, Future Directions, U.S. Department of Agriculture, Forest Service Intermountain Research Station, General Technical Report INT-220; July 1985.

1997 Proceedings – Limits of Acceptable Change and Related Planning Processes: Progress and Future Directions, U.S. Department of Agriculture, Forest Service Intermountain Research Station, General Technical Report INT-GTR-371; December 1997.

2000 Wilderness Science in a Time of Change Conference, Volume 4: Wilderness Visitors, Experiences, and Visitor Management, U.S. Department of Agriculture, Forest Service Rocky Mountain Research Station, Proceedings RMRS-P-15-VOL-4: September 2000.

Watson, A.E., M.J. Niccolucci, and D.R. Williams

1993 Hikers and Recreational Stock Users: Predicting and Managing Recreation Conflicts in Three Wildernesses, U.S. Department of Agriculture, Forest Service, Intermountain Research Station, November 1993.

Watson, A.E., D. N. Cole, D.L. Turner, and P.S. Reynolds

2000 Wilderness Recreation Use Estimation: A Handbook of Methods and Systems, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, General Technical Report RMRS-GTR-56; October 2000.

Whittaker, C., B Shelby, R. Manning, D. Cole, and G. Haas

2010 Capacity Reconsidered, Finding Consensus and Clarifying Differences, National Association of Recreation Resource Planners, monograph by the Capacity Work Group; May 2010.

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Appendix B

Extent Necessary Determination: An Analysis to Determine the Proper Types and Levels of Commercial Services

ON THE PREVIOUS PAGE
Wilderness in Sequoia and Kings Canyon National Parks
NPS Photo

APPENDIX B:

EXTENT NECESSARY DETERMINATION: AN ANALYSIS TO DETERMINE THE PROPER TYPES AND LEVELS OF COMMERCIAL SERVICES IN THE WILDERNESS OF SEQUOIA AND KINGS CANYON NATIONAL PARKS

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EXTENT NECESSARY DETERMINATION: AN ANALYSIS TO DETERMINE THE PROPER TYPES AND LEVELS OF COMMERCIAL SERVICES IN THE WILDERNESS OF SEQUOIA AND KINGS CANYON NATIONAL PARKS

A SPECIALIZED WILDERNESS ACT FINDING

INTRODUCTION

The Wilderness Act (16 USC 1131-1136; PL 88-577) secured for our nation an enduring resource of wilderness. Wilderness areas included in the National Wilderness Preservation System are to be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and to ensure that the wilderness character of these areas is preserved.

In order to achieve these goals, the Wilderness Act (the Act) in its Prohibition of Certain Uses section (§ 4(c)) lists some specific prohibited uses, or practices. There are absolute prohibitions on commercial enterprise and permanent roads, and also general prohibitions, with qualified exceptions, on: temporary roads; use of motor vehicles; motorized equipment and motorboats; landing of aircraft; mechanical transport; and structures and installations. Under the Special Provisions section of the Act, in §4(d)(5), it states that "Commercial services may be performed within the wilderness areas designated by this Act to the extent necessary for activities which are proper for realizing the recreational or other wilderness purposes of the areas." The "purposes" referred to in §4(d)(5) are those enumerated in §4(b), which states that "...wilderness areas shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use." It is worthwhile to note that these purposes are rarely, if ever, discrete; that is, a recreational activity would commonly involve scenic or educational pursuits, or even both.

DEFINITIONS

The Wilderness Act does not define the terms "activities," "commercial services," or "necessary." When Congress does not include definitions of important terms in a statute, agencies may rely on commonly accepted definitions. The word "activities" is commonly defined as, "a pursuit in which a person is active"[1], "a recreational pursuit or pastime," or "actions taken by a group in order to achieve their aims."[2] In the wilderness context, it is understood as referring to the recreational or other active pursuits engaged in by wilderness visitors. The word "commercial" is commonly defined as (1) "[o]f or relating to commerce," i.e., "[t]he buying and selling of goods, esp. on a large scale: business," (2) "[e]ngaged in commerce," (3) "[i]nvolved in work designed or planned for the mass market," or (4) [h]aving profit as a

[1] Merriam-Webster's (online)
[2] Oxford Dictionary (online)

primary aim."[3] The word "service" is commonly defined as "the organized system of apparatus, appliances, employees, etc., for supplying some accommodation required by the public" or "the performance of any duties or work for another." For the purposes of this document, a commercial service is one that relates to or is connected with commerce wherein work is performed for another person or entity, and where the primary purpose is the experience of wilderness through support provided for a fee or charge and where the primary effect is that the wilderness experience is guided and shaped through the use of support services provided for a fee or charge.

The word "necessary" is defined in some dictionaries as meaning "absolutely needed."[4] Other dictionaries define it to mean "important in order to achieve a specific result, or desired by authority or convention."[5] The word necessary appears in many federal statutes. Courts that have been called upon to interpret the word necessary in a statutory context have frequently rejected an absolutist definition and instead adopted a more flexible definition of necessary. In particular, the U.S. Court of Appeals for the Ninth Circuit specifically declined to interpret the word necessary in Section 4(c) of the Wilderness Act as "requiring a finding of absolute necessity" by the wilderness managing agency before a structure could be authorized in wilderness.[6]

Consistent with this judicial interpretation, this Extent Necessary Determination (END) does not use the word necessary in an absolutist sense. Rather, the word necessary in relation to commercial services is defined to mean a service that is important to achieve objectives for visitor use and enjoyment of wilderness in such a manner that the Desired Conditions for wilderness character are achieved, and wilderness character is thereby preserved.

The language of the Act also suggests two distinct but interrelated standards related to the terms "activities" and "commercial services." First, the "activities" that may be supported by commercial services must be "proper for realizing the recreational or other wilderness purposes." Second, "commercial services" can only be authorized "to the extent" that they are necessary for activities deemed proper. The U.S. Court of Appeals for the Ninth Circuit has concluded that this language requires agencies to determine the amount of use that can be allowed. Thus, both the type (i.e., "proper") and amount (i.e., "extent") of commercial support must be addressed in this Extent Necessary Determination.

GUIDANCE FOR EVALUATING COMMERCIAL SERVICES

The NPS *Management Policies* (2006) states that wilderness-oriented commercial services that contribute to public education and visitor enjoyment of wilderness values or that provide opportunities for primitive and unconfined recreation may be authorized if the activities conform to NPS concessions management policies and the Wilderness Act, and if they are consistent with the park's wilderness management objectives. Commercial services must be consistent with the application of the minimum requirement concept and with the objectives of the park's management plans.

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[3] Webster's II New College Dictionary 225 (1995); accord Merriam-Webster's Collegiate Dictionary 230 (2000). See wilderness Society v. U.S. Fish and Wildlife Service, 353 F.3d. 1051, 1061 (9th Cir. 2003).
[4] Merriam-Webster's (online)
[5] Encarta Dictionary (online)
[6] *Wilderness Watch v. U.S. Fish and Wildlife Service*, 629 F.3d 1024 (9th Cir. 2010), interpreting Section 4(c) of the Wilderness Act, which prohibits structures and installations in wilderness "except as necessary to meet minimum requirements for the administration of the area for the purpose of [the Act]."

The NPS's Director's Order #41: *Wilderness Stewardship* requires the NPS to prepare a documented determination setting forth the types and amount of commercial services that are necessary to realize wilderness purposes. This Extent Necessary Determination (END) satisfies that requirement.

The U.S. District Court for Northern California referred to the determination as a "comparative and qualitative analysis where the variables are considered in relation to one another and the interests at stake are weighed (High Sierra Hikers Assn. v. U.S. DOI, 848 F. Supp. 2d 1036 (N. D. Cal. 2012)). In this END, qualitative aspects of visitor use and enjoyment and wilderness character are considered, including the role of particular wilderness-appropriate visitor activities in achieving desired conditions for wilderness character and objectives for visitor use and enjoyment; the particular attributes of these activities that necessitate commercial support; the regulatory framework for those activities that ensures that wilderness character can be preserved while promoting opportunities for visitor use and enjoyment; and the manner in which commercially-supported visitor use is accommodated within the wilderness-protective standards that have been established for overall visitor use. By considering these variables in relation to one another and in relation to the objectives of the particular alternatives for future management of Sequoia and Kings Canyon National Parks' wilderness, a conclusion is reached about the level of commercial support that may be provided under each alternative such that wilderness character is preserved.

RELATIONSHIP TO THE WSP/FEIS

The END, together with the Final Environmental Impact Statement (FEIS) for the Wilderness Stewardship Plan, was prepared using an interdisciplinary approach that included wilderness management experts, commercial services staff, and other resource specialists. Through the process of preparing this END and the FEIS, the NPS considered both the potential short-term and long-term effects of commercial service activities.

The END is an integral part of the WSP/FEIS. The extent to which commercial services in the parks' wilderness were deemed necessary is an outcome of the overall wilderness planning process. This process identified key elements of wilderness character, defined desired conditions and management objectives for these elements, analyzed impacts in determining the overall amount of use appropriate in wilderness, and finally determined the proportion of this use that may be supported by commercial services while ensuring the preservation of wilderness character.

The determination of the extent necessary for commercial services is closely related to the identification of visitor capacity, or the amounts of use appropriate in the wilderness. "Appendix A: Visitor Capacity" provides an explanation of visitor capacity and the amounts of visitor use that are considered in the WSP/FEIS. This appendix provides further explanation of the process and outcomes of determining extent necessary for commercial services in wilderness.

The framework for determining visitor capacity and the extent of commercial services necessary in the SEKI wilderness included the establishment of measures and standards to identify and monitor visitor use and its effects on the condition of wilderness character. These measures and standards are described in chapter 2 of the WSP/FEIS and in "Appendix A: Visitor Capacity."

Each alternative includes a proposed specific visitor capacity and extent of commercial services and each is protective of wilderness character.

In this framework, the assessment of necessary commercial service types and amounts is an extension of the WSP/EIS's visitor use planning, and builds on the visitor capacity decision-making process that is elaborated for each alternative. Indeed, the requirement to identify the activities that are proper for

wilderness purposes is an integral part of visitor use planning, which considers the overall type and amounts of visitor use that can be accommodated while sustaining acceptable resource and social conditions that complement the purpose of a park or area, in this case, a designated wilderness area. Effective visitor use management ensures that wilderness character is preserved by limiting change to important indicators of wilderness character.

As with other aspects of visitor use planning, an assessment of necessity for commercial services within each alternative is the outcome of a decision-making process and part of a larger management program. It requires judgment about the desired environmental and experiential conditions in, and effects on, wilderness. Each of the action alternatives in the WSP/FEIS preserves wilderness character by emphasizing wilderness character qualities in different ways. Resource conditions, management intensity, and visitor capacities, including the extent of support by commercial services, are foundational elements of the alternatives. Changing one has implications for the others. Visitor capacities in the different alternatives show how higher and lower amounts of use fit with management actions to produce different resource conditions and experiences. These represent choices for the kind of place the parks' wilderness will be and the experiences it will offer wilderness visitors in the future. All alternatives preserve wilderness character, as required by the Act, while offering a reasonable range of choices about the future of the wilderness as required by the National Environmental Policy Act (NEPA).

STRUCTURE AND CONTENT OF THE EXTENT NECESSARY DETERMINATION / COMMERCIAL SERVICES EVALUATION

The sections that follow identify the types of "activities which are proper for realizing recreational and other wilderness purposes" and then determine the numeric amount of commercial support, expressed in terms of commercial service days, ensuring that the amount allowed is consistent with the preservation of wilderness character. The appropriate sequence is to first determine which activities are proper for realizing the recreational or other purposes of wilderness, determine if commercial services are beneficial for the activity, and then determine the extent to which commercial services are necessary to support those activities. To be proper, an activity must be both lawful in wilderness and subject to sufficient management control so as to preserve wilderness character. To address the amount of each activity that would be allowed, this assessment examines specific aspects of proper activities and the ability to manage the activities to preserve the wilderness character objectives of each alternative presented in the WSP/FEIS. It should also be noted that the Act does not state that an activity must be *necessary*, but rather that an activity must be proper for realizing wilderness purposes. Nor does it state that commercial services must be necessary for *access* to wilderness, but rather that commercial services may be performed only to the "extent necessary" for activities proper for realizing wilderness purposes, and can be conducted in a manner that does not degrade wilderness character, as determined by the agency.

The extent of commercial support to visitors in wilderness is expressed in terms of service days, which is defined as all or part of a day spent by a client of a commercial service provider on NPS-managed lands. For each plan alternative, a conclusion is reached about the annual overall wilderness-wide service days that may be performed. These commercial service days are divided into two categories, those that use stock and those that do not, with a secondary conclusion separating out the high-use Mount Whitney Management Area, where a reduced portion of overall service days are allocated. There is also a description of other regulatory mechanisms that control commercially supported trips.

Table B-1: Structure and Content of the Extent Necessary Determination / Commercial Services Evaluation

Section	Title	Purpose
I	Activities Which Are Proper for Realizing the Recreational or Other Purposes of Wilderness	Examines various visitor activities and the reasons why each activity is considered proper for the use and enjoyment and recreational or other public purposes of wilderness
II	Aspects of Wilderness Activities that May Necessitate Commercial Support	Looks at several potential characteristics of an activity that may provide insight into why commercial services may be necessary for that activity
III	Type of Commercial Services that are Necessary for Each Proper Activity	Uses the categories provided in Section II to analyze the aspects of specific activities that may necessitate commercial support. A conclusion regarding the necessity for commercial support is made for each activity
IV	Extent (Amount) of Commercial Support that is Necessary for Each Proper Activity	Reviews each activity against the desired conditions and visitor capacities of each alternative in order to allocate an amount of commercial support that is necessary for the proper activities
V	Summary	Alternatives Summaries and Table for Visitor Capacities, Commercial Services Allocations, and Preservation of Wilderness Character
VI	Maps	Maps show spatial distribution of Non-stock, Stock, and Combined commercial support

SECTION I: ACTIVITIES WHICH ARE PROPER FOR REALIZING THE RECREATIONAL OR OTHER PURPOSES OF WILDERNESS

For a commercial service to be considered as a necessary form of support for an activity, that activity must be proper for realizing wilderness purposes. Any activity that occurs in designated wilderness must first be of a type that does not violate the prohibitions of §4(c) on the use of motor vehicles, motorized equipment or motorboats, the landing of aircraft, or other forms of mechanical transport. NPS Management Policies 6.4.3 states that recreational uses in wilderness will be of a nature that:

- Enables the areas to retain their primeval character and influence;
- Protects and preserves natural conditions;
- Leaves the imprint of man's work substantially unnoticeable;
- Provides outstanding opportunities for solitude or primitive and unconfined types of recreation; and
- Preserves wilderness in an unimpaired condition.

Also, for an activity to be proper, it must be subject to sufficient management control so as to preserve wilderness character, which is the fundamental purpose of managing visitor use in a wilderness area. These management controls are outlined and discussed in the activity descriptions below and are in chapter 2 of the WSP.

In addition, the WSP has established goals, desired conditions, and objectives for the future management of wilderness in Sequoia and Kings Canyon National Parks (chapter 1, pages 5, 11-13). One critical objective of the WSP is to *provide opportunities for and encourage public use and enjoyment of*

wilderness in accordance with the Wilderness Act and other laws and policies. The goals, objectives, and desired conditions that are relevant for this END are:

Goals:

- Preserve ecological, geological, scientific, educational, scenic, and historical values of wilderness, including culturally significant resources and paleontological resources within wilderness, as important and prominent values, consistent with the Wilderness Act, California Wilderness Act, and the applicable planning guidance from the GMP (2007).
- Promote safety and outdoor ethics within the context of wilderness where users are expected to be self-reliant.
- Work to reduce conflicts between user groups as well as between users and sensitive resources.
- Determine the types and levels of commercial services that will be allowed in wilderness and manage these services subject to applicable laws and policies.
- Foster an inspired and informed public and park staff who value preservation of the parks' wilderness.

Desired Conditions for Wilderness Character:

- The untrammeled quality of wilderness character would be preserved by limiting deliberate manipulation of ecological systems except as necessary to promote another quality of wilderness character.
- The natural quality of wilderness character would be preserved by mitigating the impacts of modern civilization on ecosystem structure, function, and processes. The NPS aspires to minimize or localize adverse impacts caused by visitor use and administrative activities. In the wilderness, natural processes would dominate:
    - ecosystem structure and function
    - native biodiversity
    - water quality and quantity
    - decomposition, nutrient cycling and soil forming processes
    - meadow and wetland productivity
    - fire regimes
    - soundscapes, dark skies and viewsheds

  Additionally, the NPS seeks to minimize adverse impacts caused by visitor use and administrative activities to cultural, historical, and pre-historical resources.
- The undeveloped quality of wilderness character would be preserved through the removal of installations that are unnecessary for the protection of other wilderness character qualities.
- Outstanding opportunities for solitude or primitive and unconfined recreation would be provided to support visitor use and enjoyment of the parks' wilderness areas in balance with the protection of other wilderness character qualities.
    - Visitors with diverse backgrounds and capabilities would have opportunities to use and enjoy wilderness.

- Visitors would have opportunities to experience solitude, a state of being alone or feeling remote from society, although these opportunities could vary by location and time.
- Visitors would have opportunities to participate in a variety of primitive recreation activities, characterized by non-motorized, non-mechanical travel and reliance on personal skill; primitive recreation activities would be managed to preserve other wilderness character qualities.
- Visitors would have opportunities to recreate in an unconfined, self-directed manner, subject only to those regulations that are necessary to preserve wilderness character.

Objectives for Specific Planning Elements:

- Visitor use and enjoyment of wilderness would be promoted while ensuring the preservation of wilderness character.
- Visitors would have the opportunity to choose camping locations, except in areas where camping would result in unacceptable impacts.
- Visitors would have opportunities to travel with stock, from day rides to multi-day trips, in a manner that is compatible with the protection of wilderness character.
- Commercial services may be performed to the extent necessary for activities that are proper for realizing the recreational or other wilderness purposes of the areas in a manner that ensures the preservation of wilderness character. Commercial services would support visitor use and enjoyment of wilderness in a variety of appropriate ways.

In addition, these objectives were further elaborated for each action alternative. These elaborations are included in "Table B2: Discussion of Alternative Concepts", current visitor and commercial service use levels and desired conditions.

BACKPACKING AND HIKING TRIPS (OVERNIGHT CAMPING AND DAY HIKES)

Hiking and backpacking are traditional wilderness activities and are currently the most popular ways in which the public experiences the benefits of wilderness.

Day hiking: Hiking from a frontcountry location into and out of wilderness without spending the night is a popular activity that has occurred in the parks since their establishment. Day-use hiking in wilderness is a proper activity because it allows visitors to realize and experience the recreational and other values of wilderness.

Backpacking: Backpacking, which is defined as multi-day hiking while carrying overnight camping gear, fulfills the recreational, scenic, educational, conservation and other wilderness purposes.

Types of commercial services that may directly support day-hiking and backpacking are guide services that help visitors find appropriate locations for these activities and provide local knowledge or education about wilderness resources. Guide services may provide a range of support from all-inclusive (with meals/cooking and gear provided) to minimal guiding (with only a guide). These activities may be exclusively hiking-based or may use stock support to re-supply longer trips.

There are a wide variety of limitations on hiking and backpacking to ensure wilderness preservation. These limitations ensure that these activities remain compatible with wilderness character, i.e., do not lead to unacceptable impacts on resources or social conditions (see alternatives in chapter 2). Backpacking and hiking are permitted in all areas of the wilderness of Sequoia and Kings Canyon National Parks (the

parks), with the exception of a limited number of areas that might be closed to access due to resource impacts, or safety issues (e.g., wildfires). Backpacking and hiking are subject to limitations that include: party size; the requirement to properly store all food; and where campfires are allowed (although these are rare for day hikers). In addition, backpacking and hiking are limited by the general wilderness prohibition on motor vehicles and mechanical transport, by applicable federal regulations (36 CFR Parts 1 and 2) and by the capacity limitations described in chapter 2 and "Appendix A: Visitor Capacity."

This combination of controls effectively limits backpacking and hiking in the wilderness of the parks to a style which is compatible with a wilderness setting and which contrasts with frontcountry environments. Subject to the requirements and limitations discussed above, backpacking and hiking are considered activities that are proper for realizing the recreational and other purposes of wilderness.

STOCK TRIPS (RIDING, PACKING, DAY RIDES AND OVERNIGHT CAMPING WITH STOCK)

The use of stock in wilderness is a long-standing primitive type of recreation consistent with wilderness purposes. Riding and packing with stock is a documented traditional activity that was championed by the founders of the wilderness ideal and has occurred in the parks since their establishment in the late 19th and early 20th Century (Jackson 2004, McKee 2013, Tweed and Dilsaver 1990, Leave No Trace 2002). Through time, many members of the public have been able to experience the benefits of wilderness through stock- supported travel.

Stock in the parks is defined as horses, mules, burros, or llamas. Other animals (e.g., goats, used for packing elsewhere) are not allowed in the parks due to resource impacts. Wilderness trips that use stock for support are varied, but generally consist of two types:

- Traveling trips – these consist of visitors riding or walking and remaining with the stock throughout the duration of the trip. Stock is used for riding and/or for carrying supplies and equipment. Meal service provided by the commercial service operator may be included.
- Day trips – these consist of visitors riding stock from a frontcountry location into wilderness and then returning to the frontcountry without stock or people spending the night in wilderness.

Stock trips are permitted in many areas of the wilderness of the parks, with the exception of areas that are currently closed to stock access or that would be closed to stock access under the WSP due to safety concerns or impacts to natural or social conditions. Stock use is subject to limitations that include: the types of allowed animals; the types of stock feed allowed; party size; off-trail travel restrictions; the requirement to properly store all food; grazing restrictions; locations where campfires are allowed (rare for day users); the type of substrate allowed for camping (bare ground); distance from lakes and streams (25 feet minimum, 100 feet recommended); camp cleanup; and modifying campsites with rock walls, new fire rings, or other structures (all of which are prohibited). In addition, stock use is limited by the general wilderness prohibition on motor vehicles and mechanical transport, by applicable federal regulations (36 CFR Parts 1 and 2) and by the capacity limitations described in chapter 2 and "Appendix A: Visitor Capacity."

This combination of existing limitations and proposed stock use prescriptions effectively restrict stock use in the wilderness of the parks to a style which is compatible with a wilderness setting and which contrasts with stock use in frontcountry environments. Subject to the requirements and limitations discussed above, stock use is considered an activity that is proper for realizing the recreational and other purposes of wilderness.

Types of commercial services that may directly support stock trips are guide and outfitting services based on providing visitors with stock and proper equipment and assisting visitors in finding appropriate locations for these activities and providing localized knowledge or education and information about proper wilderness use and resources. These may consist of day-use trips or overnight camping (also see below under Overnight Camping).

OVERNIGHT CAMPING

Overnight camping is a traditional wilderness activity that is integral to multi-day trips involving hiking, packing, mountaineering, or oversnow travel (i.e., skiing and snowshoeing). The ability, and sometimes the necessity, to spend multiple days traveling and camping without encountering roads or permanent human habitation is a defining feature of wilderness and is an expression of the area's size and undeveloped character. Overnight camping allows visitors to immerse themselves in the wilderness resource.

Overnight camping is now permitted in most areas of the wilderness of Sequoia and Kings Canyon National Parks, with the exception of a limited number of areas that are closed to camping due to the proximity to a trailhead or due to resource impacts. Under all of the action alternatives considered in the WSP/FEIS, overnight camping would continue to be permitted in most areas of the wilderness. Overnight camping is subject to limitations that include: stay length; party size; the requirement to properly store all food; where campfires are allowed; type of substrate allowed for camping (bare ground); distance from lakes and streams (25 feet minimum, 100 feet recommended); and modifying campsites with rock walls, new fire rings, or other structures (all of which are prohibited). In addition, overnight camping is limited by the general wilderness prohibition on motor vehicles and mechanical transport, by applicable federal regulations (36 CFR) and by the capacity limitations described in chapter 2 and "Appendix A: Visitor Capacity."

This combination of limitations effectively restricts overnight camping in the wilderness of the parks to a style which is consistent with a wilderness setting and which contrasts with camping in frontcountry environments. The style of overnight camping may range from minimalist backpacking camps to camps that contain items of comfort (e.g., chairs and cooking tables) that may be associated with stock-supported groups. Subject to the requirements and limitations discussed above, overnight camping is considered an activity that is proper for realizing the recreational or other purposes of wilderness.

Other than the particular uses and practices prohibited under §4(c), the type of equipment which is permitted in wilderness is generally not addressed by regulation. While the NPS does not regulate visitor choices about equipment, it has the authority to regulate visitor behavior to prevent damage to natural and cultural resources, to protect wilderness experiences, and to ensure that wilderness character is preserved. There is disagreement among some users about what equipment may or may not be appropriate in wilderness (e.g., ice chests, phones). The NPS enforces regulations to ensure wilderness resource preservation and protection (e.g., prohibitions on loud audio devices and motorized equipment, see appendix F).

Subject to the requirements and limitations discussed above, certain types of commercial services may then be necessary to directly support overnight camping activities through the transportation of equipment or supplies. These services allow people to have enough supplies to reach inner portions of wilderness and or extend their stays to more thoroughly immerse themselves in the wilderness experience. These services also allow a diverse public who cannot all physically carry the equipment to be able to recreate in and experience the benefits of wilderness.

Examples of these types of commercial services include gear and food hauling services by stock (i.e., spot or dunnage service) or porters (dunnage service).

- Spot trips – these consist of some or all members of a party riding to a place where they separate from the animals with their gear and food and continue their trip without the stock. The stock then returns to the frontcountry. On occasion, stock may return after a period of time to pick up and assist the visitors with exiting wilderness via riding and/or carrying out gear. These trips could involve the stock going in just for the day or involve the stock staying overnight in wilderness.
- Dunnage – this consists of stock or people carrying in gear and food and meeting with wilderness users at a place where gear is delivered and visitors continue their trip without the stock. The stock drops off gear and food and returns to the frontcountry. These trips could involve stock going in just for the day or staying overnight in wilderness. This same service could be provided by porters who carry in gear and/or food for people, either initially at the start of a trip, or to provide mid-trip resupply for wilderness travelers. The human porter(s) could go in just for the day or stay overnight in wilderness.

OVER-SNOW TRAVEL (SKI AND SNOWSHOE TOURING AND WINTER OVERNIGHT CAMPING)

Skiing and snowshoeing are traditional wilderness activities. Though they require specialized skills, they have remained popular as a way to experience the recreational or other purposes of wilderness. There are a variety of limitations on skiing and snowshoeing (with backpacks or sleds) to ensure wilderness preservation. These limitations ensure the activity remains compatible with wilderness character (i.e., does not lead to unacceptable impacts on resources or social aspects). See alternatives in chapter 2.

Skiing and snowshoeing from a frontcountry location into and out of wilderness without spending the night is a popular activity that has occurred in the parks since their establishment. Day-use skiing and snowshoeing in wilderness is a proper activity. Day- skiing and snowshoeing may be supported by commercial service providers solely for skiing and snowshoeing, or to access climbing and mountaineering experiences.

Skiing and snowshoeing is now permitted in all areas of the wilderness of Sequoia and Kings Canyon National Parks, with the exception of a limited number of areas that might be closed to access due to resource impacts or safety issues (e.g., avalanches). Under all of the action alternatives considered in the WSP/FEIS, skiing and snowshoeing would continue to be permitted in most areas of the wilderness. Skiing and snowshoeing are also subject to limitations on: party size; the requirement to properly store all food; and where campfires are allowed (although these are rare for day-users). In addition, skiing or snowshoeing are limited by the general wilderness prohibition on motor vehicles and mechanical transport, by applicable federal regulations (36 CFR Parts 1 and 2) and by the capacity limitations described in chapter 2 and “Appendix A: Visitor Capacity.”

Types of commercial services that may directly support skiing and snowshoeing are guide services based on assisting visitors in finding appropriate locations for these activities and providing specialized equipment and/or technical skill development.

CLIMBING AND MOUNTAINEERING (SUMMER AND WINTER)

The rugged rock and snow-covered areas of the parks provide excellent opportunities for mountaineering (year-round, including ski mountaineering and ice climbing) and technical rock climbing. This activity has been occurring in the Sierra Nevada for more than 150 years. Both mountaineering and technical rock

climbing are proper activities in wilderness provided they are done in a manner compliant with existing regulations. There are some specialized considerations that rock and ice climbers must take into account (i.e., the proper use of fixed anchors) in order to ensure they do not degrade wilderness character. Travel for this activity could involve oversnow travel, hiking, or a mix of hiking and use of stock.

Mountaineering and technical rock climbing is now permitted in all areas of the wilderness of Sequoia and Kings Canyon National Parks, with the exception of a limited number of areas that might be closed to access due to resource impacts. Under all of the action alternatives considered in the WSP/FEIS, climbing and mountaineering would continue to be permitted in most areas of the wilderness. Mountaineering and technical rock climbing are subject to limitations that include: party size; the requirement to properly store all food; specific climbing restrictions (see "Appendix J: Climbing Management Strategy"); where campfires are allowed; type of substrate allowed for camping (bare ground); distance from lakes and streams (25 feet minimum, 100 feet recommended); and modifying campsites with rock walls, new fire rings, or other structures (all of which are prohibited). In addition, overnight camping is limited by the general wilderness prohibition on motor vehicles and mechanical transport, by applicable federal regulations (36 CFR) and by the capacity limitations described in chapter 2 and "Appendix A: Visitor Capacity."

Types of commercial services that may directly support mountaineering and technical rock climbing are guide services based on assisting visitors in finding appropriate locations for these activities and providing specialized equipment and/or technical skill development. This activity could be supported by way of hiking-based, skiing-based, or stock-based support.

FISHING

Though most fish in the parks have been introduced, recreational fishing has been a popular activity for more than a century. This activity can consist of fishing rivers, streams or lakes, whether by the use of flies or other lures or bait. Fishing as an activity is proper in wilderness provided it is done in a manner compliant with existing regulations. Travel for this activity could involve hiking or a mix of hiking and use of stock.

Fishing is now permitted in most areas of the wilderness of Sequoia and Kings Canyon National Parks, with the exception of a limited number of areas that are closed due to resource impacts, and subject to specific fishing regulations. Under all of the action alternatives considered in the WSP/EIS, fishing would continue to be permitted in most areas of the wilderness. People who fish are subject to limitations that include: stay length; party size; the requirement to properly store all food; where campfires are allowed; type of substrate allowed for camping (bare ground); distance from lakes and streams (25 feet minimum, 100 feet recommended); and modifying campsites with rock walls, new fire rings, or other structures (all of which are prohibited). In addition, people who fish are limited by the general wilderness prohibition on motor vehicles and mechanical transport, by applicable federal regulations (36 CFR) and by the capacity limitations described in chapter 2 and "Appendix A: Visitor Capacity."

Types of commercial services that may directly support fishing are guide services based on assisting visitors in finding appropriate locations for angling and providing specialized equipment and/or technical skill development. This activity could be supported by way of hiking-based, or stock-based support.

RIVER-RUNNING

River-running (kayaking and canoeing) is a fundamental and appropriate wilderness activity, provided it is non-motorized/human-powered. This activity is limited in the wilderness of the parks due to short-lived adequate seasonal water flows, the challenging whitewater conditions, and difficulty of accessing remote

rivers. Limitations on river running would include those on hiking, backpacking, and overnight camping. These limitations ensure the activity remains compatible with wilderness character (i.e., does not lead to unacceptable impacts on resources or social aspects). Travel for this activity could involve hiking or a mix of hiking and the use of stock.

River-running is now permitted on almost all rivers in the wilderness of Sequoia and Kings Canyon National Parks, with the exception of a segment of the Middle Fork Kings that is closed due to resource and experiential impacts. Under all of the action alternatives considered in the WSP/FEIS, river-running would continue to be permitted on most rivers, with the existing prohibition on the lowest segment of the Middle Fork Kings being retained. People who river-run are subject to limitations that include: stay length; party size; the requirement to properly store all food; where campfires are allowed; type of substrate allowed for camping (bare ground); distance from lakes and streams (25 feet minimum, 100 feet recommended); and modifying campsites with rock walls, new fire rings, or other structures (all of which are prohibited). In addition, people who river-run are limited by the general wilderness prohibition on motor vehicles and mechanical transport, by applicable federal regulations (36 CFR) and by the capacity limitations described in chapter 2 and "Appendix A: Visitor Capacity."

Types of commercial services that may directly support river running are dunnage/gear transport via stock or porters, and river guide services that would assist visitors in safely conducting the activity in appropriate locations, including providing localized knowledge.

PHOTOGRAPHY

Taking photographs is a popular way for the public to realize the scenic purpose of wilderness and as such is a proper activity. Travel for this activity could involve hiking or a mix of hiking and use of stock.

Photography is now permitted in all areas of the wilderness of Sequoia and Kings Canyon National Parks, with the exception of a limited number of areas that may be closed due to resource impacts. Under all of the action alternatives considered in the WSP/FEIS, photography would continue to be permitted in most areas of the wilderness. People who conduct photography are subject to limitations that include: stay length; party size; the requirement to properly store all food; where campfires are allowed; type of substrate allowed for camping (bare ground); distance from lakes and streams (25 feet minimum, 100 feet recommended); and modifying campsites with rock walls, new fire rings, or other structures (all of which are prohibited). In addition, people who conduct photography are limited by the general wilderness prohibition on motor vehicles and mechanical transport, by applicable federal regulations (36 CFR) and by the capacity limitations described in chapter 2 and "Appendix A: Visitor Capacity."

Types of commercial services that may directly support photography are guide services based on assisting visitors in finding appropriate locations for these activities and providing technical skill development.

NOTE: Filming in wilderness for commercial purposes is prohibited, unless it can be shown that a wilderness purpose is realized. The use of models, sets or props, or other approaches that promote a product or service for commercial still photography is also prohibited (NPS Director's Order 41).

OTHER ACTIVITIES THAT SUPPORT THE PURPOSES OF WILDERNESS AND THAT ARE NOT SUBJECT TO COMMERCIAL SERVICES RESTRICTIONS

Educational Trips: Education is one of the enumerated purposes of the Wilderness Act. Educational trips that have environmental education as their primary purpose occur regularly in wilderness and may also incorporate other activities, such as backpacking and hiking, or stock use. Trips such as these often allow visitors to realize many of the other purposes of the Wilderness Act such as the recreational,

conservation and historic purposes. In general, education will be considered the primary purpose of a trip when academic credit is provided, even if accompanied by staff from environmental education organizations. When academic goals are the primary purpose, having support services provided by other entities does not change the essential character of the trip, which is academic, not commercial.

Scientific Research: Scientific research conducted by educational institutions, governmental entities, and the like is considered a proper use of wilderness because these activities further the scientific, educational, historic, and/or conservation purposes of wilderness. Scientific research is encouraged under NPS policies (NPS *Management Policies* 6.3.6.1). Scientific research conducted by these types of entities is not subject to this Extent Necessary Determination even if commercial services are used to provide ancillary assistance in the transport of research supplies and equipment, either via stock or porters. Researchers of this type operate under the authority of the NPS and their activities are categorized as an administrative use of wilderness.

PUBLIC ACTIVITIES THAT ARE PROHIBITED OR NOT PROPER IN WILDERNESS

Although many activities are proper in wilderness, there are also numerous recreational and other activities which are not. Activities that are proper in wilderness are limited to those that are both legal and appropriate. Improper activities are those that:

- may have impacts that are inconsistent with the preservation of wilderness character,
- are not relevant to the public purposes of wilderness (which are "recreational, scenic, scientific, educational, conservation, and historical use," as defined in §4(b) of the Wilderness Act), and/or,
- are not of a "primitive type."

Some of these activities are prohibited specifically by law. Activities that are not proper and are prohibited in wilderness include (but are not limited to) bicycle riding or other mechanical transportation; launching into the air or landing from the air either people or objects (including but not limited to BASE jumping, hang gliding, or use of drones); use of motorized vehicles or equipment (e.g., motorcycles, generators, drills, saws); competitive events for people or animals; survival exercises or similar activities; the erection of structures; and, for many national parks specifically, hunting. Note that the parks may conduct some of the activities/uses above if they are properly analyzed and approved in a MRA. (Wilderness Act Section 4(c) and NPS *Management Policies 2006*, Chapter 6).

SECTION II: ASPECTS OF WILDERNESS ACTIVITIES THAT MAY NECESSITATE COMMERCIAL SUPPORT

To be conducted safely and in a manner that preserves wilderness character, wilderness activities often require specialized skills, knowledge, or equipment. Climbing and mountaineering, for example, involve technical skills that are necessary for ascent and descent, safety practices associated with exposure (e.g., fall hazards) and environmental factors (e.g., mountain weather), and special equipment that is employed for locomotion and safety. Stock packing involves special equipment, such as the stock and tack and skill in loading packs, riding saddle horses, leading pack mules, providing care for the animals, and mitigating stock-related environmental impacts. Wilderness visitors vary in their ability to conduct these more specialized or technical wilderness activities. Therefore, when parks choose to provide opportunities for these types of visitor activities, some level of commercial support may be necessary.

The extent to which these forms of commercial service support are necessary depends on how the parks balance the competing interests inherent in the Wilderness Act, and in particular, the charge to maintain wilderness character while providing opportunities for wilderness recreation. Factors that are considered

in this analysis include the balance the parks seek in terms of self-reliant experiences as opposed to novice or introductory experiences, and the range of social and environmental conditions that can be provided while preserving wilderness character. In the context of wilderness stewardship planning, these objectives for visitor use have been explored through the development of alternatives. Based on the analysis in this END, the alternatives included in the plan incorporate different proposals for the amount of commercial services that are necessary to achieve desired conditions for wilderness character. This END represents a comparative and qualitative analysis of the relevant wilderness factors and determines the amount of commercial services that are necessary under each alternative.

SPECIALIZED SKILLS OR KNOWLEDGE

For some wilderness visitors the need for, or lack of, specialized skills or knowledge can be a barrier to engaging in that activity. A commercial service may support a visitor activity by providing or teaching the skills or knowledge that are needed to engage in a proper wilderness activity. This may take the form of guiding, in which the outfitter/guide provides the necessary skills or knowledge to the individual or group that is participating in the activity. It may also take an instructional form, in which the outfitter/guide teaches an individual or group the necessary skills or knowledge so that they may independently participate in the activity in the future. In the latter case, the level of instruction may range from basic or introductory wilderness skills and knowledge to advanced technical skills and knowledge. Guides and instructors are also able to provide local knowledge that can make a wilderness trip safer and more rewarding for visitors who are unfamiliar with a particular wilderness area.

SPECIALIZED EQUIPMENT OR SERVICES

Wilderness activities may require specialized equipment or services that cannot be provided by all wilderness visitors who wish to engage in a particular activity. Regarding specialized equipment, the expense, care, or space required for that equipment may be too great for some wilderness visitors to provide without support from a commercial service provider. Visitors may wish to try out an activity before making the financial commitment to purchase equipment. Some visitor trips may require services, such as the transporting of equipment or supplies that cannot be provided without commercial support. For each activity that has been determined to be proper for the recreational or other purposes of wilderness, the specialized equipment or services that may necessitate commercial support are discussed.

SPECIAL SAFETY CONCERNS

Wilderness activities may involve special safety concerns that cannot be managed by all wilderness visitors without commercial support. The NPS does not attempt to eliminate the risks inherent in wilderness travel or in participation in particular wilderness activities. However, for some visitors, a commercial provider may be a necessary means of managing those inherent risks or may be a means to acquire the requisite knowledge to manage those risks independently in the future. For each activity that has been determined to be proper for the recreational or other purposes of wilderness, the special safety concerns that may necessitate commercial support are discussed.

SPECIAL RESOURCE CONCERNS

Wilderness activities may involve the potential for impacts to wilderness resources. A commercial service provider may be a means to ensure that activities are conducted in appropriate locations and in a manner that mitigates or minimizes resource impacts. For each activity that has been determined to be proper for the recreational or other purposes of wilderness, the special resource concerns that may necessitate commercial support are discussed.

OTHER CONTRIBUTIONS THAT SUPPORT WILDERNESS PURPOSES

Commercial services most often support wilderness visitors in their recreational activities, but they may also independently or cooperatively support scenic, scientific, educational, historic, or conservation objectives.

INTRODUCTORY EXPERIENCES

Commercial service providers can provide assistance to visitors who lack the experience or confidence to attempt a wilderness adventure on their own. These types of trips can introduce a diverse public to a variety of ways to experience their public wildlands. These types of support can build confidence in visitors that can lead to future more self-reliant wilderness trips. This can relate to a range of activities, such as hiking and backpacking, stock use, or oversnow travel. Introducing novice visitors to their publicly-owned wilderness can provide rewarding experiences and build support for long-term wilderness preservation.

The NPS considers the provision of such introductory experiences as critical to its mission, and recognizes that commercial services aid in this aspect of mission accomplishment. This is one of the few ways to ensure that diverse people have access to these opportunities to connect with their national parks and wilderness. Chapter 8 of NPS *Management Policies 2006* states:

> National Parks belong to all Americans, and the National Park Service will welcome all Americans to experience their parks. The Service will focus special attention on visitor enjoyment of the parks while recognizing that the NPS mission is to conserve unimpaired each park's natural and cultural resources and values for the enjoyment, education, and inspiration of present and future generations. The Service will also welcome international visitors, in keeping with its commitment to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout the world.

In addition, parks will have "an atmosphere that is open, inviting, and accessible to every segment of American society" (Chapter 8, Sec. 8.2). It has been recognized that some segments of the American population are hesitant to take advantage of their public lands due to de facto barriers: "lack of knowledge, experience, awareness (what to do, where to go, how to get there, equipment needed, etc.)" (Pease 2011). Commercial services can assist people in overcoming some of these barriers, thereby offering an opportunity to more diverse segments of society to experience national parks and wilderness.

SECTION III: TYPE OF COMMERCIAL SERVICES THAT ARE NECESSARY FOR EACH PROPER ACTIVITY

This section uses the categories provided in Section II to analyze the aspects of specific activities from Section I that may necessitate commercial support to achieve wilderness purposes. A conclusion regarding the necessity for commercial services is made for each activity. The amount of commercial services that would be allowed is addressed in Section IV.

Table B-2: Analysis of Types of Activities That May be Supported by Commercial Services

Proper Activity Supported by a Commercial Service	
Backpacking and Hiking Trips (with overnight camping and day hiking)	
Reasons that Commercial Support is Necessary for Activity	
Specialized Skills and Knowledge	Way-finding, orienteering, the use of overnight equipment, campsite selection, food preparation and appropriate food storage in wilderness, wilderness first aid, map reading, sanitation and waste disposal, leadership, and Leave No Trace© practices.
Specialized Equipment or Services	Proper use of backpack, cooking equipment, tent, food storage devices, water purification equipment
Special Safety Concerns	High elevation environment, challenging cross-country areas, orienteering/way-finding, first aid, creek crossings, mountain weather
Special Resource Concerns	N/A
Other Contributions that Support Wilderness Purposes	Introductory experiences and guided trips can lead to a better understanding of wilderness character, purposes, and values, and assists the public in being confident to appropriately experience their public lands.
Introductory Experience	Provides people with the necessary skills to engage in self-reliant recreation.
Conclusion	Backpacking and hiking are activities that are proper for realizing the public purposes of wilderness. The skills, equipment, and safety issues identified above are barriers that impede the ability of some visitors to realize the values inherent in a wilderness experience. These factors necessitate some level of commercial support for backpacking and hiking. The availability of commercial support may also offer opportunities for introductory wilderness experiences. Allowing commercial support for this activity is consistent with the desired conditions of the WSP. In terms of desired conditions, backpacking and hiking allow visitors to use and enjoy wilderness in a manner that is consistent with the preservation of wilderness, to experience a natural, undeveloped, and untrammeled environment, and to avail themselves of opportunities for solitude or an unconfined recreation experience. The use of commercial support services also helps to achieve the Desired Condition of ensuring that the parks' wilderness resources will be accessible to visitors of diverse backgrounds and capabilities.

Table B-2: Analysis of Types of Activities That May be Supported by Commercial Services (continued)

Proper Activity Supported by a Commercial Service	
Stock trips - Riding, packing, day rides and overnight camping with stock	
Reasons that Commercial Support is Necessary for Activity	
Specialized Skills and Knowledge	Safely packing, riding, and leading of stock in a remote wilderness environment are highly specialized skills. In addition, care for stock is a skill that requires specialized skills and knowledge. Use of the parks' wilderness by private (i.e., not commercially-supported) stock users accounts for less than 20% of total stock use by visitors, and this proportion has decreased over the past three decades. This illustrates that the difficulties and costs of owning and using private stock is a substantial obstacle to experiencing wilderness through the traditional activity of stock use. In addition, local knowledge is important to understand which trails are best-suited to the skill level of the stock user. Way-finding, orienteering, the use of overnight equipment, campsite selection, appropriate food storage in wilderness, wilderness first aid, map reading, sanitation and waste disposal, leadership, competency, communication, and Leave No Trace© practices are also skills and knowledge that are relevant to the use of pack stock in wilderness.
Specialized Equipment or Services	Stock trips require highly specialized and expensive equipment, including the animals, saddles, panniers, saddle trees, bear-proof food storage, hobbles and pickets, nose bags, tree-saver straps, ropes, veterinary first aid, and processed weed-free feed. The cost of stock and stock related equipment is prohibitive for most visitors. Horses and mules cost in excess of $3,000, and the equipment for each animal may exceed $1,500. In addition to the cost of the stock and stock equipment, stock owners must have access to facilities necessary to care for stock. Stock users must have a trailer to bring stock to the trailheads and a vehicle capable of towing a stock trailer. Caring for stock may cost as much as $10,000 per animal each year. Transport of animals is also prohibitively expensive.
Special Safety Concerns	Stock use in wilderness presents special safety concerns that may necessitate commercial support for some visitors that choose to participate in a traditional wilderness stock trip. Stock travel in mountainous terrain on steep, narrow trails is inherently dangerous. Accidents involving stock can result in the injury or death of riders or stock animals. A skilled packer, particularly one with local knowledge about trail and environmental conditions, can mitigate these risks. While some visitors may choose and have the ability to manage these risks independently, many will require the services of a commercial provider.
Special Resource Concerns	Improper use of stock can impact water quality, vegetation, etc. Complex grazing regulations which are critical to protect the parks' resources may be difficult to understand for the casual stock user. These resource concerns can be mitigated or eliminated by skilled commercial providers with local knowledge of trails and camping areas appropriate for stock and specific restrictions and practices to protect resources.
Other Contributions that Support Wilderness Purposes	The use of stock in wilderness is a long-standing primitive type of recreation consistent with wilderness purposes. This is a documented traditional use of wilderness that was championed by the founders of the wilderness ideal. Stock can provide access to wilderness that would otherwise be inaccessible to many members of the public (including those who travel notable distances to reach the parks), and can also provide the support to ensure a positive experience in a wilderness environment.

Table B-2: Analysis of Types of Activities That May be Supported by Commercial Services (continued)

Proper Activity Supported by a Commercial Service	
Stock trips - Riding, packing, day rides and overnight camping with stock	
Reasons that Commercial Support is Necessary for Activity	
Introductory Experience	This activity can provide an introductory experience for wilderness visitors.
Conclusion	Stock riding, packing, and camping are activities that are proper for realizing the public purposes of wilderness. The amount of knowledge and equipment required to successfully undertake a stock trip in wilderness is extremely high. Without access to commercial services, visitors who do not own their own stock are effectively barred from engaging in this type of wilderness activity and realizing the recreational, scenic, and other values that can be experienced during a stock trip. As a result, some level of commercial support is necessary. Commercial support services may also offer opportunities for introductory wilderness experiences. Allowing commercial support for this activity in accordance with the stock use prescriptions in the WSP is consistent with and supports the desired conditions of the WSP. In terms of desired conditions, commercial support for stock riding, packing, and camping allows visitors to use and enjoy wilderness in a manner that is consistent with the preservation of wilderness, to experience a natural, undeveloped, and untrammeled environment, to avail themselves of opportunities for solitude or an unconfined recreation experience, and to experience a traditional activity that may range from single day to multi-day trips. The availability of commercial stock trips also helps to ensure varied opportunities for wilderness-compatible recreation.

Proper Activity Supported by a Commercial Service	
Overnight Camping - Gear and food support including stock "spot" and stock and porter "dunnage"	
Reasons that Commercial Support is Necessary for Activity	
Specialized Skills and Knowledge	Ability to carry items to support wilderness travel and overnight camping, and to ensure that visitors have opportunities to select campsites in areas that might otherwise not be accessible to them.
Specialized Equipment or Services	N/A
Special Safety Concerns	N/A
Special Resource Concerns	Allows for appropriate wilderness equipment to be utilized (e.g., food storage containers, camp stoves, tents, etc.).
Other Contributions that Support Wilderness Purposes	Allows people to have enough supplies to reach inner portions of wilderness and or extend their stays to more thoroughly immerse themselves in the wilderness experience. Allows a diverse public who cannot all physically carry the equipment to be able to recreate in and experience the benefits of wilderness.
Introductory Experience	This activity supports an introductory experience in wilderness.

Table B-2: Analysis of Types of Activities That May be Supported by Commercial Services (continued)

Proper Activity Supported by a Commercial Service	
Overnight Camping - Gear and food support including stock "spot" and stock and porter "dunnage"	
Reasons that Commercial Support is Necessary for Activity	
Conclusion	Commercial services to support gear and food transport is necessary in the parks wilderness to achieve public purposes. Overnight camping is an activity that is proper for realizing the public purposes of wilderness, and possesses attributes that necessitate commercial support at some level. Overnight camping requires specialized skills and knowledge, involves special natural resource concerns, and may also offer opportunities for introductory wilderness experiences. Commercial support for overnight camping primarily takes the form of transporting gear and supplies that are to be used in the course of a wilderness trip. Allowing commercial support for this activity also assists in achieving the desired conditions of the WSP. In terms of desired conditions, commercial support for overnight camping allows visitors to use and enjoy wilderness in a manner that is consistent with the preservation of wilderness, to experience a natural, undeveloped, and untrammeled environment, to avail themselves of opportunities for solitude or an unconfined recreation experience, and to assist visitors of diverse abilities and experience levels in selecting their own camping locations.

Proper Activity Supported by a Commercial Service	
Oversnow Travel (ski and snowshoe touring and winter overnight camping)	
Reasons that Commercial Support is Necessary for Activity	
Specialized Skills and Knowledge	Ski, or other oversnow travel skills, route finding, winter survival, avalanche awareness, leadership
Specialized Equipment or Services	Skis, snowshoes, winter camping and survival equipment (e.g., shovels, avalanche beacons)
Special Safety Concerns	Winter survival, winter route-finding, avalanche awareness, weather
Special Resource Concerns	Human waste disposal, winter fires
Other Contributions that Support Wilderness Purposes	These are primitive and traditional recreational activities. Intense solitude is possible as this activity allows visitors to experience wilderness in a different manner.
Introductory Experience	This provides an introductory experience to winter wilderness exploration and use.
Conclusion	Over-snow travel is an activity that is proper for realizing the public purposes of wilderness, and possesses attributes that necessitate commercial support at some level. Over-snow travel requires specialized skills and knowledge, employs special equipment, involves special safety and natural resource concerns, and may also offer opportunities for introductory experiences in a winter wilderness environment. Allowing commercial support for this activity also assists in achieving the desired conditions of the WSP. In terms of desired conditions, over-snow travel allows visitors to use and enjoy wilderness in a manner that is consistent with the preservation of wilderness, to experience a natural, undeveloped, and untrammeled environment, and to avail themselves of extraordinary opportunities for solitude or an unconfined recreation experience.

Table B-2: Analysis of Types of Activities That May be Supported by Commercial Services (continued)

Proper Activity Supported by a Commercial Service	
Climbing and Mountaineering (summer and winter)	
Reasons that Commercial Support is Necessary for Activity	
Specialized Skills and Knowledge	Route finding, use of equipment for locomotion and protection, orienteering, knowledge of hazards, understanding rock and ice conditions. Certifications /training requirements.
Specialized Equipment or Services	Ropes, climbing equipment/aids, ice axes, crampons, skis, snowshoes
Special Safety Concerns	Minimize risk through education, training, and ensuring safe practices. Knowledge of safe routes and conditions.
Special Resource Concerns	Climber access and social trails, knowledge of what is allowed and what is prohibited, fixed anchors, proper disposal of human waste, knowledge of sensitive plant species, use of "clean" climbing techniques to minimize resource impacts
Other Contributions that Support Wilderness Purposes	Climbing and mountaineering has been occurring since the early exploration of the parks (mid-19th century) and is a primitive form of recreation. Some consider it a traditional value of wilderness.
Introductory Experience	This service supports an introductory experience for a less common but proper wilderness activity.
Conclusion	Climbing and mountaineering is an activity that is proper for realizing the public purposes of wilderness, and possesses attributes that necessitate commercial support at some level. Climbing and mountaineering requires specialized skills and knowledge, employs special equipment, involves special safety and natural resource concerns, and may also offer opportunities for introductory experiences or technical skills development. Allowing commercial support for this activity also assists in achieving the desired conditions of the WSP. In terms of desired conditions, climbing and mountaineering allows visitors to use and enjoy wilderness in a manner that is consistent with the preservation of wilderness, to experience a natural, undeveloped, and untrammeled environment, and to avail themselves of extraordinary opportunities for solitude or an unconfined recreation experience. Note: A future comprehensive climbing management plan would determine site specific requirements.

Proper Activity Supported by a Commercial Service	
Fishing	
Reasons that Commercial Support is Necessary for Activity	
Specialized Skills and Knowledge	Understanding regulations and proper locations for fishing activities. Knowledge of local fishing conditions and site-specific requirements. Proper use of specialized equipment.
Specialized Equipment or Services	Fishing equipment, camping equipment
Special Safety Concerns	Fast, cold rivers with dangerous conditions in many areas. High elevation conditions, cold lakes, hypothermia.

Table B-2: Analysis of Types of Activities That May be Supported by Commercial Services (continued)

Proper Activity Supported by a Commercial Service	
Fishing	
Reasons that Commercial Support is Necessary for Activity	
Special Resource Concerns	Understanding minimum impact requirements in wilderness. Understanding protocols for decontamination to prevent introduction of non-native aquatic organisms. Fishing is one of few extractive uses permissible in wilderness, so it is important for visitors to understand the fishing requirements and restrictions (catch and release, proper disposal of fish carcasses). Also fishing guides can help visitors ensure the protection of native and/or particularly sensitive fish species, such as those protected under the Endangered Species Act. Guides can promote practices that provide for bank and riparian area protection.
Other Contributions that Support Wilderness Purposes	Fishing is a primitive form of recreation that can lead to increased self-reliance. Also this provides education to users on the appropriate methods and regulations related to fishing in wilderness.
Introductory Experience	Instruction about fishing techniques in wilderness.
Conclusion	Fishing is an activity that is proper for realizing the public purposes of wilderness, and possesses attributes that necessitate commercial support at some level. Fishing is an activity that is proper for realizing the public purposes of wilderness, and possesses attributes that necessitate commercial support at some level. Fishing requires specialized skills and knowledge, employs special equipment, involves special safety and natural resource concerns, and may also offer opportunities for introductory experiences. Allowing commercial support for this activity also assists in achieving the desired conditions of the WSP. In terms of desired conditions, fishing allows visitors to use and enjoy wilderness in a manner that is consistent with the preservation of wilderness, to experience a natural, undeveloped, and untrammeled environment, and to avail themselves of opportunities for solitude or an unconfined recreation experience.

Proper Activity Supported by a Commercial Service	
River running	
Reasons that Commercial Support is Necessary for Activity	
Specialized Skills and Knowledge	Knowledge of local conditions, ability to survive in severe river conditions, navigation skills in hazardous waters
Specialized Equipment or Services	Kayaks, rafts, emergency gear, personal flotation devices, paddles, dry bags, helmets, food storage
Special Safety Concerns	Extreme river conditions, changing river conditions (fluctuating flows), wilderness travel with heavy equipment
Special Resource Concerns	Protection of Wild and Scenic River values, riparian protection, human waste disposal, litter (kayak pieces), abandoned gear and equipment

Table B-2: Analysis of Types of Activities That May be Supported by Commercial Services (continued)

Proper Activity Supported by a Commercial Service	
River running	
Reasons that Commercial Support is Necessary for Activity	
Other Contributions that Support Wilderness Purposes	River running is a primitive recreational pursuit. Areas not commonly explored would be accessed through this activity. The extremely difficult conditions of the parks' rivers present notable challenges to physical abilities and self-reliance for river runners, consistent with wilderness values.
Introductory Experience	Because of the extreme difficulty to safely run the parks wilderness rivers, novice river runners would not be able to access the parks. This activity does not support an introductory experience in wilderness.
Conclusion	River running is an activity that is proper for realizing the public purposes of wilderness, and possesses attributes that necessitate commercial support at some level. River running requires specialized skills and knowledge, employs special equipment, involves special safety and natural resource concerns, and may also offer opportunities for technical skills development. Allowing commercial support for this activity also assists in achieving the desired conditions of the WSP. In terms of desired conditions, river running allows visitors to use and enjoy wilderness in a manner that is consistent with the preservation of wilderness, to experience a natural, undeveloped, and untrammeled environment, and to avail themselves of extraordinary opportunities for solitude or an unconfined recreation experience.

Proper Activity Supported by a Commercial Service	
Photography	
Reasons that Commercial Support is Necessary for Activity	
Specialized Skills and Knowledge	Knowledge of photography skills, local knowledge of wilderness conditions and use, knowledge of care of photographic equipment in wilderness setting.
Specialized Equipment or Services	Camera equipment, tripod
Special Safety Concerns	N/A
Special Resource Concerns	N/A
Other Contributions that Support Wilderness Purposes	Supports education and the scenic purposes of wilderness. Long-standing tradition of photography of wilderness that has been extensively used to support wilderness establishment and preservation.
Introductory Experience	This activity supports an introductory experience in wilderness.
Conclusion	Photography is an activity that is proper for realizing the public purposes of wilderness, and possesses attributes that necessitate commercial support at some level. Photography requires specialized skills and knowledge, employs special equipment, supports the educational and scenic purposes of wilderness, and may also offer opportunities for introductory experiences or technical skills development. Allowing commercial support for this activity also assists in achieving the desired conditions of the WSP. In terms of desired conditions, photography allows visitors to use and enjoy wilderness in a manner that is consistent with the preservation of wilderness, to experience a natural, undeveloped, and untrammeled environment, and to avail themselves of extraordinary opportunities for solitude or an unconfined recreation experience.

SECTION IV: EXTENT OF COMMERCIAL SERVICES DETERMINED NECESSARY FOR EACH PROPER ACTIVITY IN WILDERNESS

Section IV: Extent or Quantity of Commercial Services that are Necessary for Each Proper Activity reviews each activity against the desired conditions and visitor capacities of each alternative. A conclusion is reached about the annual overall wilderness-wide service days (level of use) that may be commercially supported, divided into two categories, those that use stock and those that do not, with a secondary conclusion separating out the high-use Mount Whitney Management Area, where a reduced portion of overall service days are allocated. There is also a description of other regulatory mechanisms that control commercially supported trips.

Table B-3: Alternatives Concepts and Objectives

	Alt 1: No-action / Status Quo	Alt 2: Use Levels Near Current Levels (NPS Preferred Alternative)	Alt 3: Allow for Increased Use	Alt 4: Reduce Development and Commercial Services	Alt 5: Reduce Use
Alternatives Concepts	Continue to manage wilderness under the existing Backcountry Management Plan / Stock Use and Meadow Management Plans	*Preserve Wilderness Character with targeted site-specific actions to reduce the recreational impacts in the highest use areas of wilderness with increased restrictions, while allowing less-restricted primitive recreation in less-visited areas.* Moderate levels of commercial services would be allowed, similar to current levels overall, with some increased controls in specific areas. Types of commercial services allowed would be expanded. Commercial services in high-use areas would be reduced in level.	*Maximize opportunities for visitor use and enjoyment and emphasize the quality of wilderness as a place that provides opportunities for primitive recreation.* There would be increased opportunities for commercial services potentially in expanded areas for visitors who want to experience the wilderness but may need additional services, facilities, or direction, or who may lack the specialized equipment to travel independently.	*Increase the undeveloped and self-reliant qualities of wilderness while protecting the natural quality of wilderness through restrictions on visitor behavior in high use areas and by reducing the availability of commercial support.* Notably reduce commercial services overall (types, levels, and areas), from current conditions.	*Increase the opportunities for solitude and unconfined recreation, and protect the natural quality of wilderness by notably reducing visitor use.* Commercial services would be allowed, but less use would be expected overall commensurate with reduced trailhead quotas for all visitors (including those supported by commercial services).

Table B-3: Alternatives Concepts and Objectives (continued)

	Alt 1: No-action / Status Quo	Alt 2: Use Levels Near Current Levels (NPS Preferred Alternative)	Alt 3: Allow for Increased Use	Alt 4: Reduce Development and Commercial Services	Alt 5: Reduce Use
Objectives of the Alternatives that are Relevant to the Commercial Support Allocation	N/A	**Visitor Use Levels -** Visitor use and enjoyment of wilderness would be provided in a manner that ensures the preservation of wilderness character. In this alternative, visitor use levels would be reduced in some popular areas to preserve opportunities for solitude or other wilderness-character qualities.	**Visitor Use Levels -** Visitor use and enjoyment of wilderness would be provided in a manner that ensures the preservation of wilderness character. In this alternative, opportunities for visitor use and enjoyment of wilderness would be increased by permitting more visitor use.	**Visitor Use Levels -** Visitor use and enjoyment of wilderness would be provided in a manner that ensures the preservation of wilderness character. In this alternative, increased emphasis on self-reliance and reduced development would be accompanied by a slight decrease in visitor numbers.	**Visitor Use Levels -** Visitor use and enjoyment of wilderness would be provided in a manner that ensures the preservation of wilderness character. In this alternative, increased opportunities for solitude would be achieved through a decrease in visitor numbers.
	N/A	**Camping and Campsites -** Visitors would have the opportunity to choose camping locations, except in areas where camping would result in unacceptable impacts. In this alternative, camping restrictions would be adjusted in targeted areas.	**Camping and Campsites -** Visitors would have the opportunity to choose camping locations, except in areas where camping would result in unacceptable impacts. In this alternative, increased visitor use would require an increase in camping restrictions.	**Camping and Campsites -** Visitors would have the opportunity to choose camping locations, except in areas where camping would result in unacceptable impacts. In this alternative, an emphasis on visitor self-reliance would allow fewer camping restrictions.	**Camping and Campsites -** Visitors would have the opportunity to choose camping locations, except in areas where camping would result in unacceptable impacts. In this alternative, decreased visitor use would allow fewer camping restrictions.

Table B-3: Alternatives Concepts and Objectives (continued)

	Alt 1: No-action / Status Quo	Alt 2: Use Levels Near Current Levels (NPS Preferred Alternative)	Alt 3: Allow for Increased Use	Alt 4: Reduce Development and Commercial Services	Alt 5: Reduce Use
	N/A	**Stock Use -** Visitors would have opportunities to travel with stock, from day rides to multi-day trips, in a manner that is compatible with the protection of wilderness character. Grazing and stock access would be managed to protect wilderness character and reduce conflict with other wilderness visitors. Under this alternative, the number of meadows available to grazing would be reduced.	**Stock Use -** Visitors would have opportunities to travel with stock, from day rides to multi-day trips, in a manner that is compatible with the protection of wilderness character. Grazing and stock access would be managed to protect wilderness character and reduce conflict with other wilderness visitors. Under this alternative, increased visitor use would result in a need for more stock structures and closure of selected off-trail grazing areas in order to protect resources.	**Stock Use -** Visitors would have opportunities to travel with stock, from day rides to multi-day trips, in a manner that is compatible with the protection of wilderness character. To support the self-reliant aspect of this alternative, off-trail access would be limited to private stock, drift fences and hitch rails would be removed, and no grazing would be permitted (carry all feed).	**Stock Use -** Visitors would have opportunities to travel with stock, from day rides to multi-day trips, in a manner that is compatible with the protection of wilderness character. Grazing and stock access would be managed to protect wilderness character and reduce conflict with other wilderness visitors. In areas where stock would be permitted, fewer restrictions would be needed to protect wilderness character given the lower levels of visitor use in this alternative. Off-trail areas would not be open to stock.

Table B-3: Alternatives Concepts and Objectives (continued)

	Alt 1: No-action / Status Quo	Alt 2: Use Levels Near Current Levels (NPS Preferred Alternative)	Alt 3: Allow for Increased Use	Alt 4: Reduce Development and Commercial Services	Alt 5: Reduce Use
	N/A	**Commercial Services** - Commercial services would be performed to the extent necessary for activities which are proper for realizing the recreational or other wilderness purposes of the areas. Commercial services would support visitor use and enjoyment of wilderness in a variety of appropriate ways. Visitors with diverse backgrounds and skill levels would be encouraged to experience wilderness and to explore primitive recreation activities such as hiking, backpacking, stock trips, fishing, over-snow travel, or mountaineering, or to build skills in these activities. In order to protect wilderness character, commercial services would be reduced in the very popular Mount Whitney Management Area.	**Commercial Services -** Commercial services would be allowed to the extent necessary for activities which are proper for realizing the recreational or other wilderness purposes of the areas. Commercial services would support visitor use and enjoyment of wilderness in a variety of appropriate ways. Visitors with diverse backgrounds and skill levels would be encouraged to experience wilderness and to explore primitive recreation activities such as hiking, backpacking, stock trips, fishing, over-snow travel, or mountaineering, or to build skills in these activities. The availability of commercial support would be allowed to expand commensurate with potentially higher levels of visitor use.	**Commercial Services -** Commercial services would be allowed to the extent necessary for activities which are proper for realizing the recreational or other wilderness purposes of the areas. Commercial services would support visitors in limited ways and circumstances in order to emphasize the self-reliant aspect of wilderness character.	**Commercial Services -** Commercial services would be allowed to the extent necessary for activities which are proper for realizing the recreational or other wilderness purposes of the areas. Commercial services would support visitor use and enjoyment of wilderness in a variety of appropriate ways. Visitors with diverse backgrounds and skill levels would be encouraged to experience wilderness and to explore primitive recreation activities such as hiking, backpacking, stock trips, fishing, over-snow travel, or mountaineering, or to build skills in these activities. The types of commercial support would be similar to current conditions, but the lower overall levels of visitor use would result in lower overall levels of commercial support.

Table B-4: Visitor Capacities and Relationship to Commercial Services

	Alternative 1: No-action / Status Quo	Alternative 2: Use Levels Near Current Levels (NPS Preferred Alternative)	Alternative 3: Allow for Increased Use	Alternative 4: Reduce Development and Commercial Services	Alternative 5: Reduce Use
Visitor Capacity **VUD = visitor use day(s)** **(Also, see "Appendix A: Visitor Capacity")**	Current Conditions show an average of ~23,000 visitors/Year and ~111,000 Visitor Use Days(VUD)/ Year [This does not include PCT, JMT, and other park wilderness users who obtain wilderness permits from sources other than the parks and local US Forests (Inyo, Sequoia, and Sierra), such as Yosemite NP, and the Pacific Crest Trail Association.]	Alternative 2 would have overall visitor use levels similar to alternative1, but with some specific areas targeted for reductions and other areas allowed to increase if visitation patterns shift. However, overall use-levels would remain near alternative1 averages. Use data shows that visitation levels also fluctuate from year to year by as much as 20% above or below the annual averages, based on permit data and best professional judgment. Alternative 2 would have an estimate of a "maximum" of 134,000 VUDs (based on a 20% fluctuation over the current average annual VUD of 111,000) with annual average of approximately 108-114,000 VUD.	Alternative 3 would allow for an increase of around 30% from current visitor use levels to averages of: - visitors = ~30,000, and - VUD = ~141-147,000 (would allow fluctuations of about 15-20% above and below the "average") An estimate of a maximum of 175,000 VUDs with annual average of 141-147,000 VUD.	Alternative 4 would reduce visitor use levels from alternative1 levels by ~ 5%. Adjusted averages would be: - visitors =~22,000 - VUD =~102,500-108,500 (would allow fluctuations of about 15-20% above and below the "average") An estimate of a maximum of 127,000 VUDs with annual average of 102,500-108,500 VUD.	Alternative 5 would reduce current visitor use levels from alternative1 levels by ~ 30%. Adjusted averages would be: - visitors =~16,500 - VUDs =~74,700-80,700 (would allow fluctuations of about 15-20% above and below the "average") An estimate of a maximum of 93,300 VUDs with annual average of 74,700-80,700 VUD.

Table B-4: Visitor Capacities and Relationship to Commercial Services (continued)

	Alternative 1: No-action / Status Quo	Alternative 2: Use Levels Near Current Levels (NPS Preferred Alternative	Alternative 3: Allow for Increased Use	Alternative 4: Reduce Development and Commercial Services	Alternative 5: Reduce Use
Activities supported by commercial services (either by Concessioner or CUA holder) [CUA = Commercial Use Authorization (e.g., permit)]	Backpacking and hiking Stock trips (day rides, overnight, traveling) Stock spot and dunnage Skiing and snowshoeing Mountaineering (summer and winter)	Backpacking and hiking Stock trips (day rides, overnight, traveling) Overnight camping – gear support (porters, stock spot and dunnage) Oversnow travel (skiing, snowshoeing, and winter camping) Climbing and mountaineering (summer and winter) Fishing River running Photography	Backpacking and Hiking Stock trips (day rides, overnight, traveling) Overnight camping – gear support (porters, stock spot and dunnage) Oversnow travel (skiing, snowshoeing, and winter camping) Climbing and mountaineering. (summer and winter) Fishing River running Photography	Backpacking and Hiking Stock trips (overnight, traveling) Overnight camping – gear support (porters, stock spot and dunnage) Oversnow travel (snowshoeing, skiing, and winter camping) Climbing and mountaineering. (summer and winter) **The following would be discontinued:** - stock day rides - day-trips into wilderness, that is, where visitor/client enters and leaves wilderness without spending the night (non-stock) for any purpose (e.g., fishing, hiking, climbing) No additional activities would be supported by commercial services based on the overall goals of this alternative. This alternative promotes self-reliance; therefore a reduction in the types of activities would be appropriate.	Backpacking and Hiking Stock trips (day rides, overnight, traveling) Overnight camping – gear support (porters, stock spot and dunnage) Oversnow travel (skiing, snowshoeing, and winter camping) Climbing and mountaineering. (summer and winter) Fishing River running Photography

Table B-4: Visitor Capacities and Relationship to Commercial Services (continued)

	Alternative 1: No-action / Status Quo	Alternative 2: Use Levels Near Current Levels (NPS Preferred Alternative	Alternative 3: Allow for Increased Use	Alternative 4: Reduce Development and Commercial Services	Alternative 5: Reduce Use
Use levels of activities that commercial services could support	Current Visitor Use Days (VUD) average 111,000 per year. Current Commercial Service Days (CSD) are near 7,500 per year. Comparing this data provides an observed ratio of CSDs to VUDs of approximately 6.8% (though these numbers are comparative only and not directly linked). Of note is that the 4 years sampled for CSDs (with good quality data), were among the lowest for commercial stock use over the past 30 years.	Overall commercial service levels would be limited to near what has occurred in the recent past. The exception is the Mount Whitney Management Area, where commercial service levels would be reduced. These changes would be consistent with the desired conditions for this alternative. To summarize, under alternative 2: • Visitors with diverse backgrounds and skill levels could experience wilderness and engage in activities such as hiking, backpacking, stock trips, fishing, over-snow travel, or mountaineering, or build skills in these activities • Visitors could choose their own camping locations • Visitors could travel with stock, from day rides to multi-day trips • Visitors could use and enjoy wilderness in a variety of appropriate ways. Data available is best for the 4-year period of 2010-2013. During that time there were approximately 6,500 commercial service days on average, with a high near	Commercial service levels would be allowed to increase proportionally with the potential increase in overall use (VUDs). With this alternative allowing up to a 30% increase in overall VUDs, this could result in a proportional increase in CSDs. These changes would be consistent with the desired conditions for this alternative. To summarize, under Alternative 3: • Visitors with diverse backgrounds and skill levels could experience wilderness and engage in activities such as hiking, backpacking, stock trips, fishing, over-snow travel, or mountaineering, or build skills in these activities • Visitors could choose their own camping locations • Visitors could travel with stock, from day rides to multi-day trips • Visitors could use and enjoy wilderness in a variety of appropriate ways. • Visitors would have more opportunities to obtain permits for overnight use	Commercial service levels would be notably reduced, percentage wise compared to VUDs, from current levels. CSD levels would be reduced by about 45% of current levels, and would also be subject to site-specific reductions / prohibitions in order to control impacts in high-use areas. This alternative would notably reduce CSDs, by approximately 45% from alternative1 levels, whether or not demand was present. These changes would be consistent with the desired conditions for this alternative. To summarize, under alternative 4: • Visitors would have access to limited amounts and types of commercial support • Visitors could choose camping locations they could reach self-reliantly • Few visitors could travel with stock • Visitors could use and enjoy wilderness in a variety of appropriate ways if they could provide the necessary skills, knowledge, and	Commercial service levels would be reduced, proportionally, to that of allowed VUDs. CSD levels would be allowed near current percentages of VUD and would also be subject to site-specific reductions / prohibitions in order to control impacts in high-use areas. This alternative would provide for a reduction of overall VUDs. CSDs would also be proportionally reduced, whether or not demand was present. These changes would be consistent with the desired conditions for this alternative. To summarize, under alternative 5: • Visitors with diverse backgrounds and skill levels could experience wilderness and engage in activities such as hiking, backpacking, stock trips, fishing, over-snow travel, or mountaineering, or build skills in these activities • Visitors could choose their own camping locations • Visitors could travel with stock, from day rides to multi-day trips

Table B-4: Visitor Capacities and Relationship to Commercial Services (continued)

	Alternative 1: No-action / Status Quo	Alternative 2: Use Levels Near Current Levels (NPS Preferred Alternative	Alternative 3: Allow for Increased Use	Alternative 4: Reduce Development and Commercial Services	Alternative 5: Reduce Use
		7,500. CSDs in high-use areas would be subject to additional site-specific reductions / prohibitions in order to reduce or control impacts in these areas. This alternative would allow overall CSDs of near current to slightly increased versus current levels, and would limit (via location, percentage, and absolute numbers) any increase in CSDs in highest use areas, whether or not demand was present.	CSDs in high-use areas would be subject to additional site-specific reductions / prohibitions in order to reduce or control impacts in these areas. This alternative would allow a proportional increase in overall CSDs, but would limit (via location, percentage, and absolute numbers) any increase in CSDs in highest use areas, whether or not demand was present.	equipment without commercial support	• Visitors could use and enjoy wilderness in a variety of appropriate ways. • Visitors would have fewer opportunities to obtain permits for overnight use
Visitor capacity standards that ensure Wilderness Character is preserved (applies to all visitors, of which commercially supported visitors make up the stated percent)		Maximum permitted Proportion of Commercial Support: ~7.6%	Maximum permitted Proportion of Commercial Support: ~7.6%	Maximum permitted Proportion of Commercial Support: ~4.2%	Maximum permitted Proportion of Commercial Support: ~7.6%
		Campsite Condition Standard (WVCM): High Use – 1000 Moderate Use – 500 Low Use – 250 Consequences for Wilderness Character: Research conducted in 2009 (Cole) indicates widespread improvement in campsite condition since the time of designation. These standards would maintain current, high-quality conditions throughout the wilderness. Improved conditions would result from management	Campsite Condition Standard (WVCM): High Use – 1300 Moderate Use – 650 Low Use – 325 Consequences for Wilderness Character: These standards would potentially allow for greater campsite impacts than exist under current conditions, but given current trends in visitor use, high-quality conditions throughout the wilderness are expected to remain. Improved conditions would result from management action at	Campsite Condition Standard (WVCM): High Use – 950 Moderate Use – 475 Low Use – 235 Consequences for Wilderness Character: Research conducted in 2009 (Cole) indicates widespread improvement in campsite condition since the time of designation. These standards would maintain current, high-quality conditions throughout the wilderness. Improved conditions would result from management	Campsite Condition Standard (WVCM): High Use – 700 Moderate Use – 350 Low Use – 175 Consequences for Wilderness Character: Research conducted in 2009 (Cole) indicates widespread improvement in campsite condition since the time of designation. These standards would maintain current, high-quality conditions throughout the wilderness. Improved conditions would result from management

Table B-4: Visitor Capacities and Relationship to Commercial Services (continued)

	Alternative 1: No-action / Status Quo	Alternative 2: Use Levels Near Current Levels (NPS Preferred Alternative	Alternative 3: Allow for Increased Use	Alternative 4: Reduce Development and Commercial Services	Alternative 5: Reduce Use
		action at Guitar Lake, Kern Hot Springs, and Shepherd Pass Lake. See WSP/FEIS chapters 2 and 4 and "Appendix A: Visitor Capacity."	Guitar Lake and Shepherd Pass Lake. See WSP/FEIS chapters 2 and 4 and "Appendix A: Visitor Capacity."	action at Guitar Lake, Kern Hot Springs, Hockett Meadow, and Shepherd Pass Lake. See WSP/FEIS chapters 2 and 4 and "Appendix A: Visitor Capacity."	action at LeConte Ranger Station, Middle Dusy Basin, Lower Dusy lakes, Lakes above Tyndall, Guitar Lake, Kern Hot Springs, Simpson Junction, 11,393 Lakes, South Dusy Lakes, Atwell-Hockett Trail, Hockett Meadow, and Shepherd Pass Lake. See WSP/FEIS chapters 2 and 4 and "Appendix A: Visitor Capacity."
		Trail Encounter Frequency Standard (# of encounters per hour on 90% of quota season days): Very High – 45 High – 25 Moderate – 15 Low – 6	**Trail Encounter Frequency Standard (# of encounters per hour on 90% of quota season days):** Very High – 59 High – 33 Moderate – 20 Low – 8	**Trail Encounter Frequency Standard (# of encounters per hour on 90% of quota season days):** Very High – 43 High – 24 Moderate – 14 Low – 5	**Trail Encounter Frequency Standard (# of encounters per hour on 90% of quota season days):** Very High – 25 High – 18 Moderate – 11 Low – 4
		Consequences for Wilderness Character: Recent social science research (Martin and Blackwell 2013) suggest that almost all visitors encounter other visitors during their wilderness trips, but a majority of visitors stated that these encounters neither added nor detracted from the quality of their visit. These standards would ensure that encounter frequencies in most wilderness areas	**Consequences for Wilderness Character:** These standards would potentially allow for encounter frequencies higher than under current conditions, but given current trends in visitor use, high-quality conditions in most parts of wilderness are expected to remain. Improved opportunities for solitude would result from management action at Roads End, Rae Lakes, and Evolution Basin &	**Consequences for Wilderness Character:** These standards would ensure that encounter frequencies in most wilderness areas would remain near current conditions. Improved opportunities for solitude would result from management action at Mount Whitney, Roads End, Rae Lakes/JMT, Evolution Basin & Valley, Rae Lakes/JMT, Mount Langley Approach, Rae Lakes Loop-	**Consequences for Wilderness Character:** These standards would ensure that encounter frequencies in most wilderness areas would remain near current conditions. Improved opportunities for solitude would result from management action at Mount Whitney, Roads End, Lakes Trail, Mineral King, Evolution Basin & Valley, Rae Lakes/JMT, Mount Langley Approach, Rae

Table B-4: Visitor Capacities and Relationship to Commercial Services (continued)

	Alternative 1: No-action / Status Quo	Alternative 2: Use Levels Near Current Levels (NPS Preferred Alternative	Alternative 3: Allow for Increased Use	Alternative 4: Reduce Development and Commercial Services	Alternative 5: Reduce Use
		would remain near current conditions. Improved opportunities for solitude would result from management action at Mount Whitney Roads End, Rae Lakes/JMT, Evolution Basin & Valley, Mount Langley Approach, and Crabtree Ranger Station to Trail Crest.	Valley.	Lower, and Crabtree Ranger Station to Trail Crest.	Lakes Loop-Lower, Dusy Basin, West Side Kearsarge, and Crabtree Ranger Station to Trail Crest.
		Grazing Standards: See appendix D for specific grazing standards. **Consequences for Wilderness Character:** Meadow specific grazing capacities would limit impacts to the natural quality of wilderness throughout the parks. Stock would have access to 46% of meadows in wilderness, as compared to 51% under current conditions, thus improving the natural quality of wilderness.	**Grazing Standards:** See appendix D for specific grazing standards. **Consequences for Wilderness Character:** Meadow specific grazing capacities would limit impacts to the natural quality of wilderness throughout the parks. Stock would have access to 37% of meadows in wilderness, as compared to 51% under current conditions, thus improving the natural quality of wilderness.	**Grazing Standards:** See appendix D for specific grazing standards. **Consequences for Wilderness Character:** Grazing would not be permitted. Natural conditions would improve in meadows currently subject to grazing use.	**Grazing Standards:** See appendix D for specific grazing standards. **Consequences for Wilderness Character:** Meadow specific grazing capacities would limit impacts to the natural quality of wilderness throughout the parks. Stock would have access to 36% of meadows in wilderness, as compared to 51% under current conditions, thus improving the natural quality of wilderness

NOTES:

The above VUD calculations did not include use of the parks by visitors who obtained their wilderness permits from sources other than the parks or local US Forests (Inyo, Sequoia, and Sierra). These visitors could have originated from multiple starting points, including points north and south on the Pacific Crest Trail, John Muir Trail, or others. They could have been issued wilderness permits from various other entities, including Yosemite NP and the Pacific Crest Trail Association. However, in the rare event that a visitor permitted by a park, forest, or other permitting agency used a commercial service provider authorized to operate in the parks' wilderness, that commercial support would be subject to the Commercial Service Day allocation. See additional information on wilderness visitor use in "Appendix A: Visitor Capacity".

Table B-5: Current Visitor Use levels, Current Commercial Service Levels and Proposed Commercial Service Allocations

		Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
		Current Visitor Use Levels **data is for 4 years - 2010-2013**	**Proposed Visitor Capacity**	**Proposed Visitor Capacity**	**Proposed Visitor Capacity**	**Proposed Visitor Capacity**
	Total Visitor Use Days – by overnight users, both private and supported by Commercial Services (this does not take into account use by PCT and JMT users that are not recorded by the parks wilderness permit system, or day-use visitors)	109,815 - high 108,167 - average	111,000 average 134,000 estimated maximum	144,000 average 175,000 estimated maximum	105,500 average 127,000 estimated maximum	77,700 average 93,300 estimated maximum
			PROPOSED ALLOCATIONS BY ACTION ALTERNATIVE IN COMMERCIAL SERVICE DAYS (CSDs)			
	Total Allocation for All Commercial Services Combined – for overnight and day use, Non-Stock and Stock based.	**Commercial Service Days (CSDs):** CSDs for All (w/day): 7,474 - high 6,550 – average	For All, day and overnight, Non-Stock and Stock based. 8,400 CSDs*	For All, day and overnight, Non-Stock and Stock based. 10,920 CSDs*	For All, day and overnight, Non-Stock and Stock based. 4,390 CSDs*	For All, day and overnight, Non-Stock and Stock based. 5,880 CSDs*
Wilderness-Wide: Activities that are supported by commercial services that are *Non-Stock* based. Allocated CSDs can be used anywhere/ anytime, except in the Mount Whitney Management Area during the wilderness permit quota period. (from the Friday of Memorial Day Weekend to September 30)	▪ Backpacking and Hiking Trips ▪ Overnight Camping - gear support by porters– year round ▪ Climbing and Mountaineering (summer and winter)* ▪ Over-snow Travel (ski and snowshoe touring and winter camping – winter only fishing ▪ River Running ▪ Photography	**Commercial Service Days Supported by *Non-stock* providers:** CSDs for all visitors (w/day): 4,675 - high 4,063 – average	For All, day and overnight, Non-Stock based services. 5,040 CSDs	For All, day and overnight, Non-Stock based services. 6,550 CSDs	For All, day and overnight, Non-Stock based services. 2,630 CSDs	For All, day and overnight, Non-Stock based services. 3,530 CSDs

Table B-5: Current Visitor Use levels, Current Commercial Service Levels and Proposed Commercial Service Allocations (continued)

		Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Mt. Whitney Management Area (see map below)**:** **Activities supported by commercial services that are *Non-Stock* based. (excludes Fishing, River- running, and Photography)** **NOTE:** These are the only allocations that may be used for non-stock based services in the Mount Whitney Management Area as defined by the map below during the wilderness permit quota period. These allocations are a part of, not in addition to, the overall Non-Stock CSDs above.		**Commercial Service Days Supported by *Non-Stock* providers:** CSDs for All (w/day): 1,346 - high 1,062 – average	Of the above allocation for Non-Stock Services, the level which can occur in the Mt. Whitney Management Area 930 CSDs	Of the above allocation for Non-Stock Services, the level which can occur in the Mt. Whitney Management Area 1,210 CSDs	Of the above allocation for Non-Stock Services, the level which can occur in the Mt. Whitney Management Area 490 CSDs	Of the above allocation for Non-Stock Services, the level which can occur in the Mt. Whitney Management Area 650 CSDs
Wilderness-Wide: Activities supported by commercial services that are *Stock* based. Allocated CSDs can be used anywhere/anytime, except in the Mt. Whitney Management Area during the wilderness permit quota period.	▪ Stock trips - Riding, packing, day rides and overnight camping with stock ▪ Overnight Camping - gear support, including stock spot and dunnage	**Commercial Service Days Supported by *Stock* providers:** CSDs for All(w/day): 3,110 - high 2,487 – average	For all, day and overnight Stock based 3,360 CSDs	For all, day and overnight Stock based 4,370 CSDs	For all, day and overnight Stock based 1,760 CSDs	For all, day and overnight Stock based 2,350 CSDs

Table B-5: Current Visitor Use levels, Current Commercial Service Levels and Proposed Commercial Service Allocations (continued)

		Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Mt. Whitney Management Area: **Activities supported by commercial services that are *Stock* based.** **NOTE:** These are the only allocations that may be used for Stock-based services in the Mt. Whitney Management Area during the wilderness permit quota period. These allocations are a part of, not in addition to, the overall Stock CSDs above.		**Commercial Service Days Supported by *Stock* providers:** CSDs for All(w/day): 635 – high 521 – average	Of the above Stock allocation, the level which can occur in the Mt. Whitney Management Area 500 CSDs	Of the above Stock allocation, the level which can occur in the Mt. Whitney Management Area 650 CSDs	Of the above Stock allocation, the level which can occur in the Mt. Whitney Management Area 260 CSDs	Of the above Stock allocation, the level which can occur in the Mt. Whitney Management Area 350 CSDs

* The overall allocations of all commercial services wilderness-wide for alternatives 2-5, have been established at 12% over the highest years' use of the 4-year period of 2010-2013. It is known that current data collection methods have not been capable of completely documenting all commercial services that were provided during those 4 years, and therefore underestimate actual commercial use levels. With the implementation of this WSP, additional data collection methods will be established that provide more accurate information and ensure that allocations are not exceeded. Also, the 4-year period of best data, 2010-2013, is known to have been a period of relatively low commercial services due to a very heavy snow year in 2010 (which delays wilderness entry, due to snow on passes, to later in the season), followed by 3 drought years (which allow for early entry, but low water then shortens the primary use season). These factors are confirmed by more accurate data from annual stock use, which shows that 2012 was the 2nd lowest, 2011 was the 3rd lowest, 2013 was the 4th lowest, and 2010 was the 8th lowest commercial stock use years of the last 3 decades (Frenzel, E. and S. Haultain 2014). An informed estimate to compensate for these factors which allows for a more accurate baseline of typical commercial service levels is to estimate typical use by adjusting the high use year by 12%. This factor has been applied to the overall allocations for all commercial services wilderness-wide. The factor of 12% was selected as a reasonable estimate of unreported/unrecorded commercially supported services and also relates to the anomaly of the low stock use in those years used for comparative data (e.g., annual stock use nights from 2006-2009 was 3,150, and from 2010-2013 was 2,497, a 21% reduction).

HOW ALLOCATION NUMBERS FOR CSDS ABOVE WERE CALCULATED

- Total Visitor Use Day capacities – as stated in "Appendix A: Visitor Capacity."
- Total Allocation calculations of CSDs for all Commercial Services combined:
    - Baselines were calculated based on the observed total of all commercially-supported use during the highest year from 2010-2013 data, which equals 7,474, rounded to 7,500, and representing a baseline proportion of commercial support to visitor use days (111,000) of approximately 6.8%. This is then adjusted up by 12% to account for the known low sample data to establish a baseline commercial annual allocation maximum of 8,400 CSDs.
    - Under alternative 2, the parks would adopt a maximum allocation level equal to the baseline of 8,400 CSDs, and maintain a commercial support proportion of overall visitation of approximately 7.6%.
    - Under alternative 3, this baseline of 8,400 would be multiplied by 1.3 to allow for an increase in visitor use by up to 30% while maintaining a commercial support proportion of overall visitation of approximately 7.6%, resulting in 10,920 CSDs.
    - Under alternative 4, the baseline of 8,400 would be multiplied by 0.95 (to adjust for the limited decrease of 5% in visitor use) to 7,980, and then multiplied by .55 to provide for the notable reduction (45%), in commercial support in this alternative to 4,390 CSDs (rounded up from 4,389), and to reduce the proportion of commercially supported visitors to approximately 4.2% of overall visitation.
    - Under alternative 5, the baseline of 8,400 would be multiplied by 0.7 to allow for a decrease in visitor use of 30% while maintaining a commercial support proportion of overall visitation of approximately 7.6%, resulting in 5,880 CSDs.
- Allocation calculations for wilderness-wide Non-Stock CSDs:
    - The figures in each of the alternatives are equal to 60% of Total CSDs for that alternative (rounded):
        - Alternative 2 = 5,040 CSDs (60% of 8,400)
        - Alternative 3 = 6,550 CSDs (60% of 10,920)
        - Alternative 4 = 2,630 (60% of 4,390)
        - Alternative 5 = 3,530 (60% of 5,880)
    - The calculation of 60% of all CSDs allotted to Non-stock commercial services is based on current and past use levels, and has proven to be at a level that provides for visitor use and enjoyment of wilderness, supports activities that realize the recreational and other purposes of wilderness, and allows for the preservation of wilderness character (see WSP/EIS, chapter 4).
- Allocation calculations for wilderness-wide Stock CSDs:
    - The figures in each of the alternatives are equal to 40% of Total CSDs for that alternative (rounded):
        - Alternative 2 = 3,360 CSDs (40% of 8,400)
        - Alternative 3 = 4,370 CSDs (40% of 10,920)

  - Alternative 4 = 1,760 (40% of 4,390)
  - Alternative 5 = 2,350 (40% of 5,880)
- The calculation of 40% of all CSDs being allotted to Stock commercial services is based on current and past use levels, and has proven to be at a level that provides for visitor use and enjoyment of wilderness, supports activities that realize the recreational and other purposes of wilderness, and allows for the preservation of wilderness character (see WSP/EIS, chapter 4).

- Allocation calculations for Mount Whitney Management Area:
  - CSDs for the Mount Whitney Management Area are based on achieving a 10 % reduction of commercial service supported use of the area. The reduction is based on the combined averages of non-stock (1,062 CSDs/yr) and stock (521 CSDs/yr) use of 1,583 CSDs/yr from the four year period of 2010-2013. The baseline allowable level of CSDs for the Mount Whitney Management Area of 1,425 is determined by multiplying 1,583 by 0.9. The allowable baseline level of 1,425 CSDs/yr is allocated as described below.
    - Non-stock CSDs in the Mount Whitney Management Area will be allowed to consist of 65% of the baseline use level determined above. By multiplying the 1,425 overall CSD baseline by 0.65, a non-stock baseline of 930 CSD is derived (rounded up from 926). This non-stock baseline is then applied to each of the alternatives below:
      - Alternative 2, adopt baseline of 930 CSDs.
      - Alternative 3, multiply baseline of 930 by 1.3 to provide for an increase of 30% (adjust for the increase in visitor capacity) to 1,210 CSDs.
      - Alternative 4, multiply baseline of 930 by 0.95 (to adjust for the limited decrease, 5%, in visitor capacity) to 885, and then multiply by 0.55 (to provide for the specific notable reduction, 45%, to commercial services in this self-reliant emphasizing alternative) to 490 CSDs (rounded up from 487).
      - Alternative 5, multiply baseline of 930 by 0.7 to provide for a decrease of 30% (adjust for the decrease in visitor capacity) to 650 CSDs.
    - Stock CSDs in the Mount Whitney Management Area will be allowed to consist of 35% of the baseline use level determined above. By multiplying the 1,425 overall CSD baseline by 0.35, a stock baseline of 500 CSD is calculated (rounded up from 499). This stock baseline is then applied to each of the alternatives below:
      - Alternative 2, adopt baseline of 500 CSDs.
      - Alternative 3, multiply baseline of 500 by 1.3 to provide for an increase of 30% (to adjust for the increase in visitor capacity) to 650 CSDs.
      - Alternative 4, multiply baseline of 500 by 0.95 (to adjust for the limited decrease, 5%, in visitor capacity) to 475, and then multiply by .55 (to provide for the specific notable reduction, 45%, to commercial services in this self-reliant emphasizing alternative) to 260 CSDs (rounded down from 261).
      - Alternative 5, multiply baseline of 500 by 0.7 to provide for a decrease of 30% (to adjust for the decrease in visitor capacity) to 350 CSDs.

Monitoring and analysis of the established process of managing commercial services in wilderness will be conducted by the parks' staff in response to changes that occur during the life of the Wilderness Stewardship Plan. Depending on the nature of changes that occur, the National Park Service would take additional actions consistent with the management directions in the WSP in regards to the management of commercial services in wilderness. In all cases, appropriate environmental compliance and public involvement would occur, as necessary, when corrective actions are taken. Possible adjustments may include, but are not limited to:

- Group size limits, client-to guide ratios, number of trips, allocation of use and locations of use available to commercial services providers may be revised in response to new information, such as assessments of impacts to environmental and social conditions (especially as related to visitor capacity standards) and changes in the parks' programs.
- The number of commercial service providers may be limited.
- Approved activities, if found incompatible with resource protection, visitor enjoyment, and / or safety, may be suspended or terminated.
- The limits on commercial services imposed by this plan will be reassessed and/ or recalculated when significant changes in use patterns occur. Actions that may affect this process are:
    - Changes in visitor use travel patterns that would affect the results of an Extent Necessary Determination.
    - Extent Necessary methodology will be reevaluated using improved data that will be collected in the future.

Bearpaw Meadow High Sierra Camp and the Pear Lake Ski Hut offer overnight lodging in designated potential wilderness addition areas of these parks. When Congress designated the Sequoia-Kings Canyon Wilderness in 1984, it allowed the continuation of these facilities as non-conforming uses and designated the areas they occupy as potential wilderness additions. These seasonal facilities offer rustic lodging, and at Bearpaw Meadow High Sierra Camp, meal service (to guests and employees). Due to their special status as congressionally authorized non-conforming uses, this Extent Necessary Determination treats these facilities separately from the parks' concessioners and CUA holders who provide commercial services to visitors using designated wilderness.

The Congressionally authorized Bearpaw Meadow High Sierra Camp (lodging and meal service) is run through a long-term Concession Contract with DNC Parks and Resorts at Sequoia. This facility has a seven year (2006 -2012) avg. of 1,497 VUD/yr. This allowed seasonal commercial entity would continue to operate at its established capacity of approximately 1,700 Visitor Use Days per year (June through September) and to continue its current levels and types of resupply activities. Services at and resupply trips to the Bearpaw Meadow High Sierra Camp are not included in the calculations and limitations in table B-5 because these activities are not commercial services provided to visitors in designated wilderness and have been expressly allowed per Congressional direction.

The Congressionally allowed operation of the Pear Lake Ski Hut (lodging service) is conducted through an agreement between the NPS and Sequoia Natural History Association. This entity has a 5 year (2008/2009 – 2012/2013) avg. of 1,220 VUD/yr. This seasonal commercial operation would continue at its established capacity of approximately 1,500 Visitor Use Days per year (December through April). Services provided at Pear Lake Ski Hut are not included in the calculations or limitations in table B-5.

SECTION V: SUMMARY

SUMMARY OF ALTERNATIVE 2

Alternative 2 would seek to provide opportunities for visitors to enjoy a range of proper activities similar to existing conditions, except in areas of higher use and impact where site-specific actions would be taken to improve wilderness character. These site-specific actions would include reducing the availability of commercial support in the Mount Whitney Management Area, as well as many other site-specific restrictions that would apply to all visitors regardless of commercial support (see WSP chapter 2). Of special note are changes in the way that stock parties are regulated, since stock parties often involve commercial support. Collectively, the combination of proposed visitor capacity, regulation of visitor use, and commercial service allocation would result in conditions that preserve wilderness character, with some improvement of wilderness character in high use areas relative to current conditions. This determination is based on a variety of recent research that shows that past and current management has been successful in protecting wilderness character. This research includes studies of current visitor experiences, visitor effects on bighorn sheep, visitor effects on water quality, visitor effects on meadow condition, and visitor effects on campsite conditions. These studies show good to excellent resource conditions in most of the wilderness with very few limited site-specific exceptions. For some resources, such as meadow and campsite condition, the impacts of past use are measurable (primarily from many decades ago), but the current trend is towards improving conditions. Alternative 2 would focus management actions on site-specific resource impacts in order to improve the overall condition of wilderness character. A complete discussion of the environmental consequences of alternative 2 on Wilderness Character is included in the WSP/FEIS "Chapter 4: Environmental Consequences."

The commercial service levels proposed in table B-5 have been determined to be appropriate to achieve the objectives of alternative 2, which include the preservation of wilderness character. Namely, these commercial service levels are necessary to ensure that visitors have sufficient freedom to choose camping locations and camping styles that allow them to use and enjoy wilderness and realize the recreational (or other) purpose of wilderness; ensure that visitors with diverse backgrounds and capabilities are able to access wilderness, develop or expand wilderness skills, and otherwise use and enjoy wilderness; and to ensure that visitors are able to engage in the traditional activity of traveling with stock. Because these opportunities are envisioned to be similar to existing conditions in most areas, commercial allocations are proposed at levels similar to current conditions. The exception is in the Mount Whitney Management Area, where improvements to wilderness character would be achieved in part by reducing the levels of use supported by commercial services.

SUMMARY OF ALTERNATIVE 3

Alternative 3 would seek to provide opportunities for visitors to enjoy a range of proper activities at use levels exceeding current conditions. Actions would be taken to accommodate higher levels of visitor use while protecting the natural quality of wilderness character. These actions would often involve impacts on the undeveloped quality of wilderness and increased regulations, which would impact the unconfined aspect of wilderness character; and higher use levels would directly affect opportunities for solitude. Despite these changes, wilderness character would not be impaired under alternative 3. The conditions that visitors would encounter in terms of development, density of other visitors, naturalness, and freedom from manipulation would be consistent with conditions associated with designated wilderness areas and the requirements of the Act, and would contrast sharply with conditions found in non-wilderness settings. A complete discussion of the environmental consequences of alternative 3 on Wilderness Character is included in the WSP/FEIS "Chapter 4: Environmental Consequences."

The proposed commercial service levels have been determined to be appropriate to achieve the objectives of alternative 3, which include the preservation of wilderness character. Namely, these commercial service levels are necessary to ensure that a larger number of visitors have sufficient freedom to select camping locations and camping styles that allow them to use and enjoy wilderness and realize the recreational (or other) purpose of wilderness; ensure that visitors with diverse backgrounds and capabilities are able to access wilderness, develop or expand wilderness skills, and otherwise use and enjoy wilderness; and to ensure that visitors are able to engage in the traditional activity of traveling with stock. Because these opportunities are envisioned to occur at levels exceeding existing conditions in most areas, commercial allocations are proposed at levels that would exceed current levels of commercial support although the level of support would be proportional to current conditions.

SUMMARY OF ALTERNATIVE 4

Alternative 4 would seek to provide opportunities for visitors to enjoy primarily self-reliant activities; overall use levels would be slightly lower than current conditions, reflecting the decreased availability of commercial support. Actions would be taken to reduce most forms of visitor assistance, including removing developments and decreasing the availability of commercial support, and regulations would be relaxed to improve visitor freedom. Under alternative 4, wilderness character would be preserved in terms of opportunities for solitude and the natural wilderness qualities, and improved in terms of the undeveloped quality and unconfined aspect. This would occur, however, at the expense of the use and enjoyment for certain types of visitors, including those that desire to develop or expand wilderness skills, and those that wish to travel with stock. A complete discussion of the environmental consequences of alternative 4 on Wilderness Character is included in the WSP/FEIS "Chapter 4: Environmental Consequences."

The proposed commercial service levels have been determined to be appropriate to achieve the objectives of alternative 4, which include the preservation of wilderness character. Namely, commercial service support would be available at levels significantly diminished from current conditions, and opportunities for self-selecting camping locations, developing or expanding wilderness skills, and traveling with stock would also be diminished. Commercial allocations are therefore proposed at levels below current conditions.

SUMMARY OF ALTERNATIVE 5

Alternative 5 would seek to provide opportunities for visitors to enjoy a range of proper activities at use levels below current conditions. Actions would be taken to improve opportunities for solitude. Due to lower levels of visitor use, the natural quality of wilderness character would be protected with less reliance on development and regulations; this would improve the undeveloped quality and unconfined aspect of wilderness. However, this would occur at the expense of the use and enjoyment of many visitors, who would face greater competition for permits at many popular trailheads. Wilderness character would be preserved under alternative 5. Visitors able to obtain permits would encounter excellent conditions in terms of all wilderness character qualities. A complete discussion of the environmental consequences of alternative 5 on Wilderness Character is included in the WSP/FEIS "Chapter 4: Environmental Consequences."

The proposed commercial service levels have been determined to be appropriate to achieve the objectives of alternative 5, which include the preservation of wilderness character. Namely, these commercial service levels are necessary to ensure that a smaller number of visitors have freedom to select camping locations and camping styles that allow them to use and enjoy wilderness and realize the recreational (or other) purpose of wilderness; ensure that visitors with diverse backgrounds and capabilities are able to access wilderness, develop or expand wilderness skills, and otherwise use and enjoy wilderness; and to

ensure that visitors are able to engage in the traditional activity of traveling with stock. Because these opportunities are envisioned to occur at levels below existing conditions, commercial allocations are proposed at levels that would also be below current conditions, although the level of support would be proportional to current conditions.

CONCLUSION

The proposed allocation of CSDs in this END would support proper activities at levels (i.e., extent) that will provide for full preservation of wilderness character while ensuring that diverse high-quality wilderness opportunities are available for public enjoyment. The determined CSD levels, for each of alternatives 2, 3 and 5, would allow for commercial services to support no more than 7.6% of anticipated overall visitor capacity averages, and would support only 4.2% of averages for alternative 4. Under all action alternatives and under the agency Preferred Alternative, commercial support would remain relatively uncommon, self-supported visitation would remain the norm, and wilderness character would not be threatened by excessive commercial presence.

Nor would environmental consequences of the proposed level of commercial support threaten wilderness character. The activities that commercial services may support are the same activities that are enjoyed by the non-commercially supported public. Also, the impacts of commercially supported visitors in combination with other visitors have been properly and thoroughly analyzed in the WSP/FEIS "Chapter 4, Environmental Consequences." This analysis shows there will be no meaningful threat to wilderness character as the result of the proposed CSDs in this WSP/FEIS.

The findings of this END are the result of the balancing of multiple relevant factors, including the potential environmental effects of commercially supported visitor use, which are found not to impede the preservation of wilderness character, and the opportunities for public enjoyment that this proposed level of commercial support can provide to wilderness visitors. These findings are consistent with the primary objectives of the Wilderness Act, as stated in Section 2(a): "wilderness areas. . . . shall be administered *for the use and enjoyment of the American people* in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, *the preservation of their wilderness character*. . ." (emphasis added).

Table B-6: Summary of Visitor Capacities, Commercial Service Allocations, and Preservation of Wilderness Character

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Alternative Description	Continue to manage wilderness under the existing Backcountry Management Plan /Stock Use and Meadow Management Plans.	Preserve Wilderness Character with targeted site-specific actions to reduce recreational impacts, particularly in high-use areas.	Maximize visitor use and enjoyment and emphasize the quality of wilderness as a place that provides opportunities for primitive recreation.	Increase the undeveloped and self-reliant qualities of wilderness while protecting the natural quality of wilderness with restrictions on visitor behavior and reduced availability of commercial support.	Increase the opportunities for solitude and unconfined recreation, and protect the natural quality of wilderness by notably reducing visitor use.
Wilderness Character Values					
Natural	No campsite condition standards. Grazing management per Stock Use and Meadow Management Plan.	Campsite Condition Standard (WVCM): High Use – 1000 Moderate Use – 500 Low Use – 250 Meadow-specific grazing capacities (See appendix D)	Campsite Condition Standard (WVCM): High Use – 1300 Moderate Use – 650 Low Use – 325 Meadow-specific grazing capacities (See appendix D)	Campsite Condition Standard (WVCM): High Use – 950 Moderate Use – 475 Low Use – 235 Meadow-specific grazing capacities (See appendix D)	Campsite Condition Standard (WVCM): High Use – 700 Moderate Use – 350 Low Use – 175 Meadow-specific grazing capacities (See appendix D)
Untrammeled	Limited impacts to untrammeled quality would continue from fire management, invasive species management, and various restoration activities.				
Undeveloped	Food-storage boxes retained: 86	Food-storage boxes retained/tested for removal/removed: 48/13/25	Food-storage boxes added: 35	Food-storage boxes removed: 86	Food-storage boxes removed: 86
	Privies and restrooms retained: 23 (21 privies and 2 restrooms)	Privies and restrooms retained/tested for removal/removed: 9/7/7 (and possibly one added)	Privies and restrooms retained: 23	Privies and restrooms removed: 23	Privies and restrooms removed: 23
	Ranger stations and patrol cabins retained: 18	Ranger stations and patrol cabins retained/removed: 17/1	Ranger stations and patrol cabins retained: 18	Ranger stations and patrol cabins retained/removed: 9/9	Ranger stations and patrol cabins retained/removed: 14/4
	Hitch rails and drift fences retained: 106	Hitch rails and drift fences retained/removed: 71/35	Hitch rails and drift fences retained/removed: 87/19	Hitch rails and drift fences removed: 106	Hitch rails and drift fences retained/removed: 60/46

Table B-6: Summary of Visitor Capacities, Commercial Service Allocations, and Preservation of Wilderness Character (continued)

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Opportunities for Solitude and Unconfined Recreation	No encounter standards	Trail Encounter Frequency (# of encounters per hour on 90% of quota season days, by encounter class): Very High – 45 High – 25 Moderate – 15 Low – 6	Trail Encounter Frequency (# of encounters per hour on 90% of quota season days, by encounter class): Very High – 59 High – 33 Moderate – 20 Low – 8	Trail Encounter Frequency (# of encounters per hour on 90% of quota season days, by encounter class): Very High – 43 High – 24 Moderate – 14 Low – 5	Trail Encounter Frequency (# of encounters per hour on 90% of quota season days, by encounter class): Very High – 25 High – 18 Moderate – 11 Low – 4
Other (Cultural Resources)	The Bearpaw Meadow High Sierra Camp would continue to be operated by a concessioner of the parks.	The Bearpaw Meadow High Sierra Camp would continue to be operated by a concessioner of the parks as in alternative 1.	The Bearpaw Meadow High Sierra Camp would be retained and would continue to be operated by a concessioner. Some expansion could occur within the existing footprint.	The Bearpaw Meadow High Sierra Camp, including any historic elements, would be removed and the area rehabilitated.	The Bearpaw Meadow High Sierra Camp would be reduced in size and its season of operation would be shortened.
Visitor Capacity					
Annual Visitor Use Days	111,000 (observed three year average 2010-12)	111,000 (estimated average, with annual variation +/- 20%)	144,000 (estimated average, with annual variation +/- 20%)	105,500 (estimated average, with annual variation +/- 20%)	77,700 (estimated average, with annual variation +/- 20%)
Commercial Use Allocation					
Total	NA	~7.6%	~7.6%	~4.2%	~7.6%
Non-stock	NA	~4.6%	~4.6%	~2.5%	~4.6%
Stock	NA	~3%	~3%	~1.7%	~3%

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SECTION VI – MAPS OF MOUNT WHITNEY MANAGEMENT AREA AND OF CURRENT COMMERCIAL SERVICE LEVELS BY TRAVEL ZONE

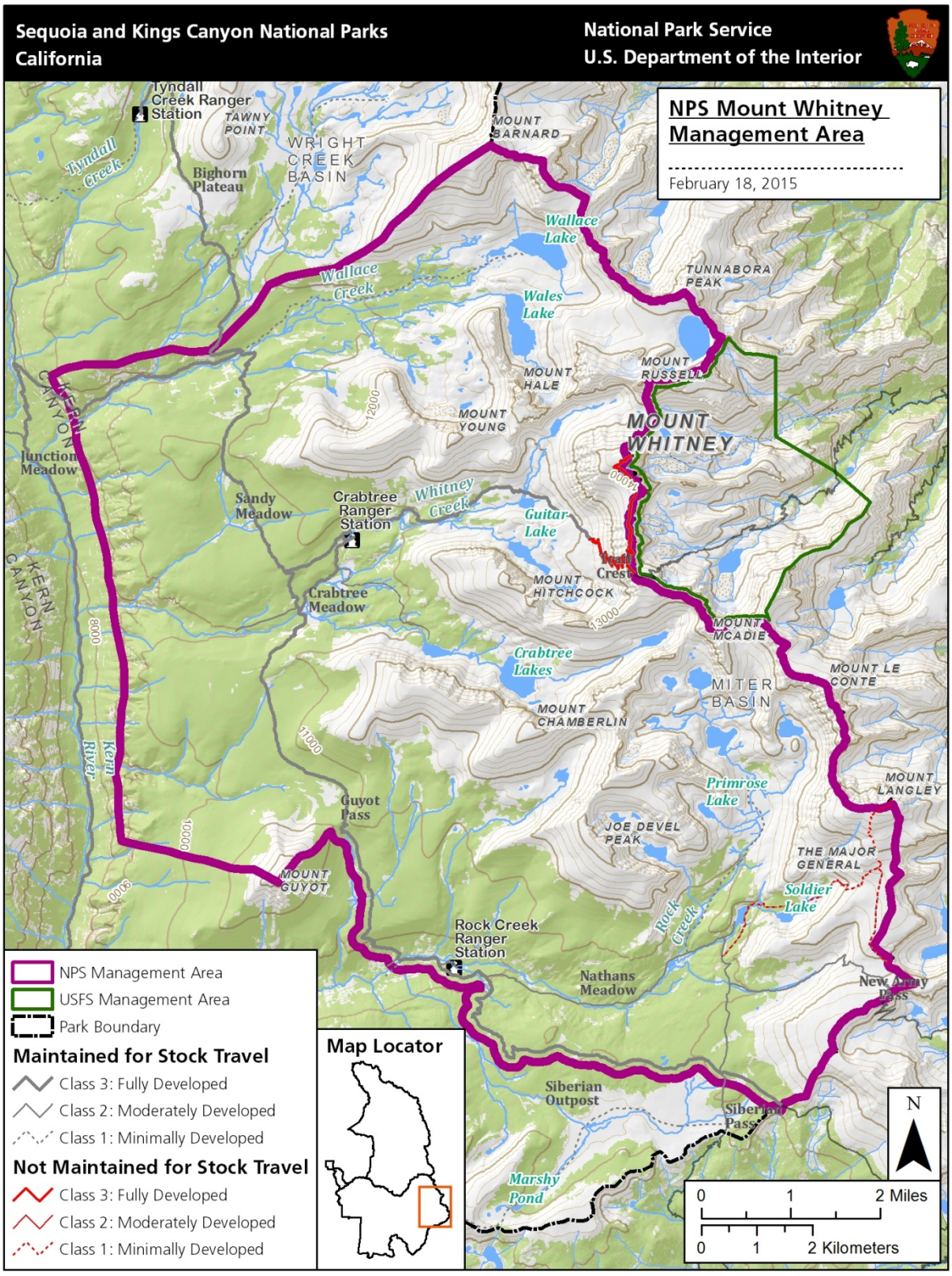


Figure B-1: Mount Whitney Management Area

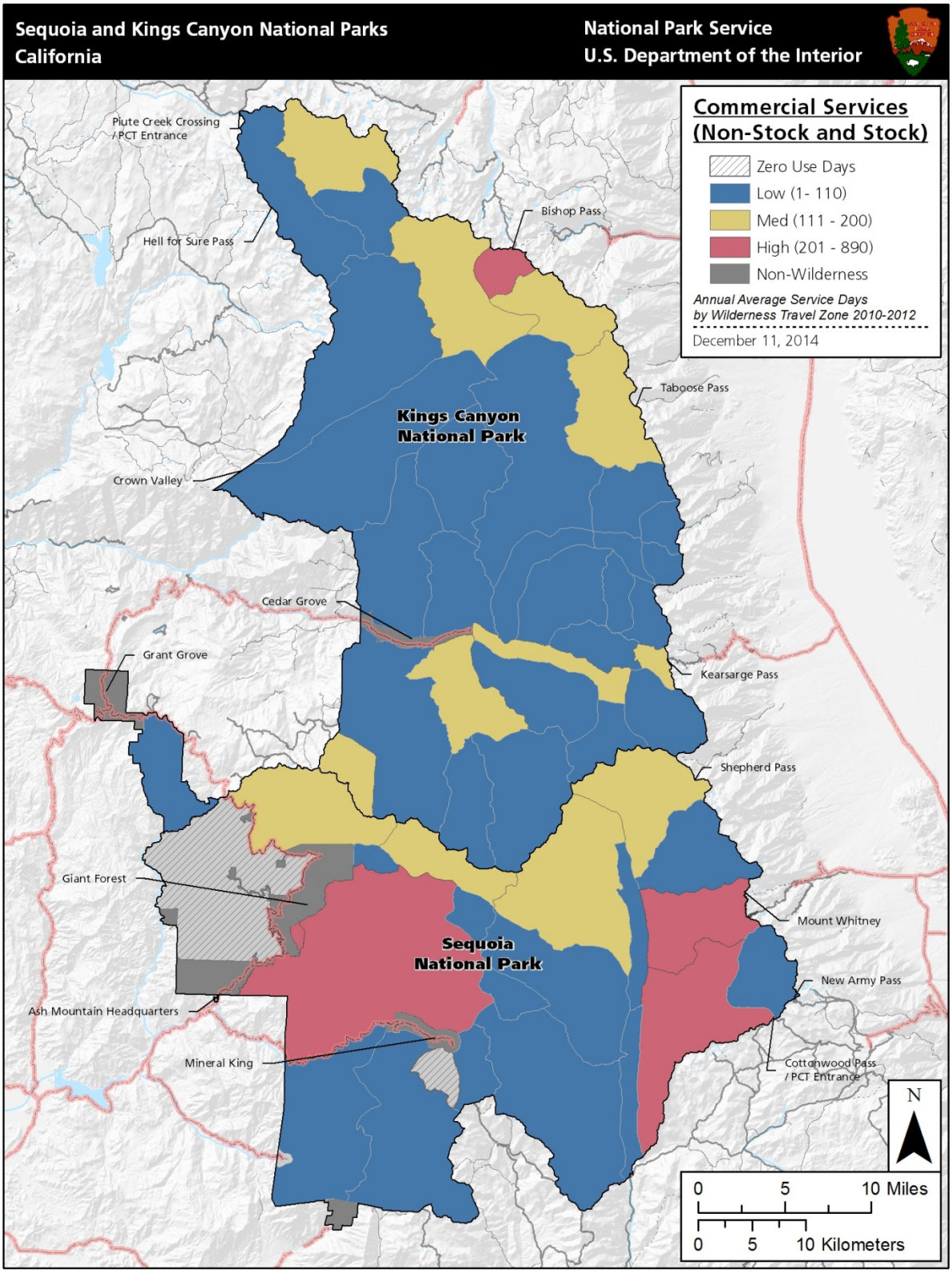


Figure B-2: Combined Non-stock and Stock Commercial Services by Wilderness Travel Zone

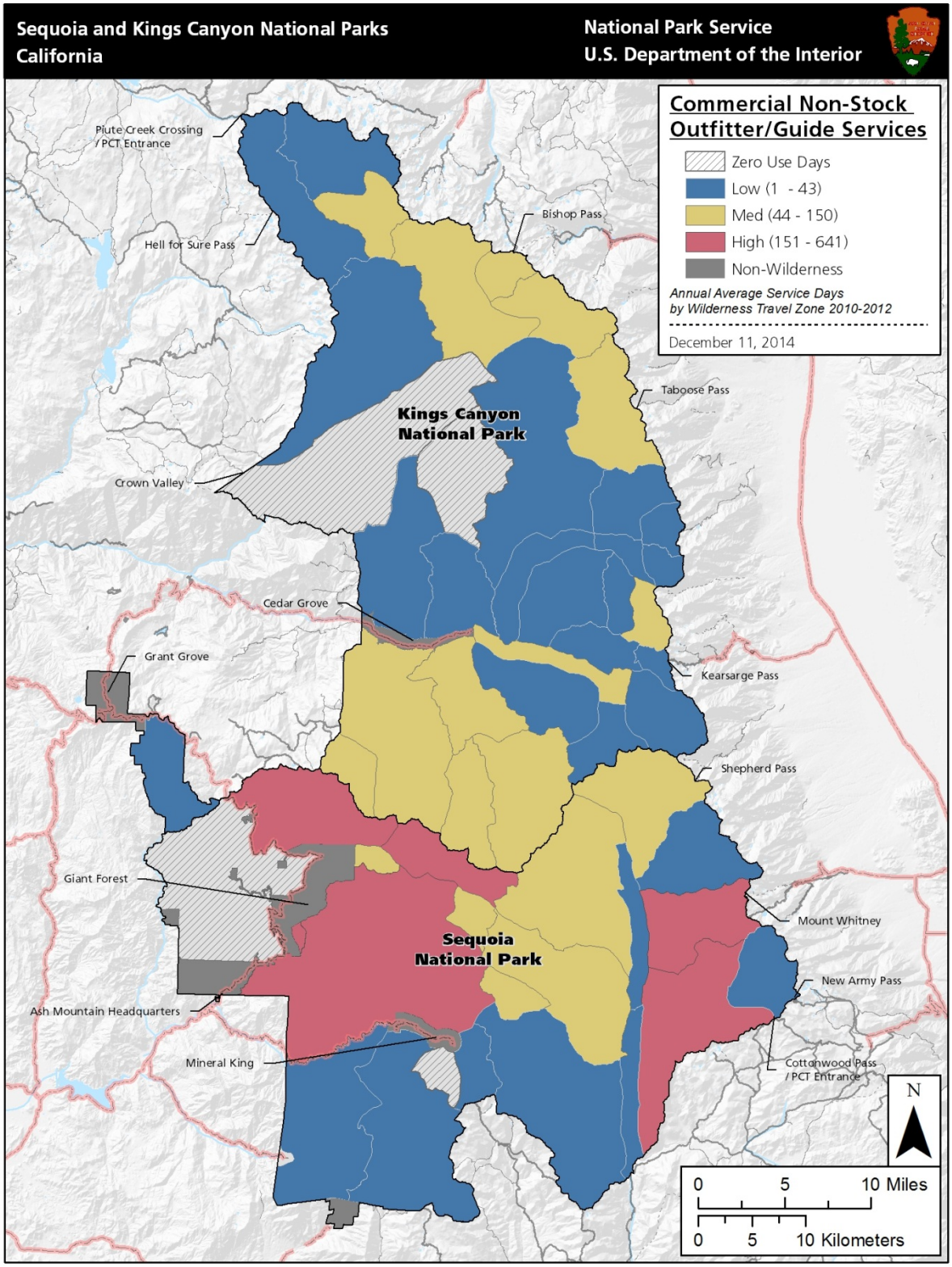


Figure B-3: Non-stock Commercial Services by Wilderness Travel Zone

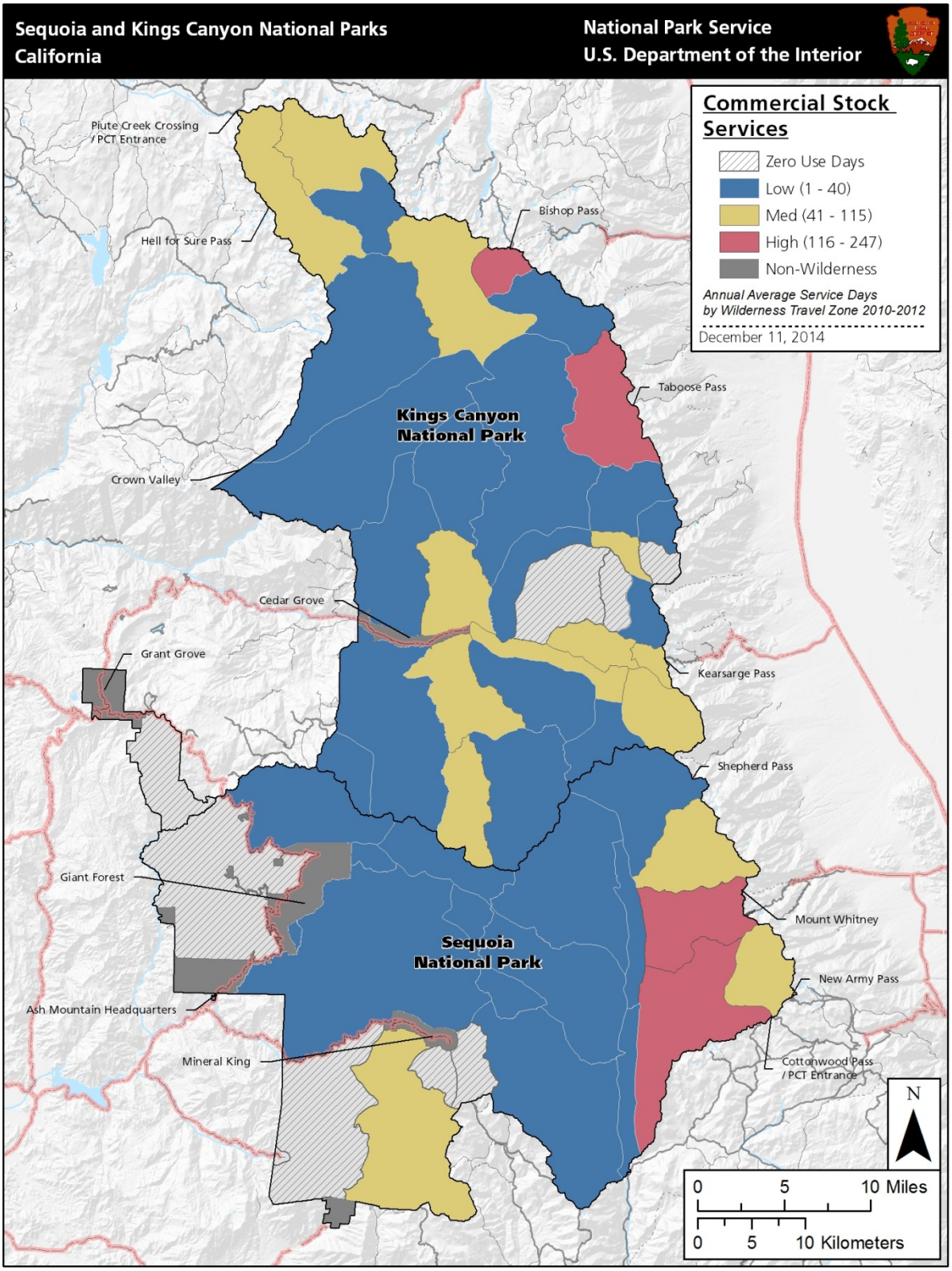


Figure B-4: Stock Commercial Services by Wilderness Travel Zone

REFERENCES

Frenzel, E. and S. Haultain

2014 *Summary report of stock use and grazing in wilderness meadows, Sequoia and Kings Canyon National Parks, 2013*. Sequoia and Kings Canyon National Parks, Three Rivers, CA, USA.

High Sierra Hikers Association v. U.S. Department of the Interior

2012 U.S. Dist. LEXIS, 74124 (N.D. Cal.)

Jackson, L.A.

2004 *The Mule Men: A history of stock packing in the Sierra Nevada*. Mountain Press, Missoula, Montana.

Leave No Trace

2002 *Leave No Trace skills and ethics: horse use*. Leave No Trace, Inc., Boulder, Colorado.

McKee, E.A., Jr.

2013 *Echoes of Blossom Peak: Cowboys, horsemen and history of Three Rivers*. Self-published.

National Park Service (NPS)

2006 *Management Policies 2006*. U.S. Government Printing Office, Washington, DC.

2007 *Final General Management Plan and Comprehensive River Management Plan/Environmental Impact Statement*. Sequoia and Kings Canyon National Parks, Three Rivers, CA. 657 pp.

2013 Director's Order 41: *Wilderness Stewardship*. Approved May 13, 2013.

Pease, James. L.

2011 *Parks and Under-served Audiences: An Annotated Literature Review*. Prepared for the National Park Service under contract by MPR Museum Consultants.

Tweed, W.C. and L.M. Dilsaver

1990 *Challenge of the Big Trees.* Sequoia Natural History Association.



Appendix C

Wilderness Character Monitoring Strategy

ON THE PREVIOUS PAGE
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 for 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 environmental impact statement (EIS), 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 the parks' 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 parks' 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. These qualities are defined in chapter 1 (starting on page 9).

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 would ideally monitor and report 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 (untrammeled, 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 (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 staff members from the parks, 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 staff from the parks 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. These would continue to be monitored over time, analyzed regularly, and results reported to the parks' 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 the parks' 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

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

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 Area and existing or potential impact of inholdings	Inholdings
	Inholdings	Type and amount of administrative and nonemergency use of motor vehicles, motorized equipment, or mechanical transport	Administrative helicopter use
	Use of motor vehicles, motorized equipment, or mechanical transport	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)
		Number and severity of disturbances to cultural resources.*	No corresponding measure identified
	Loss of statutorily protected cultural resources *	Amount of visitor use	Visitor use nights/ quota information/ party size

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

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 Number of trail contacts	Outfitter use nights
			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 Type and number of agency-provided recreation facilities	Overflights/ low flyers
			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

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

[2] WC 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 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.

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

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.

*Those measures which have established standards (campsite conditions and trail encounters, as well as stock use thresholds [see appendix D, table D-6]), would have annual reviews of data collected from monitoring efforts. If data indicates a detectable negative trend, then corrective actions would be considered and recommended to the parks' management.

A comprehensive review of monitoring results would occur at least every five years for campsite conditions, trail encounters, visitor use nights, stock use nights, stock use thresholds, and data from all other measures listed in table C-2.

For monitoring, review, and analysis of data and conditions related to stock use and meadows see appendix D.

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 operations of the parks, 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 the 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 airsheds 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 Divisions of the Parks

- 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 the parks' 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 parks' 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 parks' 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: the parks' 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 fire management officer); 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: the parks' superintendent, management assistant; and other staff from the parks 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 the parks' 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: the parks' superintendent, management assistant, and staff of the parks that work in or have an interest in meadow management.

The Parks' 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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Appendix D

Stock Use and Meadow Monitoring and Management Strategy

ON THE PREVIOUS PAGE
Wales Creek
Photo Courtesy of R. Pilewski

APPENDIX D:

STOCK USE AND MEADOW MONITORING AND MANAGEMENT STRATEGY

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STOCK USE AND MEADOW MONITORING AND MANAGEMENT STRATEGY

This appendix describes the strategy for monitoring and managing stock use that would be implemented by the NPS under the preferred alternative as described by this Wilderness Stewardship Plan and Final Environmental Impact Statement (WSP/FEIS). The introductory sections describe the objectives for managing stock use in the wilderness of the parks, provide an overview of the parks' meadow resources, and review the history of stock use, associated impacts, and its management in the parks. This is followed by sections that describe the adaptive management program, including approaches for monitoring and managing stock use in such a way as to minimize and mitigate impacts while providing continued access to wilderness for visitors travelling with stock.

INTRODUCTION

Pack and saddle stock have been used in the southern Sierra Nevada since the mid-nineteenth century, first for exploration and then in conjunction with sheep and cattle grazing and mining. In the late nineteenth century, and progressively into the twentieth century, stock were used for access to the mountains of the region for recreational purposes. The numbers of stock used for recreational trips increased and peaked in the 1930s, dropped in the 1940s, increased again in the 1950s, and have since declined. Pack stock have been used to support the development and administration of the remotest areas of the two parks—e.g., for trail building and maintenance and ranger patrols—since their establishment. The use of stock for administrative and recreational purposes is still recognized as a traditional, historically and culturally significant, and legitimate activity that will continue in the wilderness of Sequoia and Kings Canyon National Parks (NPS GMP 2007).

The Act that created the National Park Service states that its "purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for future generations" NPS Organic Act (16 USC 1). National Park Service policy and the legislation that created these parks require that ecosystems in wilderness be protected and preserved while allowing for their use and enjoyment. NPS *Management Policies 2006*, Section 8.2.2.8 states that:

> "Equine species such as horses, mules, donkeys and burros, and other types of animals (including llamas, alpacas, goats, oxen, dogs and reindeer) may be employed when it is an appropriate use to support backcountry transport of people and materials and will not result in unacceptable impacts. Planning for recreational stock use should be conducted in the context of visitor use planning to address social, biological, and physical carrying capacity considerations, and to make allocation decisions that minimize potential conflicts between and among user groups. The plan should (1) establish routes, trails, and areas of travel; and (2) identify the need for supporting infrastructure such as designated horse camps, hitch rails, corrals, and appropriate trailhead facilities designed for vehicles towing horse trailers. The plan should also identify sensitive natural and cultural resource areas and develop management strategies to protect these resources."

Grazing that is incidental to the recreational use of stock is regulated by the horse and pack stock regulations (36 CFR 2.16). Where grazing is permitted, NPS policy directs the use of best management practices, with particular attention being given to protecting wetland and riparian areas, sensitive species and their habitats. Grazing is managed so that ecosystem dynamics and the composition, condition, and distribution of native plants and animal communities are not significantly altered (NPS *Management Policies 2006*, Section 8.6.8.2).

Many kinds of disturbance occur naturally in meadow ecosystems; this strategy addresses those associated with human activities and stock use. Some disruption of natural ecosystems and processes by stock is expected and considered acceptable as the consequence of a form of primitive wilderness use that is appropriate in Sequoia and Kings Canyon National Parks. The monitoring and assessment protocols proposed in this strategy are designed to provide insight into the integrity of meadow ecosystems, to provide early warnings of stock related changes, and to inform a management program that anticipates potential impacts. The proposed management standards and thresholds are set at levels that will ensure the protection of wilderness character by triggering timely and effective corrective action.

The environmental impacts associated with stock use are discussed in detail under the impacts topics addressed in chapters 3 and 4 of this WSP/FEIS.

OBJECTIVES OF THE STOCK USE AND MEADOW MONITORING AND MANAGEMENT STRATEGY

A goal of wilderness management in Sequoia and Kings Canyon National Parks is to provide for recreational and administrative saddle and pack stock use in a manner that will protect the parks' natural and cultural resources and values, the processes that shape them, and the quality of visitor experience distinctive to them.

Chapter 1 of this WSP/FEIS further articulates the desired conditions which guide protection of the natural quality of wilderness as follows:

- The natural quality of wilderness would be preserved by mitigating the impacts of modern civilization on ecosystem structure, function, and processes.
    - The NPS aspires to minimize or localize adverse impacts caused by visitor use and administrative activities. In the wilderness, natural processes would dominate:
        - ecosystem structure and function
        - native biodiversity
        - water quality and quantity
        - decomposition, nutrient cycling and soil forming processes
        - meadow and wetland productivity
        - fire regimes
        - soundscapes, dark skies and viewsheds

Some or all of these desired conditions may not be fully attainable due to factors (such as climate change and air pollution) that are unrelated to visitor use or park administrative activities. The ability of the parks to achieve desired conditions that are either tangentially or unrelated to visitor use and administrative activities is being systematically evaluated through a "climate-smart" lens in the parks Resources Stewardship Strategy (RSS).

The following objectives for stock use and meadow monitoring and management provide a more specific interpretation of how the NPS will meet these goals:

- Limit stock induced changes to plant composition, density, cover, productivity and/or vigor

- Prevent adverse effects to soils and associated sod that may lead to accelerated erosion, prevent changes to springs, seeps and water courses that could alter hydrologic processes
- Promote recovery from past overuse where necessary.
- Minimize the effects of stock on trails and camps
- Minimize the effects of stock on hydrology and water quality
- Ensure that a series of meadows (or definable parts of meadows), including representatives of all major types within these parks, be preserved in an ungrazed condition so that they are perpetuated as—or allowed to become—natural functioning ecosystems to the greatest extent possible. Ungrazed meadows will provide an opportunity for visitors to experience naturally functioning meadows, and will facilitate study of the relative effects of climate, plant succession, and grazing.
- Design and implement a monitoring strategy to provide information about the effects of stock on the resources of the parks that enables adaptive management given uncertain future conditions and ensures that objectives are met.

BACKGROUND INFORMATION

DESCRIPTION OF THE MEADOW RESOURCE

Meadows and uplands, including woodland meadows, forest grasslands, and alpine vegetation, are among the most attractive and important natural resources within Sequoia and Kings Canyon National Parks. Meadows are the principal destinations of many wilderness travelers. Meadows and their environs are important to those visitors who ride and/or pack into the backcountry, both for camping nearby and traditionally as places to graze their stock.

Meadows and associated uplands serve as important sources of food, birthing sites, nesting areas, and hunting grounds for many species of wildlife. Meadow areas also provide an opportunity for scientific research and observation. Natural (or near natural) vegetation may serve as a baseline to which the professional resource manager can refer to evaluate the effects of use on areas used by stock. The value of such baseline conditions contributed to earning these parks International Biosphere Reserve status in 1976 (NPS 2012).

Meadows are complex ecosystems, varying widely in character and composition (Benedict and Major 1982, Ratliff 1982). The plant associations and physical conditions of a meadow determine its tolerance to the effects of grazing and trampling. Because meadow vegetation exhibits a high degree of spatial and temporal heterogeneity, only a very broad, relatively insensitive, classification system can be employed at the meadow level. Since it is often of limited value to generalize about the vegetation of meadows as a whole, it is important to understand the characteristics and tolerances of the plant associations that combine to form meadows. Traditionally, meadow classifications have been based primarily on vegetation and soil characteristics (Klikoff 1965, Benedict and Major 1982, Ratliff 1982, Ratliff 1985). Recognizing the importance of the environmental factors underlying and shaping these assemblages, Weixelman et al. (2011) have developed a classification system for Sierra Nevada meadows that incorporates both hydrology and geomorphology. This classification, which represents a more functional approach to the characterization of these complex systems, has been widely adopted by ecologists and public land managers in the Sierra Nevada.

Stock use is not confined to open meadow environments. Forests and woodlands include extensive areas of species palatable to stock including grasses, sedges, rushes, and other herbaceous plants found within aspen or conifer stands along streams, in seeps, or as an extension of the forest meadow transition. Upland

forbs and grasses may provide abundant and nutritious forage, especially when bunch grasses are present (Sumner 1941). Horses and mules spend a considerable amount of time in forested areas where they are protected from wind and mosquitoes and are able to keep their hoofs dry. Alpine vegetation may also provide forage for stock, but in general these areas are lightly used by stock parties (Frenzel and Haultain 2013), in part due to the limited availability of forage and cover for animals and the challenges faced in constraining stock in treeless terrain, and in part due to restrictions on campfires, which are preferred by many recreational stock users.

Ecologists have begun to investigate the importance of peat-accumulating wetlands (fens) in the Sierra Nevada over the past decade. Fens are peat-forming wetlands, supported by nearly constant groundwater inflow (Bedford and Godwin 2003). This state of permanent saturation leads to the development of oxygen-deprived soils characterized by very low rates of decomposition, allowing for the accumulation of organic matter produced by wetland plants. Fens develop and are maintained only under hydrologic conditions that create perennial soil saturation on the time scale of millennia (Wood 1975, Sikes et al. 2013). As is true for most of the Sierra Nevada, most fens in Sequoia and Kings Canyon National Parks occur in meadow complexes consisting of areas of wet meadow (usually saturated for 1-2 months; Benedict 1983) intermixed with peat accumulating areas that stay saturated for most or all of the year.

Concern over the conservation of these relatively rare and distinctive wetlands has grown, as it is thought that activities leading to the disturbance of the hydrologic regime or soil temperature of a fen, causing drying or warming, may threaten its functioning (Sikes et al. 2013). Alternatively, fens may be more resistant to change than wet meadows due to more stable hydrologic regimes associated with springs and other hydrogeomorphic features (Gage et al. 2014). Because peatlands are thought to play an important role in global carbon storage, research interest in fen dynamics has grown significantly in recent years. Despite this attention, the knowledge of fens does not yet allow for accurate predictions of what the impact of climate change will be on these systems (Rydin and Jeglum 2013).

HISTORY OF STOCK USE AND ASSOCIATED IMPACTS

Sheep and cattlemen of the gold rush era found the meadows and plateaus of the High Sierra unaffected by early Spanish immigrants (Strong 1964). Large numbers of domestic sheep and cattle were first herded into the southern Sierra Nevada during the great drought years of 1862-1864 (Burcham 1957).The next forty years can be characterized as a period of heavy, unregulated use. Tens (and perhaps hundreds) of thousands of sheep were driven into the High Sierra annually. Use was locally heavy (Muir 1877; Reports of the Acting Superintendent of Sequoia and General Grant National Parks, 1892, 1894; Dudley 1896, 1898, 1899; King 1902), and it is assumed that virtually all of the areas now included within the parks that were accessible to sheep were grazed. Cattle were also common in the area but were generally confined to the more easily accessible plateaus and drainages.

Sequoia National Park and Kings Canyon National Park were established in stages spanning the years 1890-1940 (Strong, 1968), and thus different areas have different grazing histories. Sequoia National Park was established in 1890 but was not expanded to include the Kern Canyon and Sierra Crest regions until 1926. Kings Canyon National Park was established in 1940. Prior to this time, that area was administered by the U. S. Forest Service. With establishment of Sequoia and Kings Canyon National Parks, grazing by sheep and cattle was virtually eliminated. Exceptions included a considerable amount of trespass grazing from 1890 to 1905, special wartime grazing permits during and immediately following World War I, and lifetime grazing permits extended as a condition of establishing Kings Canyon National Park. Although the Forest Service regulated grazing by permit on its lands after 1905, grazing pressure was heavy with maximum herd sizes on allotments peaking in the 1920s and 1930s (Harper, 1974). Thus, many meadows in Kings Canyon National Park were degraded at the time of its establishment (Sumner 1941). Detailed accounts of the use of the Sierra Nevada by domestic 1ivestock during pre-park and early park periods are

presented by Burcham (1957), Otter (1963), Loughman (1967), Vankat (1970), Harper (1974), Holmes and Dobson (1976), DeBenedetti (1977), Vankat and Major (1978), and DeBenedetti and Parsons (1979), and summarized by Neuman (1990).

Recreational use of pack and saddle stock on land now included within these parks predates their establishment. Large stock-assisted Sierra Club outings began visiting this area in the early 1900s. Loughman (1967) reported that the use of stock for recreational purposes increased steadily after World War I and peaked in the 1930s. Following a decline in the 1940s, use again increased in the early 1950s, only to decline again through the early 1960s (Briggle et al. 1961). Use levels ranged between 8,800 and 11,500 stock nights during the seven years from 1977-84 (National Park Service Annual Stock Use Reports 1977-84). This level of use as measured by the number of stock nights spent in the wilderness was about one-third of the level of the early 1950s and may have been as little as one-sixth of the peak levels of the 1930s. Use levels have continued to decline since the 1980s, with an average of 7,594 annual stock nights reported for the period 1993-2002, followed by an average of 6,775 annual stock nights reported for the years 2003 to 2012 (ranging from a low of 5,434 nights in 2012 to a high of 8,218 nights in 2003) (Hopkinson et al. 2013).

Wilderness meadows in Sequoia and Kings Canyon National Parks have been the object of much study, with early work being mostly qualitative in nature. Beginning with Sumner (1941), these reports were the result of observations that many meadows seemed to be in a deteriorated condition; the cause of this deterioration was believed to be overgrazing by pack stock, cattle, and/or sheep. There has been much controversy over both the definition and the magnitude of the effects of historic grazing. The Sumner series of observations (1940, 47, 48, 68), in conjunction with Sharsmith (1959), suggested that many meadows in the 1930s and 1940s were undamaged even with heavy use. Other areas, at the same time, were assessed as seriously deteriorated. None of the authors, however, proposed that areas they examined were unaltered compared to what would have been their condition without grazing by livestock. For example, Ratcliff (1956) noted during a survey of the Rock Creek areas that the Rock Creek, Crabtree, and Wright Creek areas were in good condition considering the past and then current levels of use. Near Timberline Lake, however, he reported damage due to trampling. He noted that his report should not be extrapolated to represent conditions in Kings Canyon. Sharsmith (1959) also found Crabtree meadows in good shape. Damage reported by Sumner, Sharsmith, and Ratcliff was, in general, proportional to use the area received. Strand (1972) observed that, “many strategically located meadows along popular trails had been severely damaged by pack stock, and their recovery from earlier abuse either prohibited or delayed."

The need to objectively define what constituted "damage" resulted in a shift from qualitative to quantitative assessment (e.g., Bennett 1965 and Strand 1972). Bennett selected ten meadows and determined their condition, trend, and causes of such trends, and made recommendations for their future management. Strand revisited Bennett's transects in search of detectable trends in condition. Strand found some meadows in slightly deteriorating or slightly improving condition; others showed no trend. In general "those meadows which received the greatest amount of grazing were also those determined to be in a state of deterioration or which showed the least amount of recovery from a previously deteriorated state. This was determined by changes in the relative densities of forage species, low value species, and “invasion species” (Strand 1972). Mazzu (1987) reread transects in four of the original meadows sampled by Bennett and Strand, and found that the meadows closed to grazing showed increased species diversity relative to those that had continued to be grazed.

Grazing had been restricted on the meadows assessed by Strand and Bennett after the earlier Sharsmith and Sumner reports. The 1960 Backcountry Management Plan (Briggle et al. 1961) was the first attempt to formally implement the recommendations of Sharsmith and Sumner:

> Ecological studies in these Parks clearly indicate that overgrazing, not drought cycles and floods, has been the primary cause of meadow deterioration despite the beliefs of a few stockmen to the contrary (Briggle et al. 1961).

Both the 1960 and the 1986 plans agreed that the history of scientific study indicated that (1) prior to the use of restrictions, locally significant damage (i.e., deteriorating vegetation and soils) existed in the parks; (2) the result of restrictions had been a general slowdown in deterioration and, in many areas, improvement; (3) there is finite level of use beyond which unacceptable impacts result, and past use patterns give some idea of what this level may be.

Widespread turn of the century grazing by sheep and cattle in the Sierra Nevada destabilized meadow wetlands by weakening sods, which allowed erosion channels to form, resulting in lower water tables and loss of meadow sediments. From the 1930s to 1980, managers in Sequoia and Kings Canyon National Parks attempted to conserve soil and restore moisture in meadows by constructing check dams and fences, logging invading trees, rerouting trails, and altering grazing management. These efforts are documented in the parks' file reports describing the activities of the dedicated Soil and Moisture Crews and were summarized for named meadows by Neuman (1990).

Popular and strategically located meadows and forage areas, many of which were reported to be in deteriorated condition during surveys conducted as late as 1959 (Sumner, 1941; Sharsmith, 1959) have been the continued focus of monitoring and management. Modern recreational and administrative stock use remains more localized than historic use, with use concentrated along the primary trail corridors, on the Hockett Plateau, in the Roaring River area, and in the Kern Canyon. Of the total meadow area in the parks, approximately half is currently open to grazing. During the period following implementation of the 1986 Stock Use and Meadow Management Plan (SUMMP), some level of use has been documented in approximately half of the meadows open to stock, or a quarter of the total meadow area of the parks (Frenzel and Haultain 2013).

Stock grazing has declined in volume since the 1960s, with a trend towards more concentrated use in the past two decades (Hopkinson et al. 2013). In an analysis of use levels between 1985 and 2009, Hopkinson et al. found that grazing levels were relatively light in the majority of meadows, with almost half of the grazed meadows having less than one animal unit night (AUN)/acre per year reported. The number of meadows with at least one season of grazing over 90 AUN/acre decreased from 17 meadows between the years 1985-1997 to only 7 meadows in the period 1998-2009. Stock use on individual meadows was highly variable, with some meadows having significant use in one year and none in the next. Detailed discussions of recent use patterns can be found in the meadow sections of the Natural Resource Condition Assessment (Hopkinson et al. 2013), and in the annual summaries of stock use and grazing (e.g., Frenzel and Haultain 2013; 2014).

The Natural Resource Condition Assessment (NPS 2013a) also assessed the condition of grazed meadows in the two parks through analysis of several decades of monitoring data. In an analysis of monitoring data collected from 25 grazed meadows between 2001 and 2009, Hopkinson et al. (2013) found a trend of increasing residual biomass, or the amount of vegetation left on a meadow at the end of the growing season, while that from comparable ungrazed meadows showed no statistically significant trend. It is likely that this reflects improved meadow condition due to an increased emphasis on residual biomass to inform stock management, with use levels managed to maintain acceptable levels of residual biomass in grazed meadows.

To evaluate stock grazing effects on plant species composition, data have been collected on a set of five paired grazed-ungrazed meadows over the past twenty-five years. Supporting earlier analyses of these data by McClaran and Neuman (1989) and Abbott et al. (2003), Hopkinson et al. (2013) found very little

evidence for grazing-related compositional differences in the five paired meadows. They also reported that percent cover of bare ground was never statistically significantly different for any of the five meadow pairs' grazed and ungrazed meadows, and that temporal trends in bare ground were generally in tandem for paired grazed and ungrazed meadows. Based on these results, the authors found no strong evidence that current management of stock use has resulted in vegetation change in the five meadow pairs sampled. They were careful to note, however, that based on a five year grazing experiment in mountain meadows in Yosemite National Park, Cole et al. (2004) concluded that when grazing impact is light, species composition change is a less sensitive indicator of meadow condition than changes in productivity and ground cover; thus, the lack of strong differences in species composition between grazed and ungrazed meadow pairs may not definitively demonstrate that stock grazing has had no effect on the meadows.

The past decade has seen a marked increase in research interest in the meadow and wetland systems of the Sierra Nevada. In addition to studies of meadow hydrology, productivity, and biodiversity, there have been a number of investigations into the environmental effects of stock use and grazing. Ostoja et al. (2014) reviewed existing literature to provide a summary of potential effects of pack stock on broad response categories relevant to Sierra Nevada meadows, including water quality, soils, plants, and wildlife. Specific relevant results on these topics have been integrated into chapter 3 of the WSP/FEIS.

A number of recent mapping efforts have addressed the value of spatially explicit information on the distribution of meadows in the two parks, both in support of grazing management and to establish a broader ecological knowledge base. Early maps of the meadows used by stock were based on black and white aerial photographs and delineated on 15 minute topographic maps (Neuman 1990). National Wetland Inventory maps based on remotely sensed imagery were created for the parks in 1996 (USFWS 1996); these included many of the wet meadow types, but by definition did not delineate upland types. In 2007 the first comprehensive association-level map of the vegetation of the two parks was completed (NPS 2007b). Based on 1:15840 color infrared photography and traditional photo-interpretation methods, this map incorporated the information captured by the earlier wetland and meadow mapping efforts. In 2013, park ecologists completed the first map distinguishing peat accumulating wetlands and wet meadow complexes within the parks' meadows (Pyrooz et al. 2014 in review), providing a level of detail that had not been discernible from the parks' 2007 vegetation map and insights into the distribution of peat accumulation across the landscape.

In addition to these mapping efforts, the hydrogeomorphic classification system developed by Weixelman et al. (2011) has recently been applied to a majority of the parks' meadows used by stock. Taken together, these studies and mapping efforts have made significant contributions to the understanding of the distribution, use and condition of park meadows.

PACK AND SADDLE STOCK MANAGEMENT HISTORY

Prior to the implementation of the 1986 SUMMP, grazing management in these Parks was not systematic. Heavily grazed meadows were identified sporadically and specific restrictions established to lessen effects. Due to evidence of grazing effects, a framework for a systematic approach to meadow management was proposed in the early 1940s (Sumner 1941; Armstrong 1942). Flexible opening dates for specific forage areas based upon site conditions, limits on herbage removal, and long-term trend monitoring were to be the foundation of the system. All meadows then would receive protection based upon ecological factors and site-specific characteristics. Although the Armstrong-Sumner system was not implemented at the time, in many ways this approach was similar to that described and implemented by the 1986 SUMMP.

Concern about the condition of many wilderness meadows led to NPS support of an inventory of meadow conditions in 1959 (Sharsmith 1959). Sharsmith visited many Kings Canyon meadows previously

surveyed by Sumner (1941) as well as meadows in Sequoia National Park. He qualitatively described trends in specific meadows through comparative photography and narratives. He concluded that many popular and strategically located meadows were in worse condition than at the time of Sumner's survey and were continuing to deteriorate. As a result of these studies, several meadows were added to the 1ists of those meadows closed to all grazing or subject to restricted grazing (NPS 1937, 1949, 1960-1964; Briggle et al. 1961). Use limits were established, including: head limits for specific forage areas (NPS 1949); closure of certain meadows to grazing and opening dates for meadows (NPS 1960-1964; Briggle et al. 1961); and a limit of 20 head per stock party in 1966. At the same time, the NPS expanded management tools to include opening dates for meadows. A program to reroute trails out of meadows was initiated; lodgepole pine and other woody species thought to have encroached into meadows as a result of historic grazing were removed in several places. No cohesive set of criteria defining acceptable or allowable impact accompanied these actions, however.

In 1985, an effort to compile available information on the meadows and forage areas in the two parks was initiated (McClaran and Neuman 1989). Park ecologists expanded this work and in 1990 *Past and Present Conditions of Backcountry Meadows in Sequoia and Kings Canyon National Parks, 2nd Edition* (Neuman 1990) was completed. Building on an early inventory and classification of the parks' meadows developed by DeBenedetti (1984), the resulting narrative recognized 333 forage areas and brought together site-specific information on vegetation associations, use levels, management history and regulatory status, and condition from a wide variety of sources. The report also included maps of the meadows and forage areas derived from black and white aerial photographs (1964, 1:16000). This work provided a detailed history of the meadows in the parks and established the context for implementation of the 1986 SUMMP. The full document is currently being converted to digital database format in order to link the information to spatial data layers, increase accessibility to site-specific management history, and to facilitate continued updates.

The 1986 SUMMP established the first formal system for the management of stock use in the parks. The plan identified which meadows would be open to grazing, and established a network of meadows to be permanently closed to grazing for the purposes of long-term protection and study. It identified areas open to off-trail travel, and specified tools for managing stock use, including night and party size limits and the use of opening dates for controlling the onset of grazing. The plan also established minimum impact restrictions and guidelines for the use of drift fences.

Recognizing that long-term information is necessary to document changes in conditions and to provide information on the effectiveness of the management program, the 1986 SUMMP also established a monitoring program. The objectives of this program were to track use levels, measure changes in plant species composition and bare ground over time, and using a system of photographic records, document coarse changes in meadow condition. In the late 1980s, a temporary range conservationist was hired by the wilderness management program to develop and implement the monitoring protocols. In 1995, a permanent plant ecologist position was created within the Division of Resource Management and Science to oversee the monitoring program. This marked the beginning of the collaborative monitoring and management program currently in place. This program relies heavily on wilderness ranger staff for much of the field data collection and on the ground management, with plant ecology staff overseeing protocol development, data collection, management and summarization. The wilderness coordinator and plant ecologist work together closely to facilitate the integration of monitoring results into adaptive management.

ADAPTIVE MANAGEMENT

Adaptive management is a structured, iterative process by which system monitoring is incorporated into management practices to achieve desired results. Adaptive ecosystem management requires continuing

monitoring and investigations to advance the understanding of stressors impacting native species and wilderness resources so that managers remain informed about which stressors are most serious, which stressors are manageable, and the ways stressors, such as grazing, can be managed. Scientific research allows for expansion of management tools available today and provides information that can be incorporated into future management activities.

Adaptive management is a system of management practices based on clearly identified desired conditions and monitoring to determine whether management actions are achieving objectives and, if not, facilitating management changes that would best ensure that desired conditions are met or re-evaluated (Walters and Holling 1990; Williams et al. 2007). Adaptive management is a technique employed for charting a decision-making course to obtain a desirable condition. An effective monitoring program is required to provide the navigational framework needed for successfully meeting the challenges of adaptive management.

Adaptive management recognizes that knowledge about natural resource systems is sometimes uncertain (43 CFR 46.30; Moir and Block 2001; Ruhl 2005). Adaptive management considers management actions and policy in a context analogous to experimental treatments. Thus, it embraces possible unknown elements by defining a set of quantitative responses that are consistent with management experience for each desired condition (hypothesized outcome). This is often accomplished through the use of various conceptual or quantitative models. The evidence for achieving the conditions/outcomes is considered in a well-designed monitoring framework.

Adaptive management integrates science and management (Lee 1993). From a science perspective, management objectives become the primary response of interest and the source of questions being posed. From a management perspective, the management objectives remain the primary concern, but learning becomes an additional, explicit objective. Thus, management takes on a part of science (i.e., learning), and science takes on a part of management (i.e., the objectives). More detailed information about the use and implementation of adaptive management is given in *Adaptive Management: The U.S. Department of the Interior Technical Guide* (Williams et al. 2007).

Compliance with NEPA is a statutory and regulatory requirement for federal activities affecting the environment, whereas adaptive management is a discretionary, learning-based approach to structured decision-making that may be used in conjunction with the NEPA process. It is a management tool that is consistent with NEPA's goal of informed decision-making (DOI 2010). Adaptive management and NEPA are complementary in that both emphasize collaboration, working with partners or stakeholders, and learning as part of the management process.

Adaptive management is an integral feature of the management of stock use under each of the alternatives evaluated in this WSP/FEIS. The adaptive management approach would include long-term monitoring to evaluate effectiveness of grazing management actions. Stakeholders, such as commercial outfitters, diverse user groups, and other land managers would continue to be fully engaged.

The proposed strategy for managing stock use is designed to prevent unacceptable impacts to meadows through implementation of multiple complementary field protocols and a suite of adaptive management tools. Taken together, the complementary elements of the management program at the parks—monitoring, which includes residual biomass and bare ground, stock use, species composition, repeat photography, and regularly scheduled site visits; an opening date system based on moisture, soil, and vegetation conditions; management tools including the ability to rest meadows when needed, as well as adjust use levels through controls on party size and length of stay; and ongoing research into meadow function and the effects of grazing on meadow ecology—are designed to protect meadows by preventing, minimizing, and/or mitigating impacts.

MONITORING STRATEGY AND THRESHOLDS FOR MANAGEMENT ACTION

Long-term information on the condition of meadows, and on stock use levels and patterns, is necessary to provide information on the effectiveness of the management program, document changes in conditions, and to inform the management of stock and the meadow systems they use. In their review of pack stock monitoring and management in wilderness, McClaran and Cole (1993) recognized the strengths of the program established by the 1986 SUMMP. However, they also called attention to two weaknesses: the application of a single uniform grazing standard to all park meadows, and the absence of defoliation standards. The monitoring protocols and management system described below address those deficiencies, through 1) the development of site-specific grazing capacities that can be modified to take into account different management objectives at the meadow scale, and 2) the continued implementation of residual biomass monitoring in frequently grazed meadows. The strategy for monitoring stock use and meadow condition includes protocols for:

- monitoring stock use, which provides a direct measurement of the timing, frequency, and duration of grazing as well as the holding and feeding of animals
- conducting site visits, for the purpose of surveillance and early detection of stock impacts (including sensitive areas such as springs, seeps, and streambanks)
- monitoring residual biomass, which provides a quantitative estimate of the amount of plant material remaining on a meadow at the end of the growing season and conversely, of the amount of vegetation consumed by grazing animals
- monitoring bare soil, which is an early indicator of the potential for increased erosion in meadow systems
- monitoring streambank alteration by stock, which is an early indicator for the potential for changes to soil erosion and meadow hydrology
- monitoring species composition, which serves to detect changes in the plant species composing meadow vegetation as a result of grazing
- photographic documentation of conditions and trends

Within each forage area, the primary meadows would be routinely evaluated to assess the status of soils, streambanks, and vegetation. Forage areas are defined as the primary meadows and their associated forested or upland grasslands, which are commonly used by stock for grazing. The forage areas open to grazing under each alternative are illustrated on the stock use and grazing alternatives maps provided in chapter 2 of this WSP/FEIS. The condition of the most heavily used portions of the forage area would be used to indicate the status of surrounding and associated areas grazed by stock. This approach rests on the assumption that if conditions in the most heavily used areas remain within established standards, the rest of the forage area will meet standards as well. If the species composition, density, and soil condition in the primary meadows remain comparable to similar but ungrazed meadows, it is assumed that the associated meadows will remain in good health. Because stock may graze areas outside of the primary named meadows, these areas would also be assessed during site visits but would not necessarily be the subject of the formal monitoring protocols.

The proposed strategy for monitoring and managing stock use relies on the measurement of proxy variables and implementation of preventive management strategies to maintain desired wilderness conditions. In the event that standards are not achieved, the management strategy prescribes adaptive management actions that will provide for recovery. The proposed management tools—such as grazing

limits, opening dates, length of stay and party size limits—are site specific, and could be revised as additional information becomes available to address meadow-specific vulnerability to impacts. Thresholds for management action are designed to provide managers with a range of tools that are triggered by either use levels and/or conditions, and the thresholds are set at a point before which unacceptable impacts occur. The following sections describe each of the formal monitoring protocols, establish thresholds for management action, and identify which actions may be triggered under different scenarios.

STOCK USE AND GRAZING LEVELS

In this WSP/FEIS, stock users are divided into three classes: administrative, commercial, and private. Administrative users are those that are employed by the NPS and who use pack stock in order to carry out their official duties. Commercial providers are entities that provide saddle and or pack stock as a paid service. Companies or individuals of this class are required to hold a NPS issued Commercial Use Authorization (CUA) or be a licensed in-park concession; clients of these commercial providers are also required to obtain a wilderness permit. Private use is packing and riding done by an individual with friends or family; only a wilderness permit is required for this class of use. At times commercial packers are employed to provide support for administrative activities. This use would continue to be attributed as commercial for tracking purposes but classified as serving an administrative function, and thus not count towards commercial service allocations. The WSP/FEIS sometimes refers to commercial and private stock use collectively as "recreational stock use," to distinguish stock use by visitors from stock use by NPS.

Because grazing would continue to be both self-reported and documented by field staff at regular intervals, managers would be able to track the timing, duration, and intensity of use throughout the summer season. As part of the annual work planning process, administrative packers would continue to share their grazing plans with wilderness managers early in the season; commercial outfitters would continue to be required to submit trip itineraries to the parks two weeks in advance of entering the wilderness. All stock parties would continue to be required to report their itineraries after completing their trips. Monthly reports of commercial stock use would be due to the Concessions Management Office according to the requirements established by the relevant Commercial Use Authorization or concessions contract. Commercial service providers would continue to be required to report day use in wilderness, including trail rides, resupply, and spot and dunnage trips whether or not any grazing occurred. Administrative use would continue to be reported monthly, while private users would be requested to submit their reports at the end of the summer season.

The location of each overnight camp, the number of people and stock present, the type of animals, the corresponding dates, and the number of stock fed or grazed would be reported. Stock use reporting forms would be provided to commercial pack stations, NPS and USFS trailheads and administrative packers. Private stock parties would be given reporting cards when obtaining wilderness permits, or when encountered by wilderness rangers in the field. Wilderness rangers would be given a supply of cards each spring for distribution to users, and would also be charged with documenting all observed use within their patrol area. The self-reported use data, along with the wilderness ranger observations, would continue to be compiled and compared against records from the wilderness permit database. This combined information would continue to be evaluated for reporting errors and inconsistencies, summarized, and reported annually. Data would be presented in tabular and graph form, and comparison with past years use presented. Where possible, trends and patterns would be identified and the potential causes discussed. Stock use data would continue to provide information that helps show what levels of stock use resulted in present conditions and would be used to inform the annual discussion of wilderness conditions and any proposed changes to management or restrictions.

Thresholds for Management Action: Use levels serve as a primary proxy for potential impacts to meadow systems, and as such, are used to trigger monitoring activity as well as management responses where necessary. Wilderness rangers would continue to track use in the field and notify the wilderness office when the estimated capacity of a meadow is approached. Self-reported commercial and administrative use would be similarly reviewed by plant ecology staff as reports become available. Meadows in which use reaches the estimated capacity (see attachment 1) would be evaluated for impacts. If conditions warrant, a grazing closure or other appropriate management action would be taken. Such actions would be recommended to the appropriate district ranger by field personnel during the grazing season for immediate implementation, or proposed to the Superintendent following the annual review of monitoring results for implementation during the following summer season. Increased use may be allowed where information from the monitoring program and observed conditions indicate.

As a guideline, areas receiving high levels of use (80% or greater of the estimated capacity) would be evaluated annually, those receiving moderate use (50-79% of the estimated capacity) would be evaluated biannually (or annually if resources are available), and those areas that are lightly used (less than 50% of the estimated capacity) would be evaluated at least every 5 years.

SITE VISITS AND CONDITION ASSESSMENTS

Site visits to grazed meadows would continue to be made with the goal of surveying for stock impacts and describing and documenting these impacts. A typical site visit would include a survey of stock camps, preferred forage areas, maintained and informal trails, stream banks, seeps, and springs, and any other sensitive features in the meadow area. In the course of each site visit, staff would describe stock impacts and other factors influencing meadow vegetation and hydrology. Stock impacts which will be evaluated would include the extent and severity of deep hoof prints, trampled vegetation, closely cropped vegetation, stream bank shearing, erosion, and extent of the area subject to preferential grazing.

Documentation would consist of categorical assessments, narrative, and photographs. The date and extent of each survey would be documented. Observations would be linked to the timing and amount of stock use which has occurred at the time of the survey. The efficacy of existing management (opening dates, capacities, head and night limits, education and outreach) for meeting goals would be evaluated. The need for additional monitoring (residual biomass, bare ground, repeat photography, streambank alteration) would be assessed. Parameters used to estimate grazing capacity would be verified. When non-native species, rare species, or other sensitive resource features are encountered, staff would document and distribute this information to appropriate specialists.

Meadow monitoring staff would continue to train others working in wilderness (wilderness rangers, other technicians, packers) in data collection protocols and collate and summarize field reports.

Because grazing would be both self-reported and documented by field staff at regular intervals, managers would remain able to track the timing, duration, and intensity of use throughout the summer season. Meadow condition would be evaluated during and at the close of the grazing season by both field rangers and professional ecologists. The frequency of site visits would be determined by documented use levels and patterns, which are largely well established and predictable, as well as through regular communication with commercial outfitters and administrative packers. As part of the annual work planning process, administrative packers would continue to share their grazing plans with wilderness managers early in the season; and commercial outfitters would continue to be required to submit trip itineraries to the parks two weeks in advance of entering the wilderness. These requirements would facilitate the focusing of monitoring efforts on popular locations as the need arises.

Thresholds for Management Action: Site visits would provide for early detection of impacts and would identify where management action or additional monitoring may be needed. Although site visits would be triggered by use levels, site visits could trigger management actions or implementation of additional formal monitoring protocols independent of stock use data.

VEGETATION AND SOILS

The primary emphasis of the vegetation and soils components of the monitoring program is to measure changes in productivity, species composition and bare soil over time. Implementation of these protocols also provides for the early detection of impacts to sensitive features (such as streambanks, seeps and springs) and the introduction of nonnative plant species. Four protocols (residual biomass, species composition, bare soil, and repeat photography) developed to address these topics are described below. Each of these protocols would be implemented in a subset of targeted meadows, which will likely fluctuate in response to use levels, availability of staff time, and expertise. Site visits by wilderness patrol and meadow monitoring staff would continue to be made to meadows not included in one of these formal sampling efforts with the goal of monitoring conditions in all meadows used by stock. Site visits would serve to document conditions in meadows used by stock using a standardized rapid assessment protocol (in development) and would include written descriptions of soil and vegetation conditions, presence of nonnative species, impacts of concern, use patterns, and any additional relevant observations.

RESIDUAL BIOMASS

Residual biomass refers to the amount of above ground plant material present in a meadow after grazing. In systems dominated by herbaceous plants, adequate residue serves to protect soil surfaces and plants, to replenish the soil mulch and organic layers, and to trap and hold moisture. Ungrazed vegetation also provides shelter and forage for animals that depend on meadows for all or part of their life cycles. As such, residual biomass is both an important contributor to meadow function and an indicator of grazing impacts that can provide a quantifiable and repeatable measure to guide management. In remote areas where the timing and duration of grazing is unpredictable and the collection of data on plant growth to generate precise estimates of plant productivity is prohibitively costly, monitoring residual biomass on ungrazed sites provides an efficient proxy measure of productivity.

The comparative yield method of estimating residual biomass (Haydock and Shaw 1975) was modified and adopted for use in the wilderness meadows of Sequoia and Kings Canyon National Parks in 1993 (Neuman 1993). In this method, reference quadrats are selected in the field to represent a linear scale of biomass within a designated plot. These quadrats then serve as standards against which the yields of 150-200 systematically selected quadrats are estimated by eye. The ocular estimates are calibrated using the dry matter yields of the original standards and two additional sets of standards that are clipped following the sampling. This procedure is applied to both a core (grazed) and reference (ungrazed) plot within each meadow. The protocol was specifically designed to be used by non-specialists (such as wilderness rangers and packers) and to avoid the installation of permanent markers in wilderness. Each year wilderness rangers at Sequoia and Kings Canyon would continue to undergo training in residual biomass monitoring, with field oversight and assistance provided by the plant ecology program to ensure data consistency and quality.

The locations of the core and reference plots would continue to be documented using photographs and distance and direction to recognizable features. Although the plots would not be permanently marked, this allows for sampling to take place in the same area year after year. As animals tend to graze close to established camps and in favored areas, the location of the plots generally coincides with the area of concentrated use and impact.

The amount of biomass remaining at the end of the growing season would continue to be estimated using this method in meadows that are regularly grazed by stock at levels approaching the estimated capacity, and/or which show signs of heavy use. Core plots would continue to be located subjectively within the area of greatest grazing pressure. If a suitable location is available, an ungrazed reference plot would be located in an area that is both biotically and abiotically comparable to the core plot, with similar soil and hydrologic regime. Optimally the reference plot would also be located within the same meadow; where this is not possible due to the presence of grazing impacts throughout the meadow; a similar site in an adjacent meadow area may be selected. Both core and reference plots may vary in size depending on the size of the meadow being monitored.

This monitoring would continue to use subjectively chosen core plots where grazing impacts are greatest; if the impacts there are considered acceptable, then the rest of the meadow will likely also fall within management standards. This design would prioritize detailed information about the greatest impacted areas of each sampled meadow rather than conditions across the entire meadow or across all meadows in the parks.

Residual biomass monitoring data would continue to be summarized and reported annually. As with the stock use data, these data would continue to be presented in tabular and graph form, and comparison with past years presented. Where possible, trends and patterns would be identified and the potential causes discussed. Residual biomass data could also be used to characterize productivity in ungrazed portions of individual meadows. This information would continue to be coupled with the stock use data and used to inform the annual discussion of wilderness conditions and any proposed changes to management or restrictions. Residual biomass guidelines would be periodically reevaluated to reflect improved knowledge about the relationship between utilization and impacts.

Thresholds for Management Action: Residual biomass monitoring provides meadow production and utilization data that can be used for informing strategies for meadow management. By quantifying the amount of plant material remaining on a meadow at the end of the growing season (and conversely, of the amount of vegetation consumed by grazing animals), the protocol allows managers to assess the validity of assumptions regarding consumption levels used in capacity estimates. When residual biomass monitoring results indicate that utilization has exceeded the established standard (utilization standards, expressed as the proportion of meadow vegetation available for grazing, are provided in attachment 1), management actions would be taken to adjust use levels to bring residual biomass into standard. The specific management actions taken would be based on a consideration of all available monitoring data.

BARE SOIL

The amount and distribution of bare soil is considered an important indicator of meadow integrity as it directly relates to site stability and susceptibility to erosion (Smith and Wischmeier 1962, Morgan 1986, Benkobi et al. 1993; Blackburn and Pierson 1994; Gutierrez and Hernandez 1996; Cerda 1999). Grazing has been linked to increases in bare soil as well as decreased plant cover, decreased primary productivity, and shifts in species composition (Miller and Donart 1981; Trimble and Mendel 1995; Olson-Rutz et al. 1996; Fahnestock and Detling 2000; Cole et al. 2004). Trampling, by either humans or stock, can produce similar results (Cole 1995; Liddle 1975, 1991) with the added impact of soil compaction that compromises root growth and water infiltration (Gilman et al. 1987; Unger and Kaspar 1994; Pietola et al. 2005).

Bare soil is considered a more sensitive indicator of meadow condition than species composition (Cole et al. 2004), as it increases at lower levels of disturbance compared with shifts in species composition in a variety of montane vegetation types of North America (including alpine meadows) (Cole 1993). Plant productivity may be more sensitive to grazing pressure than bare soil (Cole et al. 2004), but is more time

consuming and costly to monitor in wilderness settings and is also subject to high interannual variability in response to climatic factors (Moore et al. 2013), such as the timing and amount of precipitation (Walker et al. 1994), snowpack, or snowmelt (Walker et al. 1995). Because bare soil measured from point data is efficient, objective, easily obtained, and repeatable across time and observers, it has been used to assess meadow condition in Sierra Nevada meadows by the USFS (Weixelman and Zamudio 2001) and has recently been adopted as an indicator of meadow condition in Yosemite National Park (NPS 2014a and 2014b).

Weixelman and Zamudio (2001) classified bare soil cover values into low, moderate and high ecological condition classes based on monitoring data from a comprehensive multi-year study in U.S. Forest Service meadows in the Sierra Nevada (table D-1). These condition classes for bare soil values are based on point-intercept data collected from 363 meadows across a broad disturbance gradient (Weixelman and Zamudio 2001). The values for bare soil cover that define the ecological condition classes presented by Weixelman and Zamudio (2001) vary according to moisture regime and elevation. For example, to be in a high condition class, a moist (mesic) meadow would not have bare soil exceeding 6% of its surface area, and a wet (hydric) montane meadow (6,000-8,000 feet) would not have bare soil exceeding 4%. These values have recently been used as a starting point to inform condition class development in Yosemite National Park (NPS 2014a and 2014b) and are provided below as an example of how they may be applied in Sequoia and Kings Canyon National Parks. Note that the meadows included in the sample described by Weixelman and Zamudio occur at lower elevations than many park meadows, reflecting both latitudinal effects and the preference of the use of montane meadows for livestock grazing in the National Forests.

Table D-1: Provisional Bare Soil Cover Values for Ecological Condition Classes among Sierra Nevada Meadow Types

Meadow Type	High Condition	Moderate Condition	Low Condition
Montane			
Hydric meadow	0-4%	5-9%	>9%
Mesic meadow	0-6%	7-13%	>13%
Xeric meadow	0-8%	9-13%	>13%
Subalpine			
Hydric meadow	0-4%	5-8%	>8%
Mesic meadow	0-6%	7-13%	>13%
Xeric meadow	TBD	TBD	TBD

NOTES: The montane zone is about 6,000 to 9,000 feet in elevation and the subalpine zone is 9,000 to 10,000 feet in elevation in the southern Sierra. Values are from Weixelman et al. 2001 as presented in NPS 2014a.

These values are provisional and will be subject to revision following further study in park meadows.

Estimates of bare soil (and other groundcover categories—e.g., litter and duff) would continue to be collected during residual biomass monitoring (using the step-point method) and species composition monitoring (as cover data associated with each frequency quadrat). These measures have been used in concert with residual biomass data to inform assessments of meadow condition and the need for use level adjustments (Haultain and Frenzel 2013).

It is important to note that estimates of bare soil collected from the residual biomass monitoring plots reflect conditions in a relatively small proportion of the total meadow area, which by design represents the area of highest use; if the impacts there are considered acceptable, the rest of the meadow will likely also fall within management standards. This design would prioritize collection of detailed information

about the greatest impacted areas of each sampled meadow rather than conditions across the entire meadow or across all meadows in the parks.

Thresholds for Management Action: The provisional values for bare soil condition classes would be revised based on values obtained through analysis of existing data and additional data collection in order to ensure applicability to the meadows of Sequoia and Kings Canyon. NPS and USFS ecologists would gather information on bare soils in park meadows using methodology comparable to that used by the USFS and in Yosemite National Park. Data would be collected from both grazed and ungrazed meadows representing a range of use levels, elevations, and vegetation types. Results from these efforts would be used to assess the applicability of the condition classes developed by Weixelman and Zamudio (2001) to park meadows and would inform the further development of thresholds for management action (table D-2).

Table D-2: Provisional Thresholds for Management Action and Rationale Based on Bare Soil Values

Threshold(s) for Management Action	Management Actions	Rationale
Threshold 1: Monitoring indicates "low ecological condition" bare soil cover value at any grazed meadow.	Apply a secondary assessment method for a qualitative evaluation of meadow condition.	Secondary assessments are diagnostic tools that provide standardized, rapid, field-based assessments of the overall condition or functional capacity of meadows. Assessing meadow condition would aid in identifying key stressors that may be affecting meadow condition. Assessment results would assist with interpretation of monitoring results.
Threshold 2: Monitoring indicates "low ecological condition" bare soil cover value at any monitored site for two successive monitoring periods AND secondary assessment indicates stock use is a contributing stressor for both monitoring periods	Increase education about minimum impact and best management practices in meadows for Wilderness visitors, and the parks' staff and partners.	Education in maintaining meadow condition would help prevent further increases in bare soil associated with human or stock use.
	Adjust total grazing levels or timing of use if needed to minimize impacts. Rest the meadow if necessary. Temporarily discontinue grazing until conditions improve based on secondary assessment results.	Grazing capacities constitute use levels that can be sustained in a meadow based on available forage cover, productivity and site condition, which can guide in setting an appropriate level of use. Allowing a period of meadow "rest" facilitates meadow recovery. Effects of trampling and grazing that are expected to decline with reduced use or avoidance of early-season use include soil compaction, bare ground exposure, and plant disturbance.
	Monitor annually for 3-5 years or until meadow reaches moderate or high condition based on bare soil values.	Frequent monitoring would facilitate rapid detection of, and management response to, changes in ecological condition as well as inform the evaluation of the effectiveness of changes in the intensity and/or timing of use on meadow condition.

Table D-2: Provisional Thresholds for Management Action and Rationale Based on Bare Soil Values (continued)

Threshold(s) for Management Action	Management Action	Rationale
Threshold 3: Bare soil is double the value of "low ecological condition" class at a meadow OR previous management actions (such as reduction in use) have been ineffective OR assessments for 3-5 years have not shown improvement in ecological condition.	Discontinue grazing until conditions improve based on bare soil monitoring.	Allowing a period of meadow "rest" facilitates meadow recovery. Effects of trampling and grazing that are expected to decline with reduced use or avoidance of early-season use include soil compaction, bare ground exposure, and plant disturbance.

STREAMBANK ALTERATION

One of the effects of grazing animals on wetland habitats is the alteration of hydrologic regimes through impacts on streambanks and channels (Kauffman and Krueger 1984, Trimble and Mendel 1995). Streambank vegetation plays a critical role in the stability of channels and banks (Gordon et al. 2004). Impacts to streambank vegetation from grazing animals have the potential to interact with climate change to alter hydrologic conditions in wetlands (Viers et al. 2013).

Stream channel and stream bank stability is a function of many complex, interacting factors such as basin size, surficial geology and sediment supply, climate, land use, and history (Gordon et al. 2004). Depending on these factors, stream channels can be relatively static (stable) or dynamic (unstable) in the absence of stock impacts. Alteration is a measure of actual stock impacts to streambank soils and vegetation; it can occur from shearing, trampling, and trailing (table D-3). All else being equal, stability decreases with alteration. Alteration is sensitive to management and actions to reduce alteration can result in more natural channel morphology over time (Bengeyfield 2006).

There are no consensus approaches to setting streambank alteration standards (Cowley 2002). Guidelines for alteration where anadromous fish populations or other sensitive resources are a concern are generally 10%. Alteration standards of 10% on portions of the Inyo National Forest have been part of a management strategy to allow riparian recovery (Frietas et al. 2014).

Table D-3: Definition of Streambank Alteration Impact Types*

Alteration Type	Definition
Shearing	Removal of a portion of the streambank by ungulate hooves leaving a smooth vertical surface and an indentation of a hoofprint at the bottom or along the sides.
Trampling	Indentation of a hoofprint and exposed roots or soil, resulting in a depression at least 13 mm deep or soil displacement at least 13 mm upwards.
Trailing	Linear features compacted and denuded by repeated traffic. Trailing is counted where there are signs of current-year use even if hoofprints do not result in 13-mm displacement of soil because of the impacts of compaction.

* adapted from Heitke et al. 2008 and Burton et al. 2011

Site visits would be used to identify areas where streambank alteration is a concern. Monitoring would be established to quantify the extent of current year alteration and would provide information about trends

related to management actions in a specific forage area. Streambank alteration would be monitored along both banks of affected channels through the forage area. The extent of the survey would be documented by recording the upstream and downstream extents of the monitored reach. Alteration would be measured along a step-transect located along the first line of continuous perennial vegetation (the "greenline," Winward 2000), with decision rules about locating transects adapted from the Multiple Indicator Monitoring protocols (Burton et al. 2011). Alteration would be measured on a 92-centimeter (cm) line perpendicular to and centered on the greenline. Alteration could be recorded as either presence/absence along the 92 cm line or the amount of the 92 cm line that is altered ("GL" or "GLP" method, respectively, Heitke et al. 2008). Current year impacts would be identified based on the absence of weathering effects of freeze and thaw cycles, rain events, and erosion by stream flow or vegetative regrowth. Data would be summarized as percent alteration, calculated as the number of sample points altered divided by the total number of sample points (for presence/absence) or the total length of altered bank divided by the total length evaluated (precise method).

Thresholds for Management Action: In the absence of applicable standards for alteration, monitoring data would be used to identify trends in streambank alteration relative to use patterns and management actions and to provide context to evaluations by subject matter experts. If streambank alteration is associated with accelerated erosion or instability, management action would be taken to limit further alteration and facilitate recovery.

SPECIES COMPOSITION

To evaluate grazing effects on plant species composition, data have been collected from five pairs of grazed and ungrazed meadows over the past twenty-five years. Data were collected on the first meadow pair in 1985 and since then sampling has been conducted on four other meadow pairs, resampling every pair on an approximately 5-year rotation. Meadow pairs selected for monitoring are located at East Lake and on the Monarch Divide in Kings Canyon National Park, and on the Hockett Plateau and in the Upper and Lower Rock Creek drainage in Sequoia National Park. The meadow pairs represent several different meadow types, including fine sedge (*Eleocharis pauciflora*), medium sedge (*Carex scopulorum* var. *bracteosa*)-grass-herb, tall grass (*Deschampsia cespitosa*) and sedge-herb, fine grass (*Calamagrostis breweri*) and sedge-herb, and wide sedge (*Carex utriculata*)-fine grass (*Calamagrostis breweri*)-herb (as described by DeBenedetti 1984).

The sampling protocol implemented in Sequoia and Kings Canyon National Parks was developed by McClaran and Neuman (1989) specifically for use in wilderness and is described in detail in Frenzel and Haultain (2012) and McClaran and Neuman (1989). Briefly, a single large plot (approximately 500 to 3,000 m^2) has been established in the grazed and ungrazed meadows of each meadow pair. Although not permanently marked, plots are relocated using photographs and distance and compass direction from recognizable features. Each plot is divided into 10–15 equal subareas; within these 10–15 subareas, 10–20 25 x 25 cm quadrats are haphazardly located (to avoid bias) during the sampling event, for a total of 100 to 200 quadrats per meadow. The number of quadrats is determined by the vegetation type and is the same for all sampling years for a given meadow. All species rooted within the quadrat are recorded as present, as are moss and hoof prints greater than 2.5 cm deep; percentage of bare ground within the quadrat is also recorded. The same data are collected for a 10 x 10 cm quadrat nested within the 25 x 25 cm quadrat. Abundance is reported as a species' frequency of occurrence in the 100-200 quadrats of each large plot.

Early detection of nonnative plants is also a concern directly related to monitoring changes in species composition. Field staff survey for nonnative plants as part of implementation of each of the stock use and meadow monitoring protocols described here. Both active and passive surveillance protocols for detecting

nonnative species introductions, as well as appropriate management responses, are described in "Appendix N: Strategy for Reducing Nonnative Plants in Wilderness".

Thresholds for Management Action: In comparing native and naturalized species composition of the paired grazed and ungrazed areas beginning with the base year of the monitoring program, modifications to grazing use levels and patterns would be necessary when the grazed area shows: 1) more than 15% change in the dominant species as recorded by the frequency plots, or 2) more than a 15% change in the proportion of bare ground and with observed erosion.

Although these results would apply only to these specific meadow pairs, changes detected as part of this monitoring protocol would also serve as an indicator of the need for additional monitoring in similar meadows.

New occurrences of nonnative plants detected during species composition or other monitoring activities would be documented (including the collection of voucher specimens) and reported to the invasive plant program manager as soon as possible. When identification has been confirmed by a subject matter expert, immediate manual control efforts would be taken as feasible.

REPEAT PHOTOGRAPHY

The 1986 SUMMP introduced a system of using repeat photography to document gross changes in meadow vegetation over time. This system was designed to detect general changes in vegetation (e.g., a shift in dominance from grasses to sedges or sedges and grasses to forbs, enlargement or shrinking of the boundaries of vegetation types, changes in soil conditions and erosional effects and proportion of bare ground). The long-term meadow vegetation repeat photography collection was built on early work by park employees Clay Peters and Terry Gustafson (summarized in a file report prepared by T. Gustafson dated January 15, 1965), and expanded and formalized by Range Conservationist M. Neuman in the late 1980s and early 1990s. Historic scenes of park meadows were obtained, archived, and documented in a tracking database. Binders of printed photographs and associated label information were created for each wilderness patrol area, with the intention that the rangers would re-take the black and white photographs each year and return them at the end of the season for processing.

The long-term meadow repeat photography collection represents a valuable source of information on gross changes in meadow vegetation and morphology. The collection consists of 320 scenes, dating from 1929 through 1992, that have been formally documented in a database. At least 202 of these have one contemporary shot documented in the database; 34 have been re-taken three times and documented, and seven have been photographed four times. Black and white prints of each original scene and subsequent revisit have been made and reside in park files. Subsets of the photographs have been re-taken as time and resources allowed. These images provide a tool with which to document the establishment of lodgepole pine (*Pinus contorta*) saplings into meadows, a dynamic that has been the subject of much research and discussion. Recovery from past heavy grazing by cattle and sheep, and the efficacy of the efforts of the Soil and Moisture Crews (1948-1980) to halt erosion and restore proper hydrologic functioning through the installation of check dams could also be assessed using this resource. The Soil and Moisture Crews also removed 'invasions' of *Pinus contorta* and *Veratrum californicum* from within selected meadows. These restoration efforts were well documented in reports and photographs that remain in park files, and thus there are potentially useful ancillary data on management actions to correlate with any changes in condition captured by the photographic record.

Photographic documentation would continue to be included in each component of the monitoring program, although images would be acquired using contemporary high-resolution color digital photography as opposed to film. Photographs would be taken during site visits made by field staff, during

assessment of opening date conditions, as part of species composition and residual biomass monitoring, and whenever concerns or questions arise regarding meadow, camp, or trail conditions. Digital images would continue to be processed and archived on the park network for access by managers and subject matter experts.

Thresholds for Management Action: There are no specific standards in place for the types of changes that may be detected through repeat photography. Photographic documentation of such changes or of impacts associated with stock use would remain an important source of information when considering management actions. In addition to monitoring photographs taken by wilderness rangers or plant ecology staff, photographs submitted by other staff from the parks, partners, or wilderness visitors can be used to trigger subsequent site visits and inform decisions regarding monitoring or management actions.

THE MANAGEMENT SYSTEM

The goals of managing recreational grazing in a National Park wilderness differ from those in areas devoted to the production of livestock; within the park, the protection of naturally functioning meadow ecosystems is given greater weight than the provisioning of forage for stock. Grazing by recreational stock is inherently less predictable than that of production oriented livestock systems, as different numbers and types of animals, led by different handlers, arrive at varying times throughout the season. A successful management system must have the flexibility to address the variable nature of the timing and intensity of grazing by recreational stock, site-specific responses to grazing, and the inherent variability in productivity of meadow systems in response to changing weather and climate.

Under the preferred alternative, management of stock use in the wilderness of Sequoia and Kings Canyon would continue to use the grazing management tools described in the 1986 SUMMP, which are based in part on traditional range management techniques and adapted for use in the wilderness setting. Stock permitted within Sequoia and Kings Canyon National Parks would continue to include only horses, mules, burros, and llamas. Goats would remain specifically prohibited as they can carry diseases that threaten native bighorn sheep. Management actions would continue to be applied at the scale of the forage area. Forage areas are defined as the primary meadows and their associated forested or upland grasslands, which are commonly used by stock for grazing. Other areas within accessible proximity of the trails and travel zones open to use, although not designated as forage areas and not having an established use level, may also be used for grazing by stock. The 1986 SUMMP recognized that the primary meadow within each of the forage areas was likely the most sensitive to the influence of grazing and would reflect early change. The primary meadow would continue to be the focus of monitoring and used as a barometer to guide decisions on future adjustments in timing and level of grazing use.

The following sections describe the specific components of the management system and how information derived from monitoring would inform management actions.

NETWORK OF MEADOWS CLOSED TO GRAZING

A series of meadows would continue to be closed to grazing to provide opportunities to compare ungrazed meadows with grazed meadows as part of the monitoring program, to provide opportunity for scientific study of meadows that are not affected by stock grazing, and to provide opportunities for park visitors to observe a representative sample of meadows, in proximity to general travel routes, that are not affected by grazing.

For scientific study purposes, a major value of Sequoia and Kings Canyon (an International Biosphere Reserve) is that it contains ecosystems that are as undisturbed by human activities as is reasonably possible. Meadows that are representative of each significant type (by physiography, origin, plant

associations, and unique features) would continue to be protected from grazing by stock. Basin, slope, and streamside stringer meadows; meadows of pre-glacial and post-glacial origins; and meadows representative of the area's common meadow plant associations were identified by the SUMMP and would continue to be included in this category. A selection of meadows closed to grazing would be accessible by trail so that they can easily be observed by the public and accessed efficiently for scientific study.

Table D-4: Network of Meadows Closed to Grazing for Scientific and Social Value

Meadows Designated in 1986 SUMMP	Proposed Additions (Under NPS Preferred Alternative)
Big Pete Meadow (forested portion)	Bighorn Plateau
Crabtree Ranger Station Meadow	Meadow 0.6 mi south of Bighorn Plateau
Dragon Lake Meadow	Chagoopa Plateau #3 Meadow
Ellis Meadow	Darwin Meadow Proper
Goddard Creek Meadows	Grouse Meadow
Guyot Creek Meadows (west of trail)	Guyot Creek Meadows (east of trail)
Lake South America Col Meadow	Lower Crabtree Meadow
Mitchell Meadow	Taboose Pass Meadow (12 acre wet meadow at 10,920 feet)
Rock Creek Ranger Station Meadow	
Rock Creek #2 Meadow	
Wallace Creek Closed Meadow	
Woods Lake Shoreline Meadow	
Wright Creek Closed Meadow	

Meadows that would be closed to grazing under the NPS preferred alternative are listed in chapter 2 of this WSP/FEIS.

STOCK USE AND GRAZING MANAGEMENT TOOLS AND TECHNIQUES

Opening Dates

Opening dates are established for all of the park forage areas. These dates are designed to prevent mechanical disturbance to surface soil and vegetation that results in the breakage of the root-soil complex to the point that vigor of individual plants (or networks of plants) deteriorates as evidenced by deeply incised hoof prints, change in species density, or composition, or both. Such breakage increases soil erosion over what would be natural without grazing. Opening dates also allow for adequate plant development to replenish carbohydrate stores expended in spring and allow plants to reproduce. Meadow vegetation provides an important source of floral and seed forage for native fauna (Frase and Armitage 1989; Hatfield and Lebuhn 2007; Hoffman Black et al. 2011; Holmquist et al. 2011; Smith and Weston 1990). Delaying grazing in meadows thus may allow for many species of wildlife, such as birds, small mammals, invertebrates, and amphibians, to complete critical portions of their life cycles prior to the onset of grazing.

Specific opening date estimates for the parks' major forage areas are based on quantitative data gathered from individual meadows between 1977 and 1984. Moisture conditions and associated physical impacts by stock were tracked in specific plant associations throughout the season in several dozen meadows over the course of the entire study period. A number of other meadows were evaluated less frequently. In meadows where specific data did not exist for all types of hydrological years, or where only one data

point was available, extrapolations were made based on similar vegetation, location, and comparable meadow physiography.

In the initial five-year (1977-81) effort to monitor moisture conditions in individual plant associations in specific forage areas, it was found that moisture was retained at or near the surface for two to four times longer than the norm for that site when the water content of the April 1 or May 1 snowpack exceeded 150 percent of the long-term average. The actual time beyond the norm required for meadow vegetation to dry to a point where trampling damage does not occur depends primarily upon the type of plant associations present in the meadow. Late spring and early summer weather conditions, the topographic position of the meadow, and the size of the watershed it resides in may also cause some variation in this date. Correspondingly, meadows were found to retain moisture for a period of one to three weeks less than the norm during the years where the April 1 or May 1 snowpack was below 50 percent of the long-term average. While these relationships certainly occur along a gradient, the 50 percent and 150 percent level breaking points were found to correlate well with obvious wet (i.e., 1969, 1973, 1978, 1980) and dry (i.e., 1972, 1976, 1977) years.

Based on these results, opening dates for wet, dry, and normal years have been prescribed for the major forage areas based on the water content of the May 1 snowpack. Years in which the May 1 snowpack represents 50% to 150% of the long-term average are characterized as ‘normal’; those ranging from 50% or less of the long-term average are characterized as ‘dry’; and those 150% or more of the long-term average are considered ‘wet’.

Opening dates are keyed to sensitive vegetation and soil within the forage area. Sensitive vegetation and soils are defined as the plant associations and soil surfaces that are most susceptible to trampling damage and would be expected to be trod upon by free-roaming animals when present; or that are especially sensitive to herbage removal. The key plant association may not necessarily comprise a majority of the specific meadow. In nearly all cases, the key association accounts for at least 15 percent of the total meadow area.

Opening dates vary considerably depending on both climatic and topographic factors, as described above. The general range is from mid-July to mid-August for normal years, with some locations earlier or later depending on their characteristics. Opening dates in wet years are later and dry years earlier. Opening dates are established so that, generally, once a given drainage basin is open to use, the entire basin is open. Necessary protection of the resource is provided and the system is simplified for both the stock user and park management. Actual opening dates are seldom the specific dates predicted by the May 1 snowpack because field conditions vary from year to year. For example, on a year classified as normal it may be found that the actual conditions for a specific meadow or basin trend toward dry, so the actual opening date would be set somewhere between the normal and dry season date. Similarly, late lying snows in what would otherwise be characterized as a normal year can lead to delays in opening until soils are sufficiently dry. Opening dates remain flexible according to actual field conditions and staff in the field would continue to be able to make adjustments as needed to respond to observed conditions.

Tentative opening dates would continue to be made available following the April l snow survey. Opening dates for specific forage areas would continue to be established immediately following receipt of the results of the May l snow survey each year. Established opening dates would continue to be compared with on-site conditions in specific forage areas, as reflected from field data, and adjustments to the normal dates in the plan made when necessary. Actual opening dates would be documented each year and summarized as part of the annual report on stock use monitoring. Studies of the effects of early season use and its relationship to climatic conditions would continue as time and resources allow. As more information and experience are gained, the large range of moisture content included in the definition of a

normal year may be narrowed, or adjusted for specific forage areas. Specific opening dates are listed in table D-5.

Table D-5: Anticipated Opening Dates by Travel Zone and Moisture Year

Travel Zone	Forage Area Number	Name of Travel Zone or Forage Area	Dry Year <50% of average snowpack	Normal Year 50%-150% of average snowpack	Wet Year >150% of average snowpack
28	all	Goddard Canyon	1-Jul	15-Jul	1-Aug
33	1	Evolution	15-Jun	1-Jul	15-Aug
33	2-4	McClure, Colby and Darwin	7-Jul	1-Aug	31-Aug
34	all	Evolution Basin	15-Jul	1-Aug	15-Aug
38	all	Blue Canyon	1-Jul	15-Jul	1-Aug
39	all	LeConte	1-Jul	15-Jul	15-Aug
42	all	Dusy Creek	1-Jul	15-Jul	15-Aug
45	all	Upper Palisade Creek	1-Jul	15-Jul	15-Aug
46	1, 3-6	Upper S. Fork Kings River/Above JMT Jct	15-Jul	1-Aug	15-Aug
46	2	Upper S. Fork Kings River/Below JMT Jct	1-Jul	15-Jul	15-Aug
51	all	Simpson and Tehipite	1-Jul	15-Jul	1-Aug
52	all	Kennedy Canyon	1-Jul	15-Jul	1-Aug
53	1-6, 8	Dougherty Creek	15-Jul	1-Aug	15-Aug
53	7	Shorty's Meadow	1-Aug	15-Aug	31-Aug
54	all	Granite Basin	20-Jun	7-Jul	1-Aug
56	all	Twin Lakes	1-Jul	15-Jul	1-Aug
57	all	Woods Lake Basin	15-Jul	1-Aug	15-Aug
58	1	Castle Domes	1-Jul	15-Jul	1-Aug
58	2-3	Woods Creek Crossing	7-Jul	21-Jul	1-Aug
63	all	Charlotte Creek	1-Jul	15-Jul	1-Aug
65	all	Upper Bubbs Creek	1-Jul	15-Jul	1-Aug
66	all	Lower Bubbs Creek	15-Jun	1-Jul	20-Jul
67	all	East Lake	1-Jul	10-Jul	20-Jul
68	all	Sphinx Creek	15-Jun	1-Jul	20-Jul
69	all	Roaring River	10-Jun	25-Jun	20-Jul
70	all	Cloud Canyon	10-Jun	1-Jul	20-Jul
71	all	Deadman Canyon	15-Jun	1-Jul	20-Jul
72	1-13.1	Sugarloaf	15-Jun	1-Jul	15-Jul
72	13.2-22	Ferguson	15-Jun	1-Jul	20-Jul
73	all	Ball Dome Area	15-Jun	1-Jul	20-Jul
74	all	Clover and Silliman Creeks	15-Jun	1-Jul	20-Jul
75	all	Lone Pine Creek	1-Jul	15-Jul	1-Aug
77	1-4, 6-7	Bearpaw Meadow and Cliff Creek	15-Jun	1-Jul	1-Aug
77	5	Redwood Meadow	1-Jun	15-Jun	1-Aug
79	all	Kern-Kaweah	1-Jul	15-Jul	1-Aug

Table D-5: Anticipated Opening Dates by Travel Zone and Moisture Year (continued)

Travel Zone	Forage Area Number	Name of Travel Zone or Forage Area	Dry Year <50% of average snowpack	Normal Year 50%-150% of average snowpack	Wet Year >150% of average snowpack
80	all	Tyndall Creek	20-Jun	1-Jul	25-Jul
81	1-2.2, 2.4	Wright and Wallace Creeks	20-Jun	1-Jul	25-Jul
81	2.3	Wallace Creek Waterfall	1-Jul	15-Jul	10-Aug
82	all	Upper Kern Canyon (Junction Mdw to Hot Springs)	25-Jun	5-Jul	25-Jul
83	1-3, 5-8	Lower Crabtree	20-Jun	1-Jul	1-Aug
83	4	Upper Crabtree	5-Jul	15-Jul	20-Aug
84	all	Lower Rock Creek	20-Jun	1-Jul	1-Aug
85	all	Upper Rock Creek	1-Jul	15-Jul	15-Aug
86	all	Lower Kern Canyon (Hot Springs to Kern Ranger Station)	1-Jun	15-Jun	1-Jul
87	all	Chagoopa Plateau and Big Arroyo	20-Jun	10-Jul	10-Aug
88	1-2	Little Five Lakes	1-Jul	15-Jul	10-Aug
88	3-5	Big Five Lakes	15-Jul	25-Jul	15-Aug
89	1-4, 10	Lost, Soda, Lower Rattlesnake, Laurel, Crytes, Coyote	15-Jun	1-Jul	1-Aug
89	5-9	Upper Rattlesnake (>9,000 feet)	1-Jul	15-Jul	15-Aug
90	all	Hockett	10-Jun	20-Jun	20-Jul
91	all	South Fork Kaweah River	1-Mar	15-Mar	1-Apr
95	all	North Fork Kaweah River	1-Mar	15-Mar	1-Apr

Grazing Levels

The total amount of grazing in each of the meadows and related forage areas open to grazing would be guided by the estimated grazing capacities described in attachment 1. Depending on the meadow characteristics, any impact could be a limiting factor for the amount of grazing that can take place. For example, stream bank shearing could reach unacceptable levels—and trigger management action—before the amount of trampling, social conflicts, species composition changes, or defoliation reaches an unacceptable level.

Due to the inherent delays in use reporting and the variability in the timing and intensity of recreational grazing, actual use of individual areas may be somewhat higher than the estimated capacity in some years and lower in others. For this reason administrative use of specific forage areas which are also used by the public would be kept below the estimated capacity and work would be planned to minimize competition for grazing.

Traditional methods of adjusting grazing levels and patterns would be employed when necessary, including:

- adjusting the number of nights a given party may graze an area
- adjusting the number of stock per party that may graze in a specific area
- allocation of grazing to specific users (administrative, commercial, or private)

- adjusting opening dates
- adjusting the total amount of grazing that occurs within a growing season
- closing an area to grazing (or a portion of it, if feasible) temporarily

Forage areas may be temporarily closed to grazing due to stock impacts and when recovery has been sufficient those areas would be reopened. Such closures would be recommended to the appropriate district ranger by field personnel during the grazing season for immediate implementation, or proposed to the Superintendent following the annual review of monitoring results for implementation during the following season. Procedures for implementing mid-season management actions are described in Management Directive No. 9: Wilderness Stock Use and Group Size Management (NPS 2013b). All use levels would be subject to change as conditions and monitoring data indicate. Changes would be announced by March 1st of each year, with opportunity for comment by interested parties. In order to ensure that the estimated capacities reflect the most current knowledge of meadow response to grazing, capacities would undergo a comprehensive reevaluation every five years, with annual modifications as needed to ensure resource protection. Changes to capacities would be made available for public comment by March 1st of each year along with other public use limits.

Drift Fences, Hitch Rails, and Temporary Means for Holding Stock

Preventing stock from leaving a preferred grazing area and entering areas where grazing is prohibited can be challenging. In areas of higher use that are adjacent to sensitive or at risk resources, drift fences can be a tool to prevent stock from traveling away from the preferred grazing area into closed areas. Besides drift fences, users would have a wide variety of tools at their disposal which could be used to manage their stock. These tools would include electric fences, hobbles, high lines, hand grazing and in limited circumstances, pickets. These tools, often used in combination with natural features, can be effective in containing stock.

In some instances users may be able to use a temporary barrier at a pinch point to contain stock. These temporary barriers can be a very effective and low impact tool to contain stock. Temporary barriers which have been successfully used at pinch points include logs and ropes. When users are considering using a temporary barrier at a pinch point, great consideration must be given to doing so without hampering the travel of other users. Temporary barriers may only be used when stock is actually roaming free in permitted grazing areas and they must be removed when the stock is gathered. Damaging natural resources when constructing temporary barriers is prohibited.

Drift fences and hitch rails would be provided by the NPS in specific locations for visitor safety, resource protection, and visitor or administrative convenience. Fences maintained primarily for convenience would also protect resources and visitor experience, through dispersal of stock use and protection of sensitive areas. Fences and hitch rails that become unnecessary would be removed. An inventory of such installations in wilderness would be maintained by the trails program with input from wilderness field staff, and maintenance conducted under the direction of the trail maintenance program. The establishment of any new fence or hitch rail, temporary or permanent, would require separate planning and compliance, which would be conducted prior to construction. Detailed justification including a minimum requirements analysis and a description of the fence route and dimensions would be required for consideration.

The treatment of specific hitch rails and drift fences varies by alternative in this WSP/FEIS; see table 51b in chapter 2 for a list of those retained under the preferred alternative.

Minimum Impact Stock Use Practices

The following restrictions and recommended practices would minimize the impact of stock to camps and trails and to allow for the restoration of impacted areas:

1) Stock would be tethered to trees for no more than enough time to unpack the animals. Animals pawing the soil away at the base of individual trees cause soil disturbance, root damage, and debarking of trees. Deep depressions and exposed roots are visible evidence of the types of impacts this regulation is designed to prevent.
2) Stock held for periods longer than for unpacking (such as for overnight), would be tethered to a line tied between two trees or rocks. The line must be located on a hardened (flat, sparsely vegetated) site to limit impacts to tree roots and plants.
3) Picketing would be allowed for short periods of time provided that animals are moved frequently to prevent resource impacts.
4) The use of temporary electric fences is allowed for holding lead animals when stock are turned out to graze; as with picketing, such enclosures must be moved frequently to prevent resource impacts.
5) When camping, animals would not be confined within 100 feet of lakes, streams, trails or campsites except while loading or unloading. Manure deposited within or at the perimeter of camps while loading or unloading would be dispersed and scattered to points at least 100 feet from camps, water, or trails. This distance protects water quality, lessens impact on the campsite, and helps reduce insect problems.
6) Stock present in forage areas prior to opening dates or areas closed to grazing would be confined as per (2) and (3), and fed.
7) Shortcutting trails and switchbacks would be prohibited.
8) Loose herding—when riderless animals are not being led by ropes—would be prohibited except as necessary for safety where the exposure is great and there is danger of animals falling off the trail.
9) Stock manure handling best practices—The following best management practices can reduce the impacts of stock manure and urine on the natural environment and protect aesthetic aspects of wilderness character. Scattering (kicking) manure piles increases decomposition rates, reduces odors and fly concentrations, and reduces the potential for manure to enter water bodies.

   Required:

   - Remove manure from within 100 feet of core camping and tie-up areas and scatter manure on dry terrain. The core camp is defined as that area within 100 feet of the fire ring or cooking area.

   Recommended:

   - Carry a shovel and rake, and keep them readily accessible, for use in cleaning up and naturalizing areas.

   - Scatter manure whenever encountered, paying particular attention to manure piles in or near water. Remove manure piles from water whenever possible. Scatter manure that accumulates at riding break areas.

- After stock have grazed or have been held in an area, inspect the area and scatter manure piles.

- Take measures that give stock an opportunity to urinate and defecate away from water (e.g., stop to let them urinate before leading them into water to drink).

- At parking areas and trailheads, pick up and remove all manure from the parks.

In addition to the above restrictions and recommended practices, guidelines for minimum impact travel with stock would continue to be provided to all users online, at permit issuing stations, during seasonal orientation sessions, and through directed mailings to commercial service providers and interested members of the public.

TRAIL USE AND OFF-TRAIL/CROSS-COUNTRY STOCK TRAVEL

The majority of wilderness stock use occurs on the primary trail system in the parks. Current regulations (36 CFR Sec. 2.16 (b and d)) require that the superintendent designate areas and trails that are open to stock travel. The areas and trails proposed open to stock travel under the preferred alternative are described in chapter 2 of this WSP/FEIS (refer to figures 8a and 8b [alternative 1], figures 14a and 14b [alternative 2], 17a and 17b [alternative 3], 19a and 19b [alternative 4], and 22a and 22b [alternative 5] in chapter 2 for stock access and grazing restrictions).

Maintained Trails

Under the preferred alternative, visitors traveling with stock would continue to have access to most maintained trails in the parks (650 of 691 miles). Stock parties would be allowed to travel up to one-half mile from trails in areas where they are allowed to camp. In areas open to day-use only, stock parties would be allowed to travel up to 100 yards from trails. Approximately 530 miles of maintained trails would be open to overnight stock travel. Some trails would be open to stock parties for day use only, some would be open to overnight use for walking parties with burros and llamas (as they cannot travel as far in a day) but limited to day use for parties with horses or mules, and some would be closed to stock travel entirely for reasons including visitor safety, natural and cultural resource protection, and/or popular day use by hikers. Trails with restricted stock access under the preferred alternative are listed in chapter 2 of this WSP/FEIS.

Off-Trail Travel

Stock parties would continue to be allowed to travel up to one-half mile from trails to reach camps. Travel more than one-half mile from maintained trails would continue to be allowed in four areas of the parks: on the Hockett Plateau, on the Monarch Divide, in the Roaring River drainage, and along the western side of the Kern River watershed south from the Chagoopa Plateau.

Trails and areas open to use may be changed from time to time in order to provide for visitor safety or resource protection. Areas or trails that have been closed may be reopened where there is evidence that no resources of the parks or other values would be compromised. Unless in response to emergency conditions, the public would be notified of proposed modifications of areas and trails open to stock through press release and posting on the parks website; comments may be sought before a decision is made.

INTEGRATION OF MONITORING RESULTS INTO MANAGEMENT ACTIONS

Successful adaptive management relies on the formal integration of monitoring results into appropriate management action. The monitoring program described here is designed to detect and characterize impacts, and to provide information to adjust stock use when impacts exceed established standards. Standards are set to ensure that impacts are limited to levels that protect the long-term integrity of meadow habitats and that resource impairment is prevented through timely management action.

Should observations made during site visits indicate a need for immediate management action, field staff would continue to follow the procedures described in Management Directive No. 9: Wilderness Stock Use and Group Size Management (NPS 2013b). This directive describes the procedures for adjusting seasonal opening dates, and defines how case-by-case temporary meadow closures, variances for group sizes (both people and stock), and variances in grazing night limits and limits on the total amount of grazing in a meadow are made. It also establishes who is authorized to adjust opening dates and make closures and how that information is communicated to the public and park staff.

Monitoring data would continue to be summarized annually and provided to the Stock Use and Meadow Management Committee. This committee would continue to meet once each year mid-winter to discuss issues pertaining to stock use and meadow management in the wilderness of the two parks. The interdisciplinary committee would continue to be composed of representatives from most divisions of the park, including wilderness managers, trails staff, and resource specialists. The annual meeting would serve two purposes: to share results from the stock use and meadow monitoring program, and to provide a forum for the discussion of stock use management issues. Results from the previous years' monitoring program would be presented, and where conditions indicate a need for action, alternatives proposed and discussed. If a need for imposing or lifting formal restrictions on stock use should arise, recommendations would be made to the superintendent for final approval. A notice of temporary restrictions for the upcoming season would be distributed to users by March 1, and submitted to the law enforcement specialist for inclusion in the Superintendents Compendium at the same time. Area specific management actions that do not require formal restrictions—such as encouraging use of one meadow over another, or modifying administrative grazing plans—would continue to be discussed at subsequent district-level operations meetings held each spring, and communicated to field staff during early season training and orientation sessions.

Public Notification of Temporary Use Restrictions and Wilderness Conditions

Public notification of temporary restrictions on wilderness travel for the upcoming year would be provided via bulletin and posted online each year in early March. Grazing regulations, restrictions, and trip planning information, including detailed maps and descriptions of forage areas, would be posted online each year at the beginning of the grazing season, sent via mail to all commercial users, and provided to private users on request. Opening date bulletins, which include anticipated opening dates for grazing, would be sent out and posted following the early April and May snow surveys. Information regarding meadow status throughout the season—changes to opening dates at the beginning of the season, and closures as grazing capacities are reached—would be posted online, communicated via phone to commercial operators, and provided to all users who contact the wilderness office or a permitting station by phone or in person as it becomes available from the field. All users must recognize, however, that such information may not always be available and incorporate flexibility in their trip planning accordingly. Wilderness travel by its nature involves a degree of uncertainty and this is reflected and celebrated in the lack of designated campsites or allocated grazing nights in the wilderness areas managed by Sequoia and Kings Canyon National Parks.

Table D-6 provides a summary of monitoring measures and activities and proposed thresholds for triggering management actions. An explicit goal of stock use management is to select actions that are appropriate to the extent and severity of the observed impacts, and to acknowledge the variability of ecosystems and the statistical uncertainty associated with sampling those systems. Therefore, this strategy enumerates several actions for each monitoring program and threshold. More aggressive actions would be taken where impacts are more significant and certainty is high, while less aggressive actions would be taken where impacts are less significant or certainty is low. This would provide managers with the flexibility to meet the overall goals and objectives of the plan.

Table D-6: Meadow Monitoring Data, Measures, Thresholds for Action, and Actions

Monitoring Data, Measure	Threshold	Actions
Stock use, percentage of estimated grazing capacity	Current year's use is greater than 100% of estimated capacity.	Site visit during current year (if possible) or following year Consider establishing residual biomass or bare ground monitoring. Temporary reduction in the following year's capacity if conditions indicate.
	Previous five years' average use is 80-100% of estimated capacity.	Annual site visits to determine the need for management changes. Consider establishing RB or bare ground monitoring.
	Previous five years' average use is 50-80% of estimated capacity.	Site visits at least every 2 years to determine the need for management changes.
	Previous five years' average use is less than 50% of estimated capacity.	Site visits at least every 5 years to determine the need for management changes.
Site visits, qualitative evaluations	Stock impacts to vegetation cover or soil stability in springs, seeps, or stream banks observed.	Consider a temporary grazing closure to prevent further impacts. Document and establish monitoring (follow up site visits, repeat photographs, or streambank alteration as appropriate). Reevaluate opening date. Reevaluate grazing capacity.
	Stock impacts to vegetation cover or soil stability in springs, seeps, or stream banks result in accelerated erosion or instability.	Consider a temporary grazing closure until vegetation and soils have stabilized. Consider active restoration of disturbed soils and vegetation Document and establish monitoring (follow-up site visits, repeat photographs, or streambank alteration as appropriate). Reduce stock impacts (increase education, change stock handling, erect barriers, establish head or night limits). Reevaluate opening date. Reevaluate grazing capacity.

Table D-6: Meadow Monitoring Data, Measures, Thresholds for Action, and Actions (continued)

Monitoring Data, Measure	Threshold	Actions
Site visits, qualitative evaluations (continued)	Deep hoof prints observed in a sensitive area (spring, seep, steep area, rare plant population, amphibian habitat, etc.) or over a majority of the meadow area.	Consider a temporary grazing closure. Reduce stock impacts (increase education, change stock handling, erect barriers, establish head or night limits). Reevaluate opening date. Reevaluate grazing capacity.
	Closely cropped or trampled vegetation observed in a sensitive area (spring, seep, steep area, rare plant population, amphibian habitat, etc.) or over a majority of the meadow area.	Consider a temporary grazing closure. Reduce stock impacts (increase education, change stock handling, erect barriers, establish head or night limits). Reevaluate grazing capacity.
	Introduced species with the potential for spread detected.	Document extent and abundance. Provide to vegetation management program. Control immediately if feasible. Refer to vegetation management program if not feasible. Modify stock use to prevent spread, if appropriate.
Residual biomass, percentage of annual production	Less than 55% in -moist lower montane meadows with high logistical value.	Temporary reduction in the following year's capacity if conditions indicate. Reevaluate grazing capacity.
	Less than 65% in - dry or wet lower montane meadows with high logistical value - moist lower montane meadows with low logistical value - upper montane and subalpine meadows with high logistical value.	Temporary reduction in the following year's capacity if conditions indicate. Reevaluate grazing capacity.
	Less than 75% in -dry or wet lower montane meadows with low logistical value -upper montane and subalpine meadows with low logistical value.	Temporary reduction in the following year's capacity if conditions indicate. Reevaluate grazing capacity.
Bare ground, percentage of soil surface	Bare soil cover value within range for low ecological condition (values to be determined).	Site visit to assess meadow condition and contributing factors.
	Bare soil cover value within range for low ecological condition (values to be determined) for two successive monitoring periods and site visit indicates stock use is a contributing stressor for both monitoring periods.	Reduce impacts (increase education, change stock handling, erect barriers, establish head or night limits). Reevaluate opening date. Reevaluate grazing capacity. Consider temporary grazing closure until bare soil cover value improves. Monitor annually for 3-5 years or until bare soil cover value falls within range for moderate or high ecological condition (values to be determined).
	Bare soil cover value double the value for low ecological condition (values to be determined), or previous management actions have been ineffective, or monitoring for 3-5 years has not shown improvement in bare ground.	Discontinue grazing until bare soil cover value falls within range for moderate or high ecological condition (values to be determined).

Table D-6: Meadow Monitoring Data, Measures, Thresholds for Action, and Actions (continued)

Monitoring Data, Measure	Threshold	Actions
Streambank alteration	Streambank alteration is associated with accelerated erosion or instability.	Consider a temporary grazing closure until vegetation and soils have stabilized. Consider active restoration of disturbed soils and vegetation. Reduce stock impacts (increase education, change stock handling, erect barriers, establish head or night limits). Reevaluate opening date. Reevaluate grazing capacity.
Species composition, percent change	Greater than 15 percent change in the dominant species as recorded by the frequency plots.	Temporary reduction in the following year's capacity if conditions indicate. Reevaluate grazing capacity.
	Greater than 15 percent increase in the proportion of bare ground and with observed erosion.	Temporary reduction in the following year's capacity if conditions indicate. Reevaluate grazing capacity.

RELATIONSHIP TO OTHER MONITORING PROGRAMS

In addition to the specific monitoring protocols described here, there are a number of other programs in place that will provide information relevant to the management of stock use and grazing in wilderness meadows. These include, but are not limited to, the following:

- The Sierra Nevada Network Inventory and Monitoring Program has implemented a long-term Wetland Ecological Integrity monitoring protocol in Kings Canyon, Sequoia, and Yosemite National Parks (Gage et al. 2014). This protocol is designed to characterize the status of and detect changes in wetland water dynamics, plant community composition, and macroinvertebrates in wet meadows and fens. The integration of multiple vital signs in this protocol will improve the ability to understand and interpret change in ungrazed wetland systems, providing important comparison for similar systems that are subject to grazing by pack stock. The inclusion of a bare soil measurement in the permanently marked plots would contribute to a better understanding of the range of variability in this measure in ungrazed wet meadows and fens. There is also tremendous potential for collaboration between this program and the stock use and meadow management program, as both require similar skill sets and deploy field biologists to park meadows.
- The USFS monitors meadow ecosystems subject to livestock grazing in the national forests adjacent to Sequoia and Kings Canyon National Parks, and this information has been used to develop preliminary standards for bare soil for park meadows (Weixelman and Zamudio 2001) as well as provided insights into meadow ecosystem dynamics and response to grazing (Freitas et al. 2014). Sampling by USFS ecologists using this protocol in ungrazed Sequoia and Kings Canyon meadows is scheduled to begin in 2015, which would further contribute to characterization of the range of variability in bare soil and vegetation parameters in park meadows.
- As part of planning efforts focused on the Merced and Tuolumne River corridors in Yosemite National Park, the NPS has identified indicators of meadow condition and developed monitoring protocols which will also help increase the understanding of the natural range of variability in these systems (NPS 2014a, 2014b). Implementation of these protocols would also allow for the continued collaborative development of monitoring and management strategies in the Sierra Nevada parks.

RESOURCE REHABILITATION AND RESTORATION

In areas where past use has caused detrimental effects to vegetation, soils or other resources, the NPS would evaluate the effects and may undertake rehabilitation or restoration. This could include actions such as filling eroded trail beds or hitching areas and revegetating the areas. It could also include re-routing of trail segments to avoid sensitive resources, relocating camps, or the removal of nonnative plant species. Such trail management activities would be guided by the trails management plan described in appendix K of this plan, while the control of non-native plants would be guided by appendix N of this plan, the Resource Stewardship Strategy (in development) and/or a future Invasive Plant Management Plan.

RESEARCH NEEDS

Continued learning through scientific investigation and evaluation of new information is a critical component of the adaptive management process. Although the past decade has seen a marked increase in research interest in the meadow and wetland systems of the Sierra Nevada, additional research in the coming years will lead to a better understanding of wetland ecosystem dynamics. In particular, information is needed on environmental effects across ranges of use levels (e.g., frequency, duration, or intensity gradients) would enhance our understanding of effect thresholds and further inform the management of stock in wilderness (Ostoja et al. 2014). The following sections describe a limited selection of ongoing, planned and potential research topics that would be expected to improve the knowledge of ecosystem dynamics and further inform decisions regarding stock use and grazing management.

DETERMINING VULNERABILITY OF SIERRA NEVADA MEADOWS TO CLIMATE CHANGE

Sierra Nevada land managers have come to recognize that threats posed by climate change may now exceed those posed by anthropogenic activities. Although local land managers can do little to influence global climate trends, it is critically important that they understand how resources may be affected by the simultaneous effects of climate change and land use stressors. Understanding how climate change affects meadow ecosystems, which are centers of biological diversity and productivity, will be a central component of any climate change adaptation strategy for the Sierra Nevada. Although recent studies provide detailed descriptions of hydrologic processes within a few individual meadows, to date there has not been an attempt to characterize the key hydrologic attributes of large groups of meadows over broad landscapes in the Sierra Nevada. This information is needed to classify meadows for their relative vulnerability to climate change versus land use factors. Through this project, research scientists at the USGS Yosemite Field Station are creating a hydrologic vulnerability to climate change assessment for the more than 9,000 meadows located within the national parks of the central and southern Sierra Nevada.

REFINING MEASUREMENTS OF PRODUCTIVITY AND BARE GROUND IN PARK MEADOWS

In order to protect the natural quality of wilderness character while continuing to allow stock use to occur, the proposed monitoring and management strategy described in this WSP/FEIS specifically seeks to limit stock-induced changes in bare ground and plant productivity. The plan proposes preliminary grazing capacities based on modeled estimates of productivity, and preliminary standards for bare ground in grazed meadows that are based on work done primarily on USFS meadows. As the current and proposed monitoring program is primarily dedicated to assessing conditions in grazed meadows, limited direct information is available to judge whether observed bare ground and productivity on a given meadow site in these parks are altered due to visitor activity. Additional research focused on characterizing the range

of bare ground and productivity values in ungrazed reference meadows in the parks' wilderness would allow the parks to revise the preliminary standards proposed by the WSP/FEIS for these two attributes. A study design that employed randomized site selection stratified across the primary environmental gradients of importance (e.g., elevation, moisture, and species composition) would allow for broad applicability of reference data for comparison with sites used by stock.

ASSESSING POTENTIAL EFFECTS OF STOCK USE ON WILDLIFE

Although much work has been done to investigate the effects of cattle on wildlife, the applicability of these studies to pack stock effects is limited, especially in the parks where livestock grazing is prohibited (Ostoja et al. 2014). Studies specific to the effects of pack stock on meadow-dependent vertebrates, such as small mammals are thus a high priority for additional research.

DETECTING CHANGES IN SPECIES COMPOSITION IN GRAZED MEADOWS

The WSP/FEIS proposes to continue monitoring species composition in five pairs of grazed/ungrazed meadows as part of an ongoing long-term monitoring protocol. Although this dataset provides detailed information in these specific meadow pairs, and can serve as a trigger for additional monitoring in other meadows, due to constraints in the study design these results cannot be extrapolated to other meadows in the parks without caution. Through the Wetland Ecological Integrity protocol described above, changes in species composition in ungrazed meadows—in response to factors other than grazing—may be detected and be used to inform management actions where appropriate. Expanding the network of species composition study sites in grazed meadows would increase the likelihood of detecting changes occurring as a result of stock use while improving the understanding of the interaction of external stressors, such as climate change, and stock use. Revisiting the transects established by Bennett in 1965, which were subsequently re-read by Strand (1972) and Mazzu (1987), could be encouraged as a potential masters level research project. Abbott et al. (2003) also suggested that species composition could be characterized as part of the residual biomass monitoring protocol. Although assessing species composition requires specific technical expertise, such an approach may be worth exploring should such staffing be available in the future.

TEMPORARY VARIANCES AND MODIFICATIONS TO THE STRATEGY

TEMPORARY VARIANCES

Climatic conditions, accessibility to portions of the wilderness, needs and interests of wilderness stock parties, and other factors change from year to year, making it possible to consider temporary variances in site-specific guidelines.

Variances could be made in opening dates, numbers of stock per trip, number of nights per area, number of stock per area, etc. Such variances would normally be granted on a case-by-case basis to accommodate special visitor needs where the effects on wilderness character, the parks' resources and other visitors would be within acceptable limits. Short-term or one-time-only variances proposed by visitors would be considered on a case-by case basis by the Superintendent, and if approved would likely be subject to special conditions. Requests for variances should be made in writing at least four weeks in advance to provide adequate time for consideration.

MODIFICATIONS TO THE STRATEGY

As knowledge of meadow systems, technology, and field techniques evolve, the methods used to monitor stock use and resource conditions will be subject to change and improvement. The process by which grazing levels would be evaluated is described in attachment 1. Significant changes to monitoring protocols would be subject to the appropriate level of peer review and provided to the public for comment.

REFERENCES

Abbott, L.B., R.D. Piper, and K.E. Young

2003 *Analysis of Residual Biomass Monitoring Program in Sequoia and Kings Canyon National Parks.* Department of Animal and Range Sciences, New Mexico State University, Las Cruces, New Mexico. Submitted to Sylvia Haultain, Plant Ecologist, Sequoia and Kings Canyon National Parks. 201 pp.

Armstrong, J. E.

1942 *Study of Grazing Conditions in the Roaring River District, Kings Canyon National Park.* Unpub. NPS Report. 177 pp.

Bedford, B. L. and K. S. Godwin

2003 Fens of the United States: distribution, characteristics, and scientific connection versus legal isolation. *Wetlands* 23: 608-629.

Benedict, N. B. and J. Major

1982 A Physiographic Classification of Subalpine Meadows of the Sierra Nevada, California, *Madroño* 29:1-12; January 1982.

Bengeyfield, P.

2006 Managing cows with streams in mind. *Rangelands* 28(1): 3-6.

Benkobi, L., M.J. Trlica, and J.L. Smith

1993 Soil Loss as Affected by Different Combinations of Surface Litter and Rock. *Journal of Environmental Quality* 22: 657-61.

Bennett, P. S.

1965 An Investigation of the Impact of Grazing on Ten Meadows in Sequoia and Kings Canyon National Parks. M.A. Thesis, Department of Biology, San Jose State College, San Jose, California. 163 pp.

Blackburn, W.H., and F.B. Pierson

1994 Sources of Variation in Interrill Erosion on Rangelands. In W.H. Blackburn, F.B. Pierson, Jr., G.E. Schuman, and R. Zartman (eds.) *Variability in Rangeland Water Erosion Processes*. Madison, WI: Soil Science Society of America.

Briggle, W.J., L. Sumner, and M. E. Thede

1961 *A Backcountry Management Plan for Sequoia and Kings Canyon National Parks.* Unpub. NPS Report. 145 pp.

Burcham, L. T.

1957 *California Range Land. An historic-ecological study of the range resources of California*. California Division of Forestry. Department of Natural Resources, Sacramento, Ca. 26l pp.

Burton, T.A., S.J. Smith, and E.R. Cowley

2011 *Multiple indicator monitoring (MIM) of stream channels and streamside vegetation*. US Department of the Interior, Bureau of Land Management, Technical Reference, 1737-23. 155 pp.

Cole, D.N.

1993 *Trampling Effects on Mountain Vegetation in Washington, Colorado, New Hampshire, and North Carolina*. Research Paper INT-464. Ogden, UT: USDA Forest Service, Intermountain Research Station. 56 p.

1995 Experimental trampling of vegetation. I. Relationship between trampling intensity and vegetation response. *Journal of Applied Ecology.* (1995): 203-214.

Cole, D.N., J.W. Van Wagtendonk, M.P. McClaran, P.E. Moore, and N.K. McDougald

2004 Response of Mountain Meadows to Grazing by Recreational Pack Stock. *Journal of Range Management*, Vol. 57, No. 2 (Mar., 2004), pp. 153-160.

Cowley, E.R.

2002 *Guidelines for Establishing Allowable Levels of Streambank Alteration*. Unpublished report. Bureau of Land Management, Idaho State Office, Boise, ID.

DeBenedetti, S. H.

1977 *Review of Grazing History, Past Documentation, and the Nature of Impact to Meadows of Sequoia and Kings Canyon National Parks*. Unpub. NPS Report. 60 pp.

1984 *Inventory and classification of backcountry meadows in Sequoia and Kings Canyon National Parks*. Unpub. NPS report, as cited in: Neuman, M.J. 1990. Past and Present Conditions of Backcountry Meadows in Sequoia and Kings Canyon National Parks, Second edition. National Park Service file report, 722 pp.

DeBenedetti, S. H. and D. J. Parsons

1979 Mountain Meadow Management and Research in Sequoia and Kings Canyon National Parks: A Review and Update. In R. Linn (ed.) *Proceedings First Conference on Scientific Research in the National Parks*. USDI NPS Trans. and Proc. Series No. 5, Wash. D.C., Vol. II: 1350-1311.

Dudley, W. R.

1896 Forest Reservations: with a report on the Sierra Reservation, California. *Sierra Club Bull* 1:254-267.

1898 The Kaweah Group. *Sierra Club Bull* 2:185-191.

1899 Forestry Notes. *Sierra Club Bull* 2:290-293.

Fahnestock, J.T., and J.K. Detling

2000 Morphological and Physiological Responses of Perennial Grasses to Long Term Grazing in the Pryor Mountains, Montana. *American Midland Naturalist* 143: 312–320.

Frase, B.A. and K.B. Armitage

1989 Yellow-bellied marmots are generalist herbivores. *Ethnology Ecology & Evolution* Vol. 1, Iss. 4

Freitas, M.R., L.M. Roche, D. Weixelman, and K.W. Tate

2014 Montane Meadow Plant Community Response to Livestock Grazing. *Environmental Management* 54(2), 301-308.

Frenzel, E. and S. Haultain

2012 Meadow Species Composition Data Collection and Summary, Sequoia and Kings Canyon National Parks: Standard Operating Procedures Version 1.3. National Park Service, Three Rivers, CA.

2013 *Summary report of stock use and grazing in wilderness meadows, Sequoia and Kings Canyon National Parks, 2012*. Sequoia and Kings Canyon National Parks, Three Rivers, CA, USA.

2014 *Summary report of stock use and grazing in wilderness meadows, Sequoia and Kings Canyon National Parks, 2013*. Sequoia and Kings Canyon National Parks, Three Rivers, CA, USA.

Gage, E.A., J.C.B. Nesmith, L. Chow, A. Chung-MacCoubrey, D.J. Cooper, S.A. Haultain, J.G. Holmquist, J.R. Jones, S.T. McKinney, P.E. Moore, L.S. Mutch, L.A.H. Starcevich, and H. Werner.

2014 *Wetlands ecological integrity monitoring protocol for Sierra Nevada Network*. Narrative version 2.0. Natural Resource Report NPS/SIEN/NRR—20XX/XXX. In review. National Park Service, Fort Collins, Colorado.

Gilman, E.F., I.E. Leone and F. B. Flower

1987 Effect of soil compaction and oxygen content on vertical and horizontal root distribution. *Journal of Environmental Horticulture* 5: 33-36.

Gordon, N.D., T.A. McMahon, B.L. Finlayson, C.J. Gippel, and R.J. Nathan

2004 *Stream hydrology: an introduction for ecologists*. Second edition. John Wiley & Sons. West Sussex, England.

Gutierrez, J., and I.I. Hernandez

1996 runoff and interrill erosion as affected by grass cover in a semi-arid rangeland of Northern Mexico. *Journal of Arid Environments* 34(3): 287-295.

Harper, J. L.

1974 The southern Sierra of California; a regional plan for integrated recreational development. Ph.D. Dissertation, Department of Geography, University of Colorado. 1,039 pp.

Hatfield, R.G., and G. Lebuhn

2007 Patch and landscape factors shape community assemblage of bumble bees, *Bombus* spp. (Hymenoptera: Apidae), in montane meadows. *Biological Conservation* 139:150–158.

Haultain, S. and E. Frenzel

2013 *Stock Use and Meadow Monitoring Report, 2012*. Unpublished NPS file report, Division of Resources Management and Science, Sequoia and Kings Canyon National Parks, Three Rivers, California.

Haydock, K.P., and N.H. Shaw.

1975 The comparative yield method for estimating dry matter yield of pasture. Australian *Journal of Experimental Agriculture and Animal Husbandry* 15:663-670.

Heitke, J.D., R.C. Henderson, B.B. Roper, and E.K. Archer

2008 Evaluating livestock grazing use with streambank alteration protocols: Challenges and solutions. *Rangeland ecology & management*, 61(6), 647-655.

Hoffman Black, S., M. Shepherd, and M. Vaughan

2011 Rangeland management for pollinators. *Rangelands*: June 2011, Vol. 33, No. 3, pp. 9-13.

Holmes, D.O. and H.E.M. Dobson

1976 *The effects of human trampling and urine on subalpine vegetation, a survey of past and present backcountry use, and the ecological carrying capacity of wilderness, Yosemite National Park, Sierra Nevada U.S.A.* Final Report, National Park Service Contract No. CXS000-4-0026. 247 pp.

Holmquist, J. G., J. R. Jones, J. Schmidt-Gengenbach, L. F. Pierotti, and J. P. Love

2011 Terrestrial and aquatic macroinvertebrate assemblages as a function of wetland type across a mountain landscape. *Arctic, Antarctic, and Alpine Research* 43:568-584.

Hopkinson, P., M. Hammond, J. Bartolome, M. Brooks, E.L. Berlow, R. Klinger, J.R. Matchet, P. Moore, S. Ostoja, C. Soulard, L. Joppa, R. Williams, O. Alvarez, Q. Guo, S. Haultain, E. Frenzel, and D. Saah

2013 *A natural resource condition assessment for Sequoia and Kings Canyon National Parks: Appendix 13 – meadows*. Natural Resource Report NPS/SEKI/NRR—2013/665.13. National Park Service, Fort Collins, Colorado.

Kauffman, J.B. and W.C. Krueger

1984 Livestock impacts on riparian ecosystems and streamside management implications... a review. *Journal of Range Management*, 37(5):430-438.

King, C.

1902 *Mountaineering in the Sierra Nevada*. Charles Scribner's Sons. New York, New York. 37 pp.

Klikoff, L.

1965 Microenvironmental influence on vegetational pattern near timberline in the central Sierra Nevada. *Ecological Monographs* 35:187-211.

Lee, K.N.

1993 Compass and gyroscope: Integrating science and politics for the environment. Island Press, Washington, D.C.

Liddle, M.J.

1975 A theoretical relationship between the primary productivity of vegetation and its ability to tolerate trampling. *Biological Conservation* 8: 251-255.

1991 Recreation ecology: effects of trampling on plants and corals. *Trends in Ecology & Evolution* 6:13–17.

Loughman, M. L.

1967 National parks, wilderness areas, and recreation in the southern Sierra Nevada, CA: A Historical Geography. M.A. Thesis, Dept. of Geography, DC Berkeley CA. 193 pp.

Mazzu, L.C.

1987 Compositional changes over time sampled by permanent meadow transects in Kings Canyon National Park. Unpublished MS Thesis Humboldt State University.

McClaran M.P. and D.N. Cole

1993 *Packstock in wilderness: use, impacts, monitoring, and management*. General Technical Report INT-301. September. 33 pp.

McClaran, M. P. and M. J. Neuman

1989 *Developing and testing a system to monitor species composition change in backcountry meadows of Sequoia and Kings Canyon National Parks*. National Park Service.

Miller, R.F. and G.B. Donart

1981 Response of *Muhlenbergia porteri* to season of defoliation. *Journal of Range Management* 34: 91-94.

Moir, W.H. and W.M. Block.

2001 Adaptive management on public lands in the United States: Commitment or rhetoric? *Environmental Management* 28:141–148.

Moore, P.E., van Wagtendonk, J.W., Yee, J.L., McClaran, M.P., Cole, D.N., McDougald, N.K., and M.L. Brooks

2013 Net primary productivity of subalpine meadows in Yosemite National Park in relation to climate variability. *Western North American Naturalist* 73(4) pp. 409-418.

Morgan, R.P.C.

1986 *Soil erosion and conservation*, ed. by D.A. Davidson. Wiley, NY: Longman Scientific and Technical.

Muir, J.

1877 *On the post-glacial history of* Sequoia gigantea. Proc. Amer. Assoc. Adv. Sci. 25. Salem, Massachusetts.

Mutch, L.S., M. Goldin Rose, A. Heard, R.R. Cook, and G.L. Entsminger

2007 *Sierra Nevada Network: Vital Signs Monitoring Plan*. National Park Service.

National Park Service (NPS)

1892 Report of the Acting Superintendent of Sequoia and General Grant National Parks. Cited by U.S. Department of the Interior. 1986. *Stock Use and Meadow Management Plan, Sequoia and Kings Canyon National Parks.* 50 pp.

1894 Report of the Acting Superintendent of Sequoia and General Grant National Parks. Cited by U.S. Department of the Interior. 1986. *Stock Use and Meadow Management Plan, Sequoia and Kings Canyon National Parks.* 50 pp.

1937 Grazing Regulations. Sequoia and Kings Canyon National Parks. Cited by U.S. Department of the Interior. 1986. *Stock Use and Meadow Management Plan, Sequoia and Kings Canyon National Parks*. 50 pp.

1949 Grazing Regulations. Sequoia and Kings Canyon National Parks. Cited by U.S. Department of the Interior. 1986. *Stock Use and Meadow Management Plan, Sequoia and Kings Canyon National Parks*. 50 pp.

1960-1964 Grazing Regulations. Sequoia and Kings Canyon National Parks. Cited by U.S. Department of the Interior. 1986. *Stock Use and Meadow Management Plan, Sequoia and Kings Canyon National Parks*. 50 pp.

1977-1984 *Annual Stock Use Reports. Sequoia and Kings Canyon National Park*. Unpublished Reports.

2006 *Management Policies 2006*. U.S. Government Printing Office, Washington, DC.

2007a *Final General Management Plan and Comprehensive River Management Plan/Environmental Impact Statement.* Sequoia and Kings Canyon National Parks, Three Rivers, CA. 657 pp.

2007b *Vegetation of Sequoia and Kings Canyon National Parks*. National Park Service, Three Rivers, California, USA.

2012 National Park Service Procedural Manual #77-1: *Wetland Protection*. Available online: http://www.nature.nps.gov/rm77/. Accessed April 25, 2014

2013a *A natural resource condition assessment for Sequoia and Kings Canyon National Parks.* Natural Resources Report NPS/SEKI/NRR–2013/665. National Park Service, Fort Collins, Colorado.

2013b Management Directive No. 9: *Wilderness Stock Use and Group Size Management*. Sequoia and Kings Canyon National Parks internal management directive dated June 10, 2013.

2014a *Final Environmental Impact Statement for the Merced Wild and Scenic River Comprehensive Management Plan*, Yosemite National Park, Madera and Mariposa Counties, California.

2014b *Final Environmental Impact Statement for the Tuolumne Wild and Scenic River Comprehensive Management Plan*, Yosemite National Park, Madera and Mariposa Counties, California.

Neuman, M.J.

1990 *Past and present conditions of backcountry meadows in Sequoia and Kings Canyon National Parks, Second edition*. National Park Service file report, 722 pp.

1993 *Proposal for monitoring and management of residual biomass in wilderness meadows of Sequoia and Kings Canyon National Parks.* Unpublished National Park Service report. 25 pp.

Olson-Rutz, K.M.; C.B. Marlow, K. Hansen, L.C. Gagnon and R.J. Rossi

1996 Recovery of a high elevation plant community after packhorse grazing. *Journal of Range Management.* 49:541-545.

Ostoja, S.M., M.L. Brooks, P.E. Moore, E.L. Berlow, R. Blank, J. Roche, J. Chase, S. Haultain.

2014 Potential environmental effects of pack stock on meadow ecosystems of the Sierra Nevada, USA. *The Rangeland Journal* 36: 411-427.

Otter, F. L.

1963 *The Men of Mammoth Forest.* Edwards Brothers, Inc. Ann Arbor, Michigan. 169 pp.

Pietola, L., R. Horn, and M. Yli-Halla

2005 Effects of Trampling by Cattle on the Hydraulic and Mechanical Properties of Soil. *Soil & Tillage Research* 82(1):99-108.

Pyrooz, N.N., C. Cann, J.C.B. Nesmith, E. Frenzel, S.A. Haultain, and P. Hardwick

2014 *Wet Meadow and Fen Mapping of Sequoia and Kings Canyon National Parks: A photo interpretation mapping project of the parks' wetland resources* (in preparation). Natural Resource Technical Report NPS/SIEN/NRTR—2014/XXX. National Park Service, Fort Collins, Colorado.

Ratcliff, H. M.

1956 *Meadow Survey, Sequoia National Park*, Unpublished Report.

Ratliff, R.D.

1982 *A Meadow Site Classification for the Sierra Nevada, California*. Gen.Tech.Rep.PSW-60. Berkeley, CA: Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture; 16 pp.

1985 *Meadows in the Sierra Nevada of California: state of knowledge.* Gen. Tech. Rep. PSW-84. Berkeley, CA: Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture; 1985. 52 p.

Ruhl, J.B.

2005 Regulation by adaptive management–Is it possible? *Minnesota Journal of Law, Science and Technology* 7:21–58.

Rydin, H. and J.K. Jeglum

2013 *The biology of peatlands*, 2nd Ed. Oxford University Press.

Schelz, C.D.

1996 *production and residual biomass monitoring of wilderness meadows*. Unpublished National Park Service Report, Division of Science and Resources Management, Sequoia and Kings Canyon National Parks, Three Rivers, California. 93 pp.

Sharsmith, C.

1959 *A report on the status, changes, and ecology of backcountry meadows in Sequoia and Kings Canyon National Parks*. 121 pp.

Sikes, K., Cooper, D., Weiss, S., Keeler-Wolf, T., Barbour, M., Ikeda, D., Stout, D. and J. Evens

2013 *Fen conservation and vegetation assessment in the national forests of the Sierra Nevada and Adjacent Mountains, California*. Revised, public version 2, 2013.

Smith, A., M. Weston.

1990 Mammalian Species No.352 - *Ochotona princeps*. Available [online]: http://www.science.smith.edu/departments/Biology/VHAYSSEN/msi/pdf/i0076-3519-352-01-0001.pdf. Accessed April 16, 2014

Smith, D. D., and W.H. Wischmeier

1962 Rainfall erosion. *Advances in Agronomy* 14: 109-148.

Strand, S.

1972 An Investigation of the Relationship of Pack Stock to Some Aspects of Meadow Ecology for Seven Meadows in Kings Canyon National Park. M.A. Thesis, Department of Biology, San Jose State University, San Jose, California. 125 pp.

Strong, D. H.

1964 A History of Sequoia National Park. Ph.D. Thesis, Syracuse University, New York. 336 pp.

1968 *Trees or Timber? The Story of Sequoia and Kings Canyon National Parks. Sequoia Natural History Association*, Three Rivers, California. 62 pp.

Sumner, L.

1940 Unpublished file report on meadow observations. Cited by U.S. Department of the Interior. 1986. *Stock Use and Meadow Management Plan, Sequoia and Kings Canyon National Parks.* 50 pp.

1941 Special Report on Range Management and Wildlife Protection Kings Canyon National Park. Unpub. NPS Report. 46 pp.

1947 Unpublished file report on meadow observations. Cited by U.S. Department of the Interior. 1986. *Stock Use and Meadow Management Plan, Sequoia and Kings Canyon National Parks.* 50 pp.

1948 Unpublished file report on meadow observations. Cited by U.S. Department of the Interior. 1986. *Stock Use and Meadow Management Plan, Sequoia and Kings Canyon National Parks.* 50 pp.

1968 A *Backcountry Management Evaluation, Sequoia and Kings Canyon National Parks*. Unpub. NPS Report. 62 pp.

Thrower, J.

2006 Adaptive management and NEPA: How a nonequilibrium view of ecosystems mandates flexible regulation. *Ecology Law Quarterly* 33:871–895.

Trimble, S.W., and A.C. Mendel

1995 The cow as a geomorphic agent – A Critical Review. *Geomorphology* 13: 233-253

Unger, P.W., and T.C. Kaspar

1994 Soil compaction and root growth – A Review. *Agronomy Journal* 86:759-766.

U.S. Department of Agriculture, Natural Resources Conservation Service

2014 Jon Gustafson, State Rangeland Ecologist. Email message to Erik Frenzel, NPS Ecologist, regarding assessing plant productivity, 12/17/2014.

U.S. Department of the Interior

1978 *Management Policies.*

1986 *Stock Use and Meadow Management Plan, Sequoia and Kings Canyon National Parks*. 50 pp.

2010 Environmental statement memorandum No. ESM 10-20. Available [online]: http://oepc.doi.gov/ESM/ESM%2010-1%20%28Memoranda%20in%20Effect%29.pdf

U.S. Fish and Wildlife Service (USFWS)

1996 The National Wetlands Inventory. Available [online]: http://www.wetlands.fws.gov/.

Vankat, J. L.

1970 Vegetation change in Sequoia National Park, California. Ph.D. Thesis, University of California. Davis. 197 pp.

Vankat, J. L. and J. Major

1978 Vegetation Changes in Sequoia National Park, California. *J. Biogeography* 5:377-402.

Viers, J.H., S.E. Purdy, R.A. Peek, A. Fryjoff-Hung, N.R. Santos, J.V.E. Katz, J.D. Emmons, D.V. Dolan, and S.M. Yarnell

2013 *Montane meadows in the Sierra Nevada: changing hydroclimatic conditions and concepts for vulnerability assessment*. Center for Watershed Sciences Technical Report (CWS-2013-01), University of California, Davis. 63 pp.

Walker, M.D., P.J. Webber, E.H. Arnold, and D. Ebert-May

1994 Effects of interannual climate variation on aboveground phtyomass in alpine vegetation. *Ecology* 75: 393-408.

Walker, M.D., R.C. Ingersoll, and P.J. Webber

1995 Effects of interannual climate variation on phenology and growth of two alpine forbs. *Ecology* 76: 1067-1083.

Walters, C.J., and C. S. Holling

1990 Large-scale management experiments and learning by doing. *Ecology* 71:2060–2068.

Weixelman, D. A., B. Hill, D.J. Cooper, E.L. Berlow, J. H. Viers, S.E. Purdy, A.G. Merrill, and S.E. Gross

2011 *A field key to meadow hydrogeomorphic types for the Sierra Nevada and Southern Cascade Ranges in California*. Gen. Tech. Rep. R5-TP-034. Vallejo, CA. U.S. Department of Agriculture, Forest Service, Pacific Southwest Region, 34 pp.

Weixelman, D.A., and D.C. Zamudio

2001 Determining Ecological Status of Sierra Nevada Mountain Meadows Using Plant Frequency and Soil Characteristics. Cited by P.M. Faber (ed.) 2003 *California Riparian Systems: Processes and Floodplain Management, Ecology, and Restoration*. 2001 Riparian Habitat and Floodplains Conference Proceedings, 463-470. Sacramento, CA: Riparian Habitat Joint Venture.

Williams, B.K., R.C. Szaro, and C.D. Shapiro

2007 *Adaptive management: The U.S. Department of Interior technical guide*. Adaptive Management Working Group, U.S. Department of the Interior, Washington, D.C. http://www.doi.gov/initiatives/AdaptiveManagement/TechGuide.pdf

Winward, A.H.

2000 *Monitoring the vegetation resources in riparian areas*. General Technical Report RMRS-GTR-47. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 49 pp.

Wood, S.H.

1975 Holocene stratigraphy and chronology of mountain meadows, Sierra Nevada, California. PhD. Dissertation, California Institute of Technology, Pasadena. 180 pp.

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ATTACHMENT 1:

GRAZING CAPACITIES FOR RECREATIONAL PACK AND SADDLE STOCK – BACKGROUND AND USE IN SEQUOIA AND KINGS CANYON NATIONAL PARKS

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Grazing Capacities for Recreational Pack and Saddle Stock – Background and Use in Sequoia and Kings Canyon National Parks

LIMITING IMPACTS FROM STOCK GRAZING

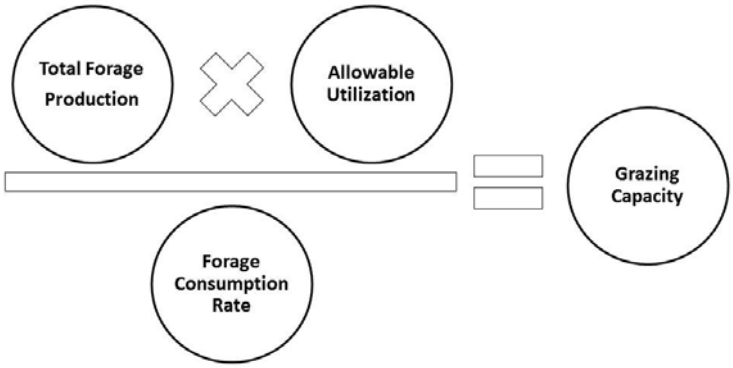
There are several ways that grazing stock can impact natural resources and other wilderness users. Setting a limit on the total amount of grazing allowed within one growing season is one management tool that the NPS can use to keep impacts within standards in the parks.

Depending on the meadow characteristics, any one kind of impact could be a limiting factor for the amount of grazing that can take place. For example, stream bank shearing could reach unacceptable levels before the amount of trampling, social conflicts, species composition changes, or defoliation reaches an unacceptable level. Because defoliation has the closest relationship to grazing (defoliation being a necessary impact for grazing to occur rather than an undesirable side effect which can be mitigated) it is the starting place for developing capacities. The methodology used to estimate capacities for grazing in the parks' meadows is described below.

GRAZING CAPACITY MODEL

Ratliff et al. (1987) present a grazing capacity model based on the ability of Sierra Nevada meadows to produce foliage palatable to stock while leaving enough plant biomass for maintenance or improvement of meadow condition and for meeting other management goals, such as wildlife habitat protection. This model was first applied to the parks' meadows grazed by pack stock in 1992 (Neuman 1994). With modification for wilderness management, this basic model provides a framework for defining and establishing annual grazing capacity.

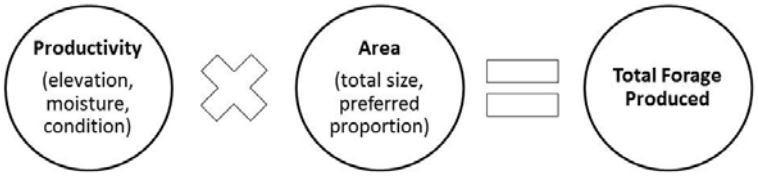
The model includes total forage production, allowable utilization (the proportion of forage production which can be grazed), and a forage consumption rate by pack and saddle stock.



FORAGE PRODUCTION

Net primary productivity (hereafter, "productivity") is the amount of solar energy captured by plants minus the amount of energy used by the plant for respiration; it is expressed per unit area. Measurements of aboveground biomass (the dry weight of plant material per unit area present at one point in time) at the end of the growing season are commonly used to estimate productivity for herbaceous species in temperate environments. Productivity varies across the landscape due to many abiotic and biotic factors (Barbour et al. 1998). In the Sierra Nevada, the factors that are most relevant are elevation, moisture

availability, and condition; in the absence of site-specific data, these are the factors used to predict productivity. The total amount of forage produced will be a product of the area and productivity.



Productivity

Measuring productivity at a specific site over a period of several years (to account for climate variation) is the most precise way of estimating forage production. In the absence of productivity data collected from a particular site, regression relationships developed from existing data can be used to estimate the amount of productivity. The regression models provided in Ratliff et al. (1987) take into account elevation, broad moisture regimes, and condition.

Elevation: All else being equal, meadow productivity decreases as elevation increases (Ratliff 1985; Ratliff et al. 1987). The model assumes a linear decline with elevation.

Moisture: Moisture availability influences both species composition and productivity (Ratliff 1985; Ratliff et al. 1987). The productivity model assumes that meadows can be assigned to one of three moisture classes (Ratliff et al. 1987). Moist meadows with shorthair grass (*Calamagrostis muiriana*), tufted hairgrass (*Deschampsia cespitosa*), or Nebraska sedge (*Carex nebrascensis*) as dominant species are the most productive. Wet meadows with beaked sedge (*Carex utriculata*, C*. vesicaria*) or spikerush (*Eleocharis acicularis*, *E. pauciflora*) as dominant species are intermediate in productivity. Dry sites with shorthair sedge (*Carex filifolia*) as the dominant species are the least productive. In comparing published information, different authors may assign a given species to different moisture categories.

Within any given meadow, a range of moisture conditions and several dominant species will exist. Because horses and mules are selective grazers and do not graze evenly across the meadow, the moisture category (wet, moist, or dry) of the vegetation favored by stock in a given forage area is used to estimate productivity.

Condition: Productivity may vary with species composition and plant vigor, and how intact litter and soils are. Taken together these factors can be considered as "range condition" and included as a factor in the productivity model. Ratliff et al. (1987) assume a decline in the productivity of forage species related to condition based on data presented in Crane (1950).

The decline in productivity is assumed to be the same at all elevations and moisture types (Ratliff et al. 1987). Meadows in excellent condition are assumed to have the maximum productivity. Productivity for other condition levels is given in reference to maximum productivity: good condition produces 65%, fair condition 44%, and poor condition 25%. No reduction was presented for very poor condition meadows.

The missing litter and humus, broken sods, and erosion that characterize fair, poor, and very poor condition meadows are rare in the parks' meadows, and where they occur, are limited to very small portions of the meadow (although before effective grazing controls were implemented, these impacts were more widespread; see Sumner 1941, Sharsmith 1959, and others). The meadows classified as "excellent" condition by Crane (1950) were largely cultivated and irrigated pastures, while natural meadows generally fit the criteria for "good" condition. Ratliff (1985) applied contemporary condition class concepts (USFS 1969) to 90 non-randomly selected Sierra Nevada meadows and found 27% to be in

excellent condition and 26% in good condition. Therefore, it is assumed that 65% of maximum productivity is a conservative, reasonable value to use in estimating the forage productivity of the parks' meadows.

Productivity model: Given these assumptions, the productivity of dry, moist, and wet meadows can be estimated by the following equations where productivity is in units of pounds per acre, and elevation is in units of feet.

- Dry: Productivity = 2275 - 0.175 * Elevation
- Moist: Productivity = 4725 - 0.325 * Elevation
- Wet: Productivity = 4705 - 0.36 * Elevation

Productivity for other condition classes can be calculated using the coefficients in table D-15. Predicted forage productivity values calculated from data in Ratliff et al. (1987) are illustrated in figure D-1.

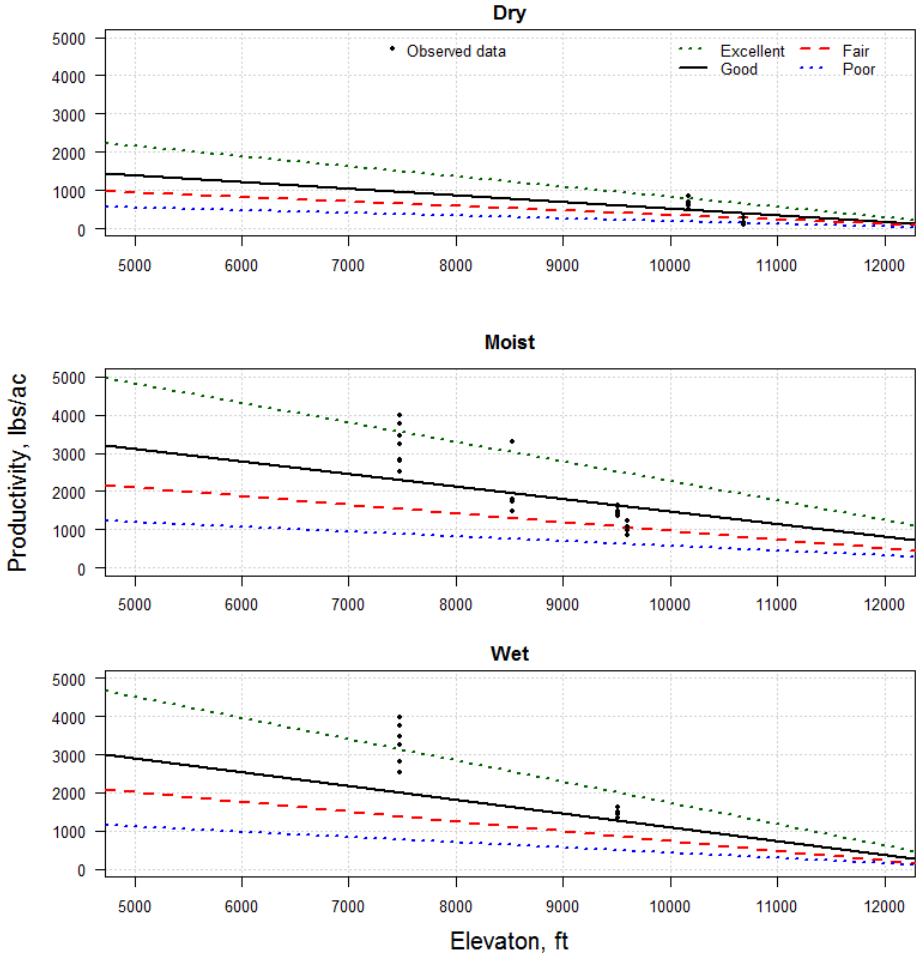


Figure D-1: Predicted productivity (pounds/acre) by elevation (feet) for three moisture classes (dry, moist, wet), and four condition classes (excellent, good, fair, poor)

While Ratliff et al. (1987) does not provide information about model fit, data reported from other locations in the Sierra Nevada can provide some estimate of the uncertainty of productivity estimates.

Productivity values from locations in the Rock Creek drainage of Sequoia National Park were measured over 5 years (Stohlgren et al. 1989). They reported productivity for three vegetation types as the mean across seven sites. Observed mean productivity was significantly lower (41 – 117% of predicted) than that predicted by the model (table D-7). The poorest agreement was for the dry site, while the best fit was for the wet-moist site.

Table D-7: Comparison of Model Productivity Values to Measured Productivity from Three Vegetation Types in Sequoia National Park

Site and Characteristics	Year	pounds/acre	% of Predicted	
Rock Creek and Miter Basin, Dry, 10400 - 11600 feet Dominant species: *Carex filifolia* Predicted productivity: 405 pounds/acre (at the weighted mean elevation of 10685 feet)	1977	297	73%	
	1978	171	42%	
	1979	120	30%	
	1980	145	36%	
	1981	101	25%	
	Mean	**167**	**41%**	
Rock Creek Ranger Station, Moist, 9600 feet Dominant species: *Eleocharis pauciflora - Calamagrostis breweri* Predicted productivity: 1607 pounds/acre	1977	986	61%	
	1978	981	61%	
	1979	869	54%	
	1980	1078	67%	
	1981	1217	76%	
	Mean	**1026**	**64%**	
Lower Rock Creek, Moist-Wet, 9400 – 9600 feet Dominant species: *Deschampsia caespitosa* Predicted productivity: 285 pounds/acre if “wet” (at the mean elevation of 9514 feet) Predicted productivity: 1637 pounds/acre if "moist" (at the mean elevation of 9514 feet)	1977	1635	127%	100%
	1978	1486	116%	91%
	1979	1353	105%	83%
	1980	1433	112%	88%
	1981	1617	126%	99%
	Mean	**1505**	**117%**	**92%**

Source: Stohlgren et al. 1989

Data from three locations in Yosemite National Park over 7 years of study (Moore et al. 2013) indicates that the measured productivity values were much higher than predicted at the high elevation xeric site and the low elevation hydric site, but were slightly lower than predicted at the middle elevation mesic site (table D-8).

Table D-8: Comparison of Model Productivity Values to Measured Productivity from Three Sites in Yosemite National Park

Site and characteristics	Year	pounds/acre	% of Predicted	
Gaylor Lakes, Dry, 10170 feet Dominant species: *Carex filifolia* Predicted productivity: 495 pounds/acre	1994	688	139%	
	1995	518	105%	
	1996	645	130%	
	1997	594	120%	
	1998	693	140%	
	1999	851	172%	
	2000	863	174%	
	Mean	**693**	**140%**	
Tuolumne Meadows, Moist 8530 feet Dominant species: *Calamagrostis breweri* Predicted productivity: 1952 pounds/acre	1994	3296	169%	
	1995	1472	75%	
	1996	1730	89%	
	1997	1782	91%	
	1998	1480	76%	
	1999	1769	91%	
	2000	1806	92%	
	Mean	**1906**	**98%**	
Harden Lake, Moist-Wet, 7480 feet Dominant species: *Deschampsia cespitosa* Predicted productivity: 2012 pounds/acre if “wet” Predicted productivity: 2294 pounds/acre if "moist"	1994	3983	198%	174%
	1995	2522	125%	110%
	1996	3468	172%	151%
	1997	3754	187%	164%
	1998	2799	139%	122%
	1999	2824	140%	123%
	2000	3249	161%	142%
	Mean	**3229**	**160%**	**141%**

Source: Moore et al. 2013

These comparisons of model predictions to observed data indicate that productivity values from the model may be inaccurate for any given site or vegetation type. Furthermore, there is considerable interannual variability which may make model predictions a better or worse fit depending on the year.

Area

Calculating capacities for management units of interest requires determining how much grazing area is available. Forage areas are defined as the primary meadows and their associated forested or upland grasslands, which are commonly used by stock for grazing. Therefore, the forage area is the scale at which grazing capacities are calculated.

Total area: The total amount of meadow area in each forage area was calculated from vegetation maps (NPS 2007).

Preferred Proportion: Because horses and mules are selective grazers and overall grazing pressure is light, grazing impacts are generally concentrated in one vegetation type ("patch grazing," McClaran and Cole 1993). For each forage area in the parks, a preferred proportion (1-100%) has been assigned. This is an estimate of the proportion of the entire forage area occupied by vegetation types favored for grazing by horses and mules.

Initial estimates of the preferred meadow vegetation proportion were assigned to the parks' forage areas by Neuman (1994) who described preferred forage as "grasses (both small, fine-leaved species and taller species) and medium sedges, occupying sites that are neither particularly dry nor wet." These estimates are periodically revised as new information is obtained about stock grazing patterns. This information is most reliably obtained by observing actual stock grazing patterns at the end of the grazing season and noting the species which have been grazed by stock and their extent. Where this information is not available, the extent of preferred vegetation can also be estimated by extrapolating observed stock grazing patterns from similar forage areas.

The preferred proportion for all forage areas in the parks was reviewed between 2012 and 2014. Where site knowledge or other information provided more precise estimates of the amount of meadow vegetation favored by stock, the preferred proportion was revised. The review also ensured that the preferred proportion did not include any peat accumulating area within the forage area.

Upland Forage: In some areas, graminoids in non-meadow upland areas may provide some or all of the preferred forage. The extent of upland forage has been described narratively for some areas, but reliable productivity values are not available. If quantitative data for the extent, productivity, and appropriate utilization rate become available, this data can be used to estimate capacity in upland areas using the same basic model as for meadow vegetation. Until quantitative data on the extent, productivity, and appropriate utilization rates for these areas become available, narrative descriptions may be used to identify management areas where total forage is grossly underestimated, and to adjust capacities upwards based on past use patterns and observed impacts (see the "Evaluation and Revision of Capacities" section).

ALLOWABLE UTILIZATION

The amount of biomass that should be left ungrazed for the purposes of maintaining a litter and humus layer on the soil, for wildlife habitat, for maintaining the health of vegetation, and for other purposes will vary with the management goals for individual meadows. In perennial grasslands such as mountain meadows, the amount of biomass to leave at the end of the growing season has generally been defined as a percentage of total biomass production. The proportion of total biomass production which can be grazed while meeting management goals is "allowable utilization." The amount of vegetation remaining ungrazed at the end of the season is referred to as "residual biomass."

Existing utilization guidelines

Guidelines for appropriate utilization rates for Sierra Nevada meadows have evolved over time.

Consistent with range standards at the time, Crane (1950) suggested that utilization guidelines of 60-70% were appropriate for Sierra Nevada meadows used for livestock production.

Ratliff (1976, 1980) measured decomposition rates of filter paper and natural herbage *in situ* to estimate how much biomass decomposed annually; these were proposed this as the minimum that should be retained as residual to maintain a meadow at a given condition, and that more could be retained to increase the condition of meadows in degraded condition (Ratliff et al. 1987, table D-9). Ratliff found that decomposition rates were highest at intermediate moisture levels, and suggested that utilization guidelines

of 20-45% would be appropriate to either maintain or improve condition of Sierra Nevada meadows (Ratliff 1985).

Neuman (1994) proposed reducing the utilization limits in Ratliff (1985, 1987) by 10 percentage points to reflect more conservative grazing levels in a National Park wilderness area.

Table D-9: Utilization Recommendations by Moisture and Condition

Moisture	Condition	Allowable utilization, Ratliff et al. (1987)
Moist	Excellent	45
	Good	40
	Fair	35
	Poor	30
Dry or Wet	Excellent	35
	Good	30
	Fair	25
	Poor	20

Source: Ratliff et al. 1987

The USFS (2001) adopted utilization limits of 30-40% for montane and subalpine meadows and 10-20% for alpine meadows in the Ansel Adams, John Muir and Dinkey Lakes Wildernesses (table D-10). The higher number is for meadows in high-seral ecological condition and the lower is for meadows in mid- to low-seral ecological condition. High-seral status would roughly correspond to Crane's (1950) excellent condition, and mid to low-seral state would roughly correspond to good or lower conditions although the two condition classifications differ.

Table D-10: Utilization Standards for Herbaceous Perennial Vegetation in Wilderness Meadows of the Sierra and Inyo National Forests

Landscape Zone	Seral Ecological State	Allowable use
Montane and Subalpine	High	40
	Mid to Low	30
Alpine	High	20
	Mid to Low	10

Source: USFS 2001

Yosemite National Park used utilization values of 25% to estimate grazing capacities in the upper montane and subalpine meadows of Upper Lyell Canyon (Ballenger 2013).

A study which evaluated the impacts of a range of utilization rates on three upper montane and subalpine meadow vegetation types in Yosemite National Park described the relationship between utilization rates and impacts to meadow attributes (Cole et al. 2004). The authors fit linear models for the relationships between utilization and productivity, basal vegetation cover, and relative graminoid cover, with variation by vegetation type and number of years of grazing. In dry *Carex filifolia* vegetation, statistically significant relationships for productivity and basal vegetation cover were reported. In mesic *Calamagrostis muiriana* vegetation, statistically significant relationships for productivity, basal vegetation cover, and relative graminoid cover were reported; the relationship with bare ground was

statistically significant, but had poor predictive ability. In mesic to hydric *Deschampsia cespitosa* vegetation, only the relationship for productivity was statistically significant.

Cole et al. (2004) suggested that managers could set utilization values by deciding the amount of change in meadow vegetation that would be accepted. This is accomplished by specifying an average level of change for an attribute (e.g., -10%) and then solving for the corresponding utilization value using the regression relationships presented for each attribute and vegetation type (table D-11). The reported coefficient of determination (r^2) value provides a sense of how well utilization predicts the response of interest. Where more than one vegetation type is present in upper montane and subalpine forage areas, one of the combinations of attribute and vegetation type will be the limiting factor, where the level of acceptable change would be reached first.

Table D-11: Utilization Values for Different Levels of Acceptable Change in Attributes for Three Upper Montane and Subalpine Meadow Vegetation Types

Attribute	Vegetation type	r^2	Acceptable change in attribute				
			0%	-5%	-10%	-15%	-20%
Productivity (from peak standing crop)	*Carex filifolia*	0.41	27%	31%	35%	39%	43%
	Calamagrostis muiriana	0.17 – 0.34	5%	15%	24%	34%	43%
	Deschampsia cespitosa	0.37	10%	17%	24%	31%	38%
Basal vegetation cover	*Carex filifolia*	0.38	28%	30%	32%	34%	37%
	Calamagrostis muiriana	0.52 – 0.68	39%	41%	43%	45%	47%
Relative graminoid cover	*Calamagrostis muiriana*	0.01 – 0.39	12%	22%	31%	41%	50%

Values were calculated from regression equations presented in Cole et al. (2004). Values for *Calamagrostis muiriana* are averages across treatment years

Proposed Utilization Rates for Action Alternatives Allowing Grazing

The proposed utilization rates would be used as a starting point for setting grazing capacities at levels that limit stock induced changes to plant composition, density, cover and/or vigor, and productivity. These capacities would be one tool to prevent adverse effects to soils and associated sod that may lead to accelerated erosion, prevent changes to springs, seeps, and water courses that could alter hydrologic processes, and could promote recovery from past overuse where necessary. Allowable utilization rates would vary by vegetation zones and the logistical value of the forage area.

Vegetation zones: Each forage area is classified as either "lower montane/woodland" or "upper montane/subalpine." The upper montane/subalpine/ forage areas are generally located at higher elevations, but overlap in elevation range with lower montane/woodland forage areas.

Lower montane/woodland zones are below approximately 8,500 feet in elevation. Research results from Ratliff (1976, 1980) were used to guide utilization rate selection for these forage areas.

Upper montane/subalpine zones are above approximately 7,500 feet in elevation. The research results from Cole et al. (2004) were used to guide utilization rate selection in these forage areas.

Logistical value: Some forage areas have high logistical value to groups travelling with stock. The characteristics used to designate forage areas as having high logistical value are:

- resource concerns other than defoliation do not limit grazing capacity
- closest forage area to a high pass
- first forage area beyond round-trip distance from trailhead
- fires allowed at forage area but not in nearby forage areas
- lack of other forage areas open to grazing nearby
- traditional stock camp
- strategic location for administrative use

Proposed Utilization Rates: Using the approach suggested in Cole et al. (2004), utilization rates were arrived at by choosing a level of change in meadow characteristics and determining what utilization value would limit changes to that level. In doing so, the parks' managers considered the value of grazing to opportunities for primitive and unconfined recreation, as well as the cost of grazing to the natural quality of wilderness.

Lower utilization rates are proposed in forage areas with low logistical value; this provides a greater level of conservation without unduly reducing recreational opportunities for stock travelers. Forage areas would not be designated as high logistical value if recent grazing demands could be met by these lower utilization rates. Fifty-five forage areas met these criteria: 14 in the lower montane and woodland zones and 40 in the upper montane and subalpine zones. A list of the named forage areas assigned a high logistical value is provided in table D-16.

Using this process, the proposed utilization standards which would be used to estimate grazing capacities under the preferred alternative range from 25% to 45% (table D-12).

Table D-12: Utilization Rates Proposed as Standards and Used to Estimate Grazing Capacities

Vegetation Zone	Moisture Class	Logistical Value	Utilization Limit
Lower Montane / Woodland	Moist	High	45%
		Low	35%
	Dry or Wet	High	35%
		Low	25%
Subalpine / Upper Montane	All	High	35%
		Low	25%

These utilization rates would, on average, result in changes to the most heavily grazed portions of meadows relative to comparable ungrazed vegetation (tables D-13 and D-14). In lower montane meadows, maximum utilization would be equal to or less than the amount needed to leave residual biomass equal to that which decomposed annually. In upper montane and subalpine meadows, maximum utilization rates would be set to limit decreases in productivity, basal vegetation cover, and relative graminoid cover to 18% or less.

Table D-13: Predicted Response of Meadow Attributes for Lower Montane and Woodland Vegetation Types to 25%, 35%, and 45% Utilization*

Attribute	Utilization Moist <35% Dry or Wet <25%	Utilization Moist 35-45% Dry or Wet 25-35%
Residual biomass	greater than annual decomposition	greater than or equal to annual decomposition
Productivity	similar to comparable ungrazed meadow vegetation	similar to comparable ungrazed meadow vegetation

* Based on Ratliff (1976, 1980, 1985); responses for productivity would be expected to occur after more than one growing season

In lower montane forage areas with higher logistical value, utilization would be limited to no more than 45% in moist meadows and 35% in dry or wet meadows. The amount of foliage left ungrazed at these levels would be approximately equal to the amount of herbage which would be expected to decompose annually; if grazed to capacity regularly, productivity would be expected to remain near current levels.

In lower montane forage areas with lower logistical value, utilization would be limited to no more than 35% in moist meadows and 25% in dry or wet meadows. The amount of foliage left ungrazed at these levels would be more than the amount of herbage which would be expected to decompose annually; if grazed to capacity regularly, productivity would be expected to trend towards or be similar to comparable ungrazed meadow vegetation.

Table D-14: Predicted Mean Response of Meadow Attributes for Three Upper Montane and Subalpine Vegetation Types to 25% and 35% Utilization*

Attribute	Vegetation type	25% utilization, percentage change relative to ungrazed conditions	35% utilization, percentage change relative to ungrazed conditions
Productivity	*Carex filifolia*	+2%	-10%
	Deschampsia cespitosa	-11%	-18%
	Calamagrostis muiriana	-10%	-16%
Basal vegetation cover	*Carex filifolia*	+7%	-16%
	Calamagrostis muiriana	+41%	+14%
Relative graminoid cover	*Calamagrostis muiriana*	-6%	-12%

* Based on Cole et al. (2004); predicted response for *Calamagrostis muiriana* is average across treatment years as reported for two, three and four years of grazing in the original study.

In subalpine and upper montane forage areas having higher logistical value, utilization rates would be limited to 35%. If grazed to capacity regularly, this level of utilization in dry *Carex filifolia* vegetation would, on average, reduce productivity by 10% and reduce basal vegetation cover by 16% relative to ungrazed vegetation. In moist to wet *Deschampsia cespitosa* vegetation, this level of utilization would, on average, reduce productivity by 18% relative to ungrazed vegetation. This level of utilization in moist *Calamagrostis muiriana* vegetation would, on average, reduce productivity by 16%, increase basal vegetation cover by 14%, and decrease relative graminoid cover by 12% relative to ungrazed vegetation. Due to the inherent variability in meadow systems, considerable variation in observed changes would be expected. The magnitude of this variation is reflected in the coefficients of determination reported for the relationship between utilization and meadow response which range from 0.01 – 0.68 (table D-11).

In subalpine and upper montane forage areas having lower logistical value, utilization would be limited to no more than 25%. If grazed to capacity regularly, this level of utilization in dry *Carex filifolia* vegetation would, on average, increase productivity by 2% and increase basal vegetation cover by 7% relative to ungrazed vegetation. In moist to wet *Deschampsia cespitosa* vegetation, this level of utilization would, on average, decrease productivity by 11% relative to ungrazed vegetation. This level of utilization in moist *Calamagrostis muiriana* vegetation would, on average, reduce productivity by 10%, increase basal vegetation cover by 41%, and decrease relative graminoid cover by 6% relative to ungrazed vegetation. Due to the inherent variability in meadow systems, considerable variation in observed changes would be expected. The magnitude of this variation is reflected in the coefficients of determination reported for the relationship between utilization and meadow response which range from 0.01 – 0.68 (table D-11).

BIOMASS CONSUMPTION RATES

Rates of biomass consumption are expressed as an amount of biomass grazed over a given period of time. As most grazing occurs during overnight stays (saddle and pack animals generally work during the day) the time period of interest is one night.

The amount of biomass grazed by a pack or saddle animal is related to the size of the animal. Ninety-four percent of all overnight stock use in the parks' is by horses and mules (Frenzel and Haultain 2013). Horses, mules, burros, and donkeys consume about 3% of their body weight each day (Holechek 1988). Among horses and mules, there is considerable variability in the size of animals that graze in the parks, with larger animals often used as saddle stock and smaller animals used as pack stock. Approximately 45% of all overnight stock use is by NPS-owned animals. The average size of horses and mules in the parks' herd is approximately 900-1000 pounds (NPS 2014). This gives an average nightly forage requirement of 27-30 pounds for horses and mules in the parks' herd. Making the assumption that the parks' herd may be slightly smaller than the other animals in the parks, a conservative nightly forage consumption of 32 pounds is assumed for horses and mules. Burros and llamas are smaller, and consume approximately 10 pounds and 7 pounds per night, respectively (Ratliff et al. 1987).

Capacities provided to stock users and managers are based on a nightly forage consumption of 32 pounds and are expressed in units of "stock nights" which is defined as an overnight stay by any horse, mule, burro, or llama. Capacities reported as stock nights (as opposed to the animal unit nights used in range management) are simple for stock users and managers to understand, track, and report. Information about animal type is included in stock use reports and is available to inform management decisions in the few places where burros and llamas make up a significant portion of the total grazing; therefore, more stock nights can be sustained in areas grazed by burros and llamas.

CAPACITY CALCULATION

Grazing capacities for the parks' forage areas are calculated as:

$$\frac{\text{area} * \text{preferred proportion} * \text{productivity} * \text{allowable utilization}}{\text{nightly forage consumption}} = \text{capacity in stock nights}$$

Model capacities are provided in table D-17 along with the model parameters.

EVALUATION AND REVISION OF CAPACITIES

Given the multiple complex goals and objectives for grazing management, the great variability in natural systems across space and time, and the difficulty in predicting the response of such systems to perturbation, it is expected that the model capacities provide only coarse estimates of the true grazing capacity in any given year. Therefore, evaluating grazing capacities against field observations and revising them upward or downward to better fulfill management goals and objectives will be an essential part of the adaptive management of pack and saddle stock grazing.

The evaluation process will include two complementary aspects: evaluation and revision of model parameters and evaluation of model capacities against observed conditions. All evaluations of model capacities or model parameters will be documented to provide a record of the information used, analysis performed, and the conclusions reached. This information will be reported as part of the annual monitoring report prepared by the plant ecology program each year.

EVALUATING AND REVISING MODEL PARAMETERS

The grazing capacities presented in table D-17 are based on the most up-to-date model parameters available. Qualitative and quantitative data collected in the field can be used to evaluate the model parameters area, preferred proportion, preferred vegetation type, moisture regime, productivity, and utilization.

AREA AND PREFERRED PROPORTION

Site visits can be used to document the extent of the meadow forage and the extent of preferred forage by observing actual stock grazing patterns at the end of the grazing season and noting the extent of area that has been preferentially grazed by stock. These model parameters can be revised as needed.

Where past grazing above modeled capacities has resulted in acceptable meadow condition, upland vegetation (such as the understory of forests and woodlands) is often an important source of additional forage for stock. Therefore, the model may underestimate grazing capacity in these forage areas. The extent of upland forage has been described narratively for some areas. Until quantitative data on the extent, productivity, and appropriate utilization rates for these areas become available, narrative descriptions may be used to identify management areas where total forage is grossly underestimated, and to adjust capacities upwards based on past use patterns and observed impacts. If quantitative data for the extent, productivity, and appropriate utilization rate become available, this data can be used to estimate capacity in upland areas using the same basic model as for meadow vegetation.

PREFERRED VEGETATION TYPE AND MOISTURE REGIME

Site visits can be used to document which species provide the preferred forage by observing actual stock grazing patterns at the end of the grazing season and noting the species which have been preferentially grazed by stock. The moisture category from Ratliff et al. (1987) can be reassigned as indicated by evaluation.

PRODUCTIVITY

The meadow productivity data provided in Ratliff et al. (1987) was based on relatively sparse data and may under- or over-predict forage productivity for any given forage area. Therefore, field measurements of productivity provide an opportunity to input more accurate data into the capacity model.

Residual biomass data measured on ungrazed reference sites provides an estimate of productivity. However, this data is measured in a relatively small area, so caution should be used in using these values to calculate capacity. At minimum, the reference sites may identify forage areas that consistently produce more or less forage biomass than predicted by the model (Abbott et al. 2003), which could result in inaccurate capacities.

Productivity estimates are averages. Annual weather fluctuations are not explicitly included in the model, although they are known to influence productivity. In high snowfall years, productivity can be reduced by cold wet soils and shorter growing seasons (Moore et al. 2013). In very low snowfall years, lack of soil moisture may limit productivity.

Comparison of model values to observed values illustrates the importance of interannual variability on productivity. Residual biomass data collected from ungrazed reference sites in the parks can be used to estimate the magnitude of interannual variation. Twenty-seven meadows had at least three years of reference residual biomass data. The coefficient of variation (ratio of the sample standard deviation to sample mean with small-sample correction [Sokal and Rohlf 1995]), for these meadows averaged 0.36. Data from three sites in Yosemite National Park had coefficients of variation ranging from 0.17 – 0.34 (Moore et al. 2013), while coefficients of variation of three vegetation types in Sequoia National Park ranged from 0.08 – 0.48 (Stohlgren et al. 1989). This variability highlights the need for multiple years of data collection to characterize productivity for use in the capacity model; 3 to 5 years should be considered the minimum needed (USDA 2014).

In years where very high or very low precipitation is an important factor, public information provided to stock users is used to warn them of reduced capacities. Monitoring of conditions throughout the season can indicate when a mid-season grazing closure is appropriate due to reduced productivity

Utilization

Utilization values have been selected which limit grazing induced changes in vegetation, soils, and hydrology. If these values fail to set capacities at a level which meets the goals and objectives of the WSP/FEIS, they could be revised accordingly.

Studies of the relationship between utilization and ecosystem properties conducted in comparable habitats (such as Cole et al. [2004] and Norton et al. [2013]) provide one source to revise utilization values. Residual biomass data provides coarse estimates of utilization. If observed conditions in a forage area with residual biomass monitoring are not meeting goals and objectives, utilization levels from the monitoring data could inform any changes to utilization levels.

The assumption has been made in setting utilization rates that utilization by wildlife, especially by large ungulates such as mule deer and bighorn sheep, is generally low. Horses and mules are characterized as patch grazers, as they tend to graze some areas very closely and leave other areas almost untouched. In most meadows, this use pattern results in areas of meadow vegetation remaining available for wildlife consumption and to meet habitat needs. In meadows monitored for residual biomass, field observations of end-of-season standing crop also account for wildlife utilization. If wildlife utilization is found to be an important consideration in a given meadow, utilization values could be revised to meet the goals and objectives of the plan.

EVALUATING AND REVISING ESTIMATED CAPACITIES

In the adaptive management context, each year becomes a data point for a given forage area. The primary tool for evaluating capacities is to compare observed grazing regimes (total amount of grazing, timing) to observed impacts. The model capacities presented in table D-17 have been evaluated with the information available. Where that information indicates that the model capacity should be revised, an "evaluated capacity" has been assigned using the methods described below. In order to ensure that the estimated capacities reflect the most current knowledge of meadow response to grazing, capacities would undergo a comprehensive reevaluation every five years, with annual modifications as needed to ensure resource protection. Changes to capacities would be made available for public comment by March 1 of each year along with other public use limits.

Comparison of Use Levels to Monitoring Data and Standards

Monitoring data (i.e., site visits, residual biomass, bare ground, streambank alteration) can be associated with grazing timing and intensity levels from stock use data.

If management goals and objectives are being met at an observed use level, then that use level is more likely to be less than or equal to the true capacity. If goals and objectives are not being met, then the observed use level is more likely to be greater than the true capacity. Over time, this should provide a more nuanced understanding of the relationship between total grazing levels and impacts and allow for refinement of grazing capacities.

In making comparisons between use levels and monitoring data, capacity will be evaluated at appropriate spatial (forage area) and temporal (multiple year) scales. In addition to foliage removal by grazing stock, poor agreement between model capacity and observed conditions may be attributable to factors other than defoliation. Climate anomalies should also be considered during evaluation of monitoring data against capacities to ensure that changes to capacities do not reflect atypical responses to grazing.

Impacts Other Than Defoliation

Where grazing at model capacities results in impacts outside of standards, impacts other than defoliation can be the factor limiting grazing capacity. In these areas, previous use levels can be compared to observed impacts to adjust capacity values. Use levels will be evaluated for their impacts in the following areas:

- Trampling
- Impacts to soils and hydrology
- Water quality
- Plant species composition
- Social conflicts

For example, concerns over mechanical impacts such as shearing, trampling in peat accumulating meadows and fens have been partially addressed by ensuring that these areas are not included in the preferred acreage of a meadow. Limiting capacity to the amount of forage available outside of fen areas may reduce the likelihood that stock will seek forage within the fen.

Grazing capacities will be evaluated and refined by continuing to document the grazing level at which impacts other than grazing occur. This will be done in a context which includes other aspects of the

grazing regime such as timing or stock handling practices. Some impacts may be more effectively mitigated through management tools other than grazing capacities, such as grazing opening dates or education of visitors and staff traveling with stock.

Timing and Intensity of Use

Managing grazing by livestock in the traditional sense differs from the management of recreational grazing in wilderness in that in the latter, the timing and intensity of grazing in any given location can be highly variable and is often unpredictable. The arrival and departure of animals at a given site can result in periods of rest for the meadow, during which vegetative growth may occur and thus result in increased capacity. Conversely, periods of intense grazing without recovery periods may lead to depletion of the allowable biomass before the estimated capacity is reached. On site monitoring allows for mid-season adjustments in use levels that reflect these conditions.

Table D-15: Regression Coefficients for Each Combination of Moisture Level and Condition*

Moisture	Condition	B_0	B_E
D	Excellent	3470	-0.265
D	Good	2275	-0.175
D	Fair	1520	-0.115
D	Poor	878	-0.0675
M	Excellent	7355	-0.51
M	Good	4725	-0.325
M	Fair	3225	-0.225
M	Poor	1825	-0.125
W	Excellent	7297	-0.5575
W	Good	4705	-0.36
W	Fair	3297	-0.2575
W	Poor	1780	-0.135

* Productivity for a given moisture and condition is given by $B_0 + B_E$*Elevation.

Table D-16: Forage Areas Designated as Having High Logistical Value

Kings Canyon National Park	Sequoia National Park
28-3 Cony Camp	77-7 Pinto Lake
28-4 Franklin-Montgomery	79-1 Cold Springs Camp Area
33-1 Evolution	79-5 Gallats Lake
39-2 Big Pete	80-3 Tyndall Cr
39-4 Ladder Camp	81-2.1 Wallace Cr/JMT Junction
39-8 Deer	83-4 Upper Crabtree
46-2 South Fork Kings River	83-7 Lower Whitney Creek
51-1 Simpson	83-8 Sandy
53-4.2 Glacier Valley	84-2 Lower Rock Creek Crossing
53-5 Fallen Moon	85-4 Penned-up
53-7 Shorty's	85-10 Nathan's
58-1 Castle Domes	86-1 Kern Bridge Camp
58-2 Woods Creek Crossing	86-2 Upper Funston
58-3 Baxter Creek Drift Fence	86-5 Lower Funston
63-1 Charlotte Creek	86-7 Lewis Camp Large Pasture
65-3 Upper Vidette	87-3 Big Arroyo Patrol Cabin
65-4 Upper Bubbs Creek	89-3 Lower Lost Canyon
66-3 Junction (Bubbs Creek)	89-9 Middle Rattlesnake Canyon
67-1 East Lake	89-10 Cow Camp (Rattlesnake Creek)
69-2.2 Upper West Side Roaring River	90-5.1 Hockett
69-3 JR Past; Allen Camp	90-5.2 Hockett Pasture
69-4 Lackey Pasture	90-9 Lower South Fork
69-5.1 Scaffold Tourist Pasture	90-10 South Fork Meadow
69-5.2 Grasshopper	90-11 South Fork Pasture
70-4 Cement Table	90-13 Slim's
70-5 Big Wet	
70-6 Grand Palace Hotel	
71-1 Austin Camp	
71-2 Grave	
71-3 Ranger	

Table D-17: Estimated Grazing Capacities for Forage Areas Open to Grazing under the NPS Preferred Alternative

Forage Area Number	Forage Area Name	Elevation, feet	Moisture	Vegetation Zone	Logistical Value	Area, acre	Preferred vegetation	Productivity, pounds /acre	Utilization	Model capacity, stock nights	Evaluated capacity, stock nights	Proposed capacity, stock nights	Avg. grazing stock nights/ year 2009-2013
28-1	Piute Cr	8050	D	U	L	0.8	100%	866	25%	5		5	0
28-2	Aspen	8200	M	L	L	0.5	100%	2060	35%	11		11	3.2
28-3	Cony Cmp	8420	M	L	H	1.8	100%	1989	45%	50		50	8.4
28-4	Franklin-Montgomery	8720	W	U	H	7.7	50%	1566	35%	66		66	19
28-5	Pig Chute	9160	M	U	L	0.8	100%	1748	25%	11		11	0
28-6	Hell-For-Sure Jct Area	10000	M	U	L	32.8	50%	1475	25%	189		189	5.8
33-1	Evolution	9230	M	U	H	13.4	80%	1725	35%	202		202	89
33-2	McClure	9630	W	U	L	21.3	50%	1238	25%	103		103	57.2
33-3	Colby	9700	W	U	L	9.6	75%	1213	25%	68		68	21.4
33-4.1	Upr Colby (Upr Colby #1)	9850	W	U	L	3.6	30%	1159	25%	10		10	0
33-4.2	Darwin Pockets (Upr Colby #2)	9850	W	U	L	4.5	30%	1159	25%	12		12	18.2
34-1	Evolution Lk	10860	W	U	L	60.4	25%	795	25%	94		94	0.2
34-2	Sapphire Lk	10970	W	U	L	36.8	35%	756	25%	76		76	0
34-3	Huxley Lk	11300	D	U	L	34.2	35%	298	25%	28		28	0
34-4	Wanda Lk	11400	D	U	L	100.9	15%	280	25%	33		33	0
38-2	Blue Cyn	8410	W	U	L	28.9	30%	1677	25%	114		114	21
38-3	Lwr Blue Cyn	8000	D	L	L	0.9	100%	875	25%	6		6	0
39-2	Big Pete	9230	W	U	H	3.2	75%	1382	35%	36	50	50	52
39-3	Little Pete	8860	W	U	L	10.3	60%	1515	25%	73		73	42.2
39-4	Ladder Cmp	8310	D	L	H	3.5	50%	821	35%	16	50	50	54.4

Table D-17: Estimated Grazing Capacities for Forage Areas Open to Grazing under the NPS Preferred Alternative (continued)

Forage Area Number	Forage Area Name	Elevation, feet	Moisture	Vegetation Zone	Logistical Value	Area, acre	Preferred vegetation	Productivity, pounds /acre	Utilization	Model capacity, stock nights	Evaluated capacity, stock nights	Proposed capacity, stock nights	Avg. grazing stock nights/ year 2009-2013
39-6	Palisade Cr Jct	8020	D	L	L	1.4	50%	872	25%	5		5	1.2
39-7	Stillwater; Lwr Deer	8430	M	L	L	5.8	60%	1985	35%	76		76	11
39-8	Deer	8840	W	U	H	15.4	25%	1523	35%	64	100	100	35.2
42-1	Dusy Cr	9500	M	L	L	1.2	50%	1638	35%	11		11	18.2
45-1	Palisade Lks	10650	M	U	L	26.7	40%	1264	25%	105		105	27.6
46-1	Upr Basin	11200	M	U	L	204	25%	1085	25%	432		432	53.6
46-2	South Fk Kings River	9900	M	U	H	51.3	30%	1508	35%	254		254	73
46-3	Bench Lk/John Muir Trail Jct	10900	W	U	L	50.6	80%	781	25%	247		247	19
46-4	Bench Lk	10550	M	U	L	4.6	60%	1296	25%	28		28	1.8
46-6	Lk Marjorie	11150	M	U	L	14.9	20%	1101	25%	26		26	1.2
51-1	Simpson	5930	M	L	H	22.8	25%	2798	45%	224		224	87.6
51-2	Tehipite Vly	4100	D	L	L	13	10%	1558	25%	16		16	5.8
51-3	Gnat	7850	M	L	L	5.5	25%	2174	35%	33		33	0
51-4	Hay	7320	M	L	L	5	50%	2346	35%	64		64	0
52-1	Volcanic Lks Basin	10000	M	U	L	46.5	10%	1475	25%	54		54	5.8
52-2	Kennedy Cyn	9300	M	U	L	32.4	60%	1703	25%	259		259	0
52-3	Upr Kennedy Cyn	9540	M	U	L	15.3	30%	1625	25%	58		58	0
52-4	Kennedy Pass	10400	M	U	L	19.1	25%	1345	25%	50		50	0
52-5	West Kennedy Lk	9963	M	U	L	4.3	25%	1487	25%	12		12	0
52-6	Frypan	7800	M	L	L	5.8	50%	2190	35%	69		69	0
52-8	Jug	9860	D	U	L	6.8	25%	550	25%	7		7	0
52-9	Big Cmp	9900	M	U	L	14.7	25%	1508	25%	43		43	0

Table D-17: Estimated Grazing Capacities for Forage Areas Open to Grazing under the NPS Preferred Alternative (continued)

Forage Area Number	Forage Area Name	Elevation, feet	Moisture	Vegetation Zone	Logistical Value	Area, acre	Preferred vegetation	Productivity, pounds /acre	Utilization	Model capacity, stock nights	Evaluated capacity, stock nights	Proposed capacity, stock nights	Avg. grazing stock nights/ year 2009-2013
53-1	Horseshoe	10200	M	U	L	25.1	20%	1410	25%	55		55	0
53-2	Horseshoe Lks Turnoff	10500	M	U	L	12.9	40%	1313	25%	53		53	0
53-3	State Lks Area	10400	M	U	L	39.6	30%	1345	25%	125		125	0
53-4.1	Dougherty	9500	M	U	L	7.1	50%	1638	25%	45		45	0
53-4.2	Glacier Vly	9950	M	U	H	25.7	40%	1491	35%	168		168	12.4
53-5	Fallen Moon	9540	W	U	H	18.8	25%	1271	35%	65		65	21.6
53-6	Volcanic Trail Jct	9420	W	U	L	2.3	50%	1314	25%	12		12	0
53-7	Shorty's	10070	W	U	H	7.8	50%	1080	35%	46		46	41.8
53-8	Granite Pass	10300	W	U	L	9.3	45%	997	25%	33		33	0
54-2	Granite Basin	10000	M	U	L	109.5	30%	1475	25%	379		379	22.5
54-3	Grouse Lk	10473	M	U	L	11.4	20%	1321	25%	24		24	0
54-4	Halfmoon	10260	M	U	L	6.1	75%	1391	25%	50		50	14.5
54-5.1	Upr Tent	8200	D	L	L	2.9	25%	840	25%	5		5	0
54-5.2	Lwr Tent	8200	D	L	L	2.3	25%	840	25%	4		4	0
56-1	High south of Pinchot Pass	11200	M	U	L	157.1	20%	1085	25%	266		266	31.2
56-2	Twin Lks Area (Woods Cr)	10600	M	U	L	89.7	20%	1280	25%	179		179	34
56-3	White Fk Cmp/Ghost Forest Cmp	9780	W	U	L	1	50%	1184	25%	5		5	2
57-1	Woods Lake Basin	10800	W	U	L	117.3	15%	817	25%	112		112	13
58-1	Castle Domes	8130	M	L	H	4.4	70%	2083	45%	90		90	36.8
58-2	Woods Cr Xing	8500	M	L	H	3	100%	1963	45%	83	75	75	95.2
58-3	Baxter Cr Drift Fence	9450	W	U	H	2.3	100%	1303	35%	33	40	40	45.6
63-1	Charlotte Cr	10000	W	U	H	30.1	25%	1105	35%	91		91	78.2

Table D-17: Estimated Grazing Capacities for Forage Areas Open to Grazing under the NPS Preferred Alternative (continued)

Forage Area Number	Forage Area Name	Elevation, feet	Moisture	Vegetation Zone	Logistical Value	Area, acre	Preferred vegetation	Productivity, pounds /acre	Utilization	Model capacity, stock nights	Evaluated capacity, stock nights	Proposed capacity, stock nights	Avg. grazing stock nights/ year 2009-2013
65-3	Upr Vidette	10680	W	U	H	5.7	50%	860	35%	27		27	1.2
65-4	Upr Bubbs Cr	10400	M	U	H	39.3	25%	1345	35%	145		145	119
66-1.1	Sphinx Cr Conf	6240	D	L	L	2.5	75%	1183	25%	17		17	0
66-1.2	Angleworm	6840	D	L	L	0.2	75%	1078	25%	1		1	0
66-2	Charlotte Cr Conf	7300	W	L	L	18.5	10%	2077	25%	30		30	0
66-3	Junction (Bubbs Cr)	8130	D	L	H	7	25%	852	35%	16	50	50	49.2
67-1	East Lk	9550	W	U	H	4.8	50%	1267	35%	33	50	50	56
67-2	Ouzel	9580	M	U	L	1.8	70%	1612	25%	16		16	0.2
68-1	Screwball	8550	W	L	L	2.4	50%	1627	25%	15		15	2.8
69-1	The Big Hole	7600	M	L	L	0.6	100%	2255	35%	15		15	0
69-2.1	Lwr West Side Roaring River	7200	D	L	L	2.4	100%	1015	25%	19		19	0
69-2.2	Upr West Side Roaring River	7600	D	L	H	1.5	100%	945	35%	16	75	75	45.4
69-3	JR Past; Allen Cmp	7380	M	L	H	0.9	100%	2327	45%	29	50	50	49.4
69-4	Lackey Past; Scaffold	7370	M	L	H	1.9	75%	2330	45%	47	55	55	48.4
69-5.1	Scaffold Tourist Past	7360	M	L	H	9.5	60%	2333	45%	187		187	311
69-5.2	Grasshopper	7700	M	U	H	3.1	60%	2223	35%	45		45	22
69-6.1	Moraine	8160	W	U	L	6	80%	1767	25%	66		66	0
69-6.2	Moraine Stringers	8800	W	U	L	10.4	80%	1537	25%	100		100	0
69-6.3	Metroyhoy	9500	W	U	L	11.3	80%	1285	25%	91		91	0
70-1.1	Grasshopper Cmp; Brewer Cr Conf	7980	M	L	L	1.4	50%	2132	35%	16		16	0.6
70-1.2	Brewer Stringers	10400	M	U	L	4.2	50%	1345	25%	22		22	5.6
70-2	Barton Stringers	9400	M	U	L	8.8	50%	1670	25%	57		57	0

Table D-17: Estimated Grazing Capacities for Forage Areas Open to Grazing under the NPS Preferred Alternative (continued)

Forage Area Number	Forage Area Name	Elevation, feet	Moisture	Vegetation Zone	Logistical Value	Area, acre	Preferred vegetation	Productivity, pounds /acre	Utilization	Model capacity, stock nights	Evaluated capacity, stock nights	Proposed capacity, stock nights	Avg. grazing stock nights/ year 2009-2013
70-3	False Cement Table	8430	M	U	L	3.6	60%	1985	25%	34		34	0
70-4	Cement Table	8540	W	U	H	5.9	75%	1631	35%	79		79	17.2
70-5	Big Wet	8740	W	U	H	29.4	35%	1559	35%	175		175	26.2
70-6	Grand Palace Hotel	9040	M	U	H	5.7	45%	1787	35%	50		50	14.2
70-7	Colby Lk	10620	D	U	L	4.4	20%	417	25%	3		3	0.6
71-1	Austin Cmp (all)	7950	M	U	H	5	60%	2141	35%	70		70	58.6
71-2	Grave	8400	M	U	H	5.1	50%	1995	35%	56		56	37.8
71-3	Ranger (all)	8780	W	U	H	49.5	35%	1544	35%	293		293	86
71-4	Upr Ranger	9230	M	U	L	11.7	30%	1725	25%	47		47	2.6
71-5	Upr Deadman Cyn	9400	M	U	L	35.4	5%	1670	25%	23		23	0
72-1	Pond	8500	W	L	L	2.5	50%	1645	25%	16		16	0
72-2	Catch'em	8900	W	L	L	2.9	50%	1501	25%	17		17	0
72-3	Willow (Sugarloaf Cr)	9200	W	L	L	9.9	50%	1393	25%	54		54	0
72-4	Mitchell (Sheep Cr)	9600	W	U	L	25.6	50%	1249	25%	125		125	0
72-5	Quartz	8920	M	U	L	5.4	20%	1826	25%	15		15	0
72-6	Williams	8020	M	L	L	31.8	20%	2119	35%	147		147	0
72-7	Comanche	7820	W	L	L	4.3	20%	1890	25%	13		13	0
72-8	Sugarloaf	7300	M	L	L	23.2	50%	2353	35%	298		298	52.2
72-9	Little Sugarloaf	7200	M	L	L	3.6	50%	2385	35%	47		47	0
72-10	Sugarloaf Cr Cmp	6960	D	L	L	0.7	50%	1057	25%	3		3	0
72-11	Tom Sears; Honeymoon	7100	W	L	L	2.3	10%	2149	25%	4		4	0
72-12	Boggy	7240	M	L	L	2.1	50%	2372	35%	27		27	0

Table D-17: Estimated Grazing Capacities for Forage Areas Open to Grazing under the NPS Preferred Alternative (continued)

Forage Area Number	Forage Area Name	Elevation, feet	Moisture	Vegetation Zone	Logistical Value	Area, acre	Preferred vegetation	Productivity, pounds /acre	Utilization	Model capacity, stock nights	Evaluated capacity, stock nights	Proposed capacity, stock nights	Avg. grazing stock nights/ year 2009-2013
72-13.1	Cabbage	7760	D	L	L	2.9	50%	917	25%	10		10	0
72-13.2	Crowley Cyn	8000	D	L	L	1.1	50%	875	25%	4		4	0
72-13.3	Upr Crowley Cyn Pockets	8940	M	U	L	20.5	25%	1820	25%	73		73	0
72-14.1	Lwr Box Cyn	8200	W	U	L	1.6	25%	1753	25%	5		5	0
72-14.2	Suez Canal	9140	W	U	L	5	25%	1415	25%	14		14	0
72-14.3	Upr Box Cyn	9750	W	U	L	16.2	25%	1195	25%	38		38	0
72-16.1	Lwr Paradise	8980	M	U	L	5.6	40%	1807	25%	32		32	0
72-16.2	Upr Paradise	9150	M	U	L	14.3	40%	1751	25%	78		78	0
72-17.1	Lwr Log	8780	M	U	L	2.6	25%	1872	25%	10		10	0
72-17.2	Upr Log	8900	M	U	L	6	25%	1833	25%	21		21	0
72-17.3	Salt Log	8940	M	U	L	0.6	25%	1820	25%	2		2	0
72-17.4	Ditch	8980	W	U	L	1.3	25%	1472	25%	4		4	0
72-17.5	Sheep Pen Meadow	9020	W	U	L	8.5	25%	1458	25%	24		24	0
72-18	Ferguson	8637	M	U	L	9.4	50%	1918	25%	70		70	3.2
72-19	Long (Ferguson Cr)	9590	W	U	L	66.1	40%	1253	25%	259		259	0
72-20.1	Lwr Lewistall	8580	W	U	L	4.5	50%	1616	25%	28		28	0
72-20.2	Upr Lewistall	8820	W	U	L	2.6	50%	1530	25%	16		16	0
72-21	Little Jack	9380	W	U	L	1.3	50%	1328	25%	7		7	0
72-22	Scenic	9780	M	U	L	32.7	35%	1547	25%	138		138	0
73-1	Sheep Cmp (Sugarloaf Cr)	8270	M	U	L	2.4	60%	2037	25%	23		23	0
73-3	Lovelace Cabin	8740	M	U	L	2.8	80%	1885	25%	33		33	0
73-4	Lost Lk	9130	W	U	L	0.8	60%	1418	25%	5		5	5.2

Table D-17: Estimated Grazing Capacities for Forage Areas Open to Grazing under the NPS Preferred Alternative (continued)

Forage Area Number	Forage Area Name	Elevation, feet	Moisture	Vegetation Zone	Logistical Value	Area, acre	Preferred vegetation	Productivity, pounds /acre	Utilization	Model capacity, stock nights	Evaluated capacity, stock nights	Proposed capacity, stock nights	Avg. grazing stock nights/ year 2009-2013
73-5	Ranger & Beville Lks	9142	W	U	L	4	50%	1414	25%	22		22	5
74-1	Twin Lks (Clover Cr)	9430	M	U	L	5.7	50%	1660	25%	37		37	0
74-2	Pattee	9260	M	U	L	9.4	50%	1716	25%	63		63	0
74-3	Clover Cr	8434	M	U	L	33.9	50%	1984	25%	263		263	0
74-4	Cahoon (Silliman Cr)	7760	W	U	L	14.9	50%	1911	25%	111		111	0
75-1	Lone Pine	8800	M	U	L	9.4	25%	1865	25%	34		34	13.2
75-2	Tamarack Lk	9215	M	U	L	4.1	15%	1730	25%	8		8	7.2
77-1	Bearpaw	7460	M	L	L	1.3	75%	2301	35%	25		25	1.4
77-2	Lwr Bearpaw	6860	M	L	L	9.1	60%	2496	35%	149		149	0
77-3	River Vly	6480	D	L	L	0.7	100%	1141	25%	6		6	0
77-5	Redwood	6040	M	L	L	10	40%	2762	35%	121		121	35.8
77-6	Cliff Cr	7400	M	L	L	4.6	40%	2320	35%	47		47	3.4
77-7	Pinto Lk	8700	M	U	H	5.6	50%	1898	35%	58		58	33
79-1	Cold Springs Cmp Area	9180	W	U	H	16	50%	1400	35%	123		123	126
79-3	Rockslide Lk	9050	M	U	L	12.1	25%	1784	25%	42		42	0
79-4	Lwr Kern-Kaweah River	9700	M	U	L	12.2	35%	1573	25%	52		52	35.8
79-5	Gallats Lk	10030	M	U	H	33.2	25%	1465	35%	133		133	30.4
79-6	Upr Kern-Kaweah River	10350	M	U	L	146.9	9%	1361	25%	141		141	52.4
80-2	Tyndall Cr/JMT Frog Ponds	11050	M	U	L	29.3	40%	1134	25%	104		104	7.4
80-3	Tyndall Cr	10600	M	U	H	14.6	50%	1280	35%	102		102	96.2
80-4	Sheep Cmp (Tyndall Cr)	11400	M	U	L	796.4	20%	1020	25%	1269		1269	15.6
80-5.1	Lk South America	11950	M	1	0	22.8	50%	841	25%	75		75	0

Table D-17: Estimated Grazing Capacities for Forage Areas Open to Grazing under the NPS Preferred Alternative (continued)

Forage Area Number	Forage Area Name	Elevation, feet	Moisture	Vegetation Zone	Logistical Value	Area, acre	Preferred vegetation	Productivity, pounds /acre	Utilization	Model capacity, stock nights	Evaluated capacity, stock nights	Proposed capacity, stock nights	Avg. grazing stock nights/ year 2009-2013
80-6	Kern Headwaters	11200	W	1	0	201.8	10%	673	25%	106		106	21.8
81-1	Wright Cr Drainage	10900	M	U	L	507	25%	1183	25%	1171		1171	100.6
81-2.1	Wallace Cr/JMT Jct	10400	M	U	H	3.2	30%	1345	35%	14		14	9.6
81-2.2	Wallace Cr	10500	M	U	L	7.3	50%	1313	25%	37		37	18.6
81-2.3	Wallace Cr Waterfall	10860	W	U	L	9.8	40%	795	25%	24		24	0
81-2.4	Marshy	11100	W	U	L	5.4	40%	709	25%	12		12	0
82-1	Junction (Kern)	8050	W	L	L	1.7	65%	1807	25%	16		16	6.6
82-2	One mi below Junction	8000	D	L	L	0.3	100%	875	25%	2		2	1.8
82-3	Three mi below Junction	7700	D	L	L	1.4	100%	928	25%	10		10	0
83-4	Upr Crabtree	10460	W	U	H	38.9	30%	939	35%	120		120	76.6
83-6	Crabtree Lks	10900	M	U	L	9.2	70%	1183	25%	59		59	0
83-7	Lwr Whitney Cr; Strawberry	9950	M	U	H	5.9	30%	1491	35%	29		29	44.8
83-8	Sandy	10600	M	U	H	47.9	30%	1280	35%	201	300	300	258
84-2	Lwr Rock Cr Xing	9500	M	U	H	47.1	25%	1638	35%	211		211	184.2
84-6	Siberian Outpost	10780	D	U	L	270.6	40%	389	25%	329		329	1.2
85-4	Penned-up	10650	W	U	H	10.8	50%	871	35%	51		51	25.8
85-6	Lwr Soldier Lk	10800	W	U	L	25	20%	817	25%	32		32	3.6
85-7	New Army Pass Jct	10920	M	U	L	50.1	25%	1176	25%	115		115	3.6
85-8	Rock Cr Lk (all)	10430	W	U	L	32.5	40%	950	25%	97		97	29.2
85-10	Nathan's	10020	M	U	H	15.7	50%	1469	35%	126	75	75	43.5
86-1	Kern Bridge Cmp	6800	W	L	H	6.1	75%	2257	35%	113	150	150	297.8
86-2	Upr Funston	6700	M	L	H	10.3	30%	2548	45%	111		111	59.6

Table D-17: Estimated Grazing Capacities for Forage Areas Open to Grazing under the NPS Preferred Alternative (continued)

Forage Area Number	Forage Area Name	Elevation, feet	Moisture	Vegetation Zone	Logistical Value	Area, acre	Preferred vegetation	Productivity, pounds /acre	Utilization	Model capacity, stock nights	Evaluated capacity, stock nights	Proposed capacity, stock nights	Avg. grazing stock nights/ year 2009-2013
86-3	Big Arroyo Conf	6640	D	L	L	1.6	40%	1113	25%	6		6	0
86-4	21-inch Cmp	6580	M	L	L	3.1	30%	2587	35%	26		26	7.4
86-5	Lwr Funston	6480	W	L	H	4.4	50%	2372	35%	57		57	0
86-6	Rattlesnake Cmp; River Past	6390	M	L	L	1.1	50%	2648	35%	16		16	0
86-7	Lewis Cmp Large Past	6400	M	L	H	9	60%	2645	45%	201	220	220	182
86-8	Kern Station Small Past	6440	M	L	L	1.5	50%	2632	35%	22		22	1.4
87-1	Upr Big Arroyo	9960	D	U	L	84.9	85%	532	25%	300		300	73.4
87-2	Little Upr Big Arroyo	9780	M	U	L	6.6	40%	1547	25%	32		32	0
87-3	Big Arroyo Patrol Cabin	9510	W	U	H	5.3	95%	1281	35%	71		71	47
87-4	Lwr Big Arroyo	9200	M	U	L	26.2	80%	1735	25%	284		284	73
87-5	Chagoopa Plateau #1	10460	W	U	L	10.1	40%	939	25%	30		30	0
87-6	Chagoopa Plateau #2	10430	W	U	L	8.7	75%	950	25%	48		48	0
87-8	Chagoopa Plateau #4	9960	W	U	L	14.3	75%	1119	25%	94		94	0
87-9	Chagoopa Plateau Treehouse	10380	M	U	L	14.1	66%	1352	25%	98		98	0
87-10	Sky Parlor	9150	D	U	L	66.2	60%	674	25%	209		209	34.4
88-1	Lwr Little Five Lks	10420	M	U	L	54	10%	1339	25%	56		56	2.6
88-2	Upr Little Five Lks	10520	W	U	L	14.8	50%	918	25%	53		53	3.2
88-3	Big Five Lks Lwr	9900	W	U	L	5.4	50%	1141	25%	24		24	2.4
88-4	Big Five Lks Upr	10220	W	U	L	22.2	35%	1026	25%	62		62	4.4
88-5	Big Five Lks Upr Stringer	10580	W	U	L	2.5	100%	896	25%	18		18	0.6
89-2	Upr Lost Cyn (all)	10100	M	U	L	31	40%	1443	25%	140		140	55.4
89-3	Lower Lost Cyn (all)	9650	M	U	H	20.2	30%	1589	35%	105		105	102.2

Table D-17: Estimated Grazing Capacities for Forage Areas Open to Grazing under the NPS Preferred Alternative (continued)

Forage Area Number	Forage Area Name	Elevation, feet	Moisture	Vegetation Zone	Logistical Value	Area, acre	Preferred vegetation	Productivity, pounds /acre	Utilization	Model capacity, stock nights	Evaluated capacity, stock nights	Proposed capacity, stock nights	Avg. grazing stock nights/ year 2009-2013
89-4	Soda Cr Cyn	9200	M	U	L	23.8	50%	1735	25%	161		161	0
89-5.1	Forester Lk Bench	10760	M	U	L	29.4	75%	1228	25%	212		212	1.6
89-5.3	Forester Lk Pocket	10710	M	U	L	6.3	50%	1244	25%	31		31	0
89-6	Upr Rattlesnake Cyn	10440	M	U	L	6.4	50%	1332	25%	33		33	14.8
89-7	Shotgun Pass	10585	M	U	L	20.5	50%	1285	25%	103		103	0.4
89-8	South Rattlesnake Cyn	10320	W	U	L	20.9	30%	990	25%	48		48	0
89-9	Middle Rattlesnake Cyn	9500	W	U	H	7.2	60%	1285	35%	61		61	47.2
89-10	Cow Cmp (Rattlesnake Cr)	8720	M	U	H	14.4	25%	1891	35%	74		74	49
89-11	Laurel Cr Basin	10400	M	U	L	77	25%	1345	25%	202		202	0
89-12	Crytes Cr	10650	M	U	L	26	35%	1264	25%	90		90	0
89-13	Coyote Cr	9400	M	U	L	36.6	50%	1670	25%	239		239	0.6
90-1	Horse Cr	8580	M	U	L	1.8	75%	1937	25%	20		20	0
90-2	Ansel Lk	10540	M	U	L	19.9	10%	1300	25%	20		20	0
90-3	Evelyn Lk	8700	M	U	L	0.8	50%	1898	25%	6		6	0
90-4	Cow Cmp (Hockett)	8470	M	U	L	5.3	30%	1972	25%	24		24	1.6
90-5.1	Hockett	8500	M	U	H	42.1	35%	1963	35%	316		316	179.6
90-5.2	Hockett Past	8500	M	U	H	8.3	65%	1963	35%	116	100	100	63
90-6	Sand	8540	W	U	L	43.8	50%	1631	25%	279		279	2.4
90-8	Tuohy Cr Jct	8275	D	U	L	3.2	50%	827	25%	10		10	0
90-9	Lwr South Fk	8500	D	U	H	18.2	50%	788	35%	78		78	58
90-10	South Fk Mdw	8515	M	U	H	13.2	50%	1958	35%	141		141	45.4
90-11	South Fk Past	8560	M	U	H	9.3	50%	1943	35%	99		99	34.4

Table D-17: Estimated Grazing Capacities for Forage Areas Open to Grazing under the NPS Preferred Alternative (continued)

Forage Area Number	Forage Area Name	Elevation, feet	Moisture	Vegetation Zone	Logistical Value	Area, acre	Preferred vegetation	Productivity, pounds /acre	Utilization	Model capacity, stock nights	Evaluated capacity, stock nights	Proposed capacity, stock nights	Avg. grazing stock nights/ year 2009-2013
90-12	Blossom Lk	10200	M	U	L	5.9	30%	1410	25%	19		19	0
90-13	Slim's	8860	M	U	H	8	50%	1846	35%	81		81	60.8
90-14	Green; Cabin	9350	M	U	L	44.1	20%	1686	25%	116		116	29.2
90-15	Tuohy	8350	M	U	L	5.8	50%	2011	25%	46		46	0
90-16	Summit	8980	M	U	L	13.5	50%	1807	25%	95		95	0
90-17	Cyclone	9290	W	U	L	31.4	40%	1361	25%	134		134	1
90-18	Summit Lk	9340	W	U	L	3.9	35%	1343	25%	14		14	0
90-19	Quinn	8340	M	U	L	23.8	50%	2015	25%	187		187	8
91-1	Ladybug Cmp	4280	D	L	L	0.4	100%	1526	25%	5		5	0
91-2	Whiskey Log Cmp	5300	D	L	L	0.4	100%	1348	25%	4		4	0
91-3	Cahoon (Hockett)	7340	M	L	L	18.5	50%	2340	35%	237		237	0
96-1	North Fk Kaweah River	1900	D	L	L	9.7	90%	1943	25%	132		132	0

Notes: Forage area number is "travel zone – number."
Moisture is D = dry, M = moist, W = wet.
Vegetation zone is U = upper montane and subalpine, L = lower montane and woodland.
Logistical value is H = higher, L = lower.
Preferred vegetation is the percentage of the meadow area which is preferentially grazed by stock.
Productivity is 65% of the maximum productivity from Ratliff et al. (1987).
Utilization is the maximum percentage of annual plant production that may be grazed.
Model capacity is total production divided by consumption rate.
Evaluated capacity is capacity developed through an evaluation of past use and impacts.
Proposed capacity is the evaluated capacity (if listed) or model capacity.

LITERATURE CITED

Abbott, L.B., R.D. Piper, and K.E. Young

2003 *Analysis of Residual Biomass Monitoring Program in Sequoia and Kings Canyon National Parks*. Department of Animal and Range Sciences, New Mexico State University, Las Cruces, New Mexico. Submitted to Sylvia Haultain, Plant Ecologist, Sequoia and Kings Canyon National Parks. 201 pp.

Barbour, M.G., J.H. Burk, W.D. Pitts, F.S. Gilliam, and M.W. Schwartz

1998 *Terrestrial plant ecology*, 3rd Edition. Benjamin/Cummings. Menlo Park, CA.

Ballenger, L.

2013 *Pack stock grazing capacity calculations for pilot management study of Upper Lyell Canyon, Yosemite National Park*. Accessed online (12/18/2014): http://www.nps.gov/yose/parkmgmt/upload/Report_MdwGC_Lyell_20130519_final-2.pdf

Cole, D.N., J.W. Van Wagtendonk, M.P. McClaran, P.E. Moore, and N.K. McDougald

2004 Response of Mountain Meadows to Grazing by Recreational Pack Stock. *Journal of Range Management*, Vol. 57, No. 2 (Mar., 2004), pp. 153-160.

Crane, B. K.

1950 Condition and grazing capacity of wet meadows on the east slope of the Sierra Nevada Mountains. *Journal of Range Management*, 303-307.

Frenzel, E. and S.A. Haultain

2013 *Summary report of stock use and grazing in wilderness meadows Sequoia and Kings Canyon National Parks, 2012*. Unpublished report on file. Sequoia and Kings Canyon National Parks, Three Rivers, CA.

Haultain, S.A.

2009 *Refining estimates of forage area grazing capacities in wilderness meadows of Sequoia and Kings Canyon National Parks*. Unpublished report on file. Three Rivers, CA.

Holechek, J.L.

1988 An Approach for Setting the Stocking Rate. *Rangelands*, Vol. 10, No. 1 (Feb., 1988), pp. 10-14.

McClaran, M.P. and D.N. Cole

1993 *Improving packstock management in wilderness*. General Technical Report INT-301. Ogden, UT: Intermountain Research Station, Forest Service, U.S. Department of Agriculture. 33 pp.

Moore, P.E., J.W. van Wagtendonk, J.L. Yee, M.P. McClaran, D.N. Cole, N.K. McDougald, and M.L. Brooks

2013 Net primary productivity of subalpine meadows in Yosemite National Park in relation to climate variability. *Western North American Naturalist*, 73(4), 409-418.

National Park Service (NPS)

2007 *Vegetation map of Sequoia and Kings Canyon National Parks*. Digital file. Three Rivers, CA.

2014 Nick Knutson, corrals manager, Sequoia and Kings Canyon National Parks. Telephone conversation with Erik Frenzel, NPS Ecologist, 12/16/2014 regarding consumption rates of park pack stock.

Neuman, M.J.

1994 *Refining estimates of forage area grazing capacities*. Unpublished report on file. Sequoia and Kings Canyon National Parks, Three Rivers, CA.

Norton, J.B., H.R. Olsen, L.J. Jungst, D.E. Legg, and W.R. Horwath

2014 Soil carbon and nitrogen storage in alluvial wet meadows of the Southern Sierra Nevada Mountains, USA. *Journal of Soils and Sediments*, 14(1), 34-43.

Ratliff, R.D.

1974 *Short-hair sedge: its condition in the high Sierra Nevada of California*. Research Note PSW-293. Berkeley, CA: Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture. 5 p.

1976 *Decomposition of filter paper and herbage in meadows of the high Sierra Nevada: preliminary results*. Research Note PSW-308. Berkeley, CA: Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture; 1976. 4 p.

1980 Decomposition of native herbage and filter paper at five meadow sites in Sequoia National Park, California. *Journal of Range Management*, 262-266.

1985 *Meadows in the Sierra Nevada of California: state of knowledge*. General Technical Report PSW-84. Berkeley, CA: Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture; 1985. 52 p.

Ratliff, R.D., M.R. George, and N.K. McDougald

1987 *Managing livestock grazing on meadows of California's Sierra Nevada*. University of California Cooperative Extension Leaflet, 21421.

Sharsmith, C.W.

1959 *A report of the status, changes and ecology of back country meadows in Sequoia and Kings Canyon National Parks*. Unpublished report on file. Three Rivers, CA.

Society for Range Management

1998 *Glossary of terms used in range management, fourth edition*. Edited by the Glossary Update Task Group, Thomas E. Bedell, Chairman.

Sokal, R.R. and F.J. Rohlf

1995 *Biometry* (3rd Ed). New York: Freeman, 1995. p. 58.

Stohlgren, T.J., S.H. DeBenedetti, and D.J. Parsons

1989 Effects of herbage removal on productivity of selected High-Sierra meadow community types. *Environmental Management* 13:485-491.

Sumner, L.E.

1941 *Special report on range management and wildlife protection in Kings Canyon National Park*. Unpublished report on file. Three Rivers, CA.

United States Department of Agriculture, Natural Resources Conservation Service

2014 Jon Gustafson, State Rangeland Ecologist. Email message to Erik Frenzel, NPS Ecologist, regarding assessing plant productivity, 12/17/2014.

United States Forest Service (USFS)

1969 *FSH 2209.21—Range environmental analysis handbook.* San Francisco, CA.

2001 *Management direction for the Ansel Adams, John Muir and Dinkey Lakes Wildernesses, Appendix G.* Final environmental impact statement.



Appendix E

Wilderness Legislation Related to Sequoia and Kings Canyon National Parks

ON THE PREVIOUS PAGE
Bubbs Canyon
NPS Photo

APPENDIX: E

WILDERNESS LEGISLATION RELATED TO SEQUOIA AND KINGS CANYON NATIONAL PARKS

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WILDERNESS ACT OF 1964

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WILDERNESS ACT

Public Law 88-577 (16 U.S. C. 1131-1136)
88th Congress, Second Session
September 3, 1964

AN ACT
To establish a National Wilderness Preservation System for the permanent good of the whole people, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled.

Short Title

Section 1. This Act may be cited as the "Wilderness Act."

WILDERNESS SYSTEM ESTABLISHED STATEMENT OF POLICY

Section 2.(a) In order to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas within the United States and its possessions, leaving no lands designated for preservation and protection in their natural condition, it is hereby declared to be the policy of the Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness. For this purpose there is hereby established a National Wilderness Preservation System to be composed of federally owned areas designated by Congress as ''wilderness areas'', and these shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness; and no Federal lands shall be designated as "wilderness areas" except as provided for in this Act or by a subsequent Act.

(b) The inclusion of an area in the National Wilderness Preservation System notwithstanding, the area shall continue to be managed by the Department and agency having jurisdiction thereover immediately before its inclusion in the National Wilderness Preservation System unless otherwise provided by Act of Congress. No appropriation shall be available for the payment of expenses or salaries for the administration of the National Wilderness Preservation System as a separate unit nor shall any appropriations be available for additional personnel stated as being required solely for the purpose of managing or administering areas solely because they are included within the National Wilderness Preservation System.

DEFINITION OF WILDERNESS

(c) A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

NATIONAL WILDERNESS PRESERVATION SYSTEM - EXTENT OF SYSTEM

Section 3.(a) All areas within the national forests classified at least 30 days before September 3, 1964 by the Secretary of Agriculture or the Chief of the Forest Service as ''wilderness'', ''wild'', or ''canoe'' are hereby designated as wilderness areas. The Secretary of Agriculture shall -

(1) Within one year after September 3, 1964, file a map and legal description of each wilderness area with the Interior and Insular Affairs Committees of the United States Senate and the House of Representatives, and such descriptions shall have the same force and effect as if included in this Act: Provided, however, That correction of clerical and typographical errors in such legal descriptions and maps may be made.

(2) Maintain, available to the public, records pertaining to said wilderness areas, including maps and legal descriptions, copies of regulations governing them, copies of public notices of, and reports submitted to Congress regarding pending additions, eliminations, or modifications. Maps, legal descriptions, and regulations pertaining to wilderness areas within their respective jurisdictions also shall be available to the public in the offices of regional foresters, national forest supervisors, and forest rangers.

Classification. (b) The Secretary of Agriculture shall, within ten years after September 3, 1964, review, as to its suitability or nonsuitability for preservation as wilderness, each area in the national forests classified on September 3, 1964 by the Secretary of Agriculture or the Chief of the Forest Service as ''primitive'' and report his findings to the President.
Presidential recommendation to Congress. The President shall advise the United States Senate and House of Representatives of his recommendations with respect to the designation as ''wilderness'' or other reclassification of each area on which review has been completed, together with maps and a definition of boundaries. Such advice shall be given with respect to not less than one-third of all the areas now classified as ''primitive'' within three years after September 3, 1964, not less than two-thirds within seven years after September 3, 1964, and the remaining areas within ten years after September 3, 1964.
Congressional approval. Each recommendation of the President for designation as ''wilderness'' shall become effective only if so provided by an Act of Congress. Areas classified as ''primitive'' on September 3, 1964 shall continue to be administered under the rules and regulations affecting such areas on September 3, 1964 until Congress has determined otherwise. Any such area may be increased in size by the President at the time he submits his recommendations to the Congress by not more than five thousand acres with no more than one thousand two hundred and eighty acres of such increase in any one compact unit; if it is proposed to increase the size of any such area by more than five thousand acres or by more than one thousand two hundred and eighty acres in any one compact unit the increase in size shall not become effective until acted upon by Congress. Nothing herein contained shall limit the President in proposing, as part of his recommendations to Congress, the alteration of existing boundaries of primitive areas or recommending the addition of any contiguous area of national forest lands predominantly of wilderness value. Notwithstanding any other provisions of this Act, the Secretary of Agriculture may complete his review and delete such area as may be necessary, but not to exceed seven thousand acres, from the southern tip of the Gore Range-Eagles Nest Primitive Area, Colorado, if the Secretary determines that such action is in the public interest.

Report to President. (c) Within ten years after September 3, 1964 the Secretary of the Interior shall review every roadless area of five thousand contiguous acres or more in the national parks, monuments and other units of the national park system and every such area of, and every roadless island within the national wildlife refuges and game ranges, under his jurisdiction on September 3, 1964 and shall report to the President his recommendation as to the suitability or nonsuitability of each such area or island for preservation as wilderness.
Presidential recommendation to Congress. The President shall advise the President of the Senate and the Speaker of the House of Representatives of his recommendation with respect to the designation as wilderness of each such area or island on which review has been completed, together with a map thereof and a definition of its boundaries. Such advice shall be given with respect to not less than one-third of the areas and islands to be reviewed under this subsection within three years after September 3, 1964, not less than two-thirds within seven years of September 3, 1964 and the remainder within ten years of September 3, 1964.
Congressional approval. A recommendation of the President for designation as wilderness shall become effective only if so provided by an Act of Congress. Nothing contained herein shall, by implication or otherwise, be construed to lessen the present statutory authority of the

Secretary of the Interior with respect to the maintenance of roadless areas within units of the national park system.

Suitability. (d)(1) The Secretary of Agriculture and the Secretary of the Interior shall, prior to submitting any recommendations to the President with respect to the suitability of any area for preservation as wilderness –
Publication in Federal Register. (A) give such public notice of the proposed action as they deem appropriate, including publication in the Federal Register and in a newspaper having general circulation in the area or areas in the vicinity of the affected land;
Hearings. (B) hold a public hearing or hearings at a location or locations convenient to the area affected. The hearings shall be announced through such means as the respective Secretaries involved deem appropriate, including notices in the Federal Register and in newspapers of general circulation in the area: Provided, That if the lands involved are located in more than one State, at least one hearing shall be held in each State in which a portion of the land lies;
(C) at least thirty days before the date of a hearing advise the Governor of each State and the governing board of each county, or in Alaska the borough, in which the lands are located, and Federal departments and agencies concerned, and invite such officials and Federal agencies to submit their views on the proposed action at the hearing or by no later than thirty days following the date of the hearing.
Any views submitted to the appropriate Secretary under the provisions of (1) of this subsection with respect to any area shall be included with any recommendations to the President and to Congress with respect to such area.
Proposed modification. (e) Any modification or adjustment of boundaries of any wilderness area shall be recommended by the appropriate Secretary after public notice of such proposal and public hearing or hearings as provided in subsection (d) of this section. The proposed modification or adjustment shall then be recommended with map and description thereof to the President. The President shall advise the United States Senate and the House of Representatives of his recommendations with respect to such modification or adjustment and such recommendations shall become effective only in the same manner as provided for in subsections (b) and (c) of this section.

USE OF WILDERNESS AREAS

Section 4.(a) The purposes of this Act are hereby declared to be within and supplemental to the purposes for which national forests and units of the national park and national wildlife refuge systems are established and administered and -
(1) Nothing in this Act shall be deemed to be in interference with the purpose for which national forests are established as set forth in the Act of June 4, 1897 (30 Stat. 11), and the Multiple-Use Sustained-Yield Act of June 12, 1960 (74 Stat. 215) (16 U.S.C. 528-531).
(2) Nothing in this Act shall modify the restrictions and provisions of the Shipstead-Nolan Act (Public Law 539, Seventy-first Congress, July 10, 1930; 46 Stat. 1020), the Thye–Blatnik Act (Public Law 733, Eightieth Congress, June 22, 1948; 62 Stat. 568), and the Humphrey-Thye-Blatnik-Andresen Act (Public Law 607, Eighty-Fourth Congress, June 22, 1956; 70 Stat. 326), as applying to the Superior National Forest or the regulations of the Secretary of Agriculture.
(3) Nothing in this Act shall modify the statutory authority under which units of the national park system are created. Further, the designation of any area of any park, monument, or other unit of the national park system as a wilderness area pursuant to this Act shall in no manner lower the standards evolved for the use and preservation of such park, monument, or other unit of the national park system in accordance with sections 1, 2, 3, and 4 of this title, the statutory authority under which the area was created, or any other Act of Congress which might pertain to or affect such area, including, but not limited to, the Act of June 8, 1906 (34 Stat. 225; 16 U.S.C. 432 et seq.); section 3(2) of the Federal Power Act (16 U.S.C. 796(2)); and the Act of August 21, 1935 (49 Stat. 666; 16 U.S.C. 461 et seq.).
(b) Except as otherwise provided in this Act, each agency administering any area designated as wilderness shall be responsible for preserving the wilderness character of the area and shall so administer such area for such other purposes for which it may have been established as also to preserve its wilderness character. Except as otherwise provided in this

Act, wilderness areas shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use.

PROHIBITION OF CERTAIN USES

(c) Except as specifically provided for in this Act, and subject to existing private rights, there shall be no commercial enterprise and no permanent road within any wilderness area designated by this Act and, except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area.

SPECIAL PROVISIONS

(d) The following special provisions are hereby made:

(1) Within wilderness areas designated by this Act the use of aircraft or motorboats, where these uses have already become established, may be permitted to continue subject to such restrictions as the Secretary of Agriculture deems desirable. In addition, such measures may be taken as may be necessary in the control of fire, insects, and diseases, subject to such conditions as the Secretary deems desirable.

(2) Nothing in this Act shall prevent within national forest wilderness areas any activity, including prospecting, for the purpose of gathering information about mineral or other resources, if such activity is carried on in a manner compatible with the preservation of the wilderness environment. Furthermore, in accordance with such program as the Secretary of the Interior shall develop and conduct in consultation with the Secretary of Agriculture, such areas shall be surveyed on a planned, recurring basis consistent with the concept of wilderness preservation by the United States Geological Survey and the United States Bureau of Mines to determine the mineral values, if any, that may be present; and the results of such surveys shall be made available to the public and submitted to the President and Congress.

Mineral leases, claims, etc. (3) Not withstanding any other provisions of this Act, until midnight December 31, 1983, the United States mining laws and all laws pertaining to mineral leasing shall, to the extent as applicable prior to September 3, 1964, extend to those national forest lands designated by this Act as "wilderness areas"; subject, however, to such reasonable regulations governing ingress and egress as may be prescribed by the Secretary of Agriculture consistent with the use of the land for mineral location and development and exploration, drilling, and production, and use of land for transmission lines, waterlines, telephone lines, or facilities necessary in exploring, drilling, producing, mining, and processing operations, including where essential the use of mechanized ground or air equipment and restoration as near as practicable of the surface of the land disturbed in performing prospecting, location, and , in oil and gas leasing, discovery work, exploration, drilling, and production, as soon as they have served their purpose. Mining locations lying within the boundaries of said wilderness areas shall be held and used solely for mining or processing operations and uses reasonably incident thereto; and hereafter, subject to valid existing rights, all patents issued under the mining laws of the United States affecting national forest lands designated by this Act as wilderness areas shall convey title to the mineral deposits within the claim, together with the right to cut and use so much of the mature timber therefrom as may be needed in the extraction, removal, and beneficiation of the mineral deposits, if needed timber is not otherwise reasonably available, and if the timber is cut under sound principles of forest management as defined by the national forest rules and regulations, but each such patent shall reserve to the United States all title in or to the surface of the lands and products thereof, and no use of the surface of the claim or the resources therefrom not reasonably required for carrying on mining or prospecting shall be allowed except as otherwise expressly provided in this Act: Provided, That, unless hereafter specifically authorized, no patent within wilderness areas designated by this Act shall issue after December 31, 1983, except for the valid claims existing on or before December 31, 1983. Mining claims located after September 3, 1964, within the boundaries of wilderness areas designated by this Act shall create no rights in excess of those rights which may be patented under the provisions of this subsection. Mineral leases, permits, and licenses covering lands within national forest wilderness areas designated by this Act shall contain such reasonable stipulations as may

be prescribed by the Secretary of Agriculture for the protection of the wilderness character of the land consistent with the use of the land for the purposes for which they are leased, permitted, or licensed. Subject to valid rights then existing, effective January 1, 1984, the minerals in lands designated by this Act as wilderness areas are withdrawn from all forms of appropriation under the mining laws and from disposition under all laws pertaining to mineral leasing and all amendments thereto.

Water resources and grazing. (4) Within wilderness areas in the national forests designated by this Act, **(1)** the President may, within a specific area and in accordance with such regulations as he may deem desirable, authorize prospecting for water resources, the establishment and maintenance of reservoirs, water-conservation works, power projects, transmission lines, and other facilities needed in the public interest, including the road construction and maintenance essential to development and use thereof, upon his determination that such use or uses in the specific area will better serve the interests of the United States and the people thereof than will its denial; and **(2)** the grazing of livestock, where established prior to September 3, 1964, shall be permitted to continue subject to such reasonable regulations as are deemed necessary by the Secretary of Agriculture.

(5) Other provisions of this Act to the contrary notwithstanding, the management of the Boundary Waters Canoe Area, formerly designated as the Superior, Little Indian Sioux, and Caribou Roadless Areas, in the Superior National Forest, Minnesota, shall be in accordance with regulations established by the Secretary of Agriculture in accordance with the general purpose of maintaining, without unnecessary restrictions on other uses, including that of timber, the primitive character of the area, particularly in the vicinity of lakes, streams, and portages: Provided, That nothing in this Act shall preclude the continuance within the area of any already established use of motorboats.

(6) Commercial services may be performed within the wilderness areas designated by this Act to the extent necessary for activities which are proper for realizing the recreational or other wilderness purposes of the areas.

(7) Nothing in this Act shall constitute an express or implied claim or denial on the part of the Federal Government as to exemption from State water laws.

(8) Nothing in this Act shall be construed as affecting the jurisdiction or responsibilities of the several States with respect to wildlife and fish in the national forests.

STATE AND PRIVATE LANDS WITHIN WILDERNESS AREAS

Section 5.(a) In any case where State -owned or privately owned land is completely surrounded by national forest lands within areas designated by this Act as wilderness, such State or private owner shall be given such rights as may be necessary to assure adequate access to such State -owned or privately owned land by such State or private owner and their successors in interest, or the State -owned land or privately owned land shall be exchanged for federally owned land in the same State of approximately equal value under authorities available to the Secretary of Agriculture:

Transfers, restriction. Provided, however, That the United States shall not transfer to a State or private owner any mineral interests unless the State or private owner relinquishes or causes to be relinquished to the United States the mineral interest in the surrounded land.

(b) In any case where valid mining claims or other valid occupancies are wholly within a designated national forest wilderness area, the Secretary of Agriculture shall, by reasonable regulations consistent with the preservation of the area as wilderness, permit ingress and egress to such surrounded areas by means which have been or are being customarily enjoyed with respect to other such areas similarly situated.

Acquisition. (c) Subject to the appropriation of funds by Congress, the Secretary of Agriculture is authorized to acquire privately owned land within the perimeter of any area designated by this Act as wilderness if **(1)** the owner concurs in such acquisition or **(2)** the acquisition is specifically authorized by Congress.

GIFTS, BEQUESTS, AND CONTRIBUTIONS

Section 6.(a) The Secretary of Agriculture may accept gifts or bequests of land within wilderness areas designated by this Act for preservation as wilderness. The Secretary of Agriculture may also accept gifts or bequests of land adjacent to wilderness areas designated by this Act for preservation as wilderness if he has given sixty days advance notice thereof to the President of the Senate and the Speaker of the House of Representatives. Land

accepted by the Secretary of Agriculture under this section shall be come part of the wilderness area involved. Regulations with regard to any such land may be in accordance with such agreements, consistent with the policy of this Act, as are made at the time of such gift, or such conditions, consistent with such policy, as may be included in, and accepted with, such bequest.

(b) Authorization to accept private contributions and gifts The Secretary of Agriculture or the Secretary of the Interior is authorized to accept private contributions and gifts to be used to further the purposes of this Act.

ANNUAL REPORTS

Section 7. At the opening of each session of Congress, the Secretaries of Agriculture and Interior shall jointly report to the President for transmission to Congress on the status of the wilderness system, including a list and descriptions of the areas in the system, regulations in effect, and other pertinent information, together with any recommendations they may care to make.

APPROVED SEPTEMBER 3, 1964.

Legislative History:

House Reports: No 1538 accompanying H.R. 9070 (Committee on Interior & Insular Affairs) and No. 1829 (Committee of Conference).

Senate report: No. 109 (Committee on Interior & Insular Affairs). Congressional Record: Vol. 109 (1963):

- April 4, 8, considered in Senate.
- April 9, considered and passed Senate.
- Vol. 110 (1964): July 28, considered in House.
- July 30, considered and passed House, amended, in lieu of H.R. 9070
- August 20, House and Senate agreed to conference report.

CALIFORNIA WILDERNESS ACT OF 1984

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2. California Wilderness Act of 1984

Public Law 98-425
98th Congress

An Act

Entitled the "California Wilderness Act of 1984".

Sept. 28, 1984
[H.R. 1437]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this title may be cited as the "California Wilderness Act of 1984".

California Wilderness Act of 1984.
National Wilderness Preservation System.
National Forest System.
National parks, monuments, etc.
16 USC 1131 note.

TITLE I

DESIGNATION OF WILDERNESS

SEC. 101. (a) In furtherance of the purposes of the Wilderness Act, the following lands, as generally depicted on maps, appropriately referenced, dated July 1980 (except as otherwise dated) are hereby designated as wilderness, and therefore, as components of the National Wilderness Preservation System—

(1) certain lands in the Lassen National Forest, California, which comprise approximately one thousand eight hundred acres, as generally depicted on a map entitled "Caribou Wilderness Additions—Proposed", and which are hereby incorporated in, and which shall be deemed to be a part of the Caribou Wilderness as designated by Public Law 88-577;

16 USC 1131 note.

(2) certain lands in the Stanislaus and Toiyabe National Forests, California, which comprise approximately one hundred sixty thousand acres, as generally depicted on a map entitled "Carson-Iceberg Wilderness—Proposed", dated July 1984, and which shall be known as the Carson-Iceberg Wilderness: *Provided, however,* That the designation of the Carson-Iceberg Wilderness shall not preclude continued motorized access to those previously existing facilities which are directly related to permitted livestock grazing activities in the Wolf Creek Drainage on the Toiyabe National Forest in the same manner and degree in which such access was occurring as of the date of enactment of this title;

16 USC 1132 note.

(3) certain lands in the Shasta-Trinity National Forest, California, which comprise approximately seven thousand three hundred acres, as generally depicted on a map entitled "Castle Crags Wilderness—Proposed", and which shall be known as the Castle Crags Wilderness;

16 USC 1132 note.

(4) certain lands in the Shasta-Trinity National Forest, California, which comprise approximately eight thousand two hundred acres, as generally depicted on a map entitled "Chanchelulla Wilderness—Proposed", and which shall be known as the Chanchelulla Wilderness;

(5) certain lands in the Angeles National Forest, California, which comprise approximately four thousand four hundred acres, as generally depicted on a map entitled "Cucamonga Wilderness Additions—Proposed", dated July 1984, and which are hereby incorporated in, and which shall be deemed to be a

part of the Cucamonga Wilderness as designated by Public Law 88-577;

16 USC 1131 note.

(6) certain lands in the Los Padres National Forest, which comprise approximately sixty-four thousand seven hundred acres, as generally depicted on a map entitled "Dick Smith Wilderness—Proposed", dated July 1984, and which shall be known as Dick Smith Wilderness: *Provided*, That the Act of March 21, 1968 (82 Stat. 51), which established the San Rafael Wilderness is hereby amended to transfer four hundred and thirty acres of the San Rafael Wilderness to the Dick Smith Wilderness and establish a line one hundred feet north of the centerline of the Buckhorn Fire Road as the southeasterly boundary of the San Rafael Wilderness, as depicted on a map entitled "Dick Smith Wilderness—Proposed", and wherever said Buckhorn Fire Road passes between the San Rafael and Dick Smith Wildernesses and elsewhere at the discretion of the Forest Service, it shall be closed to all motorized vehicles except those used by the Forest Service for administrative purposes;

16 USC 1132 note.

16 USC 1132 note.

(7) certain lands in the Sierra National Forest, California, which comprise approximately thirty thousand acres, as generally depicted on a map entitled "Dinkey Lakes Wilderness—Proposed", and which shall be known as the "Dinkey Lakes Wilderness": *Provided*, That within the Dinkey Lakes Wilderness the Secretary of Agriculture shall permit nonmotorized dispersed recreation to continue at a level not less than the level of use which occurred during calendar year 1979;

(8) certain lands in the Sequoia National Forest, California, which comprise approximately thirty-two thousand acres, as generally depicted on a map entitled "Domeland Wilderness Additions—Proposed", dated March 1983, and which are hereby incorporated in, and which shall be deemed to be a part of the Domeland Wilderness as designated by Public Law 88-577;

16 USC 1131 note.

(9) certain lands in the Stanislaus National Forest, California, which comprise approximately six thousand one hundred acres, as generally depicted on a map entitled "Emigrant Wilderness Additions—Proposed", and which are hereby incorporated in, and which shall be deemed to be a part of the Emigrant Wilderness as designated by Public Law 93-632;

16 USC 1132 note.

16 USC 1132 note.

(10) certain lands in the Tahoe National Forest, California, which comprise approximately twenty-five thousand acres, as generally depicted on a map entitled "Granite Chief Wilderness—Proposed", dated July 1984, and which shall be known as the Granite Chief Wilderness;

(11) certain lands in the Cleveland National Forest, California, which comprise approximately eight thousand acres, as generally depicted on a map entitled "Hauser Wilderness—Proposed", and which shall be known as the Hauser Wilderness;

16 USC 1132 note.

(12) certain lands in and adjacent to the Lassen National Forest, California, which comprise approximately forty-one thousand eight hundred forty acres as shown on a map entitled "Ishi Wilderness—Proposed", and which shall be known as the Ishi Wilderness;

(13) certain lands in the Sierra National Forest, California, which comprise approximately eighty-one thousand acres, as generally depicted on a map entitled "John Muir Wilderness Additions, Sierra National Forest—Proposed", dated February 1983, and which are hereby incorporated in, and which shall be

deemed to be a part of the John Muir Wilderness as designated by Public Law 88-577: *Provided*, That the Secretary of Agriculture is authorized to modify the boundaries of the John Muir Wilderness Additions and the Dinkey Lakes Wilderness as designated by this Act in the event he determines that portions of the existing primitive road between the two wilderness areas should be relocated for environmental protection or other reasons. Any relocated wilderness boundary shall be placed no more than three hundred feet from the centerline of any new primitive roadway and shall become effective upon publication of a notice of such relocation in the Federal Register;

16 USC 1131 note.

Federal Register, publication.

(14) certain lands in the Klamath National Forest, California, which comprise approximately twenty-eight thousand acres, as generally depicted on a map entitled "Marble Mountain Wilderness Additions—Proposed", dated July 1984, and which are hereby incorporated in, and shall be deemed to be a part of the Marble Mountain Wilderness as designated by Public Law 88-577;

(15) certain lands in the Sierra and Inyo National Forests, California, which comprise approximately nine thousand acres, as generally depicted on a map entitled "Minarets Wilderness Additions—Proposed", and which are hereby incorporated in, and which shall be deemed to be a part of the Minarets Wilderness as designated by Public Law 88-577: *Provided*, That the existing Minarets Wilderness and additions thereto designated by this title henceforth shall be known as the Ansel Adams Wilderness;

16 USC 1132 note.

(16) certain lands in the Eldorado, Stanislaus, and Toiyabe National Forests, California, which comprise approximately fifty-five thousand acres, as generally depleted on a map entitled "Mokelumne Wilderness Additions—Proposed", dated July 1984, and which are hereby incorporated in, and which shall be deemed to be a part of the Mokelumne Wilderness as designated by Public Law 88-577;

(17) certain lands in the Sierra and Sequoia National Forests, California, which comprise approximately forty-five thousand acres, as generally depicted on a map entitled "Monarch Wilderness—Proposed", dated July 1984, and which shall be known as the Monarch Wilderness;

16 USC 1132 note.

(18) certain lands in the Shasta-Trinity National Forest, California, which comprise approximately thirty-seven thousand acres, as generally depicted on a map entitled "Mt. Shasta Wilderness—Proposed", dated July 1984, and which shall be known as Mt. Shasta Wilderness;

16 USC 1132 note.

(19) certain lands in the Six Rivers National Forest, California, which comprise approximately eight thousand one hundred acres, as generally depicted on a map entitled "North Fork Wilderness—Proposed", and which shall be known as the North Fork Wilderness;

16 USC 1132 note.

(20) certain lands in the Cleveland National Forest, California, which comprise approximately thirteen thousand one hundred acres, as generally depicted on a map entitled "Pine Creek Wilderness—Proposed", and which shall be known as the Pine Creek Wilderness;

(21) certain lands in the Rogue River National Forest, California, and Oregon, which comprise approximately sixteen thousand five hundred acres, as generally depicted on a map entitled

"Red Buttes Wilderness Additions—Proposed", dated July 1984, and which are hereby incorporated in, and which shall be deemed to be a part of the Red Buttes Wilderness as designated by Public Law 98-328;

Ante, p. 272.
16 USC 1132 note.

(22) certain lands in the Klamath National Forest, California, which comprise approximately twelve thousand acres, as generally depicted on a map entitled "Russian Wilderness—Proposed", and which shall be known as the Russian Wilderness;

(23) certain lands in the San Bernardino National Forest, California, which comprise approximately twenty-one thousand five hundred acres, as generally depicted on a map entitled "San Gorgonio Wilderness Additions—Proposed", and which are hereby incorporated in, and which shall be deemed to be a part of the San Gorgonio Wilderness as designated by Public Law 88-577;

16 USC 1131 note.

(24) certain lands in the San Bernardino National Forest, California, which comprise approximately ten thousand nine hundred acres, as generally depicted on a map entitled "San Jacinto Wilderness Additions—Proposed", and which are hereby incorporated in, and which shall be deemed to be a part of the San Jacinto Wilderness as designated by Public Law 88—577: *Provided, however*, That the Secretary of Agriculture may pursuant to an application filed within 10 years of the date of enactment of this title, grant a right-of-way for, and authorize construction of, a transmission line or lines within the area depicted as "potential powerline corridor" on the map entitled "San Jacinto Wilderness Additions—Proposed": *Provided further,* That if a power transmission line is constructed within such corridor, the corridor shall cease to be a part of the San Jacinto Wilderness and the Secretary of Agriculture shall publish notice thereof in the Federal Register;

Federal Register, publication.

(25) certain lands in the Sierra and Inyo National Forests and the Devils Postpile National Monument, California, which comprise approximately one hundred and ten thousand acres, as generally depicted on a map entitled "San Joaquin Wilderness—Proposed", and which shall comprise a portion of the Ansel Adams Wilderness established pursuant to subparagraph (a)(15) of this section: *Provided, however,* That nothing in this title shall be construed to prejudice, alter, or affect in any way, any rights or claims of right to the diversion and use of waters from the North Fork of the San Joaquin River, or in any way to interfere with the construction, maintenance, repair, or operation of a hydroelectric project similar in scope to the Jackass-Chiquito hydroelectric power project (or the Granite Creek-Jackass alternative project) as initially proposed by the Upper San Joaquin River Water and Power Authority: *Provided further,* That the designation of the San Joaquin Wilderness shall not preclude continued motorized access to those previously existing facilities which are directly related to permitted livestock grazing activities nor operation and maintenance of the existing cabin located in the vicinity of the Heitz Meadow Guard Station within the Ansel Adams Wilderness, in the same manner and degree in which such access and operation and maintenance of such cabin were occurring as of the date of enactment of this title;

16 USC 1132 note.

(26) certain lands in the Cleveland National Forest, California, which comprise approximately thirty-nine thousand five

hundred and forty acres, as generally depicted on a map entitled "San Mateo Canyon Wilderness—Proposed", and which shall be known as the San Mateo Canyon Wilderness;

(27) certain lands in the Los Padres National Forest, California, which comprise approximately two thousand acres, as generally depicted on a map entitled "San Rafael Wilderness Additions—Proposed", and which are hereby incorporated in, and which shall be deemed to be a part of the San Rafael Wilderness as designated by Public Law 90-271; 16 USC 1132 note.

(28) certain lands in the San Bernardino National Forest, California, which comprise approximately twenty thousand one hundred and sixty acres, as generally depicted on a map entitled "Santa Rosa Wilderness—Proposed", and which shall be known as the Santa Rosa Wilderness; 16 USC 1132 note.

(29) certain lands in the Angeles and San Bernardino National Forests, California, which comprise approximately forty-three thousand six hundred acres, as generally depicted on a map entitled "Sheep Mountain Wilderness—Proposed", dated July 1984, and which shall be known as Sheep Mountain Wilderness; 16 USC 1132 note.

(30) certain lands in the Six Rivers, Klamath, and Siskiyou National Forests, California, which comprise approximately one hundred fifty-three thousand acres, as generally depicted on a map entitled "Siskiyou Wilderness—Proposed", dated July 1984, and which shall be known as the Siskiyou Wilderness; 16 USC 1132 note.

(31) certain lands in the Mendocino National Forest, California, which comprise approximately thirty-seven thousand acres, as generally depicted on a map entitled "Snow Mountain Wilderness—Proposed", and which shall be known as Snow Mountain Wilderness; 16 USC 1132 note

(32) certain lands in the Sequoia and Inyo National Forests, California, which comprise approximately sixty-three thousand acres, as generally depicted on a map entitled "South Sierra Wilderness—Proposed", dated July 1984, and which shall be known as the South Sierra Wilderness; 16 USC 1132 note.

(33) certain lands in the Modoc National Forest, California, which comprise approximately one thousand nine hundred and forty acres, as generally depicted on a map entitled "South Warner Wilderness Additions—Proposed", and which are hereby incorporated in, and which shall be deemed to be a part of the South Warner Wilderness as designated by Public Law 88-577; 16 USC 1131 note.

(34) certain lands in and adjacent to the Klamath, Shasta-Trinity and Six Rivers National Forests, California, which comprise approximately five hundred thousand acres, as generally depicted on a map entitled "Trinity Alps Wilderness—Proposed", dated July 1984, and which shall be known as the Trinity Alps Wilderness; 16 USC 1132 note.

(35) certain lands in the Los Padres National Forest, California, which comprise approximately two thousand seven hundred and fifty acres, as generally depicted on a map entitled "Ventana Wilderness Additions—Proposed", and which are hereby incorporated in, and shall be deemed to be a part of the Ventana Wilderness as designated by Public Laws 91-58 and 95-237; 16 USC 1132 note.

(36) certain lands in and adjacent to the Six Rivers and Mendocino National Forests, California, which comprise

approximately forty-two thousand acres, as generally depicted on a map entitled "Yolla-Bolly Middle Eel Additions—Proposed", dated July 1984, and which are hereby incorporated in, and which shall be deemed to be a part of the Yolla-Bolly Middle Eel Wilderness as designated by Public Law 88-577;

16 USC 1131 note.

16 USC 1132 note.

(37) certain lands in the Plumas National Forest, California, which comprise approximately twenty-one thousand acres, as generally depicted on a map entitled "Bucks Lake Wilderness— Proposed", dated March 1983, and which shall be known as the Bucks Lake Wilderness;

16 USC 1132 note.

(38) certain lands in and adjacent to the Los Padres National Forest, California, which comprise approximately twenty thousand acres, as generally depicted on a map entitled "Machesna Mountain Wilderness—Proposed", dated March 1983, and which shall be known as the Machesna Mountain Wilderness; and

16 USC 1132 note.

(39) certain lands in the Sequoia National Forest, which comprise approximately ten thousand five hundred acres, as generally depicted on a map entitled "Jennie Lakes Wilderness—Proposed", dated March 1983, and which shall be known as the Jennie Lakes Wilderness.

(b) The previous classifications of the High Sierra Primitive Area, Emigrant Basin Primitive Area, and the Salmon-Trinity Alps Primitive Area are hereby abolished.

DESIGNATION OF PLANNING AREAS

16 USC 1131 note.
Report.
President of U.S.

SEC. 102. (a) In furtherance of the purposes of the Wilderness Act, the following lands shall be reviewed by the Secretary of Agriculture as to their suitability for preservation as wilderness. The Secretary shall submit his report and findings to the President, and the President shall submit his recommendations to the United States House of Representatives and the United States Senate no later than three years from the date of enactment of this title:

(1) certain lands in the Stanislaus and Toiyabe National Forests, California, which comprise approximately thirty thousand acres, as generally depicted on a map entitled "Carson-Iceberg Planning Area", dated July 1984, and which shall be known as the Carson-Iceberg Planning Area;

(2) certain lands in the Toiyabe National Forest, California, which comprise approximately forty-nine thousand two hundred acres as generally depicted on a map entitled "Hoover Wilderness Additions Planning Area", dated July 1984, and which shall be known as the Hoover Wilderness Additions Planning Area; and

(3) certain lands in the San Bernardino National Forest, California, which comprise approximately seventeen thousand acres, as generally depicted on a map entitled "Pyramid Peak Planning Area", dated July 1984, and which shall be known as the Pyramid Peak Planning Area.

(b) Subject to valid existing rights, the planning areas designated by this section shall for a period of four years from the date of enactment of this title, be administered by the Secretary of Agriculture so as to maintain their presently existing wilderness character and potential for inclusion in the National Wilderness Preservation System.

ADMINISTRATION OF WILDERNESS AREAS

SEC. 103. (a) Subject to valid existing rights, each wilderness area designated by this title shall be administered by the Secretary concerned in accordance with the provisions of the Wilderness Act: *Provided,* That any reference in such provisions to the effective date of the Wilderness Act shall be deemed to be a reference to the effective date of this title. 16 USC 1131 note.

(b) Within the National Forest wilderness areas designated by this title— 16 USC 1133.

(1) as provided in subsection 4(d)(4)(2) of the Wilderness Act, the grazing of livestock, where established prior to the date of enactment of this title, shall be permitted to continue subject to such reasonable regulations, policies and practices as the Secretary deems necessary, as long as such regulations, policies and practices fully conform with and implement the intent of Congress regarding grazing in such areas as such intent is expressed in the Wilderness Act and this title;

(2) as provided in subsection 4(d)(1) of the Wilderness Act, the Secretary concerned may take such measures as are necessary in the control of fire, insects, and diseases, subject to such conditions as he deems desirable; and

(3) as provided in section 4(b) of the Wilderness Act, the Secretary concerned shall administer such areas so as to preserve their wilderness character and to devote them to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use.

(c) Within sixty days of the date of enactment of this title, the Secretary of Agriculture shall enter into negotiations to acquire by exchange all or part of any privately owned lands within the national forest wilderness areas designated by this title. Such exchange shall to the maximum extent practicable be completed within three years after the date of enactment of this title. The Secretary is authorized to acquire such lands by means other than exchange, beginning three years after the date of enactment of this title. Acquisition shall be only with the concurrence of the owner. Values shall be determined without reference to any restrictions on access or use which arise out of designation as a wilderness area.

FILING OF MAPS AND DESCRIPTIONS

SEC. 104. As soon as practicable after enactment of this title, a map and a legal description on each wilderness area shall be filed with the Committee on Energy and Natural Resources of the United States Senate and the Committee on Interior and Insular Affairs of the House of Representatives, and each such map and description shall have the same force and effect as if included in this title: *Provided,* That correction of clerical and typographical errors in each such legal description and map may be made. Each such map and legal description shall be on file and available for public inspection in the Office of the Chief of the Forest Service, Department of Agriculture. Public availability.

ADDITIONS TO NATIONAL PARK SYSTEM

SEC. 105. (a) The following lands are hereby added to the National Park System:

16 USC 80 note.

(1) certain lands in the Sequoia National Forest, California which comprise approximately one thousand five hundred acres, as generally depicted on a map entitled "Jennie Lakes Additions, Kings Canyon National Park—Proposed", dated March 1983, and which are hereby incorporated in, and which shall be deemed to be a part of Kings Canyon National Park; and

16 USC 46 note.

(2) certain lands which comprise approximately one hundred eighty-five acres, as generally depicted on a map entitled "McCauley Ranch Addition, Yosemite National Park", dated December 1982 and numbered 80,021, and which are hereby incorporated in, and which shall be deemed to be a part of Yosemite National Park.

(b) Upon enactment of this title, the Secretary of Agriculture shall transfer the lands described in subsection (a) of this section, without consideration, to the administrative jurisdiction of the Secretary of the interior for administration as part of the National Park System. The boundaries of the national forests and national parks shall be adjusted accordingly. The areas added to the National Park System by this section shall be administered in accordance with the provisions of law generally applicable to units of the National Park System.

Report.

(c) The Secretary of the interior shall study the lands added to the National Park System by subsection (a) of this section for possible designation as national park wilderness, and shall report to the Congress his recommendations as to the suitability or nonsuitability of the designation of such lands as wilderness by not later than three years after the effective date of this title.

16 USC 46 note.

(d) The Secretary of Agriculture is authorized and directed to transfer to the jurisdiction of the Secretary of the Interior for administration as a part of Yosemite National Park, two hundred and fifty-three acres of the Stanislaus National Forest at Crocker Ridge, identified as all that land lying easterly of a line beginning at the existing park boundary and running three hundred feet west of and parallel to the center line of the park road designated as State Highway 120, also known as the New Big Oak Flat Road, within section 34, township 1 south, range 19 east, and within sections 4, 9, and 10, township 2 south, range 19 east, Mount Diablo base and meridian. The boundary of Yosemite National Park and the Stanislaus National Forest shall be adjusted accordingly.

(e) The Secretary of the Interior is authorized and directed to transfer to the jurisdiction of the Secretary of Agriculture one hundred and sixty acres within the boundary of the Sierra National Forest identified as the northwest quarter of section 16, township 5 south, range 22 east, Mount Diablo base meridian, subject to the right of the Secretary of the Interior to the use of the water thereon for park purposes, including the right of access to facilities necessary for the transportation of water to the park.

NATIONAL PARK WILDERNESS

SEC. 106. The following lands are hereby designated as wilderness in accordance with section 3(c) of the Wilderness Act (78 Stat. 890; 16 U.S.C. 1132(c)) and shall be administered by the Secretary of the Interior in accordance with the applicable provisions of the Wilderness Act.

(1) Yosemite National Park Wilderness, comprising approximately six hundred and seventy-seven thousand six hundred acres, and potential wilderness additions comprising approximately three thousand five hundred and fifty acres, as generally depicted on a map entitled "Wilderness Plan, Yosemite National Park, California", numbered 104-20, 003-E dated July 1980, and shall be known as the Yosemite Wilderness;

16 USC 1132 note.

(2) Sequoia and Kings Canyon National Parks Wilderness, comprising approximately seven hundred and thirty-six thousand nine hundred and eighty acres; and potential wilderness additions comprising approximately one hundred acres, as generally depicted on a map entitled "Wilderness Plan—Sequoia-Kings Canyon National Parks—California", numbered 102-20, 003-E and dated July 1980, and shall be known as the Sequoia Kings Canyon Wilderness.

16 USC 1132 note.

MAP AND DESCRIPTION

SEC. 107. A map and description of the boundaries of the areas designated in section 106 of this title shall be on file and available for public inspection in the Office of the Director of the National Park Service, Department of the Interior, and in the Office of the Superintendent of each area designated in section 106. As soon as practicable after this title takes effect, maps of the wilderness areas and descriptions of their boundaries shall be filed with the Committee on Interior and Insular Affairs of the United States House of Representatives and the Committee on Energy and Natural Resources of the United States Senate, and such maps and descriptions shall have the same force and effect as if included in this title: *Provided*, That correction of clerical and typographical errors in such maps and descriptions may be made.

Public availability.

CESSATION OF CERTAIN USES

SEC. 108. Any lands (in section 106 of this title) which represent potential wilderness additions upon publication in the Federal Register of a notice by the Secretary of the Interior that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness. Lands designated as potential wilderness additions shall be managed by the Secretary insofar as practicable as wilderness until such time as said lands are designated as wilderness.

Federal Register, publication.

ADMINISTRATION

SEC. 109. The areas designated by section 106 of this tithe as wilderness shall be administered by the Secretary of the interior in accordance with the applicable provisions of the Wilderness Act governing areas designated by that title as wilderness, except that any reference in such provisions to the effective date of the Wilderness Act shall be deemed to be a reference to the effective date of this title, and where appropriate, any reference to the Secretary of Agriculture shall be deemed to be a reference to the Secretary of the Interior.

16 USC 1131 note.

SEC. 110. Notwithstanding any existing or future administrative designation or recommendation, mineral prospecting, exploration, development, or mining of cobalt and associated minerals under taken under the United States mining laws within the North Fork

Smith roadless area (RARE II, 5-707, Six Rivers National Forest, California) shall be subject to only such Federal laws and regulations as are generally applicable to national forest lands designated as nonwilderness.

WILDERNESS REVIEW CONCERNS

Conservation.

SEC. 111. (a) The Congress finds that—

(1) the Department of Agriculture has completed the second roadless area review and evaluation program (RARE II); and

(2) the Congress had made its own review and examination of national forest roadless areas in California and the environmental impacts associated with alternative allocations of such areas.

(b) On the basis of such review, the Congress hereby determines and directs that—

(1) without passing on the question of the legal and factual sufficiency of the RARE II final environmental statement (dated January 1979) with respect to national forest lands in States other than California, such statement shall not be subject to judicial review with respect to National Forest System lands in the State of California;

(2) upon enactment of this title, the injunction issued by the United States District Court for the Eastern District of California in the State of California versus Bergland (483 F. Supp. 465 (1980)) shall no longer be in force;

(3) with respect to the National Forest System lands in the State of California which were reviewed by the Department of Agriculture in the second roadless area review and evaluation (RARE II), and those lands referred to in subsection (d), except those lands remaining in further planning as referred to in subsection (e), or designated as planning areas upon enactment of this title, that review and evaluation shall be deemed for the purposes of the initial land management plans required for such lands by the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of 1976, to be an adequate consideration of the suitability of such lands for inclusion in the National Wilderness Preservation System and the Department of Agriculture shall not be required to review the wilderness option prior to the revisions of the plans but shall review the wilderness option when the plans are revised, which revisions will ordinarily occur on a ten-year cycle, or at least every fifteen years, unless prior to such time the Secretary of Agriculture finds that conditions in a unit have significantly changed;

16 USC 1600 note.

(4) areas in the State of California reviewed in such final environmental statement or referenced in subsection (d) and not designated as wilderness or planning areas by this title or remaining in further planning as referenced m subsection (e) upon enactment of this title shall be managed for multiple use in accordance with land management plans pursuant to section 6 of the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of 1976: *Provided*, That such areas need not be managed for the purpose of protecting their suitability for wilderness designation prior to or during revision of the land management plans;

16 USC 1604.

(5) in the event that revised land management plans in the State of California are implemented pursuant to section 6 of the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of 1976, and other applicable law, areas not recommended for wilderness designation need not be managed for the purpose of protecting their suitability for wilderness designation prior to or during revision of such plans, and areas recommended for wilderness designation shall be managed for the purpose of protecting their suitability for wilderness designation as may be required by the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of 1976, and other applicable law; and

16 USC 1604.

(6) unless expressly authorized by Congress, the Department of Agriculture shall not conduct any further statewide roadless area review and evaluation of National Forest System lands in the State of California for the purpose of determining their suitability for inclusion in the National Wilderness Preservation System.

16 USC 1600 note.

(c) As used in this section, and as provided in section 6 of the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of 1976, the term "revision" shall not include an "amendment" to a plan.

(d) The provisions of this section shall also apply to—

(1) those National Forest System roadless lands in the State of California: in the Plumas and Tahoe National Forests which were evaluated in the Mohawk Unit Plan; in the Six Rivers National Forest which were evaluated in the Blue Creek Unit Plan not designated as Wilderness by this title and the Fox Unit Plan; in the Klamath National Forest which were evaluated in the King Unit Plan; in the Angeles National Forest which were evaluated in the San Gabriel Unit Plan; in the Modoc and Shasta-Trinity and Klamath National Forests in the Medicine Lake Unit Plan; in the Cleveland National Forest which were evaluated in the Palomar Mountain Unit Plan and Trabuco Unit Plan; in the Los Padres National Forest which were evaluated in the Big Sur Unit Plan; in the Tahoe National Forest which were evaluated in the Truckee-Little Truckee Unit Plan; and those portions of the Carson-Iceberg roadless area not designated as wilderness or planning areas or remaining in further planning as referenced in subsection (e);

(2) National Forest System roadless lands in the State of California which are less than five thousand acres in size; and

(3) National Forest System roadless areas or portions thereof in the State of California as identified in Executive Document Numbered 1504 Ninety-sixth Congress (House Document Numbered 96-119) and identified by name and number at the end of this subparagraph, which are not designated as wilderness by this title:

National Forest	Area name	Area I D.
Eldorado	Pyramid	05023
Eldorado	Rubicon	05026
Eldorado	Dardanelles	05982
Eldorado	Tragedy-Elephants Back	05984
Eldorado	Raymond Peak	05985
Klamath	Orleans Mountain	B5079
Klamath	Condrey Mountain	05704

National Forest	Area name	Area I.D.
Lake Tahoe Basin M U.	Dardanelles	05982
Lassen	Lost Creek	05089
Lassen	Polk Springs	05097
Lassen	Chips Creek	05099
Los Padres	Machesna Mountain	05110
Los Padres	Miranda Pine	05114
Los Padres	Tepusquet Peak	05116
Los Padres	Spoor Canyon	05118
Los Padres	Fox Mountain	05120
Los Padres	Cuyama	05135
Mendocino	Wilderness Contiguous	05137
Mendocino	Elk Creek	05140
Mendocino	Big Butte-Shinbone	05145
Mendocino	Black Butte	05269
Plumas	Chips Creek	05099
Plumas	Middle Fork	05167
Plumas	Bald Rock	05169
Plumas	West Yuba	05172
Rogue River	Condrey Mountain	06704
Sequoia	Agnew	05199
Sequoia	Woodpecker	05206
Sequoia	Domeland addition	05207
Shasta-Trinity	Chanchelulla	05220
Shasta-Trinity	East Fork	05226
Shasta-Trinity	Murphy Glade	05298
Shasta-Trinity	Fisher Gulch	A5299
Sierra	Mount Raymond	05242
Sierra	Dinkey Lakes	05244
Sierra	Rancheria	C5198
Six Rivers	Orleans Mountain	B5079
Six Rivers	North Fork Smith	05707
Stanislaus	Tuolumne River	05258
Stanislaus	Raymond Peak	05985
Tahoe	West Yuba	05172
Tahoe	North Fork American	05262
Tahoe	East Yuba	05264
Toiyabe	Dardanelles	04982
Toiyabe	Tragedy-Elephants Back	04984
Toiyabe	Raymond Peak	04985
Tahoe	Granite Chief	05261
Angeles	Pleasant View	F5008
Shasta-Trinity	Castle Crags	B5219
Shasta-Trinity	Mt. Shasta	C5213
Lake Tahoe Basin M.U.	Pyramid	O5023

(e) Certain National Forest System roadless lands in the State of California as identified in Executive Document Numbered 1504 Ninety-sixth Congress (House Document Numbered 96-119) and identified by name and number at the end of this subsection, shall remain as further planning areas for purposes of this title:

National Forest	Area name	Area I.D.
Angeles	Sespe-Frazier	05002
Angeles	Arroyo Seco	05012
Cleveland	Sill Hill	05304
Cleveland	Caliente	05017
Eldorado	Caples Creek	05027
Inyo	White Mountains	A5058
Inyo	White Mountains	B5058
Inyo	Coyote-Southeast	05033
Inyo	Table Mountain	05035
Inyo	Mazourka	A5064
Inyo	Wheeler Ridge	05040
Inyo	Horse Meadow	05049
Inyo	Tioga Lake	05050
Inyo	Hall Natural Area	05051
Inyo	Log Cabin Saddlebag	05052
Inyo	Benton Range	05056

National Forest	Area name	Area I.D.
Inyo	Blanco Mountain	05059
Inyo	Birch Creek	05060
Inyo	Black Canyon	05061
Inyo	Andrews Mountain	05063
Inyo	Paiute	B5064
Inyo	Laurel-McGee	05045
Inyo	Buttermilk	05038
Lake Tahoe Basin M U.	Freel	05271
Lassen	Wild Cattle Mountain	05093
Lassen	Butt Mountain	05100
Lassen	Trail Lake	B5095
Lassen	Heart Lake	05096
Lassen	Ishi	B5098
Los Padres	Antimony	05136
Los Padres	Bear Canyon	05104
Los Padres	Bear Mountain	05103
Los Padres	Big Rocks	05112
Los Padres	Black Butte	05102
Los Padres	Black Mountain	05108
Los Padres	Diablo	05127
Los Padres	Dry Lakes	05131
Los Padres	Horseshoe Springs	05115
Los Padres	La Brea	05117
Los Padres	La Panza	05109
Los Padres	Little Pine	05278
Los Padres	Los Machos Hills	05111
Los Padres	Machesna Mountain	05110
Los Padres	Matilija	05129
Los Padres	Quatal	05268
Los Padres	Sawmill-Badlands	05134
Los Padres	Sespe Frazier	05002
Los Padres	Stanley Mountain	05113
San Bernardino	Sugarloaf	05186
San Bernardino	Raywood Flat	B5187
San Bernardino	Cucamonga B	B5174
San Bernardino	Cucamonga C	C5174
Sequoia	Dennison Peak	05202
Sequoia	Kings River	B5198
Sequoia	Oat Mountain	05197
Sequoia	Moses	05203
Sequoia	Scodies	05212
Sequoia	Cypress	A5213
Shasta-Trinity	Mt. Eddy	05229
Sierra	Kings River	B5198
Stanislaus	Carson-Iceberg (Pacific Valley portion)	B5986
Toiyabe	Sweetwater	04657
Toiyabe	Hoover Extension	E4662
Lassen	Mill Creek	05284
Los Padres	Garcia Mountain	05107

SEVERABILITY

SEC. 112. If any provision of this title or the application thereof is held invalid, the remainder of the title and the application thereof shall not be affected thereby.

SEC. 113. For fiscal years commencing after September 30, 1985, there are authorized to be appropriated such sums as may be necessary to implement the provisions of this title.

Appropriation authorization.

TITLE II

DESIGNATION WILD AND SCENIC RIVER

Ante, p. 1491.
16 USC 1274.

SEC. 201 Section 3(a) of the Wild and Scenic Rivers Act (16 U.S.C. 1271-1287) as amended is further amended by inserting the following new paragraph:

"(52) TUOLUMNE, CALIFORNIA.—The main river from its sources on Mount Dana and Mount Lyell in Yosemite National Park to Don Pedro Reservoir consisting of approximately 83 miles as generally depicted on the proposed boundary map entitled 'Alternative A' contained in the Draft Tuolumne Wild and Scenic River Study and Environmental Impact Statement published by the United States Department of the Interior and Department of Agriculture in May 1979;) to be administered by the Secretary of the Interior and the Secretary of Agriculture. After consultation with State and local governments and the interested public and within two years from the date of enactment of this paragraph, the Secretary shall take such action as is required under subsection (b) of this section. Nothing in this Act shall preclude the licensing, development, operation, or maintenance of water resources facilities on those portions of the North Fork, Middle Fork or South Fork of the Tuolumne or Clavey Rivers that are outside the boundary of the wild and scenic river area as designated in this section. Nothing in this section is intended or shall be construed to affect any rights, obligations, privileges, or benefits granted under any prior authority of law including chapter 4 of the Act of December 19, 1913, commonly referred to as the Raker Act (38 Stat. 242) and including any agreement or administrative ruling entered into or made effective before the enactment of this paragraph. For fiscal years commencing after September 30, 1985, there are authorized to be appropriated such sums as may be necessary to implement the provisions of this subsection.".

Appropriation authorization.

TITLE III

ESTABLISHMENT OF NATIONAL FOREST SCENIC AREA

16 USC 543.

SEC. 301. The area in the Mono Basin within and adjacent to the Inyo National Forest in the State of California, as generally depicted on a map entitled "Mono Basin National Forest Scenic Area" dated June 1983, and numbered 1983-3, is hereby designated as the Mono Basin National Forest Scenic Area (hereafter in this title referred to as the "Scenic Area"). Such map shall be on file and available for public inspection in the office of the Forest Supervisor, Inyo National Forest and in the of fire of the Chief of the Forest Service, Department of Agriculture. The Secretary of Agriculture (hereinafter in this title referred to as the "Secretary") may make minor revisions in the boundary of the Scenic Area after publication of notice to that effect in the Federal Register and submission of notice thereof to the Committee on Interior and Insular Affairs of the United States House of Representatives and the Committee on Energy and Natural Resources of the United States Senate. Such notice shall be published and submitted at least sixty days before the revision is made.

Public availability.

Federal Register, publication.

EXTENSION OF NATURAL FOREST BOUNDARY

16 USC 543a.

Sec. 302. (a) The exterior boundary of the Inyo National Forest is hereby extended to include the area within the boundary of the Scenic Area. Any lands and interests therein acquired pursuant to section 303 shall become part of the National Forest System.

(b) For the purposes of section 7(a)(1) of the Land and Water Conservation Fund Act of 1965 (78 Stat. 897; 16 U.S.C. 4601-4 through 4601-11), the boundary of the Inyo National Forest, as modified by this section, shall be treated as if it were the boundary of that forest on January 1, 1964.

16 USC 460*l*-9.
16 USC 460*l*-4—460*l*-11.

ACQUISITION

16 USC 543b.

SEC. 303. (a) The Secretary is authorized to acquire all lands and interests therein within the boundary of the Scenic Area by donation, exchange in accordance with this title or other provisions of law, or purchase with donated or appropriated funds, except that—

(1) any lands or interests therein within the boundary of the Scenic Area which are owned by the State of California or any political subdivision thereof (including the city of Los Angeles) may be acquired only by donation or exchange; and

(2) lands or interests therein within the boundary of the Scenic Area which are not owned by the State of California or any political subdivision thereof (including the city of Los Angeles) may be acquired only with the consent of the owner thereof unless the Secretary determines, after written notice to the owner and after opportunity for comment, that the property is being developed, or proposed to be developed, in a manner which is detrimental to the integrity of the Scenic Area or which is otherwise incompatible with the purposes of this title.

Guidelines, publication.

(b)(1) Not later than six months after the date of enactment of this title, the Secretary shall publish specific guidelines under which determinations shall be made under paragraph (2) of subsection (a). No use which existed prior to June 1, 1984, within the area included in the Scenic Area shall be treated under such guidelines as a detrimental or incompatible use within the meaning of such paragraph (2).

(2) For purposes of subsection (a)(2), any development or proposed development of private property within the boundary of the Scenic Area that is significantly different from, or a significant expansion of, development existing as of June 1, 1984, shall be considered by the Secretary as detrimental to the integrity of the Scenic Area. No reconstruction or expansion of a private or commercial building, including—

(A) reconstruction of an existing building,

(B) construction of attached structural additions, not to exceed 100 per centum of the square footage of the original building, and

(C) construction of reasonable support development such as roads, parking, water and sewage systems shall be treated as detrimental to the integrity of the Scenic Area or as an incompatible development within the meaning of paragraph (2) of subsection (a).

Conservation.

(c) Notwithstanding any other provision of law, the Secretary shall only be required to prepare an environmental assessment of

any exchange of mineral or geothermal interest authorized by this title.

ADMINISTRATION

16 USC 543c.

SEC. 304. (a)(1) Except as otherwise provided in this title, the Secretary, acting through the Chief of the Forest Service, shall administer the Scenic Area as a separate unit within the boundary of the Inyo National Forest in accordance with the laws, rules, and regulations applicable to the National Forest System. All Bureau of Land Management administered lands that fall within the boundaries of the Scenic Area are hereby added to the Inyo National Forest and shall be administered in accordance with the laws, rules, and regulations applicable to the National Forest System.

(2) In addition, the following parcels administered by the Bureau of Land Management are hereby added to the Inyo National Forest and shall be administered in accordance with the laws, rules, and regulations applicable to the National Forest System:

township 1 south; range 26 east; Mount Diablo Meridian:
east half of southwest quarter and south half of southeast quarter of section 10; and
township 1 north; range 26 east; Mount Diablo Meridian:
southwest quarter of northeast quarter and west half of southeast quarter of section 9;
southwest quarter of southwest quarter of section 15;
southwest quarter of northwest quarter and northwest quarter of southwest quarter of section 25;
north half of southeast quarter of section 26, west half of northwest quarter and northwest quarter of southwest quarter of section 27;
township 1 north; range 27 east; Mount Diablo Meridian:
east half of southeast quarter of section 34;
southwest quarter of northwest quarter of section 35; and
west half of section 30 as intersected by Scenic Area Boundary.

(b)(1) In a manner consistent with the protection of the water rights of the State of California or any political subdivision thereof (including the city of Los Angeles) or of any person to the extent that such water rights have been granted or modified under the laws of the State of California, the Secretary shall manage the Scenic Area to protect its geologic, ecologic, and cultural resources. The Secretary shall provide for recreational use of the Scenic Area and shall provide recreational and interpretive facilities (including trails and campgrounds) for the use of the public which are compatible with the provisions of this title, and may assist adjacent affected local governmental agencies in the development of related interpretive programs. The Secretary shall permit the full use of the Scenic Area for scientific study and research in accordance with such rules and regulations as he may prescribe.

(2) Except as specifically provided in this subsection, no commercial timber harvesting shall be permitted in the Scenic Area, but the Secretary shall permit the utilization of wood material such as firewood, posts, poles, and Christmas trees by individuals for their domestic purposes under such regulations as he may prescribe to protect the natural and cultural resources of the Scenic Area. The Secretary may take action including the use of commercial timber harvest to the minimum extent necessary to control fires, insects and diseases that might—

(A) endanger irreplaceable features within the Scenic Area, or

(B) cause substantial damage to significant resources adjacent to the Scenic Area.

(c) The Secretary shall permit those persons holding currently valid grazing permits within the boundary of the Scenic Area to continue to exercise such permits consistent with other applicable law.

(d) The Secretary may enter into cooperative agreements with the State of California and any political subdivision thereof (including the city of Los Angeles) for purposes of protecting Scenic Area resources and administering areas owned by the State or by any such political subdivision which are within the Scenic Area.

Management Plan.

(e) Within three years after the date of enactment of this title, the Secretary shall submit to the committees referred to in section 301, a detailed and comprehensive management plan for the Scenic Area which is consistent with the protection of water rights as provided in subsection (b)(1). The plan shall include but not be limited to—

(1) an inventory of natural (including geologic) and cultural resources;

(2) general development plans for public use facilities, including cost estimates; and

(3) measures for the preservation of the natural and cultural resources of the Scenic Area in accordance with subsections (a) and (b) of this section.

Such plan shall provide for hunting and fishing (including commercial brine shrimp operations authorized under State law) within the Scenic Area in accordance with applicable Federal and State law, except to the extent otherwise necessary for reasons of public health and safety, the protection of resources, scientific research activities, or public use and enjoyment.

(f) The Secretary is authorized to construct a visitor center in the Scenic Area for the purpose of providing information through appropriate displays, printed material, and other interpretive programs, about the natural and cultural resources of the Scenic Area.

(g)(l) Subject to valid existing rights, federally owned lands and interests therein within the Scenic Area are withdrawn from entry or appropriation under the mining laws of the United States, from the operation of the mineral leasing laws of the United States, from operation of the Geothermal Steam Act of 1970, and from disposition under the public land laws.

30 USC 1001 note.

(2) Subject to valid existing rights, all mining claims located within the Scenic Area shall be subject to such reasonable regulations as the Secretary may prescribe to assure that nothing will, to the maximum extent practicable, be consistent with protection of the scenic, scientific, cultural, and other resources of the area, and any patent which may be issued after the date of enactment of this title shall convey title only to the minerals together with the right to use the surface of lands for mining purposes subject to such reasonable regulations.

(h) Nothing in this title shall be construed to reserve any water for purposes of the Scenic Area or to affirm, deny, or otherwise affect the present (or prospective) water rights of any person or of the State of California or of any political subdivision thereof (including the city of Los Angeles), nor shall any provision of this title be construed to cause, authorize, or allow any interference with or infringement of such water rights so long as, and to the extent that,

those rights remain valid and enforceable under the laws of the State of California.

Repeal.

(i)(l) The Act entitled "An Act authorizing and directing the Secretary of the Interior to sell to the city of Los Angeles, California, certain public lands in California; and granting rights-of-way over public lands and reserved lands to the city of Los Angeles in Mono County in the State of California", approved June 23, 1936 (49 Stat. 1892), is hereby repealed.

(2) The Secretary and the Secretary of the Interior shall grant and convey rights-of-way easements, at no cost, to the city of Los Angeles for those rights-of-way on public lands and national forest lands in Mono County, California, as described and set forth in maps and accompanying descriptions which were—

(A) filed by the city of Los Angeles with the Secretary of the Interior on October 24, 1944, and

(B) accepted as proof of construction on behalf of the United States by the Commissioner of the General Land Office on January 4, 1945.

Such easement conveyances shall provide for the right of the city to continue its present operations and to maintain, reconstruct, and replace all existing water and power facilities located within the bounds of the area described in the maps and descriptions referred to in the preceding sentence. The United States shall reserve in the conveyance easements all rights to use and permit the use by others of the lands so conveyed to the extent that such use does not unreasonably interfere with the rights granted herein to the city of Los Angeles.

(3) The grant in paragraph (2) of this subsection shall become effective upon relinquishment in writing by the city of Los Angeles of its applications dated October 20, 1944, and January 17, 1945, to purchase twenty-three thousand eight hundred and fifty acres of Federal land.

(4) The easements granted under paragraph (2) of this subsection shall provide that whenever the city of Los Angeles ceases to use the land or any part thereof subject to such easements for the purposes for which it is currently being used, as of the date of enactment of this title, all interests in such land or part thereof shall revert to the United States.

(j) Existing community recreational uses, as of the date of enactment of this title, shall be permitted at the levels and locations customarily exercised.

STUDIES

16 USC 543d.

SEC. 305. The Secretary shall take such steps as may be necessary to, within one hundred and eighty days of the date of enactment of this title, enter into a contract with the National Academy of Sciences for the purpose of conducting a scientific study of the ecology of the Scenic Area. The study shall provide for consultation with knowledgeable local, State, Federal, and private persons and organizations and shall provide findings and recommendations to the Congress. Such study shall be conducted in accordance with the best scientific methodology (as set forth by the National Academy of Sciences) and shall be transmitted by the National Academy of Sciences to the Committee on Energy and Natural Resources of the United States Senate, to the Committee on Interior and Insular Affairs of the United States House of Representatives, and to the Chief of the Forest Service not later than January 1, 1987. Progress

reports regarding the study shall be transmitted to the above committees on January 1, 1985, and January 1 of each year thereafter.

ADVISORY BOARD

Establishment.
16 USC 543e.

SEC. 306 (a) There is hereby established the Scenic Area Advisory Board (hereinafter referred to as the "Board"). The Secretary shall consult with and seek the advice and recommendations of the Board with respect to—

(1) the administration of the Scenic Area with respect to policies, programs, and activities in accordance with this title;

(2) the preparation and implementation of the comprehensive management plan; and

(3) the location of the visitor center authorized by section 304(f).

(b) The Board shall be composed of nine members, who shall be selected as follows:

(1) five members appointed by the Mono County Board of Supervisors;

(2) two members appointed by the Governor of California (one of whom shall be an employee of the California Division of Parks and Recreation);

(3) one member appointed by the mayor of the city of Los Angeles; and

(4) one member appointed by the Secretary (who shall be an employee of the Forest Service).

(c) Each member of the Board shall be appointed to serve for a term of three years except that the initial appointments shall be for terms as follows:

(1) of those members appointed by the Mono County Board of Supervisors one shall be appointed to serve for a term of one year, two shall be for a term of two years, and two shall be for a term of three years;

(2) of those members appointed by the Governor of California one shall be appointed to serve for a term of one year and one shall be appointed to serve for a term of three years;

(3) the member appointed by the mayor of the city of Los Angeles shall be appointed to serve for a term of two years; and

(4) the member appointed by the Secretary shall be appointed to serve for a term of three years.

(d) The members of the Board shall be appointed within ninety days of the date of enactment of this title. The members of the Board shall, at their first meeting, elect a Chairman.

(e) The Secretary, or a designee, shall from time to time, but at least annually, meet and consult with the Board on matters relating to the administration of the scenic area.

(f) Members of the Board shall serve without compensation as such, but the Secretary is authorized to pay, upon vouchers signed by the Chairman, the expenses reasonably incurred by the Board and its members in carrying out their duties under this title.

(g) Any vacancy in the Board shall be filled in the same manner in which the original appointment was made.

(h) A majority of those members appointed shall constitute a quorum for the conduct of all business of the Board.

(i) The Board shall terminate ten years from the date of its first meeting.

Termination.

TRADITIONAL NATIVE AMERICAN USES

16 USC 543f.

SEC. 307. In recognition of the past use of the Scenic Area by Indian people for traditional cultural and religious purposes, the Secretary shall insure nonexclusive access to Scenic Area lands by Indian people for such traditional cultural and religious purposes, including the harvest of the brine fly larvae. Such direction shall be consistent with the purpose and intent of the American Indian Religious Freedom Act of August 11, 1978 (92 Stat. 469). As a part of the plan prepared pursuant to section 304(c) of this title, the Secretary shall, in consultation with appropriate Indian tribes, define the past cultural and religious uses of the Scenic Area by Indians.

42 USC 1996 and note.

AUTHORIZATION OF APPROPRIATIONS

16 USC 543g.

SEC. 308. In addition to other amounts available for such purposes effective October 1, 1985, there are hereby authorized to be appropriated such sums as may be necessary to carry out the purposes of this title.

COMPLIANCE WITH BUDGET ACT

16 USC 543h. 2 USC 651.

SEC. 309. Any new spending authority described in subsection (c)(2) (A) or (B) of section 401 of the Congressional Budget Act of 1974 which is provided under this title shall be effective for any fiscal year only to such extent or in such amounts as are provided in appropriation Acts.

Approved September 28, 1984.

LEGISLATIVE HISTORY—H.R. 1437:

HOUSE REPORT No. 98-40 (Comm. on Interior and Insular Affairs).
SENATE REPORT No. 98-582 (Comm. on Energy and Natural Resources).
CONGRESSIONAL RECORD, Vol. 129 (1983):
Apr. 12, considered and passed House.
Aug. 9, considered and passed Senate, amended.
Sept. 12, House agreed to Senate amendment.

SEQUOIA AND KINGS CANYON NATIONAL PARKS WILDERNESS IN THE OMNIBUS PUBLIC LAND MANAGEMENT ACT OF 2009

Enacted into law on March 30, 2009 (PL-111-11)

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Subtitle M—Sequoia and Kings Canyon National Parks Wilderness, California

SEC. 1901. DEFINITIONS.

In this subtitle:

(1) SECRETARY.—The term "Secretary" means the Secretary of the Interior.

•S 22 ES

(2) STATE.—The term "State" means the State of California.

SEC. 1902. DESIGNATION OF WILDERNESS AREAS.

In accordance with the Wilderness Act (16 U.S.C. 1131 et seq.), the following areas in the State are designated as wilderness areas and as components of the National Wilderness Preservation System:

(1) JOHN KREBS WILDERNESS.—

(A) DESIGNATION.—Certain land in Sequoia and Kings Canyon National Parks, comprising approximately 39,740 acres of land, and 130 acres of potential wilderness additions as generally depicted on the map numbered 102/60014b, titled "John Krebs Wilderness", and dated September 16, 2008.

(B) EFFECT.—Nothing in this paragraph affects—

(i) the cabins in, and adjacent to, Mineral King Valley; or

(ii) the private inholdings known as "Silver City" and "Kaweah Han".

(C) POTENTIAL WILDERNESS ADDITIONS.—The designation of the potential wilderness additions under subparagraph (A) shall not prohibit the operation, maintenance, and re-

pair of the small check dams and water impoundments on Lower Franklin Lake, Crystal Lake, Upper Monarch Lake, and Eagle Lake. The Secretary is authorized to allow the use of helicopters for the operation, maintenance, and repair of the small check dams and water impoundments on Lower Franklin Lake, Crystal Lake, Upper Monarch Lake, and Eagle Lake. The potential wilderness additions shall be designated as wilderness and incorporated into the John Krebs Wilderness established by this section upon termination of the non-conforming uses.

(2) SEQUOIA-KINGS CANYON WILDERNESS ADDITION.—Certain land in Sequoia and Kings Canyon National Parks, California, comprising approximately 45,186 acres as generally depicted on the map titled "Sequoia-Kings Canyon Wilderness Addition", numbered 102/60015a, and dated March 10, 2008, is incorporated in, and shall be considered to be a part of, the Sequoia-Kings Canyon Wilderness.

(3) RECOMMENDED WILDERNESS.—Land in Sequoia and Kings Canyon National Parks that was managed as of the date of enactment of this Act as recommended or proposed wilderness but not des-

ignated by this section as wilderness shall continue to be managed as recommended or proposed wilderness, as appropriate.

SEC. 1903. ADMINISTRATION OF WILDERNESS AREAS.

(a) IN GENERAL.—Subject to valid existing rights, each area designated as wilderness by this subtitle shall be administered by the Secretary in accordance with the Wilderness Act (16 U.S.C. 1131 et seq.), except that any reference in the Wilderness Act to the effective date of the Wilderness Act shall be considered to be a reference to the date of enactment of this Act.

(b) MAP AND LEGAL DESCRIPTION.—

(1) SUBMISSION OF MAP AND LEGAL DESCRIPTION.—As soon as practicable, but not later than 3 years, after the date of enactment of this Act, the Secretary shall file a map and legal description of each area designated as wilderness by this subtitle with—

(A) the Committee on Energy and Natural Resources of the Senate; and

(B) the Committee on Natural Resources of the House of Representatives.

(2) FORCE AND EFFECT.—The map and legal description filed under paragraph (1) shall have the same force and effect as if included in this subtitle,

except that the Secretary may correct any clerical or typographical error in the map or legal description.

(3) PUBLIC AVAILABILITY.—The map and legal description filed under paragraph (1) shall be on file and available for public inspection in the Office of the Secretary.

(c) HYDROLOGIC, METEOROLOGIC, AND CLIMATOLOGICAL DEVICES, FACILITIES, AND ASSOCIATED EQUIPMENT.—The Secretary shall continue to manage maintenance and access to hydrologic, meteorologic, and climatological devices, facilities and associated equipment consistent with House Report 98–40.

(d) AUTHORIZED ACTIVITIES OUTSIDE WILDERNESS.—Nothing in this subtitle precludes authorized activities conducted outside of an area designated as wilderness by this subtitle by cabin owners (or designees) in the Mineral King Valley area or property owners or lessees (or designees) in the Silver City inholding, as identified on the map described in section 1902(1)(A).

(e) HORSEBACK RIDING.—Nothing in this subtitle precludes horseback riding in, or the entry of recreational or commercial saddle or pack stock into, an area designated as wilderness by this subtitle—

(1) in accordance with section 4(d)(5) of the Wilderness Act (16 U.S.C. 1133(d)(5)); and

(2) subject to any terms and conditions determined to be necessary by the Secretary.

SEC. 1904. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated such sums as are necessary to carry out this subtitle.

BACKCOUNTRY ACCESS ACT OF 2012

Enacted into law on June 5, 2012 (PL 112-128)

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FLO12359 S.L.C.

AMENDMENT NO._____ Calendar No._____

Purpose: In the nature of a substitute.

IN THE SENATE OF THE UNITED STATES—112th Cong., 2d Sess.

H. R. 4849

To direct the Secretary of the Interior to issue commercial use authorizations to commercial stock operators for operations in designated wilderness within the Sequoia and Kings Canyon National Parks, and for other purposes.

Referred to the Committee on _____ and ordered to be printed

Ordered to lie on the table and to be printed

AMENDMENT intended to be proposed by _____

Viz:

Strike all after the enacting clause and insert the following:

SECTION 1. SHORT TITLE.

This Act may be cited as the "Sequoia and King Canyon National Parks Backcountry Access Act".

SEC. 2. COMMERCIAL SERVICES AUTHORIZATIONS IN WILDERNESS WITHIN THE SEQUOIA AND KINGS CANYON NATIONAL PARKS.

(a) CONTINUATION OF AUTHORITY.—Until the date on which the Secretary of the Interior (referred to in this Act as the "Secretary") completes any analysis and deter-

mination required under the Wilderness Act (16 U.S.C. 1131 et seq.), the Secretary shall continue to issue authorizations to provide commercial services for commercial stock operations (including commercial use authorizations and concession contracts) within any area designated as wilderness in the Sequoia and Kings Canyon National Parks (referred to in this section as the "Parks)" at use levels determined by the Secretary to be appropriate and subject to any terms and conditions that the Secretary determines to be appropriate.

(b) WILDERNESS STEWARDSHIP PLAN.—Not later than 3 years after the date of enactment of this Act, the Secretary shall complete a wilderness stewardship plan with respect to the Parks.

(c) TERMINATION OF AUTHORITY.—The authority of the Secretary to issue authorizations under subsection (a) shall terminate on the earlier of—

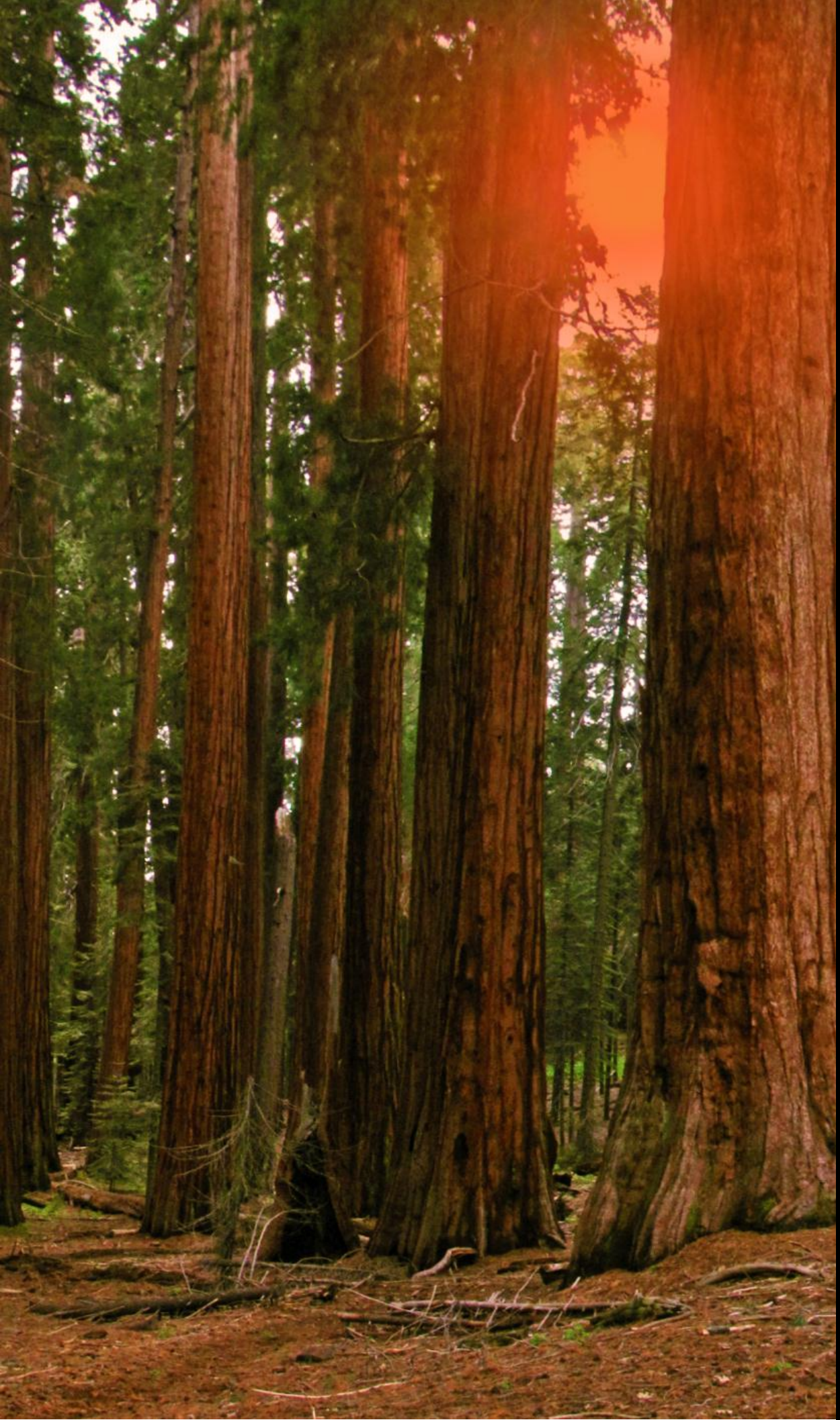
(1) the date on which the Secretary begins to issue authorizations to provide commercial services for commercial stock operations within any areas designated as wilderness in the Parks, as provided in a record of decision issued in accordance with a wilderness stewardship plan completed under subsection (b); or

FLO12359 S.L.C.

3

(2) the date that is 4 years after the date of enactment of this Act.

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Appendix F

Wilderness Regulations, Restrictions, and Permit Conditions

ON THE PREVIOUS PAGE
Redwood Mountain Grove
Photo Courtesy of Rick Cain

APPENDIX F:

WILDERNESS REGULATIONS, RESTRICTIONS, AND PERMIT CONDITIONS

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WILDERNESS REGULATIONS, RESTRICTIONS, AND PERMIT CONDITIONS

The majority of the wilderness in Sequoia and Kings Canyon National Parks is under exclusive federal jurisdiction. There are a few relatively small areas of concurrent jurisdiction, primarily in the Mineral King Valley and around Chimney Rock. In areas of exclusive jurisdiction (also known as Special Maritime and Territorial Jurisdiction) the federal government has primary responsibility for the enforcement of laws and regulations. State and local authorities retain some jurisdiction (for instance, over civil processes), and may assist the federal government under some circumstances. The regulations and laws that apply come from the United States Code (USC) and the Code of Federal Regulations (CFR); these laws are enforced exclusively by the federal government by commissioned National Park Service (NPS) Law Enforcement Rangers. In areas of concurrent jurisdiction, both the federal government and state of California have authority and both state and federal law apply.

The Wilderness Act governs agency management of wilderness. While it prohibits particular actions and uses, it does not set forth specific regulations or laws governing public activities. Laws governing the public in wilderness include those found in United States Code (USC), principally Title 16, Conservation; and Title 18, Crimes and Criminal Procedure. A number of other laws potentially apply to federal lands under wilderness designation, such as Title 21, Food and Drugs. Where a federal law does not exist, non-conflicting state laws may be adopted as federal law under 18 USC Section 13.

Wilderness regulations are ultimately designed to protect people, natural and cultural resources and wilderness character. The majority of the regulations enforced in the wilderness of Sequoia and Kings Canyon National Parks are contained in Title 36 of the Code of Federal Regulations (36 CFR). The regulations in 36 CFR apply to all National Park System units nationwide, unless otherwise specified, and protect all units of the system in a consistent manner. Adoption of regulations, and changes to existing regulations, goes through established federal rule-making procedures, including an opportunity for public comment prior to the final rule adoption. Prohibitions on certain activities (such as bicycle use on trails and possession of pets) contained in CFR and applicable to all parks cannot be waived by individual park units; changes must go through the federal rule-making process.

Park units may promulgate local, park-specific regulations in order to meet specific regulatory needs not addressed by the general regulations in 36 CFR. These special park regulations are found in Part 7 of 36 CFR. As with other regulations, park-specific regulations must go through the federal rule-making process. Parks may also establish restrictions under the authority of 36 CFR Section 1.5, which are published annually (commonly referred to as the "Superintendent's Compendium") in accordance with the requirements in 36 CFR Section 1.7. This authority to establish temporary restrictions is beneficial for situations where regulatory requirements may change, such as meadow restrictions which frequently change from year to year based on usage and environmental conditions.

Public compliance with wilderness regulations and restrictions is achieved through pre-trip education and information efforts, educational contacts in the wilderness, verbal and written warnings for violations of rules and regulation, and citations for violations. Arrest is possible for significant crimes and violations in wilderness, but is historically rare. Pre-trip education is one of the most important factors in achieving compliance with wilderness regulations and takes many forms, such as web-based information, publications and guidebooks, and in-person education during the permitting process.

Compliance with regulations is checked and monitored by park rangers assigned to patrol duties. Park rangers patrolling wilderness may be either non-commissioned rangers or commissioned law enforcement

rangers with arrest authority. Non-commissioned rangers will address minor violations by further educating the users regarding the regulation and purpose of the regulation. Non-commissioned rangers will also provide informal warnings to users violating regulations. Rangers with law enforcement authority will also address minor violations with education and warnings; more significant violations or repeat violations may result in a violation notice.

The level of enforcement for any particular violation of regulations is generally based on the egregiousness of the particular violation. Relatively few violations result in a violation notice, and most are addressed through educational efforts and warnings. The foundation of regulation compliance and enforcement will be education for wilderness users during the in-person permit issuing process. The regulations, and purpose of the regulations, will be thoroughly explained when park staff help users with pre-trip planning and when the permit is issued.

Enforcement of laws and regulations in parks is a means to ensure public safety, protect users' experience, and prevent conflicts. Enforcement is also an important means to protect wilderness resources and preserve wilderness character.

TITLE 36 CODE OF FEDERAL REGULATIONS

Title 36 of the Code of Federal Regulations (36 CFR) Parts 1 – 199 are the primary regulations enforced in the wilderness, and throughout parks. These regulations apply to National Park Service units generally and are not specific to wilderness. Some sections of 36 CFR allow for adoption of local state codes. Violations of 36 CFR regulations are misdemeanors. Penalties (fines) are not retained by the park, and are deposited to the U.S. Treasury.

36 CFR Part 1, General Provisions. Part 1, establishes scope, definitions, penalties and authorities of the regulations contained in 36 CFR. Section 1.5 gives the superintendent authority to establish special restrictions and conditions of use within a park unit. This authority is used to establish the wilderness permit requirement along with permit conditions.

Permit conditions, and a variety of other special public use conditions, are established in the Superintendent's Compendium and reviewed and approved annually. The conditions of the wilderness permit are listed on the annual Minimum Impact Restriction sheet issued with each wilderness permit (see excerpts from wilderness trip planner in next section). These conditions are intended to guide wilderness visitors in the proper use of wilderness in a manner that is consistent with maintaining wilderness character. The conditions have the force of regulation, and are used to govern activities prohibited by the Wilderness Act, and for which no stand-alone regulation exists, such as the use of a generator.

36 CFR Part 2, Resource Protection and Public Use and Recreation. Part 2 is the mainstay in providing regulatory protection for park resources and governing human activities within National Parks. The enforcement of these regulations provides direct protection to the park's wildlife, plants, cultural resources, geologic resources, and ecosystems, which protects the natural quality of wilderness character. Other regulations within Part 2 govern human behavior and regulate noise, aircraft landings, pets, property, memorializing and residing. These regulations protect the unconfined recreation and undeveloped qualities of wilderness.

36 CFR Part 3, Boating and Water Use Activities. Part 3 regulates boating, swimming and other water activities. There is limited applicability to these regulations in the Sequoia and Kings Canyon Wilderness but these regulations would apply to white water boating, boating on lakes and restricting swimming activities if there were closures.

36 CFR Part 4, Vehicles and Traffic Safety. Part 4 is designed to regulate motor vehicle traffic in National Parks and has very limited applicability in the Sequoia and Kings Canyon wilderness areas. Off-road motor vehicle use in wilderness would be prohibited under 36 CFR section 4.10. While portions of roads are within wilderness (the Oriole Lake and Milk Ranch roads), the roads are closed to public use. Authorized private land owners in the Oriole Lake area, and limited administrative use (subject to a Minimum Requirements Analysis), are the only permitted uses.

36 CFR Part 5, Commercial and Private Operations. Part 5 regulations govern business operations in the National Parks. The enforcement of these regulations in the Sequoia and Kings Canyon wilderness are primarily related to individuals conducting unauthorized business in the wilderness in violation of 36 CFR 5.3.

36 CFR Part 7 Special Regulations, Areas of the National Park System. Part 7 establishes particular regulations for individual park units. 36 CFR 7.8 applies to Sequoia and Kings Canyon National Parks, it has limited applicability to wilderness, although 36 CFR 7.8(a) confines pets to frontcountry areas and 36 CFR 7.8(b) may be used to regulate fishing.

CIVIL PENALTIES FOR RESOURCE DAMAGE

It addition to criminal penalties for violations of park laws and regulations, any violation resulting in significant damage to park resources may be subject to civil penalties. The Park System Resource Protection Act (codified in 16 USC 19jj) allows for civil penalties related to resource damage. Revenue from penalties may be used for restoration and rehabilitation of damaged lands. In addition to 19jj, courts may also independently impose restitution fees during criminal proceedings. These funds are typically payable directly to parks for restoration or rehabilitation of damaged lands.

WILDERNESS PERMIT CONDITIONS AND LEAVE NO TRACE©

Wilderness permits are required for all overnight travel. By acquiring the permit, the visitor has agreed to comply with the restrictions contained within the permit. Failure to abide by the specific conditions set forth in the permit constitutes a violation of 36 CFR 1.6(g)(2). These conditions are generally communicated to the public through annual printed material (and available on the parks' website) often titled Minimum Impact Restrictions and Stock Use and Grazing Restrictions and other topic specific handouts. Wilderness permit conditions and requirements have integrated Leave No Trace© concepts. Leave No Trace© is a national education program that promotes the responsible enjoyment and active stewardship of the outdoors (www.lnt.org). The NPS is one of many partners encouraging everyone to practice the seven principles of Leave No Trace©.

Examples of Leave No Trace© for the Sierra Nevada and wilderness permit conditions include:

Plan Ahead and Prepare. Know the restrictions, regulations, and special concerns for the area you will visit. Prepare for extreme weather, hazards, and emergencies. Visit in small groups when possible. Select terrain, mileage, and elevation changes that match the skills and abilities of your group. Carry appropriate food, clothing, equipment, and water. Ensure you have the essentials. Repackage food to minimize waste.

Travel and Camp on Durable Surfaces. Never camp on vegetation, especially meadows. Camp on locations on bare ground, such as established sites, rock, gravel, or snow. Avoid camping beneath dead trees or overhanging dead branches. Protect riparian areas by camping at least 100 ft. from water where terrain permits. Campsites must always be at least 25 ft. from water (36 CFR 2.10(a)(3)). Good campsites are found, not made. "Improvements" such as rock walls, trenches, or bough beds are prohibited (36 CFR

2.10(a)(5)). Building new fire rings is prohibited. Short-cutting trails is prohibited. Stay on trails to reduce erosion and preserve vegetation. Do not build rock cairns or other trail markers.

Dispose of Waste Properly. Pack out all trash, leftover food, and litter. Inspect your campsite and rest areas for trash or spilled foods. Deposit solid human waste in cat holes dug 6 to 8 inches deep at least 100 ft. from water, campsites, and trails. Cover and disguise the cat hole when finished. Pack out toilet paper and hygiene products. Bring plastic baggies solely for this purpose. Never wash yourself, dishes, or clothes directly in a water source. Carry water for these purposes at least 100 ft. away from streams and lakes. Scatter strained dishwater.

Leave What You Find. Preserve the past. Do not take or disturb cultural or historic artifacts. Leave rocks, plants and other natural objects as you find them (36 CFR 2.1). Avoid introducing or transporting non-native species - brush off your boots and clean your trekking poles before and after your trip.

Minimize Campfire Impacts. Campfires can cause lasting impacts. You create the least impact if you use only a stove for cooking and forego the campfire. Where fires are permitted, use established fire rings. Do not build new ones or enlarge existing ones. Keep fires small. Only use dead wood from the ground that can be broken by hand. Always attend the fire. Completely extinguish campfires by drowning with water (not dirt) and stirring until all heat is gone. Do not place aluminum foil (foil does not burn), cans or plastic (when burned it emits toxic fumes) in fires. Thoroughly sift through the ashes with a stick and remove unburned trash and pack it out.

Respect Wildlife. Observe wildlife from a distance. Do not follow, disturb, or approach them. Never feed animals (36 CFR 2.2). Feeding wildlife damages their health, alters natural behaviors, and exposes them to predators. Protect wildlife and your food by storing food and trash securely.

Be Considerate of Other Visitors. Respect other visitors and protect the quality of their experience. Be courteous. Yield to other users on the trail. Take breaks and camp away from trails and other visitors. Let nature's sounds prevail. Avoid loud voices and noises (36 CFR 2.12 and 36 CFR 2.34).

Leave No Trace© (LNT) guidelines ensure the general preservation of wilderness character and resources. There are specific situations, however, that necessitate more stringent restrictions than the LNT guidelines. These parks will on occasion implement restrictions that are more rigorous than the general LNT guidelines, specifically as conditions of wilderness permits.

TEMPORARY VARIANCES

Variances to selected restrictions could be made for party size, access, campfire limits, meadow opening dates, number of stock per trip, number of nights per area, number of stock per area, etc., depending on special, compelling circumstances. Such variances may be granted in rare case-by-case instances to accommodate special visitor needs where the effects on wilderness character, park resources, and other visitors would be within acceptable limits. Short-term or one-time-only variances proposed by visitors would be individually considered by the superintendent, and, if approved would likely be subject to special conditions. Requests for variances should be made in writing at least four weeks in advance to provide adequate time for consideration.

PUBLIC INFORMATION

A variety of means are used to convey regulatory information to the general public. The park's website, as well as the national NPS website, provides information about regulations, restrictions, temporary closures, public use limits, and special announcements. Park-produced handouts and press releases are

also used to communicate regulatory information to the public. Wilderness-specific information is made available to visitors through a variety of means. The Wilderness Trip Planner, produced by the park and updated periodically, provides a wealth of information to help users plan their trip. This includes general safety information, recommendations on minimizing the environmental impact of their actions (including the Leave No Trace© program), and regulatory information.

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Appendix G

Scoping Materials

ON THE PREVIOUS PAGE
Rae Lakes
NPS Photo

APPENDIX G:

SCOPING MATERIALS

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PUBLIC, AGENCY, AND TRIBAL SCOPING INITIATION

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United States Department of the Interior

NATIONAL PARK SERVICE
Sequoia and Kings Canyon National Parks
47050 Generals Highway
Three Rivers, California 93271-9651
(559) 565-3341

IN REPLY REFER TO:
L7617

March 22, 2011

Gabe Horta
Big Sandy Rancheria of Mono Indians
P.O. Box 337
Auberry, California 93602

Dear Mr. Horta:

We are initiating the Wilderness Stewardship Plan and Environmental Impact Statement (WSP/EIS) for Sequoia and Kings Canyon National Parks, and would like your input on this important effort. We would like to invite you to a presentation on this planning effort at the Sierra National Forest Headquarters, 1600 Tollhouse Road, in Clovis, California on April 26, 2011, from 9 am until 11 am. This meeting will provide an opportunity for your input on issues and concerns related to current and future wilderness management in Sequoia and Kings Canyon National Parks. We are also inviting area agencies and other area tribes to participate in this meeting.

For your information, we will be conducting a public scoping meeting in Fresno on April 25 at 7 pm at Fresno Pacific University, 1717 South Chestnut Avenue, in the Marpeck Center room 102, and in Visalia on April 29, at 6 pm in the Tulare County Office of Education on 2637 West Burrell. You are welcome to attend one or both of those meetings.

We are available for government-to- government consultation with your Tribe if you wish to discuss your questions and concerns about the Wilderness Stewardship Plan separately from the aforementioned meetings. If you would like a separate meeting, please contact Wilderness Coordinator Gregg Fauth at (559) 565-3137 or by Email at gregg_fauth@nps.gov.

We are in the initial stage of this planning process, also called the "scoping" phase, and foresee providing you with additional opportunities for input as we develop the plan and alternatives and prepare a draft environmental impact statement. However, as we begin our planning process, it is important to understand Tribal concerns early so these can be reflected in the plan.

If you would like to submit written comments during this scoping phase related to wilderness management in Sequoia and Kings Canyon National Parks, we would appreciate receipt of your comments by June 30, 2011. We look forward to working with you on this and other future planning efforts.

Sincerely,

Karen F. Taylor-Goodrich
Superintendent

Identical letter sent to 25 area tribes, tribal organizations, or tribal representatives.

National Park Service
U.S. Department of the Interior

Sequoia and Kings Canyon
National Parks

47050 Generals Hwy.
Three Rivers, CA 93271

559 565-3341 phone
559 565-3730 fax

Sequoia and Kings Canyon National Parks News Release

For Immediate Release: March 29, 2011
Contact: Dana M. Dierkes or Malinee Crapsey
Phone Number: (559) 679-2866 or 559-565-3131

National Park Service Seeks Public Input in Development of Wilderness Stewardship Plan for Sequoia and Kings Canyon National Parks

Sequoia and Kings Canyon National Parks, CA – Starting on April 11, the National Park Service will be seeking your input in development of a Wilderness Stewardship Plan and Environmental Impact Statement (WSP/EIS) for Sequoia and Kings Canyon National Parks in Tulare and Kings counties in California. The National Park Service is interested in your concerns about existing and future wilderness use and management at Sequoia and Kings Canyon National Parks. Potential issues which may be addressed in the plan include: day and overnight use; wilderness permitting; use of campfires; wildlife and proper food storage; party sizes; camping and campsites; human waste management; stock use; meadow management; research activities; wildlife management in wilderness; cultural resources in wilderness; maintenance of trails, bridges, or other necessary infrastructure; the extent to which commercial services are necessary to fulfill the recreational and other purposes of wilderness areas, etc. The majority of Sequoia and Kings Canyon National Parks, over 96% of the land or approximately 835,000 acres, is managed as wilderness, including the Sequoia-Kings Canyon and John Krebs wilderness areas.

- more -

To learn more about the process and how to comment, visit *http://parkplanning.nps.gov/sekiwild* and/or consider attending an upcoming workshop during the last week of April to listen to a presentation by the National Park Service and to meet with staff in an informal open house setting and discuss issues of interest or submit your comments. The schedule for the meetings is:

Monday, April 25, 2011
7:00-9:00 p.m.
Fresno Pacific University
Marpeck Center, Room 102
1717 South Chestnut Avenue
Fresno, CA 93727

Tuesday, April 26, 2011
7:00-9:00 p.m.
East Bay Regional Parks
Richard C. Trudeau Training Center,
Conf. Room 2
11500 Skyline Blvd
Oakland, CA 94619

Wednesday, April 27, 2011
7:00-9:00 p.m.
Inyo National Forest Headquarters
Conference Room
351 Pacu Lane
Bishop, CA 93514

Thursday, April 28, 2011
7:00-9:00 p.m.
L.A. River Center
California Building Atrium
570 West Avenue Twenty-Six
Los Angeles, CA 90065

Friday, April 29, 2011
6:00 – 8:00 p.m.
Tulare County Office of Education
"The Pit"
2637 West Burrel Ave.
Visalia, CA 93291

- more -

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[redacted]

All written comments must be transmitted, postmarked, or hand-delivered within 90 days of the date the "Notice of Intent," the official announcement of this public comment period, is published in the *Federal Register*. To respond electronically, you may submit your comments online to the National Park Service Planning, Environment and Public Comment (PEPC) website at *http://parkplanning.nps.gov/sekiwild*. To submit written comments by letter you may send them by U.S. Postal Service or other mail delivery service or hand-deliver your comments to Superintendent Karen F. Taylor-Goodrich, Sequoia and Kings Canyon National Parks, Attn: Wilderness Stewardship Plan, 47050 Generals Highway, Three Rivers, CA 93271. Faxed comments will be accepted at (559) 565-4202. Written comments will also be accepted during public scoping meetings. Comments in any format (written or electronic) submitted by an individual or organization on behalf of another individual or organization will not be accepted. Anonymous comments will not be accepted.

It is the practice of the National Park Service to make all comments available for public review, after the close of the EIS process. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment - including your personal identifying information - may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

For more information about Sequoia and Kings Canyon National Parks, visit www.nps.gov/seki.

–NPS–

Note to News Media: Over 20 million people live within a 250-mile drive of Sequoia and Kings Canyon National Parks.

EXPERIENCE YOUR AMERICA
The National Park Service cares for special places saved by the American people so that all may experience our heritage.

United States Department of the Interior

NATIONAL PARK SERVICE
Sequoia and Kings Canyon National Parks
47050 Generals Highway
Three Rivers, California 93271-9651
(559) 565-3341

IN REPLY REFER TO:
L7617 (SEKI)

March 30, 2011

Dear Interested Party:

You are invited to participate in an important planning process for Sequoia and Kings Canyon National Parks. We are resuming our Wilderness Stewardship Plan and Environmental Impact Statement (WSP/EIS) this spring and beginning our public scoping process. Wilderness is an important resource, with more than 808,000 acres of designated wilderness within these two parks, including the Sequoia-Kings Canyon Wilderness and John Krebs Wilderness. Including our proposed and potential wilderness additions, we manage more than 96% of our total acreage as wilderness.

We are very interested in your concerns and issues related to wilderness management and preservation at Sequoia and Kings Canyon National Parks. We will be initiating our first public comment period, also called "scoping" for the plan on April 11, 2011. A "Notice of Intent" (NOI) to prepare the WSP/EIS is expected to be published in the Federal Register in April. The public scoping period will end 90 days after the NOI is published.

We have several meetings scheduled to provide more information on the project (see page 2). If you are unable to attend the meetings, information on the proposed project is available online at the National Park Service Planning, Environment and Public Comment (PEPC) website at http://parkplanning.nps.gov/sekiwild.

Public comments may be submitted several ways. You may input your comments on the PEPC website (above), or you may direct comments regarding this project to the park by mail, hand delivery, or fax to:

Superintendent
Sequoia and Kings Canyon National Parks
Attn: Wilderness Stewardship Plan
47050 Generals Highway
Three Rivers, CA 93271
Fax: 559-565-4202

If you need assistance using our PEPC website, please contact Environmental Protection Specialist Nancy Hendricks at (559) 565-3102 and she will assist you.

Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so. We will always make submissions from organizations or businesses, and from individuals identifying themselves as representatives of or officials of organizations or businesses, available for public inspection in their entirety. Anonymous comments will not be accepted.

Thank you for your interest in the wilderness of Sequoia and Kings Canyon National Parks and we hope to see you at one of our public meetings.

for Karen F. Taylor-Goodrich
Superintendent

Wilderness Stewardship Plan Scoping Meetings/Open Houses

Monday, April 25, 2011
7:00 – 9:00 p.m.
Fresno Pacific University
Marpeck Center, Room 102
1717 South Chestnut Avenue
Fresno, California, 93727

Tuesday, April 26, 2011
7:00 – 9:00 p.m.
East Bay Regional Parks
Richard C. Trudeau
Training Center, Conf. Room 2
11500 Skyline Boulevard
Oakland, California, 94619

Wednesday, April 27, 2011
7:00 – 9:00 p.m.
Inyo National Forest HQ
Conference Room
351 Pacu Lane
Bishop, California, 93514

Thursday, April 28, 2011
7:00 – 9:00 p.m.
L.A. River Center
California Building Atrium
570 West Avenue Twenty-Six
Los Angeles, California, 90065

Friday, April 29, 2011
6:00 – 8:00 p.m.
Tulare County Office of Education
"The Pit"
2637 West Burrel Avenue
Visalia, California, 93291

National Park Service
U.S. Department of the Interior

Sequoia and Kings Canyon
National Parks

47050 Generals Hwy.
Three Rivers, CA 93271

559 565-3341 phone
559 565-3730 fax

Sequoia and Kings Canyon National Parks News Release

For Immediate Release: April 20, 2011
Contact: Dana M. Dierkes
Phone Number: (559) 679-2866

Public Meetings Scheduled in Various Cities and Towns from April 25-29 to Obtain Feedback in Development of Wilderness Stewardship Plan and Environmental Impact Statement

Sequoia and Kings Canyon National Parks, CA –Join the National Park Service at various upcoming meetings throughout central and southern California to provide your input in development of a Wilderness Stewardship Plan and Environmental Impact Statement (WSP/EIS) to guide existing and future wilderness use and management at Sequoia and Kings Canyon National Parks. Listen to a presentation by National Park Service staff. Then, meet with staff afterwards in an informal open house setting to discuss issues of interest or submit your comments. The meeting schedule is:

Monday, April 25, 2011
7:00-9:00 p.m.
Fresno Pacific University
Marpeck Center, Room 102
1717 South Chestnut Avenue
Fresno, CA 93727

Tuesday, April 26, 2011
7:00-9:00 p.m.
East Bay Regional Parks
Richard C. Trudeau Trng. Ctr., Conf. Room 2
11500 Skyline Blvd
Oakland, CA 94619

Wednesday, April 27, 2011
7:00-9:00 p.m.
Inyo National Forest Headquarters
Conference Room
351 Pacu Lane
Bishop, CA 93514

Thursday, April 28, 2011
7:00-9:00 p.m.
L.A. River Center
California Building Atrium
570 West Avenue Twenty-Six
Los Angeles, CA 90065

- more -

Friday, April 29, 2011
6:00 – 8:00 p.m.
Tulare County Office of Education
"The Pit"
2637 West Burrel Ave.
Visalia, CA 93291

All written comments must be transmitted, postmarked, or hand-delivered within 90 days of the date the "Notice of Intent" is published in the *Federal Register*. (The Notice of Intent, the official announcement of this public comment period, is expected to be published shortly.) To respond electronically, submit your comments via the National Park Service Planning, Environment and Public Comment (PEPC) website at *http://parkplanning.nps.gov/sekiwild*.
To submit written comments by letter, you may send them by U.S. Postal Service or other mail delivery service or hand-deliver your comments to Superintendent Karen F. Taylor-Goodrich, Sequoia and Kings Canyon National Parks, Attn: Wilderness Stewardship Plan, 47050 Generals Highway, Three Rivers, CA 93271. Faxed comments will be accepted at (559) 565-4202. Written comments will be accepted during public scoping meetings. Comments in any format (written or electronic) submitted by an individual or organization on behalf of another individual or organization will not be accepted. Anonymous comments will not be accepted.

It is the practice of the National Park Service to make all comments available for public review after the close of the EIS process. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment - including your personal identifying information - may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

For more information about Sequoia and Kings Canyon National Parks, visit www.nps.gov/seki.

–NPS–

Fascinating Facts:

(1) Over 96% of the land at Sequoia and Kings Canyon National Parks is managed as wilderness.
(2) Over 20 million people live within a 250-mile drive of Sequoia and Kings Canyon National Parks.

2

United States Department of the Interior

NATIONAL PARK SERVICE
Sequoia and Kings Canyon National Parks
47050 Generals Highway
Three Rivers, California 93271-9651
(559) 565-3341

IN REPLY REFER TO:
L7617

May 16, 2011

Ed Armenta
Forest Supervisor
Inyo National Forest
351 Pacu Lane, Suite 200
Bishop, California 93514

Dear Ed:

Thank you for your support at our April 27 and 28 public and agency scoping meetings at your headquarters in Bishop. It was great to meet you and your staff and discuss wilderness stewardship, particularly cross boundary issues that are important to both our agencies. We'd like to thank your staff, particularly Nancy Upham, for helping us coordinate our meetings and for sending our meeting notification to her contact list.

Based on our discussions at those meetings, we believe that it would benefit both our agencies to work together through this 3 to 4-year planning process. Therefore, we are requesting that Inyo National Forest participate as a cooperating agency in our Wilderness Stewardship Plan/ Environmental Impact Statement. We hope that as a cooperating agency, you would designate a primary point of contact for Inyo National Forest who would be the liaison with our wilderness planning staff. We expect that there would be periodic meetings with your staff to provide updates on the planning effort and opportunities for input. Work may include providing us with information about potential issues and ideas for how we can effectively work together on cross boundary management issues; assisting in developing and reviewing alternatives; and providing information and data that would allow us to better assess environmental consequences and cumulative effects. As a cooperating agency, you would be able to review preliminary draft text and provide feedback.

Please let us know if you would be interested in cooperating agency status. If you need further information, our primary contacts for the project are Wilderness Coordinator Gregg Fauth at (559) 565-3137 and Environmental Protection Specialist Nancy Hendricks at (559) 565-3102.

We look forward to working with you on this and other future planning efforts.

Sincerely,

Karen F. Taylor-Goodrich
Superintendent

United States Department of the Interior

NATIONAL PARK SERVICE
Sequoia and Kings Canyon National Parks
47050 Generals Highway
Three Rivers, California 93271-9651
(559) 565-3341

IN REPLY REFER TO:
L7617

May 16, 2011

Deb Whitman
Acting Forest Supervisor
Sequoia National Forest
1839 South Newcomb St
Porterville, California 93257

Dear Deb:

We have initiated public, agency, and tribal scoping for the Sequoia and Kings Canyon National Parks Wilderness Stewardship Plan and Environmental Impact Statement. We'd like to thank Marianna Emmendorfer and Miguel Macias for participating in our agency scoping meeting at the Sierra National Forest office on April 26.

Based on our discussions at our April 26 meeting, we believe that it would benefit both our agencies to work together through this 3 to 4-year planning process. Therefore, we are requesting that Sequoia National Forest participate as a cooperating agency in our Wilderness Stewardship Plan/ Environmental Impact Statement. We hope that as a cooperating agency, you would designate a primary point of contact for Sequoia National Forest who would be the liaison with our wilderness planning staff. We expect that there would be periodic meetings with your staff to provide updates on the planning effort and opportunities for input. Work may include providing us with information about potential issues and ideas for how we can effectively work together on cross boundary management issues; assisting in developing and reviewing alternatives; and providing information and data that would allow us to better assess environmental consequences and cumulative effects. As a cooperating agency, you would be able to review preliminary draft text and provide feedback.

Please let us know if you would be interested in cooperating agency status. If you need further information, or if you would like to schedule a meeting to discuss this further, our primary contacts for the project are Wilderness Coordinator Gregg Fauth at (559) 565-3137 and Environmental Protection Specialist Nancy Hendricks at (559) 565-3102.

We look forward to working with you on this and other future planning efforts.

Sincerely,

Karen F. Taylor-Goodrich
Superintendent

United States Department of the Interior

NATIONAL PARK SERVICE
Sequoia and Kings Canyon National Parks
47050 Generals Highway
Three Rivers, California 93271-9651
(559) 565-3341

IN REPLY REFER TO:
L7617

May 16, 2011

Scott Armentrout
Forest Supervisor
Sierra National Forest
1600 Tollhouse Road
Clovis, California 93611

Dear Scott:

As you know, we have initiated public, agency, and tribal scoping for the Sequoia and Kings Canyon National Parks Wilderness Stewardship Plan and Environmental Impact Statement. Thank you for allowing us to host our agency scoping meeting at your Clovis office on April 26. We appreciate your staff's assistance in coordinating this meeting for us, particularly Susan Burkindine for her efforts. We also would like to especially thank Dirk Charley for including us in the Tribal Forum meeting to help us engage tribes in our Wilderness planning process.

Based on our discussions at our April 26 meeting, we believe that it would benefit both our agencies to work together through this 3 to 4-year planning process. Therefore, we are requesting that Sierra National Forest participate as a cooperating agency in our Wilderness Stewardship Plan/ Environmental Impact Statement. We hope that as a cooperating agency, you would designate a primary point of contact for Sierra National Forest who would be the liaison with our wilderness planning staff. We expect that there would be periodic meetings with your staff to provide updates on the planning effort and opportunities for input. Work may include providing us with information about potential issues and ideas for how we can effectively work together on cross boundary management issues; assisting in developing and reviewing alternatives; and providing information and data that would allow us to better assess environmental consequences and cumulative effects. As a cooperating agency, you would be able to review preliminary draft text and provide feedback.

Please let us know if you would be interested in cooperating agency status. If you need further information, our primary contacts for the project are Wilderness Coordinator Gregg Fauth at (559) 565-3137 and Environmental Protection Specialist Nancy Hendricks at (559) 565-3102.

We look forward to working with you on this and other future planning efforts.

Sincerely,

Karen F. Taylor-Goodrich
Superintendent

Sequoia and Kings Canyon National Parks

National Park Service
U.S. Department of the Interior

Wilderness Stewardship Plan Update - October 27, 2011

Comments for Wilderness Stewardship Plan Now Available for Public Review

Nearly 900 comment letters were received during the public scoping period for the Sequoia and Kings Canyon National Parks' (SEKI) Wilderness Stewardship Plan and Environmental Impact Statement (WSP). The scoping period occurred from April 11 to August 31, 2011 and included five public meetings held in northern, central, and southern California.

"This tremendous response demonstrates the public's care and passion about protecting our nation's special wild places, specifically the 830,000 acres of lands managed as wilderness in Sequoia and Kings Canyon National Parks" stated Superintendent Karen Taylor-Goodrich.

All the comment letters are available for the public to read on the National Park Service's Planning, Environment and Public Comment (PEPC) website. They can be accessed at: http://parkplanning.nps.gov/sekiwild (Click on "Document List"). Personal identifying information of unaffiliated individuals has been excluded from comment letters; names of persons representing interest groups, agencies, and businesses are included.

All the comment letters have been included in one large "pdf" file that is searchable by word or phrase. All comment letters were entered as received and they have not been edited or changed in any way. We cannot verify that the comments are accurate as to fact. If you need help finding your individual comment letter in the document, or if you would like a CD version of the document, please contact the Sequoia and Kings Canyon National Parks Environmental Compliance Office at 559-565-3102.

Comments were received on an extremely wide variety of wilderness topics and issues, and expressed a wide variety of opinions. While the majority of commenters were California residents (83%), we also received comments from 41 other states and 3 other countries.

Numerous commenters were concerned about issues that have been under discussion for years while others brought forward new wilderness management considerations and ideas, such as requesting increased restrictions on types of equipment that can be brought into wilderness. Some examples of issues presented during public scoping include:

- Opinions on how wilderness should be experienced, recommending "appropriate" and "inappropriate" activities, equipment, and material items, including:
  - Campfires
  - Group sizes
  - Food storage lockers and portable bear-resistant food storage canisters
  - Camp equipment (e.g. chairs and ice chests)
  - Electronic devices (e.g. GPS units and cell phones)
  - Trails and bridges
  - Administrative use of helicopters

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- Support for or concern about stock use in wilderness.
- Support for or suggested changes in current management practices (e.g. regulations, permitting, and quotas).
- Support for or suggested changes in the conduct of commercial services (e.g. hiking, climbing, and stock trips provided by private guides and outfitters). This relates to the "extent necessary" clause of the Wilderness Act.
- Views on what wilderness means to the commenter.
- Suggestions to afford more protection to the natural environment.

Currently we are studying the comments to determine the scope and the significant issues to be analyzed in depth in the Wilderness Stewardship Plan and Environmental Impact Statement. Note that the process of commenting and providing input should not be viewed as a voting process, that is, if a particular outcome is popular among a majority of those who comment, this does not necessarily mean that it will be the final outcome. The National Park Service will make management decisions based on the mandates of relevant legislation and scientific integrity.

The tentative schedule for the Wilderness Stewardship Plan is as follows:

- Fall 2011 - Spring 2012 – Analyze Public Scoping Comments
- Spring-Summer 2012 – Alternatives Development
- Fall 2012 – Release Draft Alternatives for Public Review
- Winter 2012-Fall 2013 – Prepare Draft WSP/Environmental Impact Statement (EIS)
- Fall 2013-Winter 2014 – Public Review of Draft WSP/EIS
- Summer 2014 – Release of the Final WSP/EIS
- Fall 2014 – Record of Decision by Pacific West Regional Director

All commenters who supplied either Email or physical mailing address are included on the parks' mailing list for this project. Anyone who wishes to be included on the mailing list for this project should supply their name and either an Email or physical mailing address to: SEKI_Planning@nps.gov. Please include the following on the subject line: *WSP Mailing List.*

Additional information:

Congressionally Designated Wilderness is to be:

- lands ". . . designated for preservation and protection in their natural condition. . ."
- lands ". . . administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character. . ."
- land ". . .where the earth and its community of life are untrammeled by man." And to be land that retains its ". . . primeval character and influence . . . which is protected and managed so as to preserve its natural conditions . . ."
- land that appears ". . . affected primarily by the forces of nature, with the imprint of man substantially unnoticeable. . ." and ". . . has outstanding opportunities for solitude or a primitive and unconfined type of recreation. . ."
- land that "may also contain ecological, geological, or other features of scientific, educational , scenic, or historical value." And is ". . . devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use."

From: The Wilderness Act, Public Law 88-577, passed September 3, 1964.

Sequoia-Kings Canyon Wilderness:

- Designated by 1984 California Wilderness Act	=	723,036 acres
- Designated by 2009 Omnibus Public Land Management Act	=	45,186* acres
John Krebs Wilderness (from 2009 OPLMA)	=	39,740* acres
Total designated wilderness acres *(93.3% of park lands)	=	807,962 acres
Proposed Wilderness – managed as wilderness per NPS policies	=	~30,000 acres
Total designated or managed as wilderness (96.8% of park lands)	=	~837,962 acres

(Note: * denotes preliminary number of acres which may be slightly altered upon establishment of final wilderness boundaries)

For further reference on National Park and Wilderness Legislation and Policies, see:

- Act establishing Sequoia National Park, September 25, 1890 (and following acts)
- Act establishing Kings Canyon National Park, March 4, 1940 (and following acts)
- The National Park Service "Organic" Act, August 25, 1916
- The Wilderness Act, Public Law 88-577, September 3, 1964.
- The California Wilderness Act, Public Law 98-425, Sept. 28, 1984
- The Omnibus Public Land Management Act of 2009, Public Law 111-11, March 30, 2009
- National Park Service, Management Policies, 2006 – Chapter 6, Wilderness Preservation and Management

Note: These and other pertinent documents are posted for your review on the PEPC site at:
http://parkplanning.nps.gov/sekiwild Click on "Document List."

Sequoia and Kings Canyon National Parks
47050 Generals Highway
Three Rivers, CA 93271

Wilderness Plan Update

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ALTERNATIVES DEVELOPMENT

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National Park Service
U.S. Department of the Interior

Sequoia and Kings Canyon
National Parks

47050 Generals Hwy.
Three Rivers, CA 93271

559 565-3341 phone
559 565-3730 fax

Sequoia and Kings Canyon National Parks News Release

For Immediate Release: July 16, 2012
Contact: Dana Dierkes
Phone Number: (559) 565-3131 or (559) 679-2866 (cell)

National Park Service Will Seek Public Input in Development of Wilderness Stewardship Plan Alternatives for Sequoia and Kings Canyon National Parks Starting in October 2012

Sequoia and Kings Canyon National Parks, CA – Starting in early October, the National Park Service will be seeking public input on the preliminary draft alternatives for the Wilderness Stewardship Plan for Sequoia and Kings Canyon National Parks in Tulare and Kings counties, California. The National Park Service is interested in your ideas and feedback about alternatives to address future wilderness management at Sequoia and Kings Canyon National Parks. Topics which may be addressed in the plan include: day and overnight use; permitting and quotas; party sizes; campfires; food storage; camping and campsites; human waste management; pack stock and grazing management; scientific research; natural and cultural resource management; maintenance of signs, trails, bridges, and other recreational infrastructure; administrative infrastructure; education and outreach; the extent to which commercial services are necessary to fulfill the recreational and other purposes of wilderness areas; and front-country support facilities. Many of these topics were brought forward during the public scoping phase of the planning process, which occurred from April 11 to August 31, 2011.

To learn more about the process and how to comment, visit the National Park Service Planning, Environment, and Public Comment website (PEPC) at *http://parkplanning.nps.gov/sekiwild* and/or consider attending an upcoming workshop during the last two weeks of October to listen to a presentation by the National Park Service and meet with staff to discuss your ideas about alternatives or submit your comments. The schedule for the meetings is:

– continued on page 2 –

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[redacted]

– continued from page 1 –

Thursday, October 25, 2012
7:00 - 9:00 p.m.
Eastern Sierra Tri-county Fairgrounds
Patio Building
Sierra Street and Fair Street
Bishop, CA 93514

Friday, October 26, 2012
7:00 - 9:00 p.m.
Los Angeles River Center
California Building Atrium
570 West Avenue 26
Los Angeles, CA 90065

Monday, October 29, 2012
7:00 - 9:00 p.m.
East Bay Regional Parks
Redwood Regional Park
Richard C. Trudeau Training Center
Main Conference Room
11500 Skyline Blvd
Oakland, CA 94619

Tuesday, October 30, 2012
6:00 - 8:00 p.m.
Visalia Marriott Hotel
Main Ballroom
300 South Court Street
Visalia, CA 93291

– continued on page 3 –

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[redacted]

– continued from page 2 –

In order to ensure that your comments are considered, you may use either of two methods to comment during the alternative review process. If you wish to comment electronically, you may submit your comments online to the PEPC website by visiting http://parkplanning.nps.gov/sekiwild, clicking on "Open for Comment," and then clicking on the link to the document. The National Park Service encourages commenting electronically through PEPC, but if you wish to submit your written comments in hard copy (e.g., in a letter), you may send them by U.S. Postal Service or other mail delivery service, or hand-deliver your comments to Superintendent Karen F. Taylor-Goodrich, Sequoia and Kings Canyon National Parks, Attn: Wilderness Stewardship Plan, 47050 Generals Highway, Three Rivers, CA 93271. Faxed comments will be accepted at (559) 565-4202. Written comments will also be accepted during public workshops. Comments in any format (written or electronic) submitted by an individual or organization on behalf of another individual or organization will not be accepted. Anonymous comments will not be accepted.

It is the practice of the National Park Service to make all comments available for public review. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment - including your personal identifying information - may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

For more information about Sequoia and Kings Canyon National Parks, visit www.nps.gov/seki.

–NPS–

SEQUOIA AND KINGS CANYON NATIONAL PARKS

Sequoia and Kings Canyon National Parks, which lie side-by-side in the southern Sierra Nevada in central California, serve as a prime example of nature's size, beauty, and diversity. With the world's largest trees (by volume), grand mountains, rugged foothills, deep canyons, vast caverns, and the highest point in the lower 48 states, it is a place that attracts 1.6 million visitors a year from across the U.S. and the world. Visitor activities vary by season and elevation. The majority of Sequoia and Kings Canyon National Parks, nearly 97% of the land or approximately 835,000 acres, is managed as wilderness, including the Sequoia-Kings Canyon and John Krebs wildernesses. For more information, visit www.nps.gov/seki or call 559-565-3341.

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Sequoia and Kings Canyon National Parks
California

Newsletter 2
October 2012

National Park Service
U.S. Department of the Interior

Wilderness Stewardship Plan and Environmental Impact Statement

Preliminary Draft Alternatives Newsletter

Planning for the Future of Sequoia and Kings Canyon National Parks' Wilderness

Dear Friends,

The National Park Service (NPS) is in the early stages of preparing a Wilderness Stewardship Plan (WSP) for Sequoia and Kings Canyon National Parks. Last spring and summer, we received more than 900 comments during the initial public scoping period for the WSP. We reviewed all of the comments and have identified topics which will be addressed in the WSP. For each of the key topics, we have developed preliminary draft alternatives.

Now, we are asking for your input. Please help us identify any topics that we have missed so that we can further refine the alternatives. Take a moment to read this newsletter, which provides a summary of the alternatives, and make sure to visit our planning website at http://parkplanning.nps.gov/sekiwild for a detailed description of each of the preliminary draft alternatives. We will be accepting your comments on the preliminary draft alternatives through November 19, 2012. Also, in late October, we will be conducting public meetings to provide additional information, and to listen to your concerns and questions. A complete meeting schedule is found on this page.

We value your feedback during this process and look forward to reading your comments on these preliminary draft alternatives.

Sincerely,

Superintendent *Karen F. Taylor-Goodrich*

Public Meetings

Thursday, October 25, 2012
7:00 - 9:00 pm
Eastern Sierra Tri-county Fairgrounds
Patio Building
Sierra Street and Fair Street
Bishop, CA 93514

Friday, October 26, 2012
7:00 - 9:00 pm
Los Angeles River Center
California Building Atrium
570 West Avenue 26
Los Angeles, CA 90065

Monday, October 29, 2012
7:00 - 9:00 pm
East Bay Regional Parks
Redwood Regional Park
Richard C. Trudeau Trainng Center
Main Conference Room
11500 Skyline Blvd
Oakland, CA 94619

Tuesday, October 30, 2012
6:00 - 8:00 pm
Visalia Marriott Hotel
Main Ballroom
300 South Court Street
Visalia, CA 93291

Next Steps in the Planning Process

Dates	Planning Activity
Fall 2012	Public Review of Preliminary Draft Alternatives
Winter 2012 - Fall 2013	Refine Draft Alternatives and Prepare Draft WSP/EIS
Fall 2013 - Winter 2014	Public Review of Draft WSP/EIS
Spring 2014	Analysis of Public Comment on Draft WSP/EIS
Summer 2014	Prepare Final WSP/EIS
Fall 2014	Release Final WSP/EIS
Spring 2015	Record of Decision



Purpose and Need for the Wilderness Stewardship Plan

The California Wilderness Act of 1984 designated wilderness in Sequoia and Kings Canyon National Parks. The Omnibus Public Land Management Act of 2009 designated the John Krebs wilderness and expanded wilderness acreage. Today, 808,079 acres of the two parks is designated as wilderness, with another 29,500 acres managed as wilderness in accordance with NPS policies. Since 1986, the wilderness management in the parks has been guided by the Backcountry Management Plan and Stock Use and Meadow Management Plan. The purpose of the new Wilderness Stewardship Plan (WSP) is to establish a framework for management of wilderness within Sequoia and Kings Canyon National Parks in order to preserve wilderness character and provide opportunities for access and use in accordance with the Wilderness Act and other laws and policies.







What is Wilderness Character?

Section 2(a) of the Wilderness Act of 1964 states that wilderness areas "shall be administered for *the use and enjoyment* of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, *and so as to provide for the protection of these areas, the preservation of their wilderness character…*" (emphasis added).

Federal wilderness managers have agreed on the meaning of wilderness character as defined in Keeping It Wild (Landres, et.al.), a 2008 document produced by an interagency panel. The qualities of wilderness character have been categorized as:

- Untrammeled - wilderness is essentially unhindered and free from the *actions* of modern human control or manipulation.
- Natural - wilderness ecological systems are substantially free from the *effects* of modern civilization.
- Undeveloped - wilderness retains its primeval character and influence, and is *essentially* without permanent improvement or modern human occupation.
- Solitude or primitive and unconfined recreation - wilderness provides outstanding opportunities for solitude *or* primitive and unconfined recreation.
- Unique - An individual wilderness may have unique qualities, such as archeological resources or historic structures whose contributions to wilderness values cannot be captured by the other four qualities.

Preserving wilderness character is our mission, by law and policy.



Actions Common to All Alternatives

Commenters brought forward a number of important issues. However, many are topics related to existing laws, regulations, and policies, or are actions that will be common across all alternatives. The following are examples of these topics:

- Education will be a component of all the alternatives. A separate wilderness education and interpretation plan would be developed.
- Cultural resources, including archeological sites, historic structures, and ethnographic resources, will continue to be managed in accordance with law, including the National Historic Preservation Act.
- Cooperative management with the adjoining U.S. Forest Service wilderness areas, and Yosemite National Park, will continue to occur.
- Existing regulations will remain in place (e.g. no hunting, no pets, no pack goats, no bicycles, no paragliding, no hang gliding, no base jumping, no marijuana cultivation, etc.).
- The protection of threatened, endangered, or sensitive species, and critical habitat, will be considered under each alternative.
- The NPS is developing a resource stewardship strategy for Sequoia and Kings Canyon National Parks that will recommend science- and scholarship-based approaches to achieve and maintain the desired conditions of the parks' natural and cultural resources.
- Sequoia and Kings Canyon National Parks are recognized for being at the forefront of advancing scientific research and the integration of knowledge gained from scientific inquiry into the management of wilderness resources. The WSP will support the continuation of scientific research in wilderness, using methods that preserve the qualities of wilderness character.
- The WSP will be linked to other ongoing or future planning efforts, such as the Cave Management Plan, Aquatic Ecosystem Restoration Plan, Climbing Management Plan, and the Resource Stewardship Strategy.

Zoning

The Wilderness Act and NPS policies provide the foundation for the management of wilderness. Zoning is a management tool that can be used to make distinctions in desired conditions and management actions in wilderness, while meeting the mandates of law and policy. The following four zones would be considered for the WSP (Figure 1).

Commercial Services

Through the WSP, a specialized finding of the extent of commercial services necessary (Extent Necessary Determination) to meet one or more of the purposes of wilderness will be completed. If commercial services are shown to be necessary, alternatives could include allowing existing commercial uses, reducing commercial uses, authorizing new types of commercial services, and restricting commercial services in certain zones or areas.



Preliminary Draft Alternatives

The preliminary draft alternatives are based on wilderness planning guidelines and public input during the scoping process. These preliminary draft alternatives were developed with a goal of maintaining or improving wilderness character while providing for a diversity of appropriate uses.

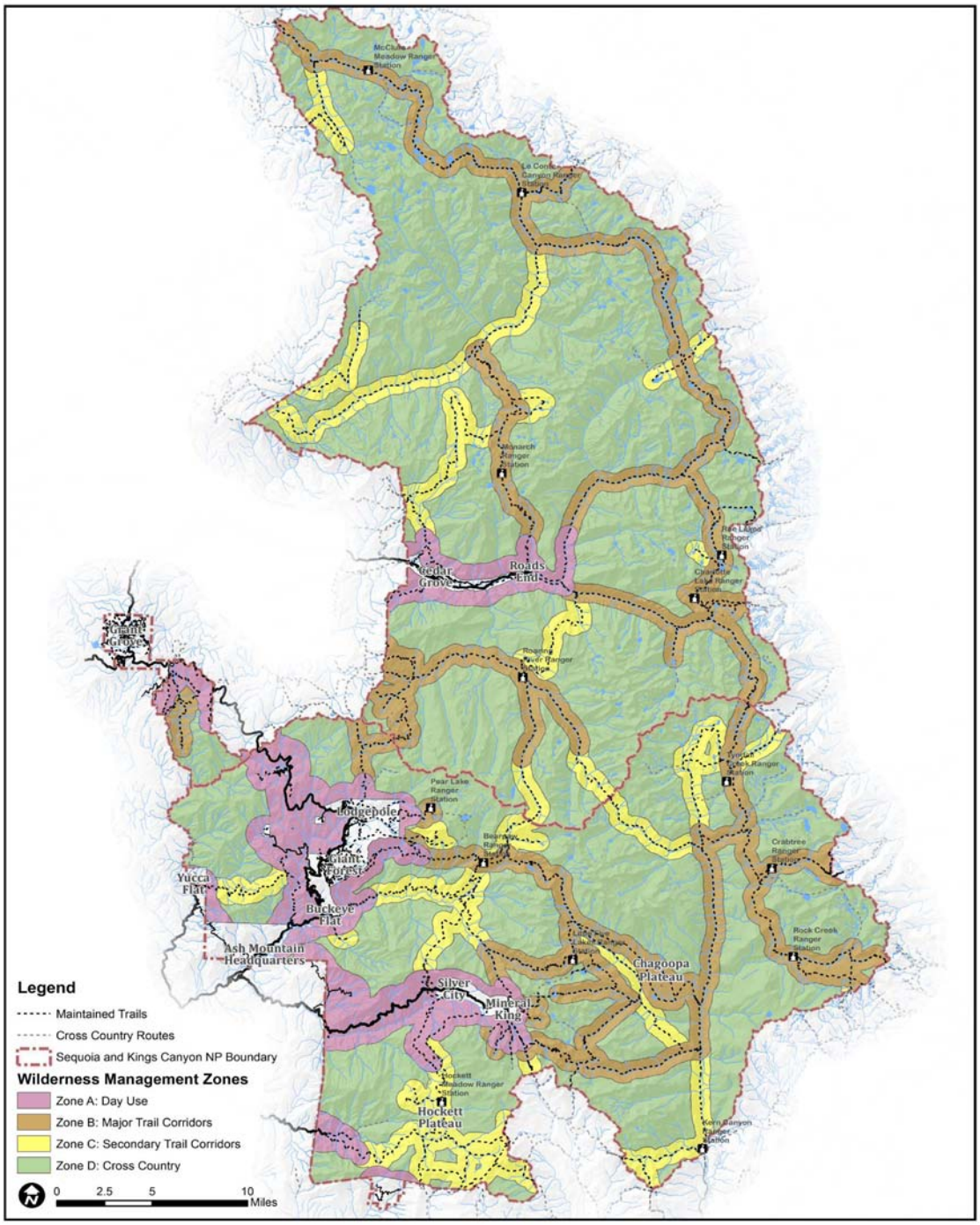
We encourage you to review the full description of the preliminary draft alternatives located on the web at: **http://parkplanning.nps.gov/sekiwild**. If you are unable to access these materials electronically, a CD or printed version of the information is available by calling (559) 565-3102.

Alternatives will be fully developed following analysis of public input received during the comment period, which ends on November 19, 2012. The alternatives and their descriptions are likely to change as public input is incorporated.

The refined draft alternatives will be presented for public comment as part of the draft WSP/EIS which is scheduled for release in early 2014. A preferred alternative for the WSP will be presented at that time.

Zone	Description
Zone A	Areas and trail corridors proximate to non-wilderness areas (within 1 mile of roads, and trail corridors within approximately 6 miles of the trailheads). Examples include the Mist Falls, Little Baldy, Watchtower/Heather Lake, and the Ladybug trail corridors.
Zone B	Includes high use major trail corridors and administrative and visitor developments, such as ranger stations, bridges, and food storage lockers. Trails are highly developed and regularly maintained. Examples include the John Muir, High Sierra, and Pacific Crest trail corridors.
Zone C	Includes lower use trail corridors that are generally less developed. There are fewer administrative and visitor developments. Examples include Taboose Pass to Bench Lake, Kennedy Canyon, and Upper Ranger Meadow to Elizabeth Pass trail corridors.
Zone D	Cross country areas that generally do not include administrative or visitor facilities. Examples include Miter Basin, Lamarck Col/Darwin Canyon, Baxter Pass, and New Army Pass to Mount Langley summit.

Wilderness Management Zones



Key Topics Addressed in the Preliminary Draft Alternatives

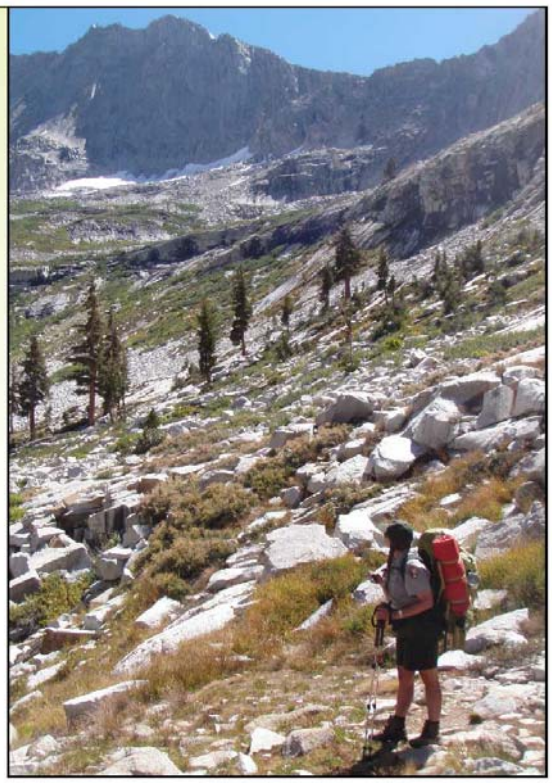
Permitting/Quotas
The NPS would develop specific entrance/ trailhead quotas. Destination quotas-- where the total number of visitors allowed at a particular location is limited-- would be considered for selected areas.

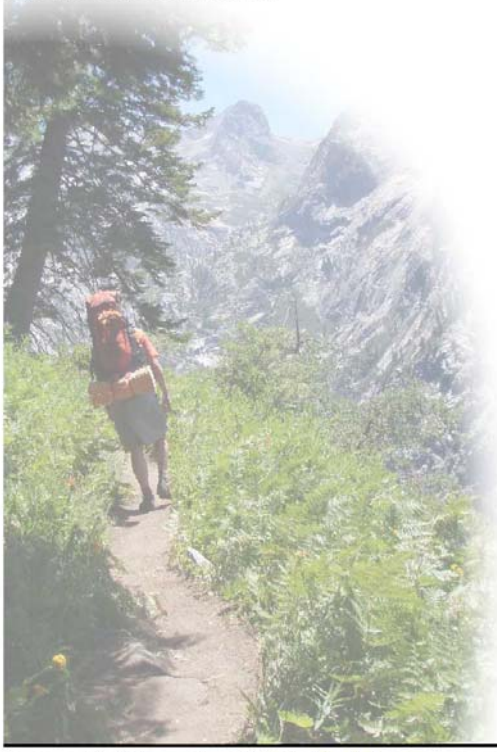
Trails/Bridges and Related Trail Structures, including Signs
A Trail Management Plan will be a component of the WSP. A trails classification system is being developed to guide the level of trail development, maintenance, and signing.

Campfires
The NPS currently restricts campfires for protection of down wood resources and for other ecological purposes. Elevational fire limits would be considered for resource protection.

Food Storage
Food storage requirements provide resource protection by preventing wildlife from obtaining human food. A range of alternatives is included to address food storage in wilderness.

Human Waste Management
Management goals related to human waste include protecting natural and cultural resources, reducing litter and health hazards created by improperly disposed of toilet paper, and increasing visitor knowledge of appropriate sanitation and toilet paper disposal in wilderness. Alternatives related to facilities and disposal methods are considered.





Party Size - People
The size of groups traveling and/or camping together would be managed to preserve opportunities for solitude and to reduce adverse impacts on the natural character of wilderness. A variety of options are explored.

Party Size - Stock Groups
The size of stock groups would be managed to preserve opportunities for solitude and to manage the impacts on wilderness character created by the number of stock and people traveling and camping together. The number of people, the number of stock, and the combined group size could be limited to manage impacts.

Campsites - Backpacker
Our goal is to provide opportunities for solitude or primitive and unconfined recreation, and to preserve the natural quality of wilderness character, while limiting development. Alternatives include removing, maintaining, and designating campsites.

Campsites - Stock Camps
The NPS will consider alternatives to address the issue of hiker and stock user conflict and to minimize impacts from stock camps to opportunities for solitude and the natural quality of wilderness. Options considered include establishing stock camps and requiring their use, recommending the use of previously used and established camps, and the removal and restoration of some stock camps.







Night Limits for All Campers (Stock and Backpackers)

Short-term night limits in high use areas would be considered in order to protect opportunities for solitude. Short-term night limits could be applied in areas close to trail heads, busy trail junctions, or at popular destinations. Long-term night limits would be established to ensure that individuals / groups do not establish semi-permanent camps thereby limiting opportunities for others.

Stock (horses, mules, burros, and llamas)

Alternatives consider constraints on stock travel for resource protection and to minimize conflicts between users.

Recreational and Administrative Grazing

Options for recreational and administrative grazing are considered, including expanding the existing meadow management program, setting elevational limits on grazing, and prohibiting grazing overall.

Administrative Support Facilities - Ranger Stations, Staging Areas, and Administrative Pastures

Ranger stations may include a tent platform or building and associated administrative facilities. Ranger stations may be used by other administrative functions, such as for resource stewardship, maintenance, and other purposes. Alternatives include keeping existing ranger stations, adding stations, or removing stations.

Administrative Support Facilities - Crew Camps

Crew camps are used by park maintenance, resource managers, and rangers to administer the wilderness. Camps may include core camping areas, fire pits, and food storage lockers. Options for managing crew camps are considered in the alternatives.

Other Facilities

Redwood Canyon Cabin and Cache: The Redwood Canyon cabin and cache is a structure in wilderness. It is currently used by a non-governmental organization to facilitate research in a nearby cave. Future options for this cabin are explored through the WSP.

Pear Lake Ski Hut (Ranger Station): The California Wilderness Act of 1984 and its accompanying House of Representatives Committee Report 98-40 (1983) provides for the continued winter operation of the Pear Lake Ski Hut, unless this non-conforming use is deemed to have unacceptable wilderness impacts. The area is categorized as a Potential Designated Wilderness Addition (PDWA) based on the non-conforming use of a commercial enterprise (winter ski hut operation). Options for the continuation or cessation of the ski hut operation are explored in the WSP.

Bearpaw High Sierra Camp: The Bearpaw High Sierra Camp is operated as a commercial enterprise in a PDWA per the California Wilderness Act (1984) and its accompanying House of Representatives Committee Report 98-40 (1983). The WSP will look at options for the continuation or cessation of the non-conforming commercial enterprise of the Bearpaw High Sierra Camp.

Hockett Plateau High Sierra Camp: The 2007 GMP called for the consideration of a new commercial high sierra camp on the Hockett Plateau. However, this option has been ruled out as a result of clauses in the 2009 Omnibus Act requiring the area to be managed as wilderness (Public Law 111-11, March 30, 2009, 123 STAT. 991).

Frontcountry Facilities to Support Wilderness Use

The development or modification of any frontcountry facilities that may support the use, enjoyment, and stewardship of wilderness would be evaluated in the WSP. Commercial services in the frontcountry that support wilderness use would be addressed after the Extent Necessary Determination is completed.



Preliminary Draft Alternatives Overview

The following summary table is representative of what is included in the full matrix of alternatives found at:
http://parkplanning.nps.gov/sekiwild

Topic	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
	No Action - Current management practices continue.	Accommodate increased visitor use while protecting wilderness character by allowing increased facilities for visitor and administrative support.	Protect wilderness resources by balancing visitor access, development, and restrictions.	Protect wilderness resources and reduce need for development by decreasing visitor access and increasing restrictions.	Substantially reduce development and protect wilderness resources by reducing visitor use and increasing restrictions.	Provide for the most unconstrained wilderness experience and protect wilderness by significantly reducing the number of visitors allowed.
Permits	Permits required for overnight use only	Permits required for overnight use only	Permits required for overnight use only	Permits required for day and overnight use	Permits required for day and overnight use	Permits required for day and overnight use
Quotas: Entry	No Change to existing trailhead quotas	Quotas would increase for some trailheads	Quotas would remain mostly unchanged except in high use areas	Quotas decreased at some higher use trailheads	Quotas decreased at most trailheads	Quotas decreased at all trailheads
Quotas: Destination	Some destination quotas exist in popular areas	More destination quotas could be added	More destination quotas could be added	More destination quotas could be added	More destination quotas could be added	No destination quotas
Campfires	Campfires prohibited above 10,000' in KICA and 10,400' in SEQU (and lower in specific locations)	Campfires prohibited above 10,400'(and lower in specific locations)	Campfires prohibited above 10,000' in KICAA and above 8,500' in SEQU	Campfires prohibited above 8,500' wilderness-wide	Campfires prohibited wilderness-wide	Campfires allowed in all areas except Zone A
Food Storage: Requirements	Containers required in some areas	Containers required in some areas	Containers required in some areas	Containers required for all overnight users	Containers required for most overnight users	Self-determined, appropriate food storage required
Food Storage: Lockers	Food storage lockers are present in many locations	Some food storage lockers would be added	Existing food storage lockers would be maintained or some removed	All food storage lockers would be removed	All food storage lockers would be removed	All food storage lockers would be removed
Party Size	Day use limit is 25, overnight limit is 15, stock limit of 20	Party sizes increased	Party sizes mostly unchanged	Party sizes decreased from current limit	Party sizes decreased from current limit	Party sizes decreased from current limit
Stock Use: Access	Stock allowed on most trails	Stock allowed on most trails	Some areas closed to stock	Some areas closed to stock	No stock access in Zone D	Most areas open to stock
Stock Use: Grazing	Grazing is allowed in selected meadows while other meadows are closed to grazing	Some additional meadows may be opened to grazing by small stock parties	Elevation limit established for grazing, but some grazing allowed below elevation limit	Elevation limit established for grazing, but some grazing allowed below elevation limit	No grazing allowed	Few grazing restrictions

National Park Service
U.S. Department of the Interior

Sequoia and Kings Canyon National Parks
47050 Generals Highway
Three Rivers, California 93271-9700
http://parkplanning.nps.gov/sekiwild

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Sequoia and Kings Canyon National Parks

California

Newsletter 2
October 2012

National Park Service
U.S. Department of the Interior

How to Comment

There are several ways to provide comments:

- Access additional information and provide comments online at: http://parkplanning.nps.gov/sekiwild;
- Attend the public meetings; or
- Mail or fax comments to:

Karen F. Taylor-Goodrich, Superintendent
ATTN: Wilderness Stewardship Plan Preliminary Draft Alternativess
Sequoia and Kings Canyon National Parks
47050 Generals Highway, Three Rivers, CA 93271-9700
Fax: (559) 565-4202

The comment period for the preliminary draft alternatives ends on November 19, 2012. Before including your address, phone number, e-mail address, or other personal information in your comment, you should be aware that your entire comment – including your personal identifying information – may be publicly available at any time. Comments made by individuals or organizations on behalf of other individuals or organizations will not be accepted.

Questions to Consider

Is this a sufficient range of alternatives?

Have we missed any key topics?

What do you like about the alternatives?

Are there specific elements that should be changed? If yes, how would you change them?



For complete information visit http://parkplanning.nps.gov/sekiwild

United States Department of the Interior

NATIONAL PARK SERVICE
Sequoia and Kings Canyon National Parks
47050 Generals Highway
Three Rivers, California 93271-9651
(559) 565-3341

IN REPLY REFER TO:
1.A.1 Permanent

October 3, 2012

David Alvarez, Chairperson
Traditional Choinumni Tribe
2415 East Houston Avenue
Fresno, CA 93720

Dear Chairperson Alvarez:

As you may be aware, we are in the process of preparing a Wilderness Stewardship Plan for Sequoia and Kings Canyon National Parks. Last spring and summer, we conducted public scoping and offered to meet with area tribes to discuss your concerns and issues. We received more than 900 pieces of correspondence during this initial scoping period. We were able to meet with several tribal representatives during this period. Many people brought forward substantive issues and topics which provided us with information we needed to develop preliminary draft alternatives. We now are seeking your input on these alternatives.

The preliminary draft alternatives newsletter is attached. The newsletter provides you with a summary of the alternatives; for more comprehensive information, please visit our planning website at: http://parkplanning.nps.gov/sekiwild.

We are available for government-to-government consultation with your tribal group or organization if you wish to discuss the Wilderness Stewardship Plan. We would be happy to make a presentation at an upcoming tribal meeting at a location of your choosing, and to talk about your issues and concerns.

To schedule a meeting, please contact Wilderness Coordinator Gregg Fauth at (559) 565-3137 (email at gregg_fauth@nps.gov) or Cultural Resources Program Manager, David Humphrey (559) 565-3139 (email at dave_humphrey@nps.gov). We look forward to working with you on this and other future planning efforts.

Sincerely,

Karen F. Taylor-Goodrich
Superintendent

Identical letter sent to the following area tribes, tribal organizations, or tribal representatives.

Chairperson David Alvarez
Traditional Choinumni Tribe
2415 East Houston Avenue
Fresno, CA 93720

Chairman Raymond Andrews
KutzadikaA Indian Community Cultural Preserve
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Bishop, CA 93515

Chair Ruben Barrios
Santa Rosa Rancheria
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Lemoore, CA 93245

Tribal Chairwoman Donna Begay
Tubatulabals of Kern Valley
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Lake Isabella, CA 93240

Chair Elaine Bethel-Fink
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North Fork, CA 93643

Chairperson Lawrence Bill
Sierra Nevada Native American Coalition
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Vice Chair Richard Button
Lone Pine Paiute-Shoshone
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Lone Pine, CA 93545

Chairman John Davis
Kings River Choinumni Farm Tribe
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Clovis, CA 93612-2211

Chairman Dale Delgado Jr.
Bishop Paiute Tribe
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Bishop, CA 93514

Chairperson Delia Dominguez
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Covina, CA 91722

Chair Ryan Garfield
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Tribal Council Chairman John L. Glazier
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Big Pine, CA 93513

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Chairperson Charlotte Lange
Mono Lake Indian Community
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Chair David Laughing Horse Robinson
Kawaiisu Tribe
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Kernville, CA 93238

Board Chairperson Mandy Marine
Dunlap Band of Mono Indians
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Chairperson Robert Marquez
Cold Springs Rancheria of Mono Indians
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Independence, CA 93526

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Bishop, CA 93514

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Highland, CA 952346

Co-Chairperson Robert Robinson
Kern Valley Indian Community Tribal Council
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Weldon, CA 93283

Chairperson Jake Saulque
Benton Paiute Reservation
567 Yellow Jacket Rd
Benton, CA 93512

Chairperson Rosemary Smith
The Choinumni Tribe of Yokuts
1505 Barstow
Clovis, CA 96311

Vice-Chair William Vega
Bishop Indian Tribal Council
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Bishop, CA 93514

Chair Leanne Walker-Grant
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Chair June Walker-Price
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Chairperson Mary Wuester
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Lone Pine, CA 93545

Chair Susan Weese
Wukchumni Tribal Council
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Visalia, CA 93292

Chairperson Ken Woodrow
Eshom Valley Band of Indians / Wuksache Tribe
1179 Rock Haven Court
Salinas, CA 93906



Appendix H

Wilderness Information and Education Strategy

ON THE PREVIOUS PAGE
Hamilton Lake
NPS Photo

APPENDIX H:

WILDERNESS INFORMATION AND EDUCATION STRATEGY

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WILDERNESS INFORMATION AND EDUCATION STRATEGY

Nearly 97% of Sequoia and Kings Canyon National Parks is designated or managed as wilderness. To experience these parks is to encounter, directly or indirectly, one of the world's premiere wilderness areas. To work for these parks is to serve the missions of both the parks and the wilderness.

Information and education have long been recognized as some of the most effective tools available to meet these missions and support visitor experiences. In this document, the term *education* includes not only curriculum-based work with schools, but also other forms of information sharing done by these parks, such as interpretation, orientation, and outreach.

The parks' staff uses all these techniques to communicate about the many aspects of wilderness: its preservation, the experiences it offers, and its benefits to society. Recognizing that the word wilderness means many things to many people, the parks strive to teach by example and to learn from others. When possible, the parks work to adjust the level, complexity, and type of information shared in order to reach audiences with different characteristics: age, familiarity with relevant concepts and topics, wilderness experience, goals, and interests. The parks offer different levels of participation and connection with wilderness.

This strategy was developed in 2014 in support of the parks Wilderness Stewardship Plan. It is designed to support ongoing efforts to improve, update, and develop new ways to connect with the public about wilderness, and to expand the demographics of the audiences with whom the parks connect regarding wilderness. It is a flexible document, open to revision through trial and error, evaluation, and changing techniques, conditions, or priorities.

STATUS OF CURRENT EFFORTS

A variety of the parks' work groups and programs participate in educating the public and other employees of the parks about wilderness. The Wilderness Office and rangers take the lead with overnight wilderness users, while the interpretive division focuses on wilderness day users, other visitors of the parks, students, and outreach to people outside the parks. They connect with thousands of people every day. These and other efforts of the parks are echoed and magnified by maintenance crews, resource management staff, concession office staff, law enforcement, the parks' partners, volunteers, and many others who are committed to constant improvement of wilderness stewardship by one and all.

As a result, many products already in use in these parks offer information on wilderness guidelines, options, values, and experiences. The sharing takes place one-on-one, through visitor and student programs, and via a variety of materials: handouts, exhibits, trailhead panels, webpages, slide shows, and films (see *Existing Products and Techniques*, below).



An old saying may be applied to wilderness: "We conserve what we love. We love what we understand. We understand what we are taught."

To date, this effort has made a difference on the ground: Conditions in the wilderness have improved over the past 30 years, based largely on visitor response to concerted efforts by wilderness rangers and others to encourage minimum-impact techniques (see "Campsite Condition" in the "Wilderness Character" section of "Chapter 3: Affected Environment," in the WSP/FEIS).

PURPOSE AND NEED FOR A STRATEGY TO ENHANCE CURRENT EFFORTS

The term "wilderness" encompasses an array of landscapes, laws, philosophies, ideals, and experiences. It offers recreation, inspiration, a sense of belonging, solitude, challenge, self-reliance, connections to nature, scenic beauty, and risk. Every visitor meets wilderness on its own terms, and for their own purposes. Helping people, including those who have not yet experienced wilderness, to understand and appreciate the factors that may contribute to *their* relationship with wilderness calls for an equally broad array of tools and techniques for sharing information.

Wilderness in these parks and other areas add value to the shared society, economy, and future, even for those who never set foot in it. Because of this, wilderness needs current and future stewards, people who care about and care for it. It needs people of all ages, varying backgrounds, diverse cultures, and different knowledge and experience who will champion wilderness in a variety of ways. This calls for ongoing efforts to broaden ways in which to connect with people about wilderness and to expand the number and kinds of people who connect to it. It calls for exploring wilderness as a value, not just as a regulated environment.

Another way to reach more and different people is by increasing the number and type of employees who have and can confidently share information about it. Many policy documents direct this effort (see the "References" section, below), including:

> **Director's Order #41.** Wilderness Stewardship (2013) – Staff education is an integral part of wilderness stewardship. Therefore, wilderness awareness training will be incorporated into all appropriate training programs for park staff, including seasonal staff, cooperating association employees, concessions employees, and volunteers.

Visitor understanding of and compliance with their roles in wilderness stewardship is also critical to successful management. Wilderness management, however, is a complicated balance of laws, uses, protection strategies, and changing conditions. This strategy can help the parks' staff to tease out the information needed to enhance understanding by their employee and public audiences. By following a series of steps, those park divisions with operational plans that touch on some aspect of wilderness can identify audiences, messages, and methods for imparting information that is critical to their work and related aspects of wilderness.

This strategy is designed to assist development of new information that includes any changes due to adoption of the Wilderness Stewardship Plan as well as refining existing informational materials in order to enhance wilderness stewardship among employees, partners, visitors, and the general public – both traditional supporters and those unfamiliar with wilderness. The strategy aims to support the following goals and desired outcomes:

GOALS

The goal of this strategy is to enhance understanding, enjoyment, and stewardship of wilderness – and its benefits – in a broad range of audiences. More specifically:

- Diverse people feel welcomed and encouraged to connect with wilderness.
- People have incremental, progressive opportunities to discover the value and meaning of wilderness for themselves, in ways that are appropriate to their interests and abilities, and that offer varied levels at which to participate at a rate with which they are comfortable.
- Visitors and staff understand and support wilderness as an important facet of the parks' landscape, experience, and management.
- Wilderness condition and visitor experience improve due to increased understanding and stewardship by visitors, commercial-service users, and staff.



A visitor reads a wayside titled "Wilderness" at Panoramic Point in the Grant Grove area of Kings Canyon National Park.

DESIRED GENERAL OUTCOMES

- All employees have easy access to correct information about wilderness and their role in its management.
- Employees embrace the opportunity to learn and share information about wilderness. They know where to find information for themselves, and where to direct others for additional information.
- All employees welcome a wide variety of people to experience wilderness directly or indirectly.
- Each work group provides their contacts with information in varied formats and levels of detail.
- Employees of the parks integrate wilderness stewardship into their jobs and communicate that with coworkers and visitors.
- Visitors and staff recognize and endorse the characteristics of wilderness that call for human restraint, self-reliance, and personal responsibility, and make informed choices regarding their use of, support for, and work in wilderness.
- Visitors and staff have an increased understanding of issues affecting wilderness, in particular, aspects of climate change.

SPECIFIC DESIRED OUTCOMES

- Staff provide information on the spectrum of appropriate uses in wilderness.
- Visitors recognize the spectrum of legal uses in wilderness. The result: they experience neither conflict nor decreased satisfaction when they encounter uses different from theirs but will report illegal uses to a ranger.

- Trail crews, rangers, fire crews and monitors, contractors and researchers, resources staff, volunteers, and others working in wilderness continue to share information with visitors they encounter and explain the wilderness-protection measures that influence their tasks.
- Fire, law enforcement, compliance, and resource/research staff use and communicate the minimum-requirement concept as a positive means for preserving and managing wilderness.
- Concessions Office staff provide current and potential concessioners, contractors, permittees, and commercial use authorization holders with information that clarifies the positive aspects of the parks' requirements and invites them and their clients to partner with the parks in wilderness stewardship.
- Interpretive and educational programs and outreach efforts continue to reach diverse audiences across a range of ages regarding the values and characteristics of wilderness. The parks increase cooperation with organizations to exchange information about shared wilderness trails and visitors (e.g., neighboring wilderness-management agencies, the Pacific Crest Trail Association [PCTA], the John Muir Trail Association [JMTA], and Yosemite National Park).
- Work groups and the public learn and adapt to changes in wilderness management that result from adoption of the Wilderness Stewardship Plan.

THE STRATEGY

In 2013, the parks used a survey to determine the level of knowledge that employees have on wilderness topics. The results of that survey are helping the parks to assess needs for training, experience, or access to information about wilderness. By reviewing the survey results and using the following strategy, work groups can improve how they integrate wilderness information into their jobs and share it with the public.

When initiating or creating any operational plan or SOP, every division should consider whether it has a wilderness component that calls for sharing information about that aspect of the plan:

1) Does this plan or operating procedure connect in any way to wilderness on the ground, administratively, or in concept? If so:
2) **Identify audiences** (public, partner, and park) that need or would benefit from wilderness information related to this planning effort.
3) **Identify work groups,** cooperators, and partners that serve those audiences.
4) **Identify information and messages** that each group needs for each of their audiences.
5) **Develop materials and methods** to meet these informational needs.
6) **Make materials available**, readily and widely, in a variety of formats.
7) **Train employees to use new communication technologies** as appropriate and as technologies become available.
8) **Develop and submit proposals for projects** that advance the effort to develop another generation of wilderness stewards, in the parks and in the public.

Note: Items 2, 3, and 4 may be interchangeable, depending on the planning process underway.



Trailhead orientation, safety and minimum-impact guidelines, plus a touch of inspiration, welcome a visitor at Road's End in Kings Canyon National Park.

USING THE STRATEGY

This strategy supports each work group in reviewing and improving the ways in which they:

- provide wilderness information and management;
- integrate wilderness information into their planning efforts as appropriate;
- develop and provide correct, thorough, and audience-appropriate materials;
- train their employees to use this information; and
- make information widely available to current and potential audiences/contacts.

It calls on each division to be alert to changing conditions – different audiences, resource conditions, wilderness uses, planning efforts, changes in funding or staffing – and to adapt the wilderness information that needs to be dispersed and how best to accomplish that.

It also involves helping people to imagine different aspects of wilderness – to sense its challenge and space, to appreciate its values to the world downstream, to comprehend what it offers to science and education, to embrace the need for self-reliance. To accomplish this, employees are urged to add interest and images to the facts they can offer.

A challenge to incorporating some technologies to enhance information availability involves the minimal amount of connectivity in the parks. The parks expect to be able to incorporate some of these options over time thanks to both local and the parks' efforts to increase internet and telephone access and bandwidth, and to changing technology.

FOR ASSISTANCE

The Division of Interpretation, Education, and Partnerships, as well as the Wilderness Office, are committed to contacting work groups that have connections to wilderness in order to help them implement this strategy and propose needed materials. Also available to help groups to direct their improvement are the results of the survey on employee knowledge of wilderness, conducted in 2013.

The following serve as reference for divisions or work groups to use or build on as they implement the strategy in their operational planning:

1) Identify Audiences —The term audience refers to any group with whom the parks exchange information. They may be visitors, clients, partners, subjects of SARs, cooperators, donors, and other individuals or groups.

> A note about diversity from the *NPS Wilderness Education and Partnership Plan*:
> Ensuring outreach education for diverse and multicultural audiences is a priority…. The relative lack of minority involvement in wilderness has been identified as a complex problem arising from economic, cultural, and social factors. …Sequoia, Kings Canyon, and [other parks in California] already offer significant wilderness outreach programs and partnerships specifically targeted to culturally diverse students.

It is important to note that many of the audiences in and living near the parks are immigrants and the children of immigrants. These parks will seek to continue these efforts and increase outreach to even more audiences, including those who never have or are unlikely to experience wilderness. Questions for work groups to consider should include: Do the parks have some materials that address the needs of or provide benefit to all these groups? Do materials need to be available in other languages?

Audiences with whom work groups may interact: These are not only audiences for wilderness information but may be important partners in sharing wilderness-stewardship goals with other audiences:

- Staff of the parks: permanent and temporary
  - Wilderness rangers and crews
  - Interpreters
  - Staff with public contact
  - Staff without regular public contact
- Cooperators/partners:
  - With public contact
  - Others
- Volunteers
- Researchers in wilderness
- Neighboring agencies
- Commercial-use licensees
- Frontcountry concessioners
- Wilderness concessions operations
- Visitors encountered in wilderness:
  - started from the parks' trailheads
  - Started outside the parks' boundaries
- Non-government organizations and partners (including friends groups that work with the public, mass media, and elected officials) (e.g., PCTA and JMTA)
- Special permit requesters:
  - Commercial film permits, events, human-ash dispersal, etc.
- Parks' visitors not going to wilderness
- Other publics, including:
  - Students, teachers
  - Wilderness advocates; Non-supporters
- Neighboring property owners
- Other local residents
  - Cabin permittees, inholders
- Local businesses
- Media outlets
- Wilderness visitors – planning a trip in advance and those ready to leave on a trip:
  - Day-hikers; Long-trippers: PCT, JMT
  - Backpackers; Stock users
  - Solo travelers
  - Informal groups; Formal groups
  - Seeking commercial assistance: guides, stock, shuttles
- Those needing permit variances

2) Identify Work Groups Involved —The work of every division relates in some way to wilderness. Work groups know that results improve and work is more satisfying when the audiences they serve have the wilderness information they need. (See "Specific Desired Outcomes" section, above.)

3) Identify Information and Messages — Consider:
What wilderness information do you need to perform your job successfully? What information do you wish your audience had?

What information or insight would improve your audience's satisfaction, safety, understanding, or stewardship? Can the information be offered at varied levels: does everyone need it all?

Types of information and messages:

- Permit information
- Other regulations and policies
- Commercial activity in wilderness
  - filming in wilderness
- The job you do in wilderness (staff)
- Safety – personal responsibility:
  - travel techniques
  - weather conditions
  - sanitation/health
  - fire danger
- The basic concept of wilderness
  - wilderness characteristics and qualities
  - best management practices for protecting each of the qualities
- Use of or reliance on the rapidly evolving suite of electronic equipment available
- Trail and travel options and conditions, including the new trail-classification system
- Ecological/environmental conditions
- Food:
  - storage: regulations, techniques, planning for long-distance travel
  - packaging
- Resources: natural and cultural
  - exotics
  - dark night skies: value/protection
- Sharing wilderness with other users
  - wilderness etiquette
  - climbing/peak registers
- Minimum impact / Leave No Trace©
- Fire use



Researchers in wilderness are an example of a group that could be encouraged to share information with visitors they encounter:

What are they studying and why? How do they operate in order to minimize their impacts on wilderness character? Will what they learn influence wilderness management?

These soil cores taken by this researcher are part of the first-ever inventory of soils in the parks.

Consider the benefits of sharing information pertaining to wilderness values other than recreation. Examples of important aspects of wilderness that are of significance to society include:

- Ideas behind the National Wilderness Preservation System;
- Economic/ecological benefits for communities (e.g., ecosystem services, property values);
- Opportunities to enjoy wilderness vicariously;
- Non-recreational purposes of wilderness: scenic, scientific, geological, educational;
- Observed and potential effects of climate change in wilderness;
- Wilderness as a natural laboratory;
- Wilderness influences on U.S. history, character, and culture;
- Cultural values associated with wilderness values and resources such as good air quality, dark skies, scientific discovery and history, challenge, personal freedom, and more.

Messages are most successful when they are accompanied by description, images, and the reasons for regulations. Consider what might help your audience to "get" your message.



At the wilderness-permit desk in Grant Grove, a child proudly displays Junior Ranger badges earned at many parks – a wilderness steward in the making.

In addition, there are many messages that shared by the parks' employees that have less obvious connections to wilderness: water and air quality, wildlife habitat, dark skies and natural soundscapes, archeology and cultural resources, the parks' histories, and many more. One of the goals is to look for ways to point out these connections to the parks' audiences.

Timing of messages: For each audience, there may multiple opportunities for contacting them, and good reasons for using more than one opportunity. In determining how and when to reach each audience, consider which of the following should be addressed:

- Before arrival
- In the frontcountry
- In the wilderness
- Post-wilderness visit while still in park
- Post-visit after leaving the park
- At any time
- Special events (e.g., 50th anniversary of the Wilderness Act, anniversary of the designation of the parks' wilderness areas, the centennial of NPS)

4) Develop Materials and Methods — Consider how best to dispense information at different times and locations. Consider possible barriers to communication: age, language, depth of understanding about wilderness, lack of exposure to the concept of wilderness, and so on. Work with the Division of Interpretation and/or the Wilderness Office to fine tune what is needed.

How would your messages be best communicated? Consider:

- Staff trainings
- With permits: wilderness, research
- Written
- Spoken
- Handouts, postings, or signs
- Trailhead panels
- Interpretive/orientational exhibits:
- Indoors / Outdoors
- Travelers Information Station (TIS) broadcast (radio 1610 in SEKI)
- News releases, other media events
- Outreach activities
- In a classroom or on a field trip
- Through another entity:
  - Concessioners,
  - Commercial use licensees
  - Partners/SNHA
  - Neighboring agencies
  - Organizations of wilderness users
- With contracts
- Wilderness concessions operations
- General visitors of the parks
- Online / internet:
  - Is a new webpage needed?
  - Are new links between pages needed?
  - Webcast, podcast

Existing training and materials: Find out what is already available for SEKI. Consider using or adapting existing materials, references, and trainings. Many options are available at low or no cost (see the "Existing Training and Materials" section below).

5) Make Materials Available —

- Identify the outlets for your materials. Make your information widely available. Most information developed can be made available in some format online; check with the Division of Interpretation.
  - What other forms of technology might carry your messages successfully?
  - Develop standard operating procedures that include:
    - Updating materials on a regular basis
    - Distributing them to the outlets identified
    - Maintaining supplies.
    - Including them in annual trainings.

EXISTING TRAINING AND MATERIALS

Many options are available at low or no cost from reliable sources. The Wilderness Office, interpreters, wilderness rangers, and the Sequoia Natural History Association (SNHA – an important partner in these parks) use a number of these consistently for staff training:

- **Wilderness: Gateway to National Park Service Wilderness** (http://wilderness.nps.gov/):
  - Wild soundscapes in the national parks
  - Wilderness education and partnership plan
  - K – 12 Wilderness and Land Ethic Curriculum
  - Wilderness education plans toolbox
  - Wilderness Views: interactive multimedia program with accompanying curriculum
- **Arthur Carhart National Wilderness Training Center (http://carhart.wilderness.net/),** managed by four federal land-management agencies that manage wilderness. These are used regularly by the parks' Wilderness Office:
  - Wilderness Stewardship:
    - Classroom Courses
    - Online Courses
    - Webinars
    - Core Competencies
  - Wilderness Information Resources: online tools for the natural resource workforce, scientists, educators, students, and the public
    - Wilderness.net
    - Print Resources and Products
    - National Wilderness Preservation System Displays
  - Wilderness Education Resources: online educational materials designed to increase public awareness, knowledge, and understanding of wilderness heritage
    - Outdoor Explorers Mentoring Program
    - Distance Education Courses
    - K-12 Curriculum
    - WildLink Project
    - DVD Technical Assistance
- **Eppley Institute for Parks and Public Lands (http://eppley.org) –** at Indiana University, in partnership with NPS. Online and classroom courses: some are free, others are low cost. Carhart Training Center and Wilderness.net also offers some of these courses. Courses include:
  - Understanding American Wilderness
  - Natural and Cultural Resource Management in Wilderness (multiple courses, also on DOILearn)



Some wilderness enthusiasts start young, but many discover it a bit later in life – sometimes with help from a park employee.

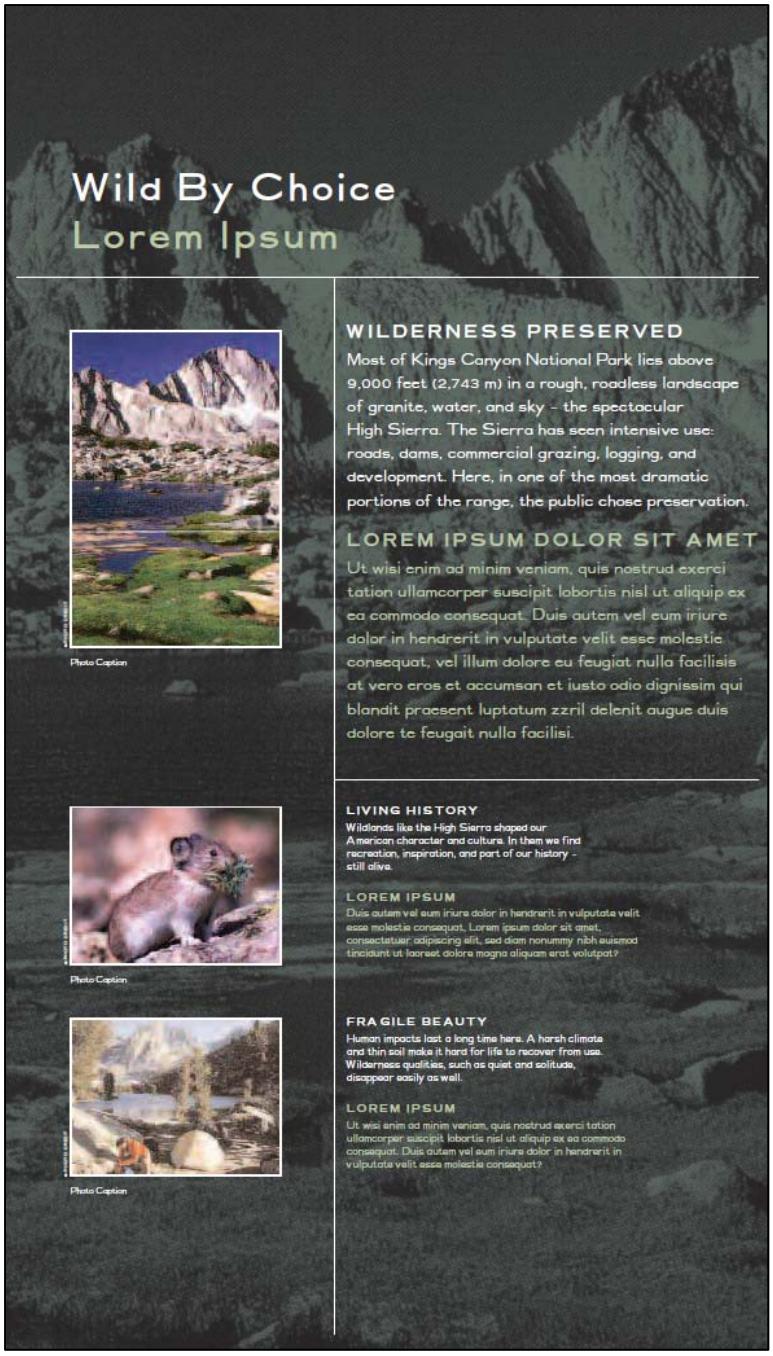
- **Wilderness.net:** Connecting federal employees, scientists, educators, and the public with their wilderness heritage (http:www.wilderness.net) – public wilderness-information website based on a collaborative partnership between federal land-management agencies that manage wilderness and the University of Montana:
  - Interagency Classroom Training Courses, including
    - Interagency Wilderness Interpretation & Education Training: Action Planning for the 50th Anniversary and Beyond
    - Regional Wilderness Stewardship Course
  - Online Courses (many are free), including:
    - Wilderness Act
    - Writing a Minimum Requirements Analysis
    - Natural Resource Management in Wilderness (also on DOILearn)
  - K – 12 Educational Resources and websites for educators, including:
    - Wilderness Investigations
    - Outdoor Explorers Mentoring Program
    - WildLink
    - Wilderness and Land Ethic Curriculum
    - Wilderness Views and Teacher Resources
- **DOI Learn (http:www.doi.gov/doilearn) –** U.S. Department of the Interior website links to catalog that includes trainings on wilderness planning, management, resources, interpretation, safety, and first aid. A number of the courses are also offered by the Carhart Center, Eppley, and Wilderness.net.

EXISTING PRODUCTS, TECHNIQUES, AND EXAMPLES

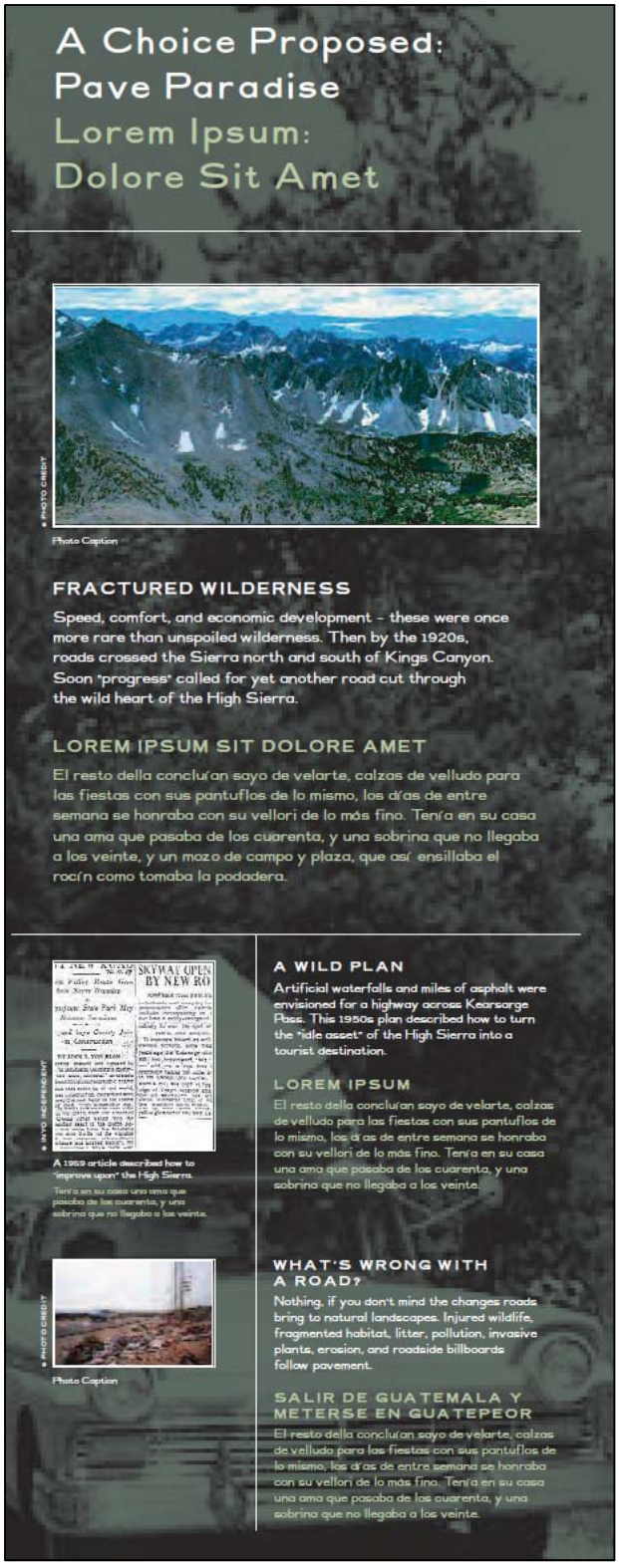
The parks already share many messages on wilderness, wild places, and related values throughout the parks. The following provides a starting point for additional efforts:

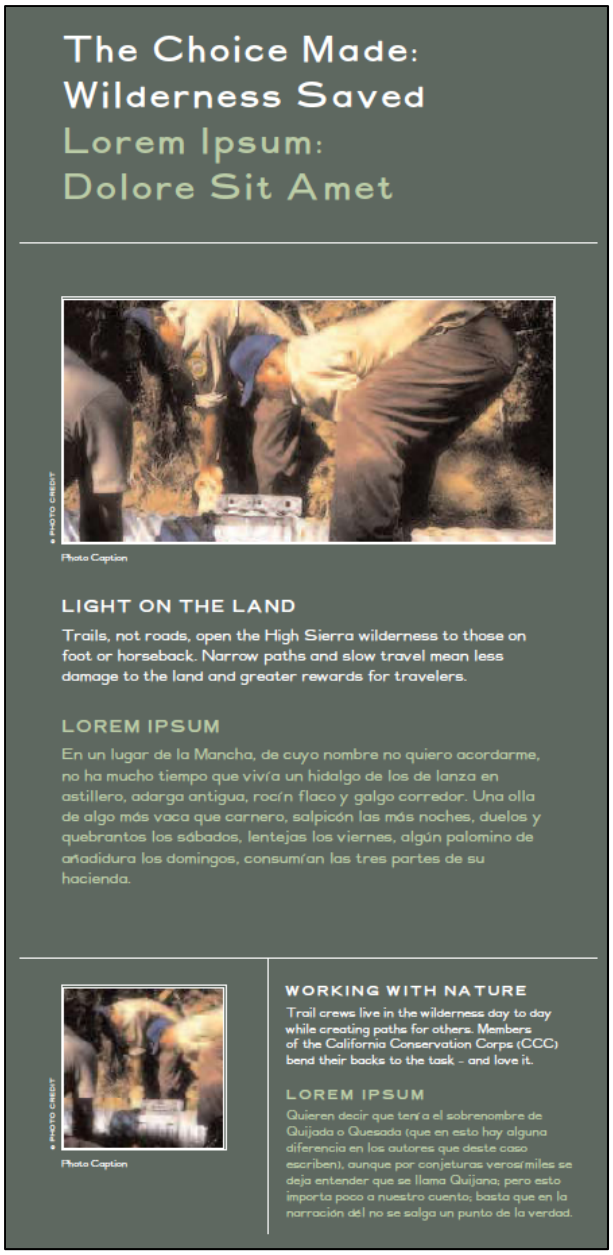
EXHIBITS – INDOORS, WITHIN THE PARKS

- **Kings Canyon Visitor Center**: These bilingual exhibits highlight wilderness as an identifying aspect of Kings Canyon National Park, and explore choices that society made in order to preserve it. (Note: The second language shown is place-holder text. Spanish was added before installation.)



Visitor Center, *continued*: One panel explores what might have been on one side, and current management on the other.



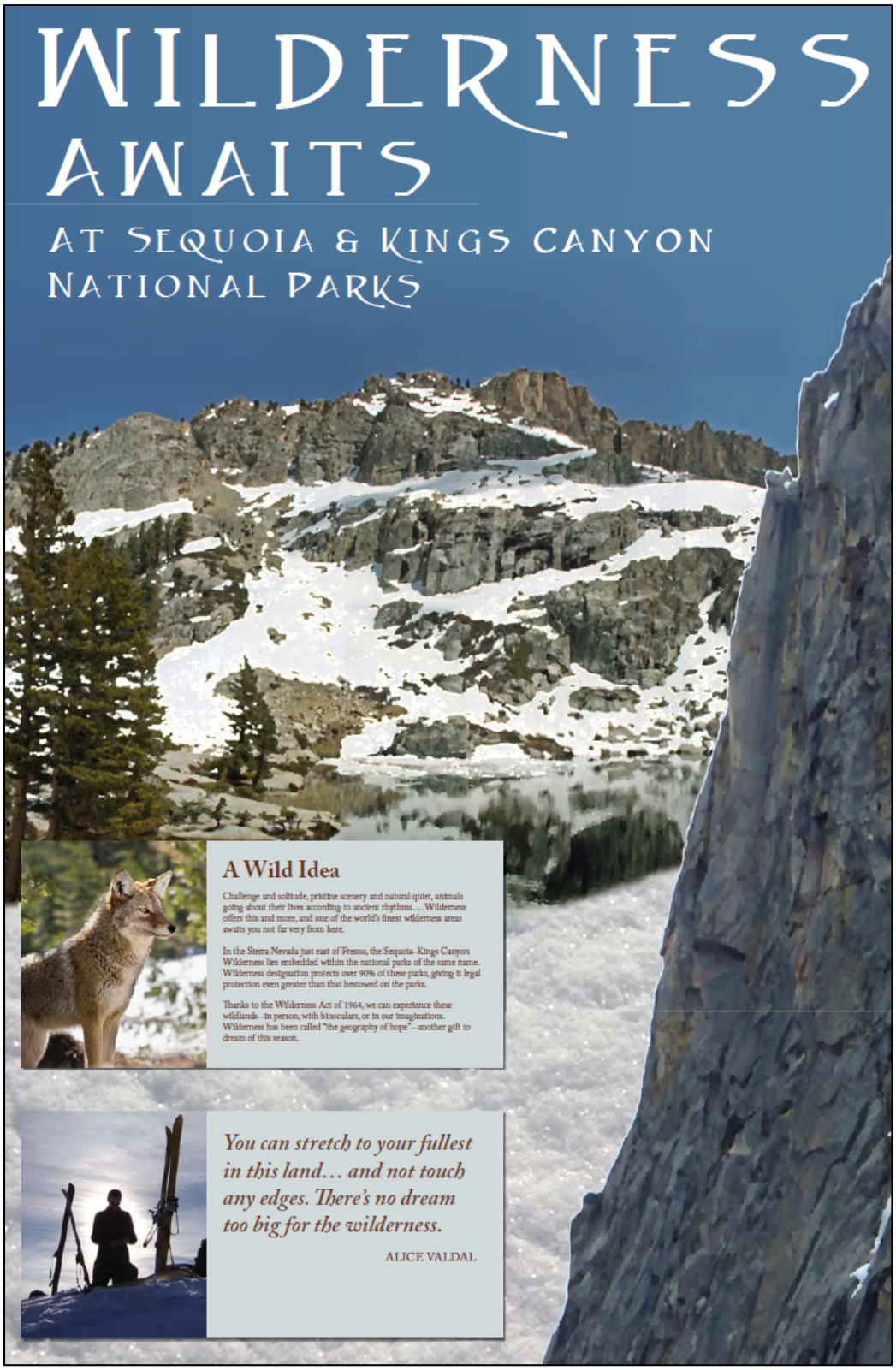


Visitor Center, *continued*: Another exhibit in the visitor center offers two journals: one from early explorers in the Kings Canyon high country, and one illustrating the day-to-day life of a modern wilderness ranger.



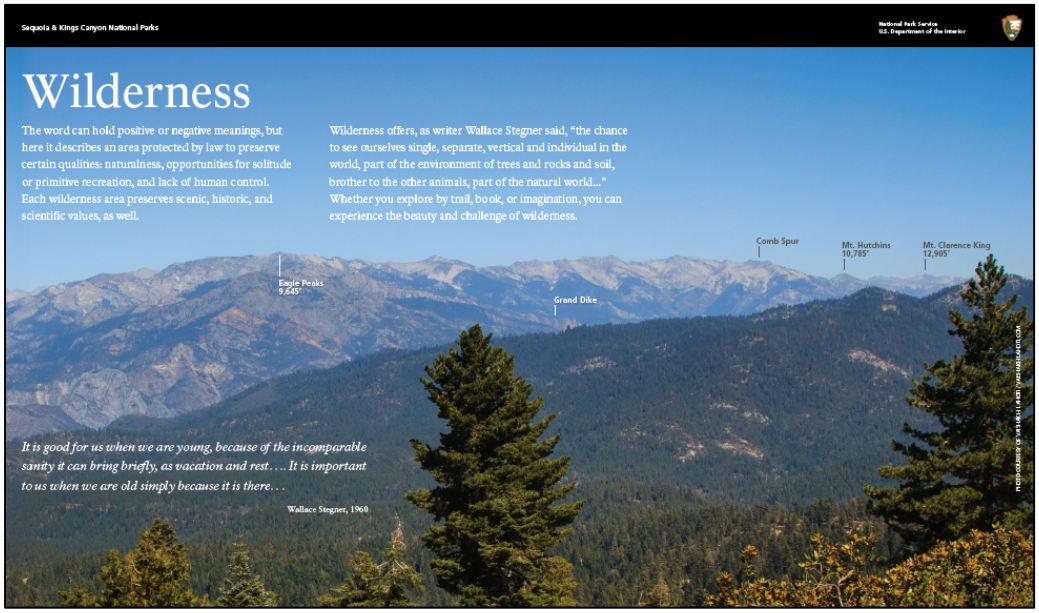
EXHIBITS – INDOORS, OUTSIDE THE PARKS

- **Fresno Airport:** These parks regularly display 6-foot-tall exhibit panels such as this at the airport:

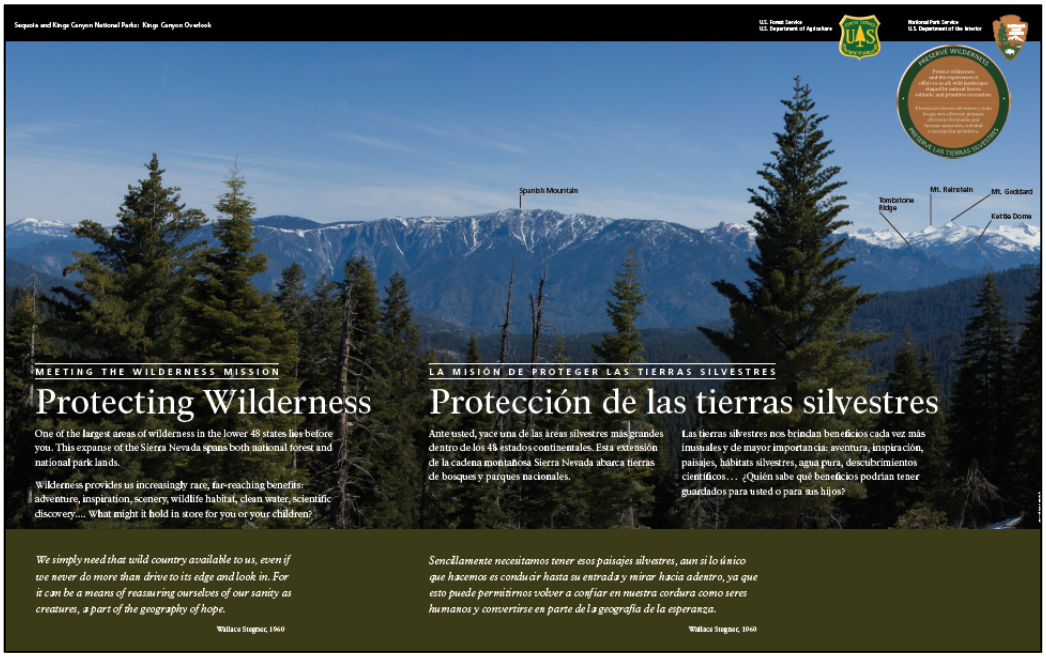


EXHIBITS – OUTDOORS, IN THE PARKS: WAYSIDES AT OVERLOOKS

- Panoramic Point (in the Grant Grove area): Describing the qualities of wilderness and inviting people to experience it in a variety of ways, directly and indirectly.



- Kings Canyon Overlook on the Generals Highway (bilingual) – part of a series along the highway the describes the basic mission of the national parks: Wilderness as part of the mission of national parks and national forests, and as a place that is important to people even if they do not go there.



EXHIBITS – OUTDOORS, IN THE PARKS CONTINUED: WAYSIDES ALONG TRAILS AND ROADS

- Moro Rock Staircase on the edge of the Giant Forest: A series of exhibits points out past and future changes of the wilderness views they see from the top of this popular viewpoint.



- Posted inside the parks' shuttle buses: Under development for summer 2014 and beyond, these images will be read by visitors inside the shuttles as they ride to, from, and within Sequoia National Park.

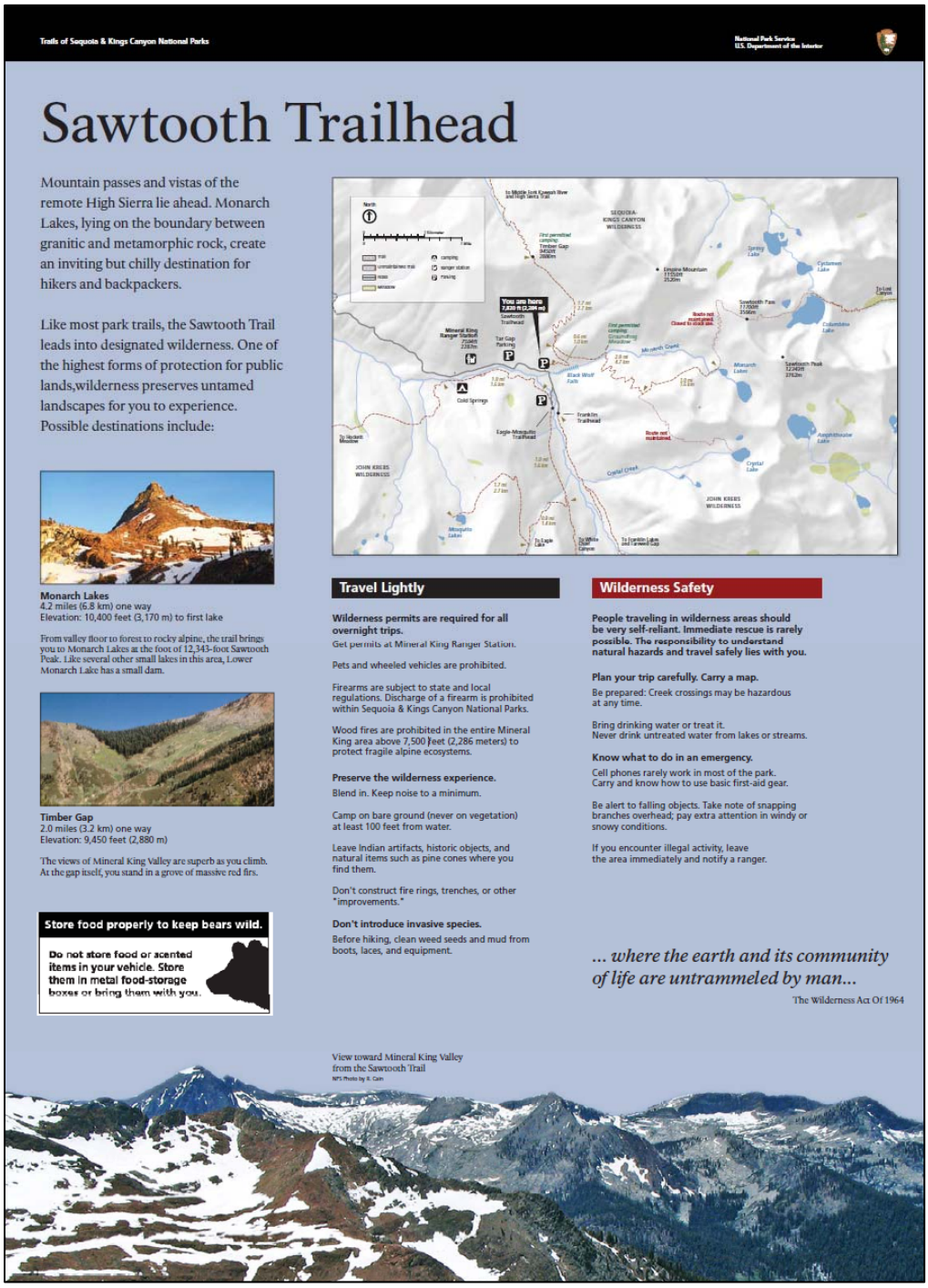


- At the end of Crescent Meadow Road where the High Sierra Trail starts (Sequoia National Park): Part of a series on people who shaped these parks.

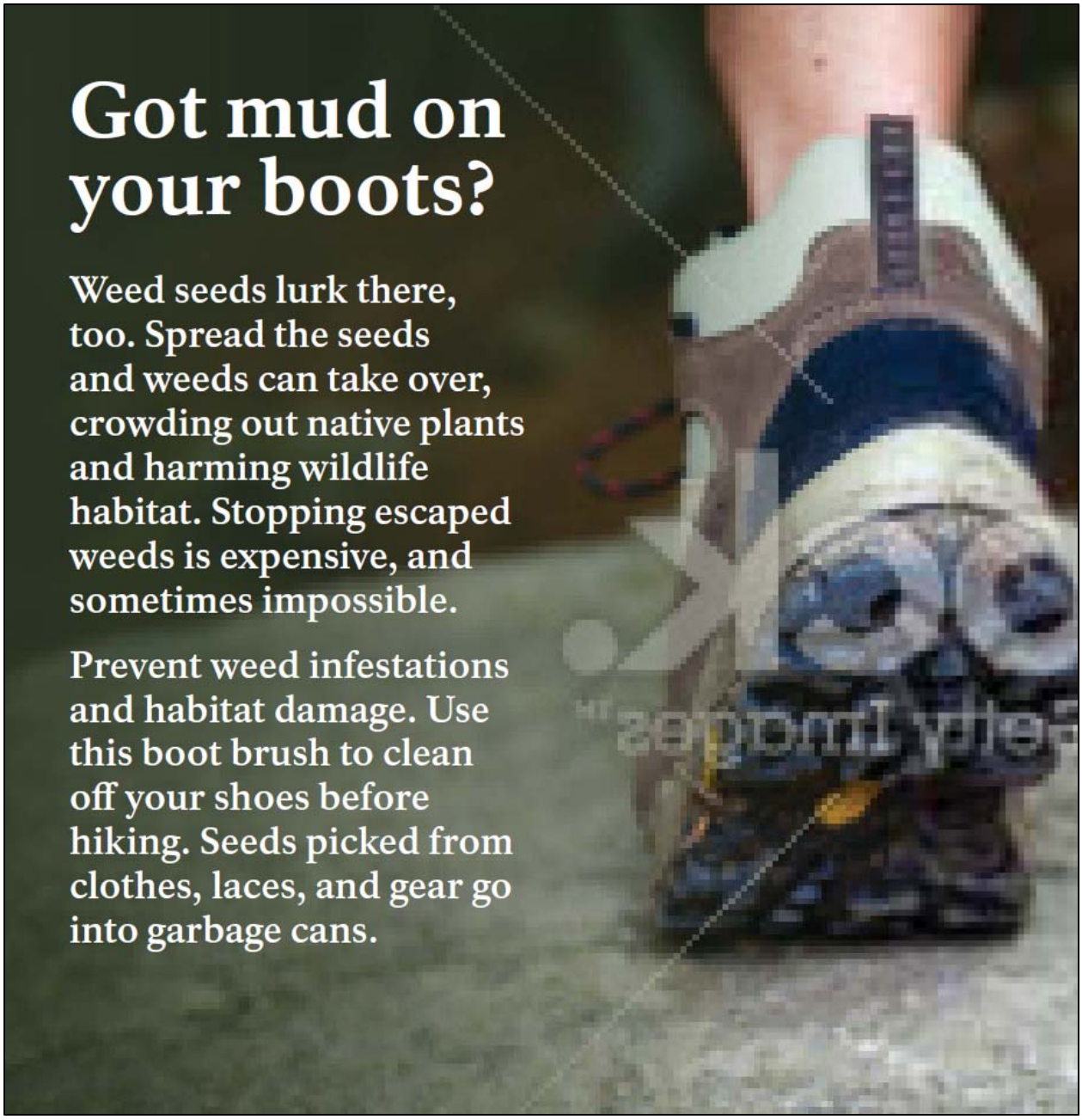


ORIENTATION EXHIBITS – OUTDOORS, IN THE PARKS: AT TRAILHEADS

These reach not only overnight wilderness users, but day hikers and those exploring the aread for the first time. Recent efforts have placed 18 such panels at almost all wilderness trailheads on the west side of the parks. Each has a quote about the essence of wilderness, and information about minimum impact use, safety, regulations, destinations, and designated wilderness as a form of landscape protection.



Some wayside panels address specific ways to help protect wilderness character and qualities – in this case, preventing introduction of nonnative seeds. (When final, these panels will be installed in 2014).



PUBLICATIONS & PRINTED INFORMATION – IN THE PARKS, ONLINE; FREE, FOR SALE

The parks' newspaper always carries basic information about wilderness permits. Sometimes it covers the topic in more depth. Handouts and other free materials provide additional details.



SEQUOIA & KINGS CANYON NATIONAL PARKS

& SEQUOIA NATIONAL FOREST/GIANT SEQUOIA NATIONAL MONUMENT

SUMMER 2009 GUIDE

Crystal Cave Tours / Free Activities • page 3
Road & Safety Tips / Finding Gasoline • page 5
Highlights & Shuttle in Sequoia Park • page 6
Highlights in Kings Canyon & USFS • page 7
page 8 • Facilities & Ranger Programs in Sequoia
page 9 • Facilities & Programs in Kings Canyon & USFS
page 10 • Camping & Lodging / Bears & Your Food
page 12 • Park Road Map

Finally forever wild

What would be the best use for gorgeous slopes and lake basins ringing a beautiful sub-alpine valley in the southern Sierra Nevada?

Debates over how to use public land are common to this country's history. In this case, the area in question is Mineral King, and the history of its potential uses is a long one.

Let's start back in 1873, when one James Crabtree dreamed a dream of riches. In that vision, an Indian chief led him to a place where he should establish a mine. The resulting White Chief Mine soon inspired a rush of silver seekers and the name "Mineral King."



Looking across Mineral King Valley from one of the Mosquito Lakes, now protected in the John Krebs Wilderness. Photo @Rick Cain

Yet the land yielded nothing in the way of mineral wealth. The name stuck anyway, but it was rich scenery and cool mountain air that continued to draw people after the mines went bust.

Fast forward to 1926. An expansion of Sequoia National Park excluded Mineral King due to the old jumble of mining claims. Instead, it became the "Sequoia Game Refuge," overseen by the U.S. Forest Service. People increasingly sought it out for recreation, idyllic scenery, and mild summer temperatures, and for the lovely lake basins to be explored.

Twenty years later, commercial downhill skiing became an option. Should the rocky basins and valley of Mineral King Valley be transformed with lifts and lodges? Could wealth be wrested from the area this way, rather than by mining?

This on-and-off debate continued until a serious proposal made it to the national stage in 1965, a plan that included 14 ski lifts, two hotels, and a parking garage. People questioned the proposal. Should large roads be blasted through the national park to serve this non-park area? Could ski facilities survive the frequent avalanches that keep this area unusually free of forest?

A national discussion in the courts and public airwaves went on for a decade. It came to an abrupt end when one congressman stood up for preserving Mineral King. Fresno's John Krebs sponsored a bill to add Mineral King to Sequoia National Park. Despite many local objections, the nation agreed with him, and the bill passed.

Still, talk over this area's future did not end. This spring, the name "Mineral King" was again before Congress. Again the discussion involved what its best and highest use might be.

Once again the American people made a decision through their representatives, this time choosing the highest form of preservation for America's public lands — wilderness designation. Named for the man who rose to defend Mineral King 40 years ago, the John Krebs Wilderness now protects its beauty, habitat, and wild experiences for generations to come.

PUBLICATIONS – FOR SALE IN THE PARKS

The parks ensure that bookstores in visitor centers carry books on wilderness for both adults and children. They include biographies of wilderness advocates, trail guides, minimum-impact guides, and history, and continually seek new and different books, maps, and activities on this topic.

AUDIO VISUAL PRODUCTS – IN THE PARKS, FOR SALE, ONLINE

The film *Gem of the Sierra*, shown daily in the Kings Canyon Visitor Center, was created to orient, inform, and inspire people about three outstanding features of Kings Canyon National Parks: its expansive wilderness, deep canyon, and giant sequoias.



ONLINE – WEBSITE AND SOCIAL MEDIA

- Photos and Multimedia: links to a variety of images of the parks' wilderness
- E-hike on Paradise Creek Trail into wilderness.
  Another e-hike, on the High Sierra Trail, is planned for completion by fall of 2014.
- 360-degree panorama of wilderness views from Moro Rock.
- Two webcams, at Park Ridge and lower Giant Forest, provide a glimpse into the parks' wilderness.
- A tremendous amount of information about wilderness logistics, guidelines, regulations, and safety is available on line and as printouts in the parks (check for live links):

Overnight backpacking	Trail Descriptions
Day Hiking	Trailhead Availability
Food Storage in the Wilderness	Trail Conditions
Permit Issuing Hours & Reservations	Wilderness Trip Planner
Permit Reservation Application	Stock Use

SOCIAL MEDIA



A typical post on the parks' Facebook page.

On the parks' Facebook page, the parks' staff and online "visitors" regularly post information related to wilderness. Sometimes a conversation starts between visitors and/or the parks.

For two years, these parks have held a photo contest on their Facebook page. In 2014, "wilderness" became a category in the competition. People entered almost 300 photos overall. Two rounds of voting led to large spikes in *likes*, *reach*, and *visits* (Facebook terms). The first round of voting reached almost 90,000 people. On January 1, 2014, the site had 29,834 likes. On the day of photo judging, there were 32,423 likes – an increase of about 2500 in less than two months. The first round of voting for the overall favorite brought 250 new fans in one day. People new to the idea of wilderness saw the beauty of its manifestation in these parks. People familiar with wilderness shared their experiences and viewpoints through their images, and were willing to share them for future use by the parks.



The winning photo in the wilderness category for the 2014 Facebook Photo contest: Mount Whitney Storm by Daniel Jeffcoach.

PERSONAL SERVICES – WALKS, TALKS, AND PROGRAMS

Programs by the parks' and SNHA staff that invite visitors to touch or focus on wilderness include snowshoe walks, day and night hikes, slide programs, astronomy talks, and special events such as celebrations of wilderness and dark skies. These personal contacts and experiences help people to develop a sense of connection to the untamed parts of the world.



PERSONAL SERVICES – EMPLOYEES IN THE FIELD

Employees work with people in the wilderness, at trailheads, on dayhikes, and at desks, sharing rules, encouragement, observations, regulations, and wilderness values. That these efforts make a difference is shown by inventories of the condition of campsites in the wilderness show clearly: Outreach to visitors by the parks' staff over the past 30 years has resulted in significant improvement of naturalness and other wilderness qualities (2013 Wilderness Character Assessment. In: *Sequoia and Kings Canyon National Parks Wilderness: Taking Stock of Visitor Perceptions and Trends, Manager Recollections, Long-term Observations and Resource Conditions*. Aldo Leopold Wilderness Research Institute).







PERSONAL SERVICES – EDUCATION IN THE PARKS



School groups of varying ages learn from the parks' education staff, resource management staff, and volunteers. Many students served by the parks' programs are immigrants and the children of immigrants.







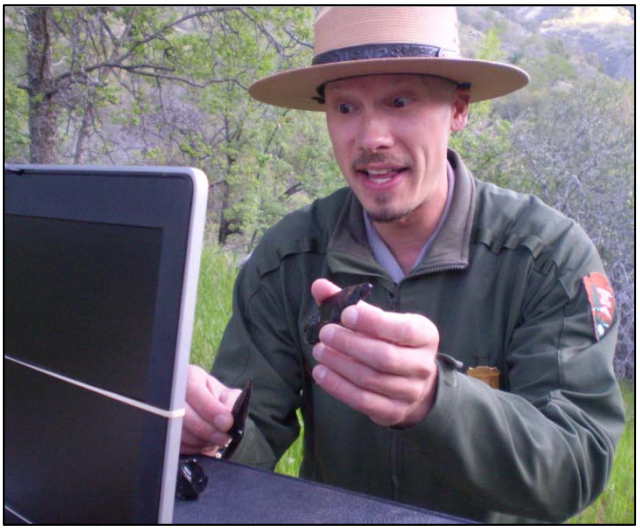
PERSONAL SERVICES – EDUCATION IN THE CLASSROOM



Rangers trained in educational techniques regularly visit classrooms in the San Joaquin Valley, part of the popular "Rangers in the Classroom" program.



New digital camera equipment now allows rangers to "visit" classrooms farther away as well as those that cannot afford to make a field trip.

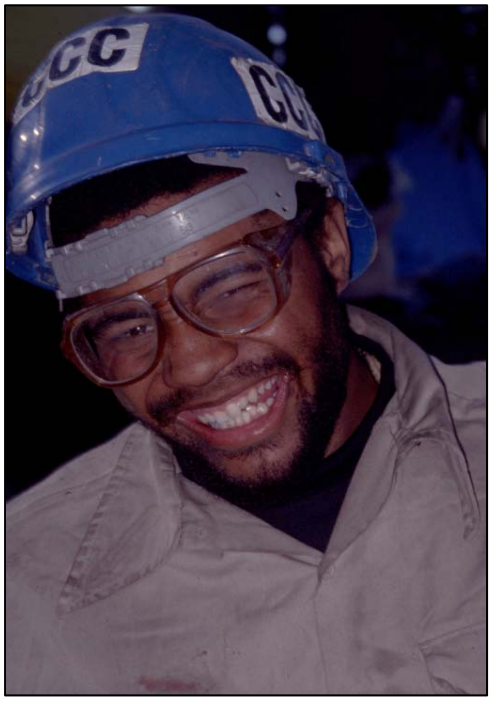


PERSONAL SERVICES – WALKS, TALKS, AND PROGRAMS BY PARTNERS



The Sequoia Field Institute (part of Sequoia Natural History Association – SNHA) offers a variety of programs and skill-building trips into the wilderness.

PERSONAL SERVICES – TRAININGS AND PROJECTS WITH PARTNERS AND VOLUNTEERS



The California Conservation Corps partners with these parks to offer invaluable experiences that build outdoor and other skills as well as self-confidence in young people who spend long stretches of time in the wilderness.

PERSONAL SERVICES – TRAININGS AND PROJECTS WITH STAFF AND VOLUNTEERS







Embracing stewardship of wilderness and demonstrating it to those who pass by (clockwise from top left):

A ranger uses the minimum tool needed for the job; volunteers revegetate a wilderness meadow; and the parks' staff train volunteers, partners, and other staff about wilderness and related topics.

PERSONAL SERVICES – OUTREACH OUTSIDE THE PARKS

Often accomplished through the public information office, this generally refers to reaching beyond the parks' boundaries to share the parks' ideals and issues.

Ongoing efforts encourage local communities to celebrate the wilderness resource of these parks. Outreach is often tied to special events such as National Parks Family Day in Fresno and "First Saturday" in Three Rivers. For the Fresno Airport's annual Christmas gala in 2013, extensive decorations had a wilderness theme (and were kept on display for months).

At citizenship swearing-in ceremonies, people are introduced to the national park concept and more. They learn that they have become citizens of the wide wilderness of these parks. Two of these ceremonies have been held in these parks to date.

REFERENCES: FOUNDATIONAL DOCUMENTS THAT DIRECT WILDERNESS INFORMATION AND EDUCATION EFFORTS

DIRECTOR'S ORDER #41: WILDERNESS STEWARDSHIP (2013)

6.14 Interpretation and Education

The Comprehensive Interpretive Plan for parks with proposed, recommended, or designated wilderness should include and address the primary the parks' interpretive themes that reflect the wilderness. Wilderness significance statements and interpretive themes can be found in the NPS Wilderness Education and Partnership Plan, developed by the Wilderness Leadership Council. Wilderness character, resources, and stewardship should be included in the park's interpretation, education, and outreach programming and should be included as an integral component of the park's long-range interpretive plan and annual implementation plan.

Staff education is an integral part of wilderness stewardship. Therefore, wilderness awareness training will be incorporated into all appropriate training programs for the parks' staff, including seasonal staff, cooperating association employees, concessions employees, and volunteers.

Leave No Trace© (LNT) principles and practices will be applied to all forms of recreation management within wilderness. LNT principles should be incorporated into interpretive activities and products such as hikes, talks, brochures, maps, and websites. All commercial guides leading trips into wilderness should attend LNT workshops and be required to incorporate LNT into their trips. The parks' staff who work in wilderness should attend LNT workshops and training.

NPS MANAGEMENT POLICIES 2006

6.4.2 Wilderness Interpretation and Education

In the context of interpretive and educational planning, national park system units with wilderness resources will:

> (1) operate public education programs designed to promote and perpetuate public awareness of and appreciation for wilderness character, resources, and ethics while providing for acceptable use limits;

(2) focus on fostering an understanding of the concept of wilderness that includes respect for the resource, willingness to exercise self-restraint in demanding access to it, and an ability to adhere to appropriate, minimum-impact techniques; and

(3) encourage the public to use and accept wilderness on its own terms—that is, the acceptance of an undeveloped, primitive environment and the assumption of the potential risks and responsibilities involved in using and enjoying wilderness areas.

NPS interpretive plans and programs for wilderness parks will address the primary interpretive themes for wilderness. Education is among the most effective tools for dealing with wilderness use and management problems and should generally be applied before more restrictive management tools.

NPS WILDERNESS EDUCATION AND PARTNERSHIP PLAN (2002)

Interpretation provides opportunities for people to forge intellectual and emotional connections to the meanings inherent in wilderness. The NPS Wilderness Education and Partnership Plan lays out a strategy for identifying audiences, developing services, and delivering those services in a thoughtful and coherent manner.

The primary purposes of the Wilderness Education and Partnership Plan are to:

1. Establish the individual elements of the NPS Wilderness Education Program.

2. Establish a priority for funding and implementation of the elements of the plan.

3. Provide for the continuity of the program through the development of an approved and comprehensive work plan.

The goal of these actions is to broaden awareness and understanding of the idea of wilderness and to inspire appreciation of wilderness values in an increasingly diverse population. Wilderness education and interpretation must reach beyond National Park Service audiences to increase knowledge of the National Wilderness Preservation System and the NPS role in managing wilderness. Desired results include increased public support for wilderness that results in protection of wilderness resources and preservation of wilderness for future generations.

INTERAGENCY UNIFIED NATIONAL STRATEGIC PLAN FOR WILDERNESS EDUCATION (1995)

Educating the public has long been considered an important function of stewardship. In the past, this has largely meant training wilderness visitors in low-impact camping techniques and user ethics. Wilderness education needs to expand beyond instructing visitors to build a shared understanding of the role and value of wilderness to society. The wilderness message needs to reach a much broader spectrum of the American public.

Historically, wilderness training has concentrated on wilderness specialists. The parks must now expand wilderness training to the interdisciplinary staff and line officers to assure all personnel are adequately equipped for their stewardship role.

SEQUOIA AND KINGS CANYON GENERAL MANAGEMENT PLAN (GMP), 2007

The Parks' Purposes

The purposes of the parks are the reasons why Congress established these areas as part of the national park system. The purpose statements are basic to all other assumptions about the parks and the ways in which the parks should be used and managed. As defined by the parks' managers, the following are the purposes of Sequoia and Kings Canyon National Parks, which incorporate the mission statement:

- Protect forever the greater Sierran ecosystem — including the sequoia groves and high Sierra regions of the park — and its natural evolution.
- Provide appropriate opportunities to present and future generations to experience and understand park resources and values.
- Protect and preserve significant cultural resources.
- Champion the values of national parks and wilderness.

The Parks' Significance

Sequoia and Kings Canyon National Parks are special and unique places because they have [among other things]: the core of the largest area of contiguous designated wilderness in California, the second largest in the lower 48 states…

The Parks' Primary Interpretive Themes

One of SEKI's primary interpretive themes is: Sequoia and Kings Canyon National Parks protect a large wilderness area, where natural forces prevail, and which provides significant scientific and social values to the world.

LEAVE NO TRACE©

Federal and State Land Management Agency Partners

The Leave No Trace Center for Outdoor Ethics has a memorandum of understanding with the following federal and state land management agencies: National Park Service, Bureau of Land Management, USDA Forest Service, US Fish and Wildlife Service, US Army Corps of Engineers and the National Association of State Park Directors. (See NPS *Management Policies 2006*, above.)





Appendix I

Minimum Requirements Analysis

ON THE PREVIOUS PAGE
Valhalla in Sequoia National Park
NPS Photo

APPENDIX I:

MINIMUM REQUIREMENTS ANALYSIS

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SEQUOIA AND KINGS CANYON NATIONAL PARKS

MINIMUM REQUIREMENTS ANALYSIS

INSTRUCTIONS AND BACKGROUND MATERIALS

WORKSHEET INSTRUCTIONS

- The Minimum Requirements Analysis (MRA) worksheet is designed to assist the parks' employees and outside researchers with completing a Minimum Requirement Analysis for wilderness projects. These instructions refer directly to the MRA worksheet. For more information about MRAs, see the toolboxes on www.wilderness.net/toolboxes.
- **Use of this document assumes familiarity with the Wilderness Act, other relevant legislation, and agency policy.** For training in the Wilderness Act or on conducting a Minimum Requirements Analysis, go to: www.wilderness.net/index.cfm?fuse=NWPS&sec=elearning.
- The Wilderness Act prohibits specific activities—the use of motor vehicles, motorized equipment, and mechanical transport, the landing of aircraft, and the installation of structures and equipment—when other reasonable alternatives are available. The MRA worksheet provides a formalized method for developing alternative ways to address an issue by evaluating and comparing the effects of various actions on wilderness character.
- Any proposed administrative activity that has the potential to affect the wilderness or potential wilderness additions will be analyzed through the minimum requirement process. It is important to use professional judgment when deciding whether or not you need to complete the MRA Worksheet. Projects that have negligible impacts (e.g., observing wildlife, monitoring vegetation with a small crew, revisiting previously installed scientific equipment) do not need to go through the MRA process. If you are unsure about how to proceed, contact your Division Chief, the Research Coordinator, your supervisor, the Assistant Wilderness Coordinator (AWC), or the Environmental Protection Specialist (EPS).
- The process will be used to determine if the action will be implemented and, if so, the tools or techniques that will be used. The analyses will clearly identify how minimum requirement decisions were developed and include reference to the applicable compliance documents (Categorical Exclusion, Environmental Assessment, and Environmental Impact Statement). Approval will be documented with the superintendent's signature, and a permanent record of the analyses will be retained in the parks' files.

The MRA Worksheet is based on the requirements of both the Wilderness Act and NPS Management Policies (2006):

> Section 4(c) of the Wilderness Act states: *" . . .except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be. . .* ***no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area****."*

Section 6.3.5 of NPS Management Policies 2006 states that the Minimum Requirement concept will be a two-step process to [1] determine if the management action is necessary *"for administration of the area as wilderness and does not cause a significant impact to wilderness resources and character; and* [2] *the techniques and types of equipment needed to ensure that impacts on wilderness resources and character are minimized."* Also: *"When determining minimum requirements,* ***the potential disruption of wilderness character and resources will be*** *considered before, and* ***given significantly more weight than, economic efficiency and convenience."***

STEP 1: DETERMINE IF ANY ADMINISTRATIVE ACTION IS NECESSARY

Description of Situation

The description should explain, in general terms, the situation that may require action. However, it should neither assume that action will be taken, nor identify a specific method or tool to be used. The description helps determine whether any action is necessary in wilderness. ***The appropriate administrative response may be no action at all.***

The description should not justify the use of motorized equipment/mechanical transport or the placement of a structure, facility, or temporary road. If action is needed, the specific actions, methods, and tools will be identified and evaluated in Step 3.

The table below provides examples of correct/incorrect descriptions. The descriptions are abbreviated for training purposes. Actual descriptions should provide all relevant background information.

Correct examples of description	Incorrect examples of description
An administrative cabin is deteriorating and there is a proposal to reconstruct the structure. The cabin is located six miles inside the wilderness and is currently used by trail crews and wilderness rangers.	There is a need to use motorized tools to restore an administrative cabin
A windstorm has blown down trees which are blocking maintained trails. Approximately 47 miles of trail are currently blocked limiting access to 32% of the wilderness.	Chainsaws would be the quickest tool for clearing the downed trees.
There is a lack of information available to biologists about a wildlife species that has the potential for listing under the ESA.	A helicopter should be used to survey the population because all other methods would take too long.
A trail bridge has washed out. The bridge serves a main trail used by visitors and outfitter-guides to access approximately 20% of the wilderness. Alternatives to access this portion of the wilderness would add 18 miles to the travel route.	There is a need to replace the washed out trail bridge. A helicopter is needed to fly in a replacement bridge and would be the most cost effective and safest tool for the job.
Invasive plant species are present in the wilderness along the Clear Creek, Blue Lake, and Windy Pass Trails. The trails are the most popular access routes to the lake basin area of the wilderness and are used by both recreation livestock users and hikers.	A motorized herbicide sprayer is the most efficient tool to treat invasive plants.

Answer questions A through F with "Yes" or "No," and explain your answer. If one of the questions is not applicable to the proposal, answer "No" and explain why it is not applicable.

To 'check' or 'uncheck' a box, move your cursor into the box and double click to open the check box form field options menu. Alternatively, you may access the field menu by holding your cursor over the box, right click, and select properties.

Remember that in Step 1, the analysis is about whether or not there is a need to take action and not about specific proposed activities or techniques. The specific alternatives for implementing a decision and the positive and negative impacts of each action will be described and evaluated in Step 3.

A. Options Outside of Wilderness

Can actions taken outside of wilderness adequately address the situation and meet project goals?

Identify options outside of wilderness and discuss whether or not they can adequately address the situation described above.

Examples of administrative actions outside wilderness include:

- installing nest boxes or conducting wildlife surveys outside of wilderness boundaries
- surveying visitors at the trailhead, rather than on the trail
- using quota reductions to address recreational impacts
- locating monitoring or other administrative structures outside of wilderness

B. Valid Existing Rights or Special Provisions of Wilderness Legislation

Is action necessary to satisfy valid existing rights or special provisions in <u>wilderness legislation</u> (the Wilderness Act of 1964 or subsequent wilderness laws)?

Valid existing rights are granted only by provisions in law. These may include rights associated with mining, water, rights-of-way, or access to non-federal lands inside wilderness. Special provision language could be contained within the Wilderness Act of 1964 or the designating legislation for Sequoia-Kings Canyon Wilderness and/or John Krebs Wilderness.

Identify any valid existing rights or special provisions in wilderness legislation and cite the law and section. If there are none, state that none exist.

Examine the special provision and describe whether the law says that a specific action "shall" be taken or that an action "may" be taken. Remember that legislative history (i.e., Congressional committee reports) is useful background information that should be considered, but it does not have the same requirement for implementation as direction contained in law.

Some valid existing rights or provisions of special legislation may be satisfied by an option outside wilderness. Such possibilities would likely reduce impacts to the wilderness resource and character and should be explored.

Valid Existing Rights or Special Provisions that apply to Sequoia and Kings Canyon National Parks are:

<u>Omnibus Public Land Management Act of 2009</u>

- Section 1902. Designation of Wilderness Areas:

(1) John Krebs Wilderness

(C) Potential Wilderness Additions – The designation of the potential wilderness additions

(A) shall not prohibit the operation, maintenance, and repair of the small check dams and water impoundments on Lower Franklin Lake, Crystal Lake, Upper Monarch Lake, and Eagle Lake. The Secretary is authorized to allow the use of helicopters for the operation, maintenance and repair of the small check dams and water impoundments on these same lakes.

- Section 1903 (c) – Hydrologic, Meteorologic, and Climatological Devices, Facilities, and Associated Equipment: The Secretary shall continue to manage maintenance and access to hydrologic, meteorologic, and climatological devices, facilities and associated equipment consistent with House Report 98–40.
- Section 1903(e) Horseback Riding – Nothing in this subtitle precludes horseback riding in, or the entry of recreational or commercial saddle or pack stock into, an area designated as wilderness by this subtitle (1) in accordance with section 4(d)(5) of the Wilderness Act and (2) subject to any terms and conditions determined necessary by the Secretary.

Other special provisions and valid existing rights included in the 1984 California Wilderness Act and Omnibus Public Land Management Act of 2009 and accompanying Committee Reports include:

- the continued use of Bearpaw High Sierra Camp (a Potential Wilderness Addition).
- management of southern Hockett Plateau as Proposed Wilderness.
- existing Rights of private landowners at Oriole Lake to access their private lands

C. Requirements of Other Legislation

Is action necessary to meet the requirements of other federal laws?

Laws that do not directly address wilderness may influence the need for actions in wilderness. In some instances, the administrator is asked to satisfy the requirements of multiple laws. Identify and cite applicable provisions of other laws and describe any conflicts between the provisions of other laws and the Wilderness Act or enabling legislation for your area. If no other laws are applicable, state that there are no requirements.

Apparent conflicts between the Wilderness Act and other legislation may require innovative approaches and not all apparent conflicts are genuine. No law over-rides another law (unless specifically stated in the superseding law). The requirements of all applicable laws must be met.

For a list of laws that may apply to projects within SEKI, refer to attachment 1 (pages I-17 – I-22).

D. Wilderness Character

Is action necessary to preserve one or more of the qualities of wilderness character?

Explain how taking action in wilderness is necessary to preserve each quality of wilderness character.

As you become increasingly familiar with analyzing effects on the qualities of wilderness character, you will realize that taking action often positively impacts one or more qualities of wilderness character while

simultaneously negatively impacting others. Keep in mind that at this point in the analysis you are determining if any action is necessary, not looking at impacts from taking action (that analysis comes in Step 3, if you decide at the end of Step 1 that some action must be taken).

For more information about the qualities of wilderness character, refer to attachment 2 (pages I-23 – I-26).

E. The Public Purposes of Wilderness

Is action necessary to achieve one or more of the public purposes for wilderness (as stated in Section 4(b) of the Wilderness Act): "recreational, scenic, scientific, educational, conservation, and historical use?"

Identify which of the public purposes are applicable to the situation and describe whether it is necessary to take action to be consistent with that public purpose.

The public purposes are defined as follows:

Recreational: Wilderness is designated, in part, to provide for recreation opportunities that allow visitors to experience wilderness ***as wilderness***. This public purpose is related to the direction for administration of wilderness areas Section 2 (a) "…and these shall be administered for the use and enjoyment of the American people in such a manner as will leave them unimpaired for future use and enjoyment as wilderness…" The recreational public purpose is also supported by the definition of wilderness found in Section 2 (c) "…has outstanding opportunities for solitude or a primitive and unconfined type of recreation…"

A management action is consistent with the recreational public purpose, and may be necessary, if the action will contribute to providing opportunities for visitors to experience wilderness. A management action is not necessary if it impacts these opportunities. The need to accommodate visitor use, or provide "easy" access, does not over-ride the mandate to preserve the qualities of wilderness character.

Scenic: The scenic public purpose of wilderness is the visual experience provided by the natural features of wilderness (vegetation, geology, water, etc.) obtained by visitors inside wilderness or as seen by others outside wilderness. This public purpose is closely related to the Natural, Undeveloped, and Opportunities for Solitude or Primitive and Unconfined Recreation qualities of wilderness character. It is also related to the Wilderness Act Section 2 (c) definition of wilderness and direction for management, "…which is protected and managed so as to preserve its natural conditions." In addition, Section 2 (c) lists "scenic" as a value that may be found in wilderness.

It may be necessary to take management action to be consistent with the scenic public purpose when there is a need to protect or restore natural conditions and, therefore, the scenic value of wilderness. An action is not needed and is inconsistent if it impairs the natural scenery of wilderness (e.g., modern human structures or installations).

Natural events (such as fires, floods, mudslides, and insect or disease infestations) are not a negative impact to the scenic public purpose. The scenic public purpose does not include the view from the wilderness to other lands nor would it justify cutting trees inside wilderness to provide a view point along a trail.

Scientific: The Wilderness Act, in Section 2 (a) includes "…gathering and dissemination of information regarding their use and enjoyment" as part of the necessary administration of the area. In addition, Section 2 (c) lists "scientific" as one of several values that may be found in wilderness.

A management action is consistent with the scientific public purpose, and may be necessary, when an opportunity for research or other scientific activity is needed for the benefit of wilderness. This public purpose does not require that all proposals for research or scientific activities in wilderness be implemented. Instead, this purpose recognizes the value of research and scientific activities that are necessary for wilderness management or that have a significant value for society and, in certain unique circumstances, can only be accomplished in wilderness, even if it involves a use prohibited by Section 4(c) of the Wilderness Act. An action which does not directly support the scientific public purpose nonetheless may be allowed if it does not involve a prohibited use or otherwise degrade wilderness character.

For example, is a proposal to monitor air quality in wilderness consistent with the scientific public purpose? The scientific public purpose includes gathering information about the effects of outside forces (i.e., air pollution) on wilderness. If a suitable location outside wilderness cannot be found, and if the information to be gathered is needed to preserve wilderness character, monitoring in wilderness may be evaluated to determine if it is the minimum necessary action to meet management objectives for the management of the wilderness. In addition, air quality monitoring may also be consistent with the conservation public purpose if the information gathered can be used to ensure preservation of the Natural quality of wilderness character.

Educational: The educational public purpose of wilderness is the benefit to the American people that is provided through learning about wilderness and understanding the role of wilderness ecosystems and visitor opportunities in the broader social and biophysical landscapes. The Wilderness Act, in Section 2 (c) includes "educational" as a value that may be found in wilderness.

A management action is consistent with the educational public purpose, and may be necessary, if opportunities for education about the wilderness resource (either in general, or for a unique, specific element) are recognized and necessary to meet management objectives that preserve wilderness character. Activities such as interpretation inside wilderness (e.g., signs) or marketing that encourages use of specific locations for recreation opportunities is inconsistent with the educational public purpose and could impact the preservation of wilderness character if opportunities for solitude or a primitive and unconfined type of recreation are compromised.

Conservation: The conservation public purpose is closely related to both the Natural and Untrammeled qualities of wilderness character. The Wilderness Act in Section 2 (c) defines wilderness as a place "…where the earth and its community of life are untrammeled by man…" and that is "…protected and managed so as to preserve its natural conditions…" Also in Section 2 (c), the Wilderness Act, includes "ecological" as one of the values that may be found in wilderness. These definitions and terms are consistent with the common definition of conservation which is to save or protect.

A management action is consistent with the conservation public purpose, and may be necessary, when actions benefit the natural conditions and the natural function of ecological processes in wilderness through protection or restoration. But not all biophysical management or restoration actions are consistent with the conservation public purpose.

For example, a proposal to alter existing habitat in wilderness to help prevent listing of a wildlife species may or may not be consistent with the conservation public purpose. It may be consistent if the action

would help restore natural conditions that have been impacted by modern human activity to within the Historic Range of Variability (HRV).

If the action to alter existing habitat would create conditions outside the HRV, it would be inconsistent with the conservation public purpose (and possibly degrade the Natural quality of wilderness character). However, compliance with the Endangered Species Act or adoption of new scientifically-based goals for conserving ecosystem integrity in the face of rapid global changes may still require this or other actions to be considered and possibly implemented. In these cases the proposed action may need to be revised to minimize the use of motorized equipment, installations, structures, etc.

Historical: The historical public purpose of wilderness is represented by the historic and pre-historic sites, artifacts, structures, or other cultural landscapes that may be within the areas and by the human activities that once occurred there. Section 2 (c) lists "historical" as one of several values that may be found in wilderness.

A visitor to wilderness, or anyone learning about wilderness, becomes aware of or benefits from the associations between past human activities or influences and the wilderness. There may be a need for management action that is consistent with the historical public purpose if there is a need for protection of cultural resources. But the historical public purpose does not mean that every structure must be preserved or restored or that every past use of wilderness must continue.

F. Other Guidance

Is action necessary to conform to direction contained in agency policy, unit and wilderness management plans, species recovery plans, or agreements with tribal, state, and local governments or other federal agencies?

Describe any applicable guidance for the situation or project. If the issue has been addressed in agency policy, unit and wilderness management plans, species recovery plans, or agreements with tribal, state, and local governments or other federal agencies, cite the guidance here.

Carefully consider the context and requirements of the policy, plan or agreement. Plans developed using a NEPA analysis are decisions that provide stronger guidance than plans developed with less public or interdisciplinary involvement.

For a list of plans, policies, and agreements that may apply to projects within SEKI, refer to attachment 3 (pages I-27 – I-34).

Decision

Is administrative action necessary in wilderness?

Evaluate your responses to the questions above in order to determine whether or not administrative action is necessary in wilderness.

In making the determination, prioritize compliance with the Wilderness Act and the provisions of other laws (questions A-D). Second priority is given to question E, since the Public Purposes are subject to the clause: "Except as otherwise provided in this Act." Third priority is given to question F, since policies, plans, and agreements do not override the legal requirements used as the basis of the other questions.

Consider the following: If you do not accomplish the work, what would be the resulting impacts? Would there be adverse effects on wilderness? Would you fail to meet the mandate of other laws and/or policies?

If you are unable to determine if action is necessary, consult your Division Chief or supervisor. Researchers should consult the Research Permit Coordinator.

STEP 2: DETERMINE THE NEED TO DEVELOP ALTERNATIVES

Does your project propose a Section 4(c) prohibited activity?

If your project includes a Section 4(c) prohibited activity, skip Step 2 and proceed directly to Step 3.

> Section 4(c) prohibited activities include: the use of mechanical transport (wheelbarrows, bicycles, etc.) and/or motorized equipment and vehicles (chainsaws, water pumps, rock drills, etc.); the landing of aircraft; and the installation of materials, equipment, and/or structures.

If your project does not include a Section 4(c) prohibited activity, answer the questions provided.

If you answer *yes* to any of the questions, you may be required to complete Step 3. Contact the AWC or the EPS for guidance.

If you answered *no* to all of the questions, provide a brief project description and retain the form in your permanent administrative record. Submit an electronic copy to the Assistant Wilderness Coordinator.

STEP 3: DETERMINE THE MINIMUM ACTIVITY

Description of Alternatives

Develop a minimum of two action alternatives plus a no-action alternative. The no-action alternative is used for comparison purposes and/or a baseline when evaluating effects. (In rare cases, it may be appropriate to develop only one action alternative.)

Develop reasonable and feasible alternatives. When you develop alternatives, consider existing laws, policies, and guidance. Also consider your specific project objectives. Only analyze alternatives that do not appear to be "too remote or speculative" to accomplish the project's purpose.

For each alternative, describe: the methods and techniques that will be used; when the activity will take place; where the activity will take place; the necessary mitigation measures; and the general effects to the biophysical and social components of the wilderness resource and the qualities of wilderness character.

Identify and describe a full range of feasible alternatives, including (as applicable):

- No-action
- No Section 4(c) prohibited uses
- Minimal Section 4(c) prohibited uses (e.g., a combination of motorized and non-motorized methods or tools)

The level of detail required in the description of alternatives and effects varies by the complexity of the activity. For some projects, it may be necessary to reference agency policy, standards, or guidelines for construction of facilities and structures, safety, etc. A "no-action" alternative should be included to help

confirm that action in wilderness is necessary and to facilitate a comprehensive comparison of effects (this is also useful for subsequent NEPA analysis).

Include mitigation measures that would be implemented for the various activities, methods, and tools that could be used. This is particularly important when describing the effects to the biophysical or social components of the wilderness resource from workers traveling or camping in the wilderness.

Include an explanation of how the impacts can be mitigated: through employee training; location of work areas, campsites and travel routes; project timing; temporary closures; and other actions. Also include any seasonal timing requirements or identified need for urgency based on protection of wilderness character or worker safety.

Describe the alternatives to highlight their differences. For instance, if *all* alternatives contain an identical action component and mitigation, evaluate it separately as an action common to all alternatives.

A. Wilderness Character

In Step 1, you used the qualities of wilderness character as criteria for determining whether or not action is necessary in wilderness. Here, describe the positive or negative effects ***of each alternative*** on wilderness character. Identify both short-term and long-term effects where necessary.

For more information on the five qualities of wilderness character, refer to attachment 2 (pages I-23 – I-26).

Untrammeled

Identify how this quality is positively impacted where a trammeling is reduced or eliminated or negatively impacted where trammeling occurs or increases. Discuss the degree to which the components or processes of ecological systems are ***intentionally*** controlled, manipulated, or hindered by the proposed actions.

This quality is degraded by modern human activities or actions that control or manipulate the components or processes of ecological systems inside the wilderness. Examples include the suppression of natural fire or managing vegetation and wildlife. ***Even when the manipulation is for a "good" purpose, such as eliminating a non-native species, it is considered a trammel and has a negative impact to this quality.*** A proposal which does not manipulate the biophysical environment has no impact on this quality. ***The only way a positive effect to this quality could be registered is if the proposal would stop a current manipulation of the biophysical environment.***

For projects that do not intend to manipulate "the earth and its community of life" (e.g., the installation of monitoring equipment, clearing trees from a trail, etc.), simply state that there is no effect on the Untrammeled quality of wilderness character.

Undeveloped

This quality is degraded by the presence of structures, installations, habitations, and by the use of motor vehicles, motorized equipment, or mechanical transport that increases people’s ability to occupy or modify the environment. Examples include: radio repeaters, monitoring installations, administrative cabins, helicopter landings, and the use of chain saws, pumps, motor vehicles, motor boats, etc.

An alternative that does not involve these prohibited activities would have no impact on this quality. An alternative that removes a structure or installation, or otherwise stops a prohibited use, would have a

positive effect on this quality. Note that when a proposal is broken down into phases or components, more than one effect to this quality may be registered. For instance, an alternative to remove a sampling device by flying it out with a helicopter would both improve (by removing the structure) and degrade (by using an aircraft) this quality.

Natural

Describe the potential positive or negative impacts to this quality in terms of protection or restoration of natural conditions (i.e., air, water, soil, wildlife, fish, plants). Include, where applicable, a discussion of the effects related to protecting natural conditions within the regional landscape (i.e., insects, disease, non-native species, and wildlife migration corridors).

There are positive impacts to this quality if the alternative would improve natural conditions, negative impacts if the alternative would degrade natural conditions, and no impact if the alternative would have no effect on natural conditions.

Examples of degradation include: the results of suppressing a natural fire or allowing non-native invasive species to become established or expand. Examples of the preservation of this quality include: the effects from allowing natural fire, successful treatment of non-native species, and the restoration of native species.

Note that in some instances, an alternative might have both positive and negative impacts. For instance, providing artificial water to aid in the recovery of a sensitive species would be a positive impact (if the species increased) to this quality and also a negative impact because of the effects to other species due to an unnatural water source. (Of course, this alternative would have impacts to other qualities as well.)

Opportunities for Solitude or Primitive and Unconfined Recreation

Identify how opportunities for solitude or a primitive and unconfined type of recreation will be protected or degraded. Include negative impacts to visitors from the use of motorized equipment, mechanical transport, landing of aircraft, structures, or installation, as well as the positive impacts from actions that preserve these opportunities.

If necessary, describe the positive or negative impacts separately for each sub-part of this quality: Solitude, Primitive Recreation, and Unconfined Recreation.

Examples of degradation include: management actions that cause (by action or inaction) crowding or too many visitor encounters (impacting solitude); facilities or other signs of modern civilization (impacting primitive recreation); and additional restrictions on visitor behavior (impacting unconfined recreation). An alternative which increases solitude, removes infrastructure that diminishes primitive recreation, or removes a management restriction would have a positive impact on this quality.

Because this quality has three sub-parts, the effects are not always straight forward. One alternative could produce multiple counterweighing impacts to this quality. For example, designating campsites negatively impacts unconfined recreation while positively impacts solitude.

Other Features of Value

Identify any values or characteristics of this wilderness (i.e., "ecological, geological, or other features of scientific, educational, scenic, or historical value") that are not accounted for in the above qualities, and

describe the effects on these unique features. Heritage and cultural resources including historic sites and paleontological localities are also included here.

B. Safety

Describe any safety concerns for visitors or workers directly associated with implementing the alternative. Identify which hazards can be mitigated and which hazards cannot be mitigated. Describe how mitigation might be achieved through providing information to the public, temporary area closures, training, or the use of protective equipment.

Identify the degree of risk for each alternative after considering both the rate of occurrence and severity of reported injuries. Base the determination of the safety risks of implementing an alternative on adequate supporting evidence (i.e., agency accident data, project specific Job Hazard Analysis, agency specific guidelines, or other documentation).

C. Other Criteria

Describe the alternative's effect on any other applicable criteria, such as maintaining traditional skills, other special provisions, economic and timing constraints, etc.

Note: While administrative activities should always be accomplished with economic efficiency, neither the cost nor the time required for implementation can be primary factors in allowing uses that would otherwise be prohibited. Identify and describe the costs and time required for each alternative, but avoid pre-selecting an alternative based on these criteria.

Additional Alternatives

Action alternatives which are not feasible to implement should be identified, when appropriate. Provide brief reasons as to why these alternatives were "considered but dismissed."

Valid reasons for dismissing an alternative include: 1) actions that are impossible to accomplish by any means, 2) actions that are possible to accomplish but implementation would cause *significantly* greater negative impacts to wilderness character, or 3) actions that would cause a significant safety risk to workers or the public which cannot be mitigated. Alternatives should not be eliminated from full consideration simply because implementation would take more time or money or because the skills or equipment needed are not readily available. Other valid reasons for ruling out an alternative may relate to timing restrictions associated with the NPS budget cycle, or that the alternative does not conform to laws, regulations, or NPS policy.

Comparison of Alternatives

Compare the alternatives in the table provided using your best judgment on their level of effect, (both positive and negative, short- and long-term). The overall impact of an alternative can be roughly approximated by tallying the scores.

You are mandated by the Wilderness Act to "preserve wilderness character," and this is the most important criteria for wilderness. Therefore, the impacts on the qualities of wilderness character are tabulated first.

Decision

What is the minimum activity?

Usually, the alternative that results in the least overall adverse effect to wilderness character and that represents the minimum requirement necessary to administer the area as wilderness will be the selected alternative. However, there may be other considerations. If you do not select the alternative with the least overall adverse effect, provide the rationale.

The selected alternative must conform to all applicable laws. Explain why the use of motorized equipment, aircraft landing, mechanical transportation, structures, or installations is the minimum requirement for the administration of the area as wilderness by briefly describing the benefits or adverse effects to the qualities of wilderness character and other legal requirements.

The selected alternative must also meet agency policy. Cite the specific criteria, direction, standard, or guideline that applies and explain how the alternative complies.

The rationale should demonstrate that the decision is clearly a result of objective evaluation of the alternatives and not the result of an inappropriate bias or justification of an alternative or method for non-wilderness reasons.

If your selection is based at least in part on the safety criterion, be sure to explain the rationale and include or reference supporting analysis or documentation. This analysis should explain why the use of motorized equipment or other prohibited uses is necessary because to do otherwise would cause increased risks to workers or visitors that cannot be satisfactorily mitigated through training, use of personal protective equipment (PPE), or other actions.

Avoid selecting an alternative based primarily on costs and the amount of time needed for implementation. While administrative activities should always be accomplished with economic efficiency, both law and agency policy directs us away from considering either the cost or the time required for implementation as the over-riding factor for administrative use of otherwise prohibited activities.

Cumulative Effects

Do you know of any other projects in the vicinity of your project location(s) (past, present, or future) that have the potential to impact wilderness character?

If yes, describe the effects. If you are unsure, contact your Division Chief or supervisor.

STEP 4: SIGNATURES AND REPORTING

Review and Approval

Electronic copies of the MRA worksheet should be submitted concurrently to the Assistant Wilderness Coordinator and Environmental Protection Specialist for review to ensure legal adherence to the purposes of the Wilderness Act and for compliance review.

If the project is not included within the scope of a current compliance document (existing categorical exclusion, environmental assessment, or environmental impact statement), a project proposal form must

be completed, and presentation to the Leadership Team will be required. **Follow the process as directed in MD-59.**

Other reviewers may be added as appropriate (e.g., Science Coordinator or other subject matter experts). Comments provided by the reviewers may need to be addressed in an updated worksheet.

After all comments or concerns are addressed, the updated worksheet will be submitted to the Division Chief for review. The Division Chief will determine if they will recommend the proposed alternative to the Superintendent.

The Division Chief will forward a printed MRA worksheet to the Superintendent for review and signature. If the Division Chief changes the MRA, they will return the updated version electronically to the AWC and EPS. **If the MRA is part of a larger environmental compliance or permitting package, the entire package must go to the Superintendent for signature at the same time.**

The signed MRA will be sent to the EPS for record keeping. Signed/scanned copies will be filed as PDFs under: S:\SUPT\Environmental Compliance Office\Wilderness\MRMTs and MRAs*Year*\Signed MRAs. The EPS will email a PDF of the signed MRA Worksheet to the project proponent so that he/she can review mitigation, monitoring, and reporting requirements.

Note – The Minimum Requirements Analysis Worksheet is not a substitute for a NEPA analysis and decision where one is required.

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ATTACHMENT 1:
REQUIREMENTS OF OTHER LEGISLATION

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Laws that may apply to projects within the parks include (but are not limited to):

The Organic Act of the National Park Service

"Sec.1. …. The service thus established shall promote and regulate the use of the federal areas known as national parks, monuments, and reservations hereinafter specified by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

The Organic Act directs us "to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

The 1978 Amendment (a.k.a. Redwoods Act) strengthened the protective functions of NPS and influenced recent decisions regarding resource impairment. "…the protection, management, and administration of these areas shall be conducted in the light of the high public value and integrity of the NPS and shall not be exercised in derogation of the values and purposes for which these various areas have been established…"

The National Park Service Omnibus Management Act of 1998

The National Park Service Omnibus Management Act of 1998 directs the Secretary of the Interior "to assure that management of units of the National Park System is enhanced by the availability and utilization of a broad program of the highest quality science and information."

This act establishes the framework for fully integrating natural resource monitoring into the management process of the NPS. Section 5934 of the Act requires the Secretary of the Interior to develop a program of "inventory and monitoring of NPS resources to establish baseline information and to provide information on the long-term trends in the condition of the National Park System resources." The message of the Parks Omnibus Management Act of 1998 was reinforced by Congress in the FY 2000 Appropriations bill.

Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended -- Public Law 93-205

This act and its amendments were enacted to provide a program for the conservation of wildlife and plant species that are threatened or endangered with extinction. The Act recognizes that several species of plants are in danger of extinction, and these species are of aesthetic, ecological, educational, historical, recreational and scientific value. The act sets up specific procedures to determine which plant and animal species are added or removed from protective status. It also sets up cooperative programs with states and establishes civil penalties for violation of the act. Subsequent amendments to this act were made in 1978 and 1982. The Act requires federal agencies to ensure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of listed species or modify their critical habitat.

National Historic Preservation Act, Antiquities Act, and the Archaeological Resources Protection Act

These laws provide the statutory basis for protecting and managing heritage resources on federal lands. Policies derived from this legal direction seek to balance the need for protecting heritage resources with

the apparently conflicting mandate in the Wilderness Act to eliminate structures which do not have a legitimate administrative need. The intent and direction of all applicable laws must be met in wilderness.

National Trail System Act

Sec.3.(2):" (2) National scenic trails, established as provided in section 5 of this Act, which will be extended trails so located as to provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities of the areas through which such trails may pass. Sec. 7 (j) (j) Potential trail uses allowed on designated components of the national trails system may include, but are not limited to, the following: bicycling, cross-country skiing, day hiking, equestrian activities, jogging or similar fitness activities, trail biking, overnight and long-distance backpacking, snowmobiling, and surface water and underwater activities. Sec. 11. (a)(1) In addition to the cooperative agreement and other authorities contained in this Act, the Secretary of the Interior, the Secretary of Agriculture, and the head of any federal agency administering federal lands, are authorized to encourage volunteers and volunteer organizations to plan, develop, maintain, and manage, where appropriate, trails throughout the Nation. (2) Wherever appropriate in furtherance of the purposes of this Act, the Secretaries are authorized and encouraged to utilize the Volunteers in the Parks Act of 1969, the Volunteers in the Forests Act of 1972, and section 6 of the Land and Water Conservation Fund Act of 1965 (relating to the development of Statewide Comprehensive Outdoor Recreation Plans).

Americans with Disabilities Act (1990)

The purpose of this act is to provide a clear and comprehensive national mandate for the elimination of discrimination against people with disabilities in areas of employment, transportation, communication, from the discriminatory aspects of architecture, over protective rules and policies, failure to make modifications to existing facilities and practices, and relegation to lesser services, programs, activities, benefits, jobs, or other opportunities. This Act amends the Rehabilitation Act of 1973 which requires federal agencies to make facilities and programs accessible. ADA extends the mandate to all state and local governments and any facility or program receiving government funding. The Rehabilitation Act, ADA and the Wilderness Act appear to conflict dramatically if read literally without applying some common sense. The latter proposes to protect natural and undeveloped landscape values for future generations. ADA seeks to eliminate all discrimination to programs and facilities by tailoring facilities and programs to be universally accessible. The key point is that equal access will be provided and facilities will be 'universally accessible' by not discriminating against people with disabilities. Wheelchairs (as defined by the law) are allowed in wilderness. However, wilderness trail standards (management objectives) are applied and not the trail standards established for accessible non-wilderness trails. This approach allows equal access to all but does not alter the character of the wilderness.

Federal Noxious Weed Act of 1974 (PL 93-629)

The Federal Noxious Weed Act of 1974 (FNWA) is a federal legislation enacted in 1975. The purpose of the FNWA was to manage and control the spread of noxious weeds. Pursuant to the Act, the U.S. Secretary of Agriculture was given the authority to declare plants "noxious weeds", and limit the interstate spread of such plants without a permit.

The FNWA was amended by the 1990 Farm Bill on November 28, 1990. The amendment requires the Bureau of Land Management, the National Park Service, the U.S. Fish and Wildlife Service, the U.S. Forest Service, and all other federal land managing agency to do the following: (a) Designate an office or person trained in managing undesirable plant species, to develop and coordinate a program to control such plants on the agency's land, (b) Ensure that the agency’s budget process adequately fund the plant

management program, (c) Develop and implement cooperative agreements with the States regarding undesirable plants on agency land, (d) Establish integrated management systems to control or contain undesirable plants targeted under the cooperative agreements.

The provisions relating to the FNWA were found under 7 USCS §§ 2801 through 2814. The FNWA was superseded in 2000 by the Plant Protection Act, except for the amendment of 1990. 7 USCS §§ 2801 through 2813 now stands repealed

Carson-Foley Act of 1968 (43 USC 1241)

This law provides for the control of noxious plants on land under the control and jurisdiction of the federal government by permitting the appropriate state agency to enter such lands to destroy noxious plants.

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ATTACHMENT 2
QUALITIES OF WILDERNESS CHARACTER

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<table>
<tr>
<td>1. Untrammeled:

“...an area where the earth and its community of life are untrammeled by man...”

“...generally appears to have been affected primarily by the forces of nature.”

Wilderness is essentially unhindered and free from modern human control or manipulation.

Measures of this quality could include:
• spraying weeds
• suppressing fire
• collaring wildlife
• eradicating fish
• manipulating water flow
• unauthorized trespass cattle
• unauthorized marijuana cultivation</td>
<td>2. Natural

“...is protected and managed so as to preserve its natural conditions.”

Wilderness ecological systems are substantially free from the effects of modern civilization.

Measures of this quality could include:
• species of concern
• non-native species
• visibility, ozone
• acid deposition
• water quality, loss of soil
• loss of connectivity
• pathways for nonnative species
• fire regimes</td>
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<tr>
<td>3. Undeveloped

“...an area of undeveloped federal land...without permanent improvement or human habitation”

“...where man himself is a visitor who does not remain.”

Wilderness retains its primeval character and influence and is essentially without permanent improvement or modern human occupation.

Measures of this quality could include:
• authorized non-recreational physical development: scientific equipment, radio repeaters, fish barrier
• unauthorized non-recreational physical development: illegal stock pond, irrigation systems for marijuana cultivation
• inholdings
• administrative mechanization: wheelbarrows, chainsaws, water pumps, rock drills, helicopters
• emergency mechanization</td>
<td>4. Solitude or primitive and unconfined recreation

“…has outstanding opportunities for solitude or a primitive and unconfined type of recreation“

Wilderness provides outstanding opportunities for solitude or primitive and unconfined recreation.

Measures of this quality include:
• visitor use
• trail contacts
• area affected by travel routes
• night sky visibility
• soundscape
• authorized recreation facilities: trails, toilets, bridges, shelters (these decrease self-reliant recreation)
• unauthorized recreation facilities: user-created campsites, climbing hardware, illegal motorcycle trail
• visitor management restrictions</td>
</tr>
<tr>
<td colspan="2">5. Other Features of Value

"…may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."

An individual wilderness may have unique qualities that cannot be characterized in the other four qualities.

Measures of this quality include: cultural sites, archeological resources, historic trails, cultural landscapes</td>
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The four qualities of wilderness character mentioned in Section 2(c) of the Wilderness Act are:

Untrammeled – In wilderness, the "earth and its community of life" are essentially unhindered and free from modern human control or manipulation, "in contrast with those areas where man and his own works dominate the landscape." This quality is important because it helps ensure that wilderness is managed with the utmost humility and restraint, respecting the autonomy of nature that allows a place to be wild and free.

Undeveloped – Wilderness retains its "primeval character and influence," and is essentially "without permanent improvements" or modern human occupation. Preserving this quality keeps areas free from "expanding settlement and growing mechanization" and "with the imprint of man's work substantially unnoticeable" as required by the Wilderness Act.

Natural – A wilderness area is to be "protected and managed so as to preserve its natural conditions." Wilderness ecological systems are substantially free from the effects of modern civilization. Preserving this quality ensures that indigenous species, patterns and ecological processes are protected and allows us to understand and learn from natural features.

Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation – The Wilderness Act defines wilderness as having "outstanding opportunities for solitude or a primitive and unconfined type of recreation." This quality is about the *opportunity* for people to experience wilderness; it is not directly about visitor experiences *per se*. The opportunities provided by wilderness include the chance to experience primitive recreation, natural sights and sounds, solitude, freedom, risk, the physical and mental challenges of self-discovery and self-reliance, and to use traditional skills free from the constraints of modern culture.

Other Features of Value -- In addition to the four required qualities of wilderness listed above, the Wilderness Act says these areas "may also contain ecological, geological, or other features of scientific, educational, scenic, or historical use" that reflect the character of this wilderness. Some of these unique features, such as the presence of threatened and endangered species, are also part of the Natural quality of a wilderness and could be evaluated for effects to that quality unless the specific species or habitat is unique to the wilderness area. Other components, however, such as the presence of important geologic features, cultural resources, historical sites, paleontological localities, or any features not in one of the other four qualities do not fit easily into one of the four statutory qualities. While many different types of features could be included, the intent is to include those that are significant or integral to the wilderness and that are decision factors that represent the unique characteristics and special features of this wilderness. Features mentioned in wilderness enabling legislation would likely qualify. The Unique Features that are present must be just as rigorously protected as the other qualities of wilderness character, however, and so you should account for these separately in this section of the MRA.

The description of wilderness character qualities above is not comprehensive. For a detailed discussion of wilderness character refer to:

U.S. Forest Service Rocky Mountain Research Station, General Technical Report, RMRS-GTR-151: *Monitoring Selected Conditions Related to Wilderness Character: A National Framework.*

U.S. Forest Service Rocky Mountain Research Station, General Technical Report, RMRS-GTR-212: *Keeping It Wild: An Interagency Strategy to Monitor Trends in Wilderness Character Across the National Wilderness Preservation System.*

ATTACHMENT 3:
OTHER GUIDANCE

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Plans, policies, and agreements that may apply to projects within SEKI include (but are not limited to):

Executive Order 11990, Protection of Wetlands (42 Fed. Reg. 26961)

Direct the NPS and other federal agencies to protect and manage wetlands as follows:

Section 1. (a) Each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; and (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

Executive Order 13112, "Established Policy to Limit the Introduction and Spread of Invasive Species" (1998)

This federal directive provides overarching guidance for the management of invasive species, and requires federal agencies to act upon: leadership and coordination, prevention, early detection and rapid response, control, education, research, and restoration.

NPS Management Policies 2006

4.4.2 Management of Native Plants and Animals – The Service may intervene to manage individuals or populations of native species only when such intervention will not cause unacceptable impacts to the populations of the species or to other components and processes of the ecosystems that support them. Also management is necessary:

- because a population occurs in an unnaturally high or low concentration as a result of human influences (such as loss of seasonal habitat, the extirpation of predators, the creation of highly productive habitat through agriculture or urban landscapes) and it is not possible to mitigate the effects of the human influences; and
- to protect rare, threatened, or endangered species.

4.4.2.3 Management of Threatened or Endangered Plants and Animals – The Service will survey for, protect, and strive to recover all species native to national park systems units that are listed under the Endangered Species Act. The Service will fully meet its obligations under the NPS Organic Act and the Endangered Species Act to both proactively conserve listed species and prevent detrimental effects on these species.

4.4.4 Management of Exotic Species – Exotic species will not be allowed to displace native species if displacement can be prevented.

4.4.4.2 Removal of Exotic Species Already Present – All exotic plant and animal species that are not maintained to meet an identified purpose of the parks will be managed—up to and including eradication—if (1) control is prudent and feasible, and (2) the exotic species interferes with natural processes and the perpetuation of natural features, native species or natural habitats, or disrupts the genetic integrity of native species.

4.5 Fire Management – All wildland fires will be effectively managed through application of the appropriate strategic and tactical management options as guided by the park's fire management plan.

4.6.5 Wetlands – The Service will implement a "no net loss of wetlands" policy. In addition, the Service will strive to achieve a longer-term goal of net gain of wetlands across the national park system through restoration of previously degraded or destroyed wetlands.

When natural wetland characteristics or functions have been degraded or lost due to previous or ongoing human actions, the Service will, to the extent practicable, restore them to predisturbance conditions.

When practicable, the Service will not simply protect but will seek to enhance natural wetland values by using them for educational, recreational, scientific, and similar purposes that do not disrupt natural wetland functions.

4.7.2 Weather and Climate – Parks containing significant natural resources will gather and maintain baseline climatological data for reference.

5.0 Cultural Resources Management – The cultural resource Management Policies of the National Park Service are derived from a suite of historic preservation, environmental, and other laws, proclamations, executive orders, and regulations. A comprehensive list can be found in the Cultural Resource Management Handbook issued pursuant to Director's Order #28. Taken collectively, this guidance provides the Service with the authority and responsibility for managing cultural resources in every unit of the national park system so that those resources may be preserved unimpaired for future generations. Cultural resource management will be carried out in a manner that is consistent with these legislative and regulatory provisions and with implementing policies and procedures such as the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (48 Federal Register (FR) 44716-740), and Standards and Guidelines for Federal Agency Historic Preservation Programs Pursuant to the National Historic Preservation Act (63 FR 20497-508).

5.3.1 Protection and Preservation of Cultural Resources – The National Park Service will employ the most effective concepts, techniques, and equipment to protect cultural resources against theft, fire, vandalism, overuse, deterioration, environmental impacts, and other threats without compromising the integrity of the resources.

5.3.5.4 Historic and Prehistoric Structures – The treatment of historic and prehistoric structures will be based on sound preservation practice to enable the long-term preservation of a structure's historic features, materials, and qualities. There are three types of treatment for extant structures: preservation, rehabilitation, and restoration.

6.3.5 Minimum Requirement – All management decisions affecting wilderness must be consistent with the minimum requirement concept. This concept is a documented process used to determine if administrative activities effecting wilderness resources or the visitor experience are necessary and how to minimize impacts. The minimum requirement concept will be applied as a two-step process that determines:

- Whether or not the proposed management action is appropriate or necessary for administration of the area as wilderness; and does not pose a significant impact to wilderness resources and character; and
- The techniques and type of equipment needed to ensure that impact to wilderness resources and character is minimized.

In accordance with this policy, superintendents will apply the minimum requirement concept in the context of wilderness management planning as well as to all other administrative practices, proposed special uses, scientific activities and equipment use in wilderness. When determining minimum

requirement, the potential disruption of wilderness character and resources will be considered before, and given significantly more weight than, economic efficiency and convenience. If a compromise of wilderness resources or character is unavoidable, only those actions that preserve wilderness character and/or have localized, short-term adverse impacts will be acceptable.

While the parks' managers have flexibility in identifying the method used to determine minimum requirement (See IV.C.2) within the approved wilderness management plan, the method used must clearly weigh the benefits and impacts of the proposal, document the decision process, and be supported by an appropriate environmental compliance document. Parks with no approved wilderness management plan must develop a separate process to determine minimum requirement until the plan is finally approved. Parks will complete a minimum requirement analysis on those administrative practices and equipment use that have the potential to impact wilderness resources or values. The minimum requirement concept cannot be used to rationalize permanent roads or inappropriate or unlawful uses in wilderness.

Administrative use of motorized equipment or mechanical transport will be authorized only:

- If determined by the superintendent to be the minimum requirement needed by management to achieve the purposes of the area as wilderness, including the preservation of wilderness character and values, or
- In emergency situations (search and rescue) involving the health or safety of persons actually within the area. Such management activities will be conducted in accordance with all applicable regulations, policies, and guidelines, including minimum requirement protocols as practicable.

Such management activities will also be conducted in accordance with all applicable regulations, policies, and guidelines and, where practicable, will be scheduled to avoid creating adverse resource impacts or conflicts with visitor use.

6.3.6.1 Scientific Activities in Wilderness, General Policy – The National Park Service has a responsibility to support appropriate scientific activities in wilderness and to use science to improve wilderness management. The Service recognizes that wilderness can and should serve as an important resource for long-term research into and study and observation of ecological processes and the impact of humans on these ecosystems. The National Park Service further recognizes that appropriate scientific activities may be critical to the long-term preservation of wilderness.

Scientific activities are to be encouraged in wilderness. Even those scientific activities (including inventory, monitoring, and research) that involve a potential impact to wilderness resources or values (including access, ground disturbance, use of equipment, and animal welfare) should be allowed when the benefits of what can be learned outweigh the impacts on wilderness resources or values. However, all such activities must also be evaluated using the minimum requirement concept and include documented compliance that assesses impacts against benefits to wilderness.

6.3.7 Natural Resources Management (in wilderness) – Management should seek to sustain the natural distribution, numbers, population composition, and interaction of indigenous species. Management intervention should only be undertaken to the extent necessary to correct past mistakes, the impacts of human use, and influences originating outside of wilderness boundaries. Management actions, including the restoration of extirpated native species, the alteration of natural fire regimes, the control of invasive alien species, the management of endangered species, and the protection of air and water quality, should be attempted only when the knowledge and tools exist to accomplish clearly articulated goals.

6.3.8 Cultural Resources (in wilderness) – The Wilderness Act specifies that the designation of any area of the park system as wilderness "shall in no manner lower the standards evolved for the use and

preservation of" such unit of the park system under the various laws applicable to that unit (16 USC 1133(a)(3)). Thus, the laws pertaining to historic preservation also remain applicable within wilderness but must generally be administered to preserve the area's wilderness character. The responsible decision-maker will include appropriate consideration of the application of these provisions of the Wilderness Act in analyses and decision-making concerning cultural resources.

Cultural resources that have been included within wilderness will be protected and maintained according to the pertinent laws and policies governing cultural resources using management methods that are consistent with the preservation of wilderness character and values. These laws include the Antiquities Act and the Historic Sites, Buildings and Antiquities Act, as well as subsequent historic preservation legislation, including the National Historic Preservation Act, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act. The Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation projects provide direction for protection and maintenance. Cemeteries or commemorative features, such as plaques or memorials, that have been included in wilderness may be retained (including approved access to these sites), but no new cemeteries or additions to existing cemeteries may be made unless specifically authorized by federal statute, existing reservations, or retained rights.

6.3.10 Management Facilities – Part of the definition of wilderness as provided by the Wilderness Act is "undeveloped federal land retaining its primeval character and influence, without permanent improvements." Accordingly, authorizations of NPS administrative facilities in wilderness will be limited to the types and minimum number essential to meet the minimum requirements for the administration of the wilderness area. A decision to construct, maintain, or remove an administrative facility will be based primarily on whether or not the facility is required to preserve wilderness character or values, not on considerations of administrative convenience, economic effect, or convenience to the public or staff of the parks.

6.3.10.2 Trails in Wilderness – Trails will be permitted within wilderness when they are determined to be necessary for resource protection and/or for providing for visitor use for the purposes of wilderness.

Trails will be maintained at levels and conditions identified within the approved wilderness management plan or other planning document. Trail maintenance structures (such as water bars, gabions) may be provided, under minimum requirement protocols, where they are essential for resource preservation or where significant safety hazards exist during normal use periods.

9.2.2.9 Trail Bridges – Trail bridges may be used for crossing swift waters areas prone to flash flooding, and other places that present potential safety hazards. Less obtrusive alternatives to bridges (such as, fords) and trail relocation will be considered before a decision is made to build a bridge. A bridge may be the preferred alternative when necessary to prevent stream bank erosion or protect wetlands or fisheries. If a bridge is determined to be appropriate, it will be kept to the minimum size needed to serve trail users, and it will be designed to harmonize with the surrounding natural scene and be as unobtrusive as possible.

Director's Order 77-1: *Wetland Protection* (Section 2.7)

Where natural wetland characteristics or functions have been degraded or lost due to previous or ongoing human activities, the NPS will, to the extent appropriate and practicable, restore them to pre-disturbance conditions.

Sequoia and Kings Canyon National Parks Backcountry Management Plan (1986)

Section 2.2 Facilities – Facilities in the backcountry include trails, bridges, campsites, signs, ranger stations, resource monitoring and research devices, and toilets. Facilities are limited to those necessary for administrative activities and visitor use, to produce as little conflict as possible with visitors' wilderness experience.

Section 3.2 Philosophy – Provides guidance on the overall management philosophy of SEKI's backcountry.

Section 5.13.2 Management Policies – The ranger patrol cabins [stations] will be maintained for administrative use, including use by trail, research, or resources management crews, snow surveyors, etc.

Section 5.14 Administration – Provides guidance on how the parks' managers are to treat generally prohibited actions of Section 4(c) of the Wilderness Act. Specifically treated are radio communications (5.14.2.1), helicopters (5.14.2.2), mechanized trail maintenance equipment (5.14.2.3), cabins (5.14.2.4), administrative camps (5.14.2.5), administrative stock use (5.14.2.6), NPS backcountry crews (5.14.2.7), and NPS personnel (5.14.2.8). Section 5.14.3 also provides reference to the Administrative Use Guideline Addendum (January 1985) which provides further clarification on administrative and management actions occurring in SEKI's Wilderness and backcountry.

Section 5.16 Scientific Study and Impact Monitoring – Provides guidance on how the parks' managers are to conduct "scientific study and monitoring" in wilderness and backcountry areas.

Sequoia and Kings Canyon National Parks General Management Plan/Record of Decision (2007)

The GMP provides direction for desired conditions and appropriate facilities in wilderness, and reiterates and reinforces the parks' purpose and significance.

Some key wilderness related information from GMP or ROD:

"Within the wilderness, efforts will be made to preserve a sense of remoteness and freedom from human-caused impacts. However, simple amenities such as ranger stations may be present to support administrative activities, reduce or control resource impacts, or provide for research and monitoring. Facilities used to support the administration and protection of wilderness may be provided."

"Use of stock continues, both as a means of access to wilderness by visitors, and for the administration of wilderness and protection of wilderness values." "The parks' designated wilderness and other areas managed as wilderness are zoned to reflect the varying intensities of use of different areas.

"Preserve or rehabilitate historic ranger cabins, Smithsonian Institution shelter (Mount Whitney shelter), Pear Lake ski hut, and other structures. Preserve and / or stabilize the Shorty Lovelace Historic District cabins or allow them to molder. Evaluate some trails to determine their eligibility for the National Register of Historic Places, plus provide historic trails information."

Assess backcountry ranger stations and replace or rehabilitate as necessary.

Language from the ROD: In heavily traveled zones, there exist engineered trails and bridges, food lockers, designated campsites, and toilets to protect the parks' resources, while in less-used areas, amenities are minimal or non-existent.

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SEQUOIA AND KINGS CANYON NATIONAL PARKS

MINIMUM REQUIREMENT ANALYSIS WORKSHEET

". . . except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act..."

– The Wilderness Act, 1964

INSTRUCTIONS

A Minimum Requirement Analysis (MRA) is required for ***all*** administrative actions in wilderness that either propose a Wilderness Act Section 4(c) prohibited use or have an effect on wilderness character (per Director's Order 41). **See the Minimum Requirement Instructions for directions and background materials to assist you with this analysis**. Additional instructions may be found at: http://www.wilderness.net/mrdg/

Routing Information

1) Complete the Minimum Requirement Analysis Worksheet (MRA). Name the file as follows: SubmissionDate_ShortTitle_LastName_Version1.docx.
2) Email the MRA (WORD version) to the Assistant Wilderness Coordinator (AWC) and the Environmental Protection Specialist (EPS) for review. **You must submit your MRA at least two weeks before your proposed action is to occur.**
3) **If revisions are necessary**, the EPS will:
    a. Return the MRA to the project proponent for revisions. Once revisions are made, project proponent will rename file as Version2. Then, repeat Step 2.

    If no revisions are needed, the EPS will:
    a. Rename the file as Final and save it under: S:\SUPT\Environmental Compliance Office\Wilderness\MRMTs and MRAs*Year*\Final
    b. Forward the electronic copy to the Division Chief for review and signature and "cc:" the project lead.
4) Division Chief will review and forward a printed copy to the Superintendent for signature. If the Division Chief changes the MRA, they will return the updated version electronically to the AWC and EPS. **If the MRA is part of a larger environmental compliance or permitting package, the entire package must go to the Superintendent for signature at the same time.**
5) The signed MRA will be sent to the EPS for record keeping. Signed/scanned copies will be filed as PDFs under: S:\SUPT\Environmental Compliance Office\Wilderness\MRMTs and MRAs*Year*\Signed MRAs
6) The EPS will email a PDF of the signed MRA Worksheet to the project proponent so that he/she can review mitigation, monitoring, and reporting requirements.

GENERAL INFORMATION:

Project Title:_____

Project Duration:_____

(For longer projects, review the MRA yearly to determine accuracy. Prepare a new MRA if the project is modified, new prohibited actions are proposed, or at a minimum every 5 years.)

Date Submitted:_____

Project Proponent:_____

Contact Information: _____

Tracking Number (Office Use Only):_____

STEP 1:

Determine if any administrative action is necessary.

Description of Situation:

What is the situation that may prompt administrative action? What is the reason that you are proposing an action (or actions) in wilderness? Do not describe the action itself. Rather, describe the desired goal or outcome.

A. Options Outside of Wilderness

Can actions taken outside of wilderness adequately address the situation and meet project goals?

Yes: ☐ **No:** ☐

Explain:

B. Valid Existing Rights or Special Provisions of Wilderness Legislation

Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws)? Cite law and section.

Yes: ☐ **No:** ☐

Explain:

C. Requirements of Other Legislation

Is action necessary to meet the requirements of other federal laws? Cite law and section.

Yes: ☐ **No:** ☐

Explain:

D. Wilderness Character

Is action necessary to preserve one or more qualities of wilderness character?

Untrammeled:

Yes: ☐ **No:** ☐

Explain:

Undeveloped:

Yes: ☐ **No:** ☐

Explain:

Natural:

Yes: ☐ **No:** ☐

Explain:

Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation:

Yes: ☐ **No:** ☐

Explain:

Other Features of Value (e.g., Cultural Resources):

Yes: ☐ **No:** ☐

Explain:

E. Public Purposes

Is action necessary to achieve one or more of the public purposes for wilderness (as stated in Section 4(b) of the Wilderness Act): "***recreational, scenic, scientific, educational, conservation, and historical use***"?

Yes: ☐ **No:** ☐

Explain:

F. Other Guidance

Is action necessary to conform to direction contained in agency policy, unit and wilderness management plans, species recovery plans, or agreements with tribal, state and local governments or other federal agencies?

Yes: ☐ **No:** ☐

Explain:

Decision:

Is administrative action necessary in wilderness?

To determine if an action is necessary in wilderness, review questions A-F above. NOTE: The questions vary in weight. A-D have first priority, E has second priority, and F has third priority.

In addition, consider the following: If you do not accomplish the work, what would be the resulting impacts? Would there be adverse effects on wilderness? Would you fail to meet the mandate of other laws and/or policies?

If you are unable to determine if action is necessary based on Step 1 information, consult your Division Chief or supervisor. Researchers should consult the Research Permit Coordinator.

Yes: ☐ **No:** ☐

Explain:

Compliance Pathway:

Yes: ☐ **No:** ☐

If yes, provide document name and PEPC reference number:

If no (or if you are unsure), contact the Environmental Protection Specialist for instructions.

STEP 2:

Determine the need to develop alternatives.

Does your project propose a Section 4(c) prohibited activity?
Section 4(c) prohibited activities include: the use of mechanical transport and/or motorized equipment and vehicles, the landing of aircraft, and the installation of materials, equipment and/or structures.

NOTE: Installations include items used to support activities such as communications, water development, stock use, or wildlife management. It includes debris such as old dump sites, plane crash sites, or locations of unexploded ordinance. It includes memorials or other monuments other than those placed during land surveys. It also includes unattended measurement or other device(s) left in place for the purpose of recording environmental data or marking a study plot.

Yes: ☐ **No:** ☐

If *yes*, proceed to Step 3.

If *no*, continue with the questions below.

Wilderness Character Questions	**Yes**	**or**	**No**
Does the proposed activity include human actions that intentionally control or manipulate the components or processes of ecological systems inside the wilderness (e.g., does it involve a trammel)? *(This question does not include collecting abiotic samples or handling, removing or killing organisms for scientific identification or measurement.)*	☐		☐
Would the proposed activity include any of the following: 1) removing or killing rare or sensitive species/subspecies, 2) handling of threatened or endangered species/subspecies, 3) having more than negligible effects on the health or survival of a population of a species/subspecies, or 4) introducing plants and/or animals into the wilderness?	☐		☐
Would the proposed activity occur in a sensitive area (e.g., critical habitat) or at a sensitive time for a particular species?	☐		☐
Does the proposed activity necessitate the establishment of crew camps that exceed normal recreational use (e.g. the installation of food storage lockers, privy structures, or shower facilities)?	☐		☐
Would the proposed activity change the trail class of any given trail?	☐		☐
Does the proposed activity rely on crews that exceed the maximum group size for a particular area?	☐		☐
Would the proposed activity restrict (even temporarily) visitor access to or movement in a particular area?	☐		☐
Would the proposed activity result in a discernible and noticeable effect (beyond that expected if the crew were members of a typical/legal recreational group) on opportunities for solitude?	☐		☐
If the proposed activity is approved, is there a risk of long-lasting, cascading, or otherwise significant unintended effects?	☐		☐

Additional Questions	Yes	or	No
Would the proposed activity likely be controversial with any publics?	☐		☐
Would the proposed activity pose other legal or policy issues?	☐		☐
Would the proposed activity occur in an area that already has past, ongoing, or future planned 4(c) prohibited activities?	☐		☐
Would the proposed activity result in more than a minor beneficial or adverse effect on the parks' natural or cultural resources, which could require the preparation of an EA or EIS?	☐		☐

If you answered yes to any of the questions above, you may be required to complete Step 3. Contact the AWC or the EPS for guidance.

If you answered no to all of the questions, provide a brief project description below and retain this form in your permanent administrative record. Submit an electronic copy to the Assistant Wilderness Coordinator.

Project Description:

Prepared by:

Name	Position	Date

STEP 3:

Determine the minimum activity.

Develop a range of reasonable and feasible alternatives. You should have at least two alternatives *plus* a "no-action" alternative. Add additional pages as necessary. Be sure to describe in detail those aspects of your project that involve 4(c) general prohibitions. These are usually contained in the Untrammeled and/or Undeveloped qualities.

You should also include a list of alternatives that were considered but dismissed, with a brief explanation for dismissal. Alternatives should not be eliminated simply because of the cost or time involved. The potential disruption of wilderness character and resources will be considered before, and given significantly more weight than, economic efficiency and convenience.

Please refer to the MRA Instructions for additional information on developing alternatives and identifying effects.

Description of the Alternative:

What are the details of this alternative? When, where, and how frequently will the action occur? What methods and techniques will be used? How long will the activity last? What mitigation measures will be taken?

NOTE: *The positive and negative effects of this alternative should not be included in the description.*

A. Wilderness Character

Does this alternative affect the qualities of wilderness character? What mitigation measures will be taken? *For definitions of wilderness character qualities, see the MRA Instructions.*

Untrammeled:

Yes: ☐ **No:** ☐

Explain:

Undeveloped:

Yes: ☐ **No:** ☐

Explain:

Natural:

Yes: ☐ **No:** ☐

Explain:

Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation:

Yes: ☐ **No:** ☐

Explain:

Other Features of Value (e.g., Cultural Resources):

Yes: ☐ **No:** ☐

Explain:

B. Safety

How does this alternative affect visitor and/or employee safety? Does it present a new or changed situation that threatens visitor safety? If there are adverse effects, what mitigation measures will be taken? Which hazards cannot be mitigated?

Visitor Safety:

Employee Safety:

C. Other Criteria

Does this alternative help maintain proficiency in the use of primitive and traditional skills? Does it affect the special provisions (grazing, mining, water developments, access to non-federal land, etc.) identified in Sections 4 and 5 of the Wilderness Act? Are there any timing requirements or cost constraints that need to be considered?

Yes: ☐ **No:** ☐

Explain:

Alternative #2

Description of the Alternative:

What are the details of this alternative? When, where, and how frequently will the action occur? What methods and techniques will be used? How long will the activity last? What mitigation measures will be taken?

NOTE: *The positive and negative effects of this alternative should not be included in the description.*

A. Wilderness Character

Does this alternative affect the qualities of wilderness character? *For definitions of wilderness character qualities, see the MRA Instructions.*

Untrammeled:

Yes: ☐ **No:** ☐

Explain:

Undeveloped:

Yes: ☐ **No:** ☐

Explain:

Natural:

Yes: ☐ **No:** ☐

Explain:

Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation:

Yes: ☐ **No:** ☐

Explain:

Other Features of Value (e.g., Cultural Resources):

Yes: ☐ **No:** ☐

Explain:

B. Safety

How does this alternative affect visitor and/or employee safety? Does it present a new or changed situation that threatens visitor safety? If there are adverse effects, what mitigation measures will be taken? Which hazards cannot be mitigated?

Visitor Safety:

Employee Safety:

C. Other Criteria

Does this alternative help maintain proficiency in the use of primitive and traditional skills? Does it affect the special provisions (grazing, mining, water developments, access to non-federal land, etc.) identified in Sections 4 and 5 of the Wilderness Act? Are there any timing requirements or cost constraints that need to be considered?

Yes: ☐ **No:** ☐

Explain:

Alternative #3

Description of the Alternative:

What are the details of this alternative? When, where, and how frequently will the action occur? What methods and techniques will be used? How long will the activity last? What mitigation measures will be taken?

NOTE: *The positive and negative effects of this alternative should not be included in the description.*

A. Wilderness Character

Does this alternative affect the qualities of wilderness character? *For definitions of wilderness character qualities, see the MRA Instructions.*

Untrammeled:

Yes: ☐ **No:** ☐

Explain:

Undeveloped:

Yes: ☐ **No:** ☐

Explain:

Natural:

Yes: ☐ **No:** ☐

Explain:

Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation:

Yes: ☐ **No:** ☐

Explain:

Other Features of Value (e.g., Cultural Resources):

Yes: ☐ **No:** ☐

Explain:

B. Safety

How does this alternative affect visitor and/or employee safety? Does it present a new or changed situation that threatens visitor safety? If there are adverse effects, what mitigation measures will be taken? Which hazards cannot be mitigated?

Visitor Safety:

Employee Safety:

C. Other Criteria

Does this alternative help maintain proficiency in the use of primitive and traditional skills? Does it affect the special provisions (grazing, mining, water developments, access to non-federal land, etc.) identified in Sections 4 and 5 of the Wilderness Act? Are there any timing requirements or cost constraints that need to be considered?

Yes: ☐ **No:** ☐

Explain:

Additional Alternatives

Yes: ☐ **No:** ☐

If yes, list alternatives and explain reason for dismissal:

Comparison of Alternatives

Rate each alternative on a scale of +3 to -3.

-3	-2	-1	0	+1	+2	+3
High Negative	Moderate Negative	Low Negative	No Impact Undeterminable	Low Positive	Moderate Positive	High Positive

Wilderness Character	Alternative 1 No-action	Alternative 1 No-action	Alternative 2	Alternative 2	Alternative 3	Alternative 3
Untrammeled						
Undeveloped						
Natural						
Solitude or Primitive and Unconfined Recreation						
Unique/Other Features						
Total						

Safety	Alternative 1 No-action	Alternative 1 No-action	Alternative 2	Alternative 2	Alternative 3	Alternative 3
Visitor						
Employee						
Total						

Other Criteria Summary	Alternative 1 No-action	Alternative 1 No-action	Alternative 2	Alternative 2	Alternative 3	Alternative 3
Total						

Decision:
What is the minimum activity?

Select an alternative. Usually, the alternative that has the least overall adverse effect on wilderness character is preferred. However, there may be other considerations.

Note: When selecting the preferred alternative the potential disruption to wilderness character and resources will be considered before, and given significantly more weight than, economic efficiency and convenience. If a compromise of wilderness character or resources is unavoidable, only those actions that preserve wilderness character and/or have localized, short-term acceptable adverse impacts will be allowed.

Selected alternative: _____

Rationale (include safety criterion, if appropriate):

Cumulative Effects:
Do you know of any other projects in the vicinity of your project location(s) (past, present, or future) that have the potential to impact wilderness character?

Yes: ☐ **No:** ☐

If yes, please describe.

Provide details on Wilderness Act Section 4(c) uses proposed in this alternative:

4(c) Prohibition	Frequency and/or Quantity	Duration
mechanical transport		
motorized equipment		
motor vehicles		
motorboats		
landing of aircraft		
structure(s)/installation(s)		
temporary road		

Additional mitigation, monitoring and reporting requirements (Reviewers provide input):

Follow-Up Form Required: **Yes:** ☐ **No:** ☐

STEP 4: Signatures and Reporting

Prepared by:

Name	Position	Date

Review and Comments

Name/Position	Comments	Date
Assistant Wilderness Coordinator		
Environmental Protection Specialist		
Other reviewer as appropriate		

Approvals	Print Name	Signature	Date
Recommended:	Division Chief		
Approved:	Superintendent		

Return to Office of Compliance and Planning for administrative record once document has been approved by the Superintendent.

Minimum Requirement Analysis
Follow-Up Form

Project Title:
Tracking Number:

General:

1) Did you complete your proposed action?

Yes: ☐ **No:** ☐ Partial: ☐

If "partial," please explain:

2) Did your work include a 4(c) prohibited action (e.g., the use of helicopters or motorized tools, the installation of equipment, etc.)?

Yes: ☐ **No:** ☐

Installations:

Did your work include the installation of equipment (e.g., tarping, gill nets, RAWS stations, wildlife cameras, etc.)?

Yes: ☐ **No:** ☐

If "yes," please list the type, location, and duration of each installation.

Installation Type	Location	Duration

Helicopters:

Did your work include the use of a helicopter?

Yes: ☐ **No:** ☐

Motorized Tools:

Did your work include the use of motorized tools or mechanical transport (e.g., chainsaws, rock drills, hand drills, water pumps, wheelbarrows, etc.)?

Yes: ☐ **No:** ☐

If "yes," please list the tool type, the location where it was used, and the approximate hours of run time.

Tool Type	Location	Hours of Run Time

Please email the completed form to the assistant wilderness coordinator.



Appendix J

Climbing Management Strategy

ON THE PREVIOUS PAGE
Hamilton Gorge in Sequoia National Park
Photo Courtesy of Rick Cain

APPENDIX J:

CLIMBING MANAGEMENT STRATEGY

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CLIMBING MANAGEMENT STRATEGY

BACKGROUND

The National Park Service (NPS) recognizes climbing as a legitimate and appropriate activity for realizing unconfined and self-reliant recreational opportunities in wilderness. Aspects of climbing may affect wilderness character, including the qualities of natural, undeveloped, and opportunities for solitude (see wilderness character discussion in chapter 3). This climbing management strategy (strategy) is intended to provide guidance of climbing activities in wilderness while preserving wilderness character. Climbing has been a popular activity in the area comprising Sequoia and Kings Canyon National Parks (hereafter the parks), and the Sierra Nevada since the mid-1800s. The wide variety of peaks and rock formations in the parks provide excellent opportunities for a wide spectrum of climbing including rock, big wall, snow and ice, bouldering, canyoneering, caving, and mountaineering. It is a popular area for local, regional, national and international climbers.

For the purposes of this strategy, climbing is defined as ascending or descending very steep terrain, usually by using hands and feet to maintain balance, and typically utilizing ropes and anchors to prevent falls. This includes rock climbing, ice climbing, canyoneering, caving, rappelling, and other similar activities. The requirements for fixed anchors described below apply equally in all areas of the parks' wilderness, including above and below ground locations. The parks are in the process of developing an updated Cave Management Plan (CMP) and it is anticipated that the CMP will adopt the general guidelines of this strategy but expand on cave specific activities.

Climbing in its various forms continues to be a popular activity with the visiting public. Because climbing has resource impacts, managers strive to find a balance between allowing climbing to continue as freely as possible and controlling impacts on environmental resources and other visitors of the parks. A voluntary commitment to Leave No Trace© climbing techniques on the part of the climbing community is an important factor in ensuring the preservation of resources and wilderness character.

Definitions of Key Terms

Clean climbing *— a rock climbing term that describes techniques and equipment that climbers use in order to avoid damaging the rock by widening cracks or drilling holes. Clean climbing techniques may date back to the 1920s and possibly earlier. The term itself likely emerged around 1970 with the widespread and rapid adoption of nuts (also called chocks), hexes, and cams in the United States and Canada. These were adopted for use in preference to pitons, and at times bolts, which damage rock and are more difficult and time-consuming to install.*

Fixed Anchors *— consist of webbing, bolts, pitons, chains, and other devices and equipment permanently or semi-permanently attached to rocks (or other natural features) that are left in place after a rock climbing activity. These may be divided into two categories: 1) permanent anchors (e.g., bolts and pitons), and 2) removable or abandoned anchors (e.g., slings, nuts) with or without accompanying hardware such as carabiners.*

The parks and other areas in the Sierra Nevada have long been known for a strong traditional climbing ethic. The local climbing community in general does not accept practices that create undue impacts, such as adding bolts to existing routes or establishing new bolt-intensive routes. Chipping or gluing new holds is considered unethical and is prohibited. Clean-climbing techniques are generally the norm. It is incumbent on the local and national climbing community, along with the parks, to inform and educate climbers new to the area of this fact for the ultimate protection of resources and to maintain access to climbing areas.

Many impacts related to climbing, such as soil compaction and erosion, wildlife disturbance, or noise, are also associated with other forms of visitor use. However, other impacts are associated solely with climbing, such as the use of chalk or fixed anchors. These are discussed in more detail below.

The intent of this appendix is to focus on a limited set of issues, impacts, and mitigations that are directly related to climbing in wilderness. This appendix is not intended as a comprehensive climbing management plan, but will serve as interim guidance on climbing activities in the absence of such a plan. A future climbing management plan would more thoroughly document and analyze use levels and patterns, identify significant concerns, and implement detailed management actions to comprehensively address climbing related issues.

POLICY AND LAW

Climbing management in National Park wilderness is directly guided by relevant laws, NPS Management Policies, Director's Orders, and Reference Manuals. The U.S. Code of Federal Regulations, and the parks' Superintendent's Compendium also provide indirect and direct management control of climbing and related activities. Director's Order #41: Wilderness Stewardship, and its Reference Manual #41 (DO #41 and RM #41), provides specific guidance on the management of climbing in wilderness. In section 7.2 Climbing, it states: "If climbing activities occur in wilderness, climbing management strategies will be included as part of the park's Wilderness Stewardship Plan, or other activity- level plan. . . Wilderness climbing education and impact monitoring will be important components in climbing management programs . . . climbing practices with the least negative impact on wilderness resources and character will always be the preferred choice." Reference Manual #41 adds that, "Climbing has a history that predates the Wilderness Act, but wilderness is a unique resource that has overriding implications for all recreation uses, including climbing. Wilderness has a special status that compels all visitors to a higher standard of ethics and conduct."

Climbers accessing wilderness are subject to the rules and regulations of wilderness use as described in the WSP/FEIS and established in the Superintendent's Compendium. This includes possessing a valid wilderness permit for overnight use.

Specific federal regulations that relate to climbing and resource preservation include:

- Title 36 CFR 2.1 Preservation of natural, cultural and archeological resources - Prohibits practices of possessing, destroying, injuring, defacing, removing, digging, trundling (rolling rocks) or disturbing (chipping, gluing or gardening) from their natural state any park features.
- Title 36 CFR 2.2 (a)(2) Wildlife Protection - Prohibits feeding, touching, teasing, frightening, or intentional disturbing of wildlife nesting, breeding, or other activities.
- Title 36 CFR 2.12 Audio Disturbances - Prohibits the practice of utilizing motorized equipment or machinery that creates unreasonable noise, particularly in undeveloped areas (e.g., motorized rock drills, amplified sound devices).
- Title 36 CFR 1.5 (f) Closures and Public Use Limits - Temporary closures of specific climbing routes and areas will be enforced to ensure prudent management of raptor nesting areas where they coincide with popular climbing routes.

OBJECTIVES

- Provide opportunities for the pursuit of the traditional activity of climbing in the park's wilderness.
- Ensure that climbing activities do not unacceptably impact wilderness character or resources.
- Emphasize clean-climbing as the proper method to realize the benefits of climbing in wilderness.
- Promote strategies that "will address ways to control, and in some cases reduce, the number of fixed anchors to protect the parks' wilderness resources or to preserve the 'untrammeled,' 'undeveloped,' and 'outstanding opportunities for solitude' qualities of the park's wilderness character." (RM#41)
- Work cooperatively with climbers and the climbing community to advance the practices of responsible climbing in wilderness.
- Provide education to the public on responsible climbing practices in wilderness.

IMPACTS OF CLIMBING AND MITIGATIONS

LITTERING / HUMAN WASTE

Non-degradable litter is common to all aspects of visitation. Litter as it relates to climbing, is deposited by climbers, climbing spectators and at bivouac (bivy) sites. Athletic tape is sometimes found at the base of crack climbs. Ledges and the base of cliffs have been found to have fecal matter scattered around. Some bivy sites pose a problem, since waste cannot be buried. Decomposition of waste is a problem at high elevations due to cold temperatures. Exposed waste poses health problems to other climbers or wildlife and degrades the aesthetics of the user experience.

Climbers, and other wilderness users, are required to clean up after themselves and pack out trash and garbage and follow waste management regulations. Climbers will be expected to pack out human waste when in an area where cat holes or other appropriate means of human waste disposal (e.g., privies) are not available or appropriate. Waste should never be dropped while on a climb (it should be tubed or bagged for later proper disposal).

EROSION

Off the Rock: Climbers and mountaineers often bushwhack and scramble to gain access to the base of their route. Very steep informal trails can result. These informal trails may be braided with other informal trails to the same climb. Because they travel straight up the grade, water is diverted along the path, causing soil loss, gullying and loss of vegetation. At the base of climbs in high use areas, the ground is typically compacted and denuded of vegetation. Informal trails often contour along the base of the rock formation to the start of other climbs.

When informal approach trails to the base of heavily used climbing routes are identified, climbers and the parks' management will increase education efforts to discourage / disperse use in order to establish a sustainable pattern of use. In rare occasions, signs may be placed to direct climbers away from problem or sensitive areas in order to protect resources (after conduct of a minimum requirement analysis). Informal trails associated with climbing routes will be managed according to the guidelines in the Trail Management and Classification System (see appendix K). Dispersed travel to the base of climbs may be encouraged in specific cases.

On the Rock: Through continuous use, the rock surface becomes smoother and freer of lichens, moss and dirt. Ledges and cracks also lose dirt and vegetation from climbing traffic. Toe and finger holds become worn off. Some climbers alter routes by gluing on artificial holds or chipping or prying the rock to create or improve holds. The gluing and chipping of holds, and the intentional "gardening" or cleaning the rock of soil and vegetation, and rolling of rocks deemed as hindrances (trundling), are not legal, or ethical, in wilderness.

SOCIAL IMPACTS

While climbing is widely accepted in the parks, the activity has not previously been addressed through an approved plan, policy, or regulation. Under the Code of Federal Regulations, various aspects of climbing recreation are managed in order to protect the parks' resources. Climbers, and other wilderness users, have a variety of individual experiences and personal perspectives. The climbing community and the parks' staff will continue to work together to mitigate user conflicts and enact appropriate administrative actions.

NOISE

Climbers frequently yell to communicate during a climb. Such noise can disrupt wildlife or impact hikers adjacent to climbing areas. Other noises (e.g., rock hammers) are also considered intrusive in the wilderness setting. Climbers will be encouraged to be sensitive to the value of natural quiet. Rock hammers, when allowed, must be used judiciously during sensitive times for wildlife (e.g., breeding, nesting) and in areas where other visitors may be disturbed.

WILDLIFE

Many of the popular climbing areas in the parks are also prime habitat for sensitive species of wildlife. Birds of prey frequently nest on rocks along and adjacent to established climbing routes. Concerns exist for both birds and climber safety.

The raptor area closures program has been a very successful means to reduce impacts. This program will continue. Temporary closures will be used to protect nesting raptors during critical phases of the courtship, nesting, and fledging periods. Precautionary and usually seasonal closures will occur in areas historically used by raptors (e.g., Moro Rock and Chimney Rock). Raptor activity will be monitored and those areas or routes with current raptor use will be closed. Other areas where susceptible wildlife activity is discovered will also be closed. Closures will be in effect long enough to ensure protection and non-disturbance of the birds. Temporary closures may be enacted for other wildlife protection as necessary (e.g., bighorn sheep).

VISUAL IMPACTS / CHALK

Visual impacts associated with climbing vary with user's attitudes towards climbing and their proximity to the activity. Bright colored slings, shiny metal bolts, white chalk and the sight of climbers and ropes on an otherwise undisturbed formation can detract from the scenic purpose of wilderness and the opportunities for solitude quality of wilderness character. The use of chalk may also cause a change in pH when it comes in contact with lichens, inhibiting growth or killing the plant.

Climbers will be encouraged to use protection, slings, and other equipment that blend in with the natural surroundings. The prudent use of chalk will be allowed, with balls preferred over loose chalk. Climbers will be encouraged to be sensitive to visual and environmental impacts that could occur and make attempts to clean rock of visual intrusions as practicable.

HARDWARE / EQUIPMENT

A wide range of equipment and hardware has been developed to be used as protection and aids for climbers. Hammer-driven pitons which widened and scarred cracks have been generally replaced by removable devices, as part of clean-climbing practices. However, the exploration of steeper, more difficult face climbs has led to an increase in the placement of fixed, artificial protection (e.g., bolts) by some climbers.

The use of permanent fixed anchors (e.g., bolts) is rarely appropriate in wilderness. Removable or abandoned (semi-permanent) fixed anchors (e.g., slings with or without accompanying hardware such as carabiners) must be placed judiciously and closely managed in order to prevent the degradation of wilderness resources and character. Where anchor points are necessary for climber safety, the use of removable equipment is the overwhelming preference. Permanent fixed anchors should not be placed merely for convenience or to make an otherwise un-climbable route climbable.

PUBLIC USE OF FIXED ANCHORS

Fixed anchors consist of webbing, bolts, pitons, chains, and other devices and equipment permanently or semi-permanently attached to rocks (or other natural features) that are left in place after the activity. These are, for the purposes of this strategy, divided into two categories: 1) permanent anchors (e.g., bolts), and 2) removable or abandoned (semi-permanent) anchors (e.g., slings with or without accompanying hardware such as carabiners).

NPS Director's Order #41 (DO #41) establishes that "Authorization will be required for the placement of new fixed anchors or fixed equipment. Authorization may be required for the replacement or removal of existing fixed anchors or fixed equipment. The authorization process to be followed will be established at the park level and will be based on a consideration of resource issues (including the wilderness resource) and recreation opportunities. Authorization may be issued programmatically within the Wilderness Stewardship Plan or other activity-level plan, or specifically on a case-by-case basis, such as through a permit system." And "If unacceptable impacts are occurring in wilderness as a result of climbing, the park superintendent may deem it necessary to restrict or prohibit the placement of fixed anchors."

For the purposes of this strategy, those fixed anchors, both permanent and removable/abandoned, which are currently in place may remain.

- Permanent fixed-anchors (e.g., bolts or pitons), may be placed, or replaced by individual climbers only with prior approval (see permit system below) or in the rare case of emergency. Existing bolts may be removed by individual climbers, without prior permission, if they are deemed unusable or unsafe. The climber should then communicate details of the removal to the parks (through the Chief Ranger's Office).
- Removable (or abandoned and semi-permanent) fixed-anchors (e.g., slings, nuts, or other clean climbing hardware) may be replaced or removed by individual climbers as necessary without prior approval. New semi-permanent rappel or retreat fixed-anchors may also be placed by individual climbers without prior approval, with the strong advisory to leave only the minimum necessary slings or hardware to safely descend or retreat from wilderness climbing routes, in order to keep wilderness climbing routes as free of abandoned slings and hardware as possible. The setting up of fixed-anchors for top-roping is strongly discouraged. When replacing existing slings or hardware, it is incumbent on the individual climber to carry old equipment out of wilderness and to dispose of it properly. Climbers are also strongly encouraged to remove any unsafe/unusable equipment from wilderness for proper disposal.

New, bolt-intensive climbing routes (i.e., "sport climbs") are not appropriate in wilderness and are expressly prohibited.

ADMINISTRATIVE USE OF FIXED ANCHORS

Per DO #41 "Proposals for the placement of fixed anchors or fixed equipment for the administrative purpose of facilitating future rescue operations must be evaluated through a MRA. [Minimum Requirement Analysis]" The parks may place and maintain permanent or removable fixed anchors for administrative and emergency purposes, but only after a MRA is completed, with the exception of emergencies. The NPS will not, as policy or practice, monitor any fixed anchors to evaluate their condition or accept any responsibility for the soundness of fixed anchors. The NPS, when it encounters them during park operations, may remove those fixed anchors deemed unsafe, unnecessary, or intrusive to wilderness.

SAFETY

Personal safety in climbing, as in all wilderness activities, remains the responsibility of the climber / wilderness user. RM #41 states, "Climbing is a "high risk" sport, and climbers are solely responsible for their own safety. Many climbing routes traverse hazardous terrain, and the National Park Service is not obligated to assess or mitigate these hazards, nor is it responsible for assessing or maintaining the safety of fixed anchors or fixed equipment. While the National Park Service has the authority to provide search and rescue services to the parks' visitors in need of assistance, there is no legal requirement to do so. All rescue activities in wilderness will be managed to provide necessary treatment and services to the sick, injured and stranded, keeping in mind the safety and well-being of rescue personnel, the victim and the public, plus "light on the land" and "minimum requirements/tool" rescue actions."

PATROL, EDUCATION AND ENFORCEMENT PROGRAM

Without a visible patrol and education/enforcement program, educational efforts, policies and regulations will have minimal effect. An important aspect of the patrol function is the incorporation of education, research, monitoring, and impact mitigation. Patrols are predicated on the commitment to protect the resource, educate visitors, guard against illegal activities, provide necessary assistance, and perform search and rescue functions in cases of emergencies. Patrols will focus primarily on 1) the education of visitors as to resource impact issues, minimum impact techniques and preventative search and rescue and 2) the enforcement of applicable laws and regulations when necessary and appropriate.

The parks will conduct a strong educational effort promoting minimum impact techniques and sound climbing ethics as outlined in Leave No Trace© Outdoor Skills and Ethics: Rock Climbing booklet in general, and specifically these parks' wilderness regulations and restrictions. The parks will maintain a "Rock Climbing" page on the parks' official website (www.nps.gov/seki), which will contain this strategy, and other climbing guidelines, rules and restrictions pertaining to climbing, as well as pertinent links to related websites. This page will also communicate any information on removal of fixed-anchors, performed by the climbing community or the parks.

Climbers are required to comply with specific regulations and should always:

- Pack out all litter and manage human waste properly (leave it cleaner than you found it)
- Use existing trails to approach climbs
- Know and respect environmentally sensitive areas (e.g., raptor closures)

- Know and abide by all regulations
- Avoid the use of all fixed anchors, as much as possible
- Request and obtain permission for placement or replacement of permanent fixed anchors
- Communicate to the parks any actions involving bolt removal, and on other issues involving the climbing environment
- Be considerate of wildlife and other users
- Share the climbing resource with others and practice and encourage clean-climbing techniques

As enforcement measures become necessary, patrol staff will enforce applicable regulations (e.g., no power drills for bolt placement, no pets in the wilderness, illegal guiding activities, violation of raptor closures, illegal camping and bivouacs, or resource degradation for the purpose of enhancing a climbing route).

RESEARCH AND MONITORING

The parks have sporadically conducted informal surveys of a small proportion of known and potential climbing areas. Given this limited information, a comprehensive inventory would be of value in assisting the proper management of climbing. It is a goal of the parks to develop and maintain an inventory and monitoring program to gather detailed information on how climbing activities affect wilderness character and resources. This inventory would be conducted prior to or in conjunction with the future development of a comprehensive climbing management plan.

SUMMIT REGISTERS

More than 170 summit (or peak) registers exist in the parks. They generally consist of a sealable weather-resistant container (metal, plastic, or glass) holding a small notebook in which people record dates and details of their climbs. The parks recognize that a limited number of summit registers is compatible with wilderness character, provided registers are in appropriate locations, of appropriate size and construction, and are well maintained. It is a desired condition of this WSP/FEIS to reduce developments and installations in wilderness; therefore, the parks will work toward reducing the number of registers and will not permit placement of new registers. In the near future, the parks will pursue the development of a general agreement (e.g., Memorandum of Understanding) between the NPS and the Sierra Peaks Section of the Sierra Club, which would determine locations, maintenance standards, and other conditions under which registers could remain.

REFERENCES

Access Fund Blog

2013 What the New NPS Wilderness Climbing Policy Means for Climbers & Bolting. Available online: http://www.accessfund.org/site/apps/nlnet/content2.aspx?c=tmL5KhNWLrH&b=5071835&ct=13244769 . Accessed 2014.

American Alpine Club

2014 American Alpine Club response to National Park Service Director's Order 41 Section 7.2 on Climbing in Wilderness. Available online: http://www.americanalpineclub.org/p/wilderness-climbing. Accessed 2014.

Leave No Trace Center for Outdoor Ethics

2014 LNT for Rock Climbing. Available online: https://lnt.org/blog/leave-no-trace-rock-climbing. Accessed 2014.

Moser, Sally, Greg Vernon, and David Hickey

1993 *Southern Sierra Rock Climbing: Sequoia/Kings Canyon Including Courtright Reservoir, Volume 1*. Chockstone Press, Evergreen, Colorado. Out-of-print.

National Park Service (NPS)

2000 *Joshua Tree National Park. Backcountry and Wilderness Management Plan*. Available online: http://www.nps.gov/jotr/parkmgmt/bcmp.htm. Accessed 2014.

2001 *Rocky Mountain National Park, Backcountry / Wilderness Management Plan and Environmental Assessment*. Available online: http://www.nps.gov/romo/parkmgmt/wilderness_ backcountry_plan.htm. Accessed 2014.

2005 *New River Gorge National River, Climbing Management Plan, Environmental Assessment*. April.

2007 *Zion National Park, Backcountry Management Plan and Environmental Assessment*. Available online: http://www.nps.gov/zion/parkmgmt/zion-backcountry-management-plan-and-environmental-assessment-available-for-review.htm. Accessed 2014.

2009 *New River Gorge National River, Climbing Information brochure*.

2013a Director's Order #41: *Wilderness Stewardship*.

2013b Reference Manual #41. *Managing Climbing Activities in Wilderness*.

2014a Pinnacles National Park (Monument). Available online: http://www.nps.gov/pinn/index.htm. Accessed 2014.

2014b Yosemite National Park. Website. Available online: http://www.nps.gov/yose/index.htm. Accessed 2014.

ATTACHMENT 1:
APPLICATION FOR SPECIAL USE PERMIT

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OBTAINING A PERMIT

To request permission to place a new permanent fixed anchor, or replace an existing permanent fixed anchor complete the Special Use Permit (Form 10-930) application below and submit to:

Superintendent, Sequoia and Kings Canyon National Parks
47050 Generals Highway
Three Rivers, CA 93271

INSTRUCTIONS

Within the permit, provide detailed information on:

- What you propose to do; place a new permanent fixed anchor, or replace an existing permanent fixed anchor.
- Where you propose to accomplish the above – provide as much detail as possible – area, route, etc.
- The description and justification of the proposed action (i.e., provide in detail, why you need to do what you are proposing. Attach any diagrams, maps, and additional pages if necessary):
- The dates of the proposed action
- Will you be accomplishing the action by yourself or with assistance of others? Please describe.

Regulations and restrictions for all wilderness users, as well as specific required conditions for permittees, include:

- Permittee will be required to comply with all wilderness regulations, including obtaining a wilderness permit (if staying overnight) and abiding by all camping restrictions and guidelines, and ensuring that other group members conduct themselves accordingly.
- The use and possession of motorized equipment (e.g., drills) is prohibited.
- The permittee is responsible for their personal safe conduct and that of other group members.

You may provide additional information and justification by attaching additional pages. You will be notified of the disposition of the application and the necessary steps to secure your final permit. Applications should be submitted at least 4 weeks before the date of the proposed action.

National Park Service
Sequoia and Kings Canyon National Parks
47050 Generals Highway, Three Rivers, CA 93271
559-565-3111

Application for Special Use Permit

Please supply the information requested below. **Attach additional sheets, if necessary, to provide required information**. A nonrefundable processing fee of $20.00 must accompany this application unless the requested use is an exercise of a First Amendment right. You must allow sufficient time for the parks to process your request; check with the parks for guidelines. You will be notified of the status of the application and the necessary steps to secure your final permit. Your permit may require the payment of cost recovery charges and proof of liability insurance naming the United States of America as also insured.

Enter either a social security number OR a tax ID number: we do not require both.

Applicant Name:	Company/Organization Name:
Social Security #:	Tax ID #
Street/Address:	Street/Address:
City/State/Zip Code:	City/State/Zip Code:
Telephone #:	Contact name:
Cell phone #:	Telephone #:
Fax #:	Fax#:
Email:	Email:

Description of Proposed Activity (attach diagram, attach additional pages if necessary):

Requested Location(s): _____

Date(s):

Set up begins: (date and time)	Activity begins: (date and time)	Activity ends: (date and time)	Removal completed (date and time)

Maximum Number of Participants: _____ (Please provide best estimate)

Maximum Number of vehicles: (attach parking plan)

_____Cars _____Vans/lt.trucks _____Utl.vans/trucks _____Buses/oversized vehicles

Support equipment (list all equipment; attach additional pages if necessary):

List support personnel including addresses and telephones; attach additional pages if necessary:

Individual in charge of activity on-site (include cell phone number) and authorized to make decisions related to the permitted activity: _____

Is this an exercise of First Amendment Rights?	☐ Y	☐ N
Have you visited the requested area?	☐ Y	☐ N
Have you obtained a permit from the National Park Service in the past? (If yes, provide a list of permit dates and locations on a separate page.)	☐ Y	☐ N
Do you plan to advertise or issue a press release before the event?	☐ Y	☐ N
Will you distribute printed material?	☐ Y	☐ N
Is there any reason to believe there will be attempts to disrupt, protest or prevent your event? (If yes, please explain on a separate page.)	☐ Y	☐ N
Do you intend to solicit donations or offer items for sale? (These activities may require an additional permit.)	☐ Y	☐ N

You are encouraged to attach additional pages with information useful in evaluating your permit request including: staging, sound systems, parking plan, security plans, sanitary facilities, crowd control, emergency medical plan, use of any building, site clean-up, etc.

The applicant by his or her signature certifies that all the information given is complete and correct, and that no false or misleading information or statements have been given.

Signature _____ Date _____

Printed Name_____ Title_____

Note: This is an application only, and does not serve as permission to conduct any special activity in the park. The information provided will be used to determine whether a permit will be issued. Send the

completed application along with the application fee in the form of a credit card payment, cashier's check, money order or personal check made payable to **National Park Service** to:

Superintendent,
Sequoia and Kings Canyon National Parks
47050 Generals Highway
Three Rivers, CA 93271

If your request is approved, a permit containing applicable terms and conditions will be sent you. The permit must be signed by the responsible person and returned to the parks for final approval by the Superintendent before the permitted activity may begin.

Notice to Customers Making Payment by Personal Check: When you provide a check as payment, you authorize us either to use information from your check to make a one-time electronic fund transfer from your account or to process the payment as a check transaction. When we use information from your check to make an electronic fund transfer, funds may be withdrawn from your account as soon as the same day we receive your payment, and you will not receive your check back from your financial institution.

NOTICES

Privacy Act Statement: The Privacy Act of 1974 (5 U.S.C. 552a) provides that you be furnished with the following information in connection with information required by this application. This information is being collected to allow the parks' manager to make a value judgment on whether or not to allow the requested use. Applicants are required to provide their social security or taxpayer identification number for activities subject to collection of fees and charges by the National Park Service (31 U.S.C. 7701). Information from the application may be transferred to appropriate Federal, State, and local agencies, when relevant to civil, criminal or regulatory investigations or prosecutions.

Paperwork Reduction Act Statement: We are collecting this information subject to the Paperwork Reduction Act (44 U.S.C. 3501) to provide the parks' managers the information needed to decide whether or not to allow the requested use. All applicable parts of the form must be completed in order for your request to be considered. You are not required to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

Estimated Burden Statement: Public reporting burden for this form is estimated to average 30 minutes per response including the time it takes to read, gather and maintain data, review instructions and complete the form. Direct comments regarding this burden estimate or any other aspect of this form to the Information Collection Clearance Officer, National Park Service, 1849 C Street NW. (1237), Washington, D.C. 20240

Title 18 U.S.C. Section 1001 makes it a crime for any person to knowingly and willfully make to any department or agency of the United States any false, fictitious, or fraudulent statements or representations as to any mater within its jurisdiction.



Appendix K

Trail Management and Classification System

ON THE PREVIOUS PAGE
Wilderness in Sequoia and Kings Canyon National Parks
NPS Photo

APPENDIX K:

TRAIL MANAGEMENT AND CLASSIFICATION SYSTEM FOR SEQUOIA AND KINGS CANYON NATIONAL PARKS

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TRAIL MANAGEMENT AND CLASSIFICATION SYSTEM FOR SEQUOIA AND KINGS CANYON NATIONAL PARK

PURPOSE AND NEED FOR THE TRAIL MANAGEMENT AND CLASSIFICATION SYSTEM

INTRODUCTION AND HISTORY

The trail system of Sequoia and Kings Canyon National Parks (the parks) has a history as long as human use of the area. American Indians lived and traveled in what are now park lands. Besides traveling the foothills and mid-ranges for subsistence, American Indians established routes over many Sierra Crest passes to trade back and forth between the Owens and San Joaquin Valleys. In the 19th century, European-American explorers, shepherds, miners, loggers, and cattle ranchers entered the mountains and began to establish trails and routes for stock travel (often following American Indian routes over passes). In the late 19th century and into the mid-20th century, private recreationists, explorers, and others began to explore the area and establish stock trails. After over 20 years of discussion and exploration, construction began on John Muir Trail in 1915. With the establishment of Sequoia National Park, more formal trail construction and maintenance efforts came into play, notably early trail construction by the military and the construction of the High Sierra Trail in the 1920s. Many Sequoia National Park trails benefited from Civilian Conservation Corps work in the 1930s. After the creation of Kings Canyon National Park in 1940, trail work in the north end of the parks began to include regular clearing and rerouting into switchbacks, and all of the parks' trails became dedicated to recreational rather than extractive uses. In the 1960s resource management concerns were evident as many of the parks' trails were rerouted out of meadows by volunteer and agency crews, and trail work since then has focused on the dual goals of protecting wilderness and the parks' resources while providing for recreational and administrative access. The Pacific Crest Trail was one of the two original National Scenic Trails established in 1968.

Each generation of trail builders and users had goals, techniques, and resources that they brought to bear on establishing their trails. As goals have changed, trails have been established, rerouted, reconstructed, and maintained or abandoned. The current trail system reflects this varied history, which continues into the present with changing visitor desires and management goals.

The purpose of this Trail Management and Classification System is to explain the guiding principles of trail management at Sequoia and Kings Canyon National Parks, to describe desired conditions for the trail system, to describe programmatic methods used in trail management, and to identify actions that will need to be taken in order to achieve the desired conditions of the Wilderness Stewardship Plan (WSP).

RELATED LAWS, POLICIES, AND PLANS

The WSP provides detailed information on the legislative and policy context that requires planning in wilderness. Several citations particularly relevant to trail management planning are repeated here:

ORGANIC ACT

The NPS *Organic Act* of 1916 directs the U.S. Department of the Interior and the National Park Service (NPS) to manage units of the national park system "to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (16 USC 1).

SEQUOIA AND KINGS CANYON ENABLING LEGISLATION

Sequoia Enabling Act of 1890: Preamble: "…dedicated .and set apart as a public park, or pleasure ground for the benefit and enjoyment of the people…" and to "…provide for the preservation from injury of all timber, mineral deposits, natural curiosities or wonders within said park, and their retention in their natural condition" (Sec. 2).

Kings Canyon Enabling Act of 1940: Sec. 3. "That the National Park Service shall… administer for public recreational purposes the lands withdrawn." and "to insure (sic) the permanent preservation of the wilderness character of the Kings Canyon National Park."

WILDERNESS ACT

The *Wilderness Act* of 1964 states: "Except as otherwise provided in this Act, each agency administering any area designated as wilderness shall be responsible for preserving the wilderness character of the area and shall so administer such area for such other purposes for which it may have been established as also to preserve its wilderness character. Except as otherwise provided in this Act, wilderness areas shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use."

NATIONAL TRAIL SYSTEM ACT AND PACIFIC CREST TRAIL MANAGEMENT PLAN

National Trails System Act of 1968: Sec. 7(c): "National scenic or national historic trails may contain campsites, shelters, and related-public-use facilities. Other uses along the trail, which will not substantially interfere with the nature and purposes of the trail, may be permitted by the Secretary charged with the administration of the trail. Reasonable efforts shall be made to provide sufficient access opportunities to such trails and, to the extent practicable, efforts shall be made to avoid activities incompatible with the purposes for which such trails were established."

Comprehensive Management Plan for the Pacific Crest Trail (1982), Appendix C: Criteria for Location, Design, Signing, and User Facilities, p12, General Design Criteria: "The design of the Pacific Crest Trail should be in keeping with the nature and purpose of the trail. As a National Scenic Trail, it should exhibit high quality, permanence, and minimize disturbance to the environment. It should be designed, on a segment-by-segment basis, to accommodate, in a safe and enjoyable manner, the volume and types of traffic planned."

NPS *MANAGEMENT POLICIES 2006*

NPS *Management Policies 2006* provides interpretation and policy guidance relative to laws, proclamations, executive orders, regulations, and special directives. Examples of the management policies that provide direction to this trails plan are listed below.

8.2. Visitor Use – Enjoyment of park resources and values is part of the fundamental purpose of all parks. To provide for enjoyment of parks, the NPS will encourage visitor activities that:

- are appropriate to the purpose for which the park was established
- are inspirational, educational, or healthful, and otherwise appropriate to the park environment

- will foster an understanding of, and appreciation for, park resources and values, or will promote enjoyment through a direction of, interaction with, or relation to park resources
- can be sustained without causing unacceptable impacts on park resources or values.

8.2.5.1. Visitor Safety – While recognizing that there are limitations on its capability to totally eliminate all hazards, the NPS and its concessioners, contractors, and cooperators will seek to provide a safe and healthful environment for visitors and employees.

9.2. Transportation Systems – The location, type, and design of transportation systems and their components (e.g., roads, bridges, trails, and parking areas) all strongly influence the quality of the visitor experience. These systems also affect, to a great degree, how and where park resources will be impacted. Before a decision is made to design, construct, expand, or upgrade access to or within a park, nonconstruction alternatives — such as distributing visitors to alternative locations — must be fully explored. If nonconstruction alternatives will not achieve satisfactory results, then a development solution may be pursued if the project:

- is appropriate and necessary to meet park management needs or to provide for visitor use and enjoyment
- is designed with extreme care and sensitivity to the landscape through which it passes
- will not cause unacceptable adverse impacts on natural and cultural resources, and will minimize or mitigate those that cannot be avoided
- will not cause use in the areas it serves to exceed the areas' visitor carrying capacity
- will incorporate universal design principles to provide for accessibility for all people, including those with disabilities
- will take maximum advantage of interpretive opportunities and scenic values
- is based on a comprehensive and multidisciplinary approach that is fully consistent with the parks' General Management Plan (GMP).

9.2.2 Trails and Walks – Trails and walks provide the only means of access into many areas within parks. These facilities will be planned and developed as integral parts of each park's transportation system and incorporate principles of universal design. Trails and walks will serve as management tools to help control the distribution and intensity of use. All trails and walks will be carefully situated, designed, and managed to:

- reduce conflicts with automobiles and incompatible uses;
- allow for a satisfying park experience;
- allow accessibility by the greatest number of people; and
- protect park resources.

9.2.2.2. Hiking Trails – Trail design will vary to accommodate a wide range of users and will be appropriate to user patterns and site conditions.

9.2.2.3. Equestrian Trails – Equestrian trails and related support facilities may be provided when they are consistent with park objectives and when site conditions are suitable.

6.1. Wilderness Preservation and Management – The NPS will manage wilderness areas for the use and enjoyment of the American people in such a manner as will leave them unimpaired for future use and

enjoyment as wilderness. Management will include the protection of these areas, the preservation of their wilderness character, and the gathering and dissemination of information regarding their use and enjoyment as wilderness.

6.3.10.2 Trails in Wilderness – Trails will be permitted within wilderness when they are determined to be necessary for resource protection and/or for providing for visitor use for the purposes of wilderness. … Trail maintenance structures (such as water bars, gabions) may be provided, under minimum requirement protocols, where they are essential for resource preservation or where significant safety hazards exist during normal use periods. Historic and/or prehistoric trails will be administered in keeping with approved cultural resource and wilderness management plan requirements.

6.4.1 General Policy – Park visitors need to accept wilderness on its own unique terms. … The National Park Service will not modify the wilderness area to eliminate risks that are normally associated with wilderness, but it will strive to provide users with general information concerning possible risks, (and) any recommended precautions …

GENERAL MANAGEMENT PLAN AND DESIRED CONDITIONS:

Desired Conditions for Class 3 Trails (identified in GMP as "Major Trails"):

Desired Natural Resource Conditions – Natural resources are mostly undisturbed. Impacts are restricted to trails and campsites, facilities, and attractions near the trails. Impacts are reversible, but it may take many years for natural resource regeneration. The goal is to restore disturbed areas, including visitor-created or widened trails.

Desired Visitor Experience –While day hikers may use trails closer to trailheads, most users are overnight visitors. On the more popular trails there is a moderate to high probability of encountering others, particularly at campsites and attractions. Visitors have opportunities for a wide range of experiences, with some opportunities for solitude and isolation from the sights, sounds, or evidence of other users. Travel is generally along remote but regularly maintained trails that require a moderate degree of outdoor skills and self-reliance. Party sizes may be larger than those allowed on secondary trails or in cross-country areas. Visitors may have to use designated, established campsites in some popular areas.

Desired Conditions for Class 1 and 2 Trails (identified in GMP as "Secondary Trails")

Desired Natural Resource Conditions – Natural resources are mostly undisturbed. Impacts are generally confined to the immediate area of trails. Damaged areas and unplanned impacts (such as trails created by visitors) are restored or left to regenerate naturally.

Desired Visitor Experience – Visitors are generally overnight users. Use is lower than on major trails, and there is less probability of visitors encountering others while hiking and camping. Party sizes may be smaller than along major trail corridors. Visitors need self-reliance and outdoor skills. Food canisters may be required.

Desired Conditions for Off-trail Areas (identified in the GMP as "Cross-country Areas")

Desired Natural Resource Conditions – Natural resources are largely undisturbed, with wild and naturally functioning ecosystems. Evidence of past use may be actively removed to reduce resource damage (e.g., restoring previously disturbed areas, or eliminating visitor-created trails and campsites) or left to regenerate naturally.

Desired Visitor Experience –Visitors are generally overnight users, and most need to commit a minimum of two nights to use these areas. Visitation is very low, with a low probability of encounters with other users while hiking and camping. Party sizes are generally small. Visitors may experience challenges and must be self-reliant. Food canisters may be required. Visitors need a high degree of backcountry skills, including map reading and orienteering.

GUIDING PRINCIPLES OF TRAIL MANAGEMENT AT SEQUOIA AND KINGS CANYON NATIONAL PARKS

Based on the desired conditions established by the parks' GMP, the overall desired condition is for the trail system to provide access and support to a wide range of wilderness recreational opportunities, including opportunities for stock and hiker use, a range of levels of user experience levels, and the opportunity for different visitors to seek their desired level of challenge and solitude at different times and places in wilderness. These opportunities should be provided in a way that minimizes impacts on wilderness character, particularly to the wilderness' natural and undeveloped qualities, and maximizes the effectiveness of resources spent on trail management activities.

The goals of trail management at the parks therefore are to protect wilderness character, provide for visitor access and a diversity of primitive recreational experiences, and to conduct trail management activities efficiently and effectively. The following provides a summary of each goal:

PROTECT WILDERNESS CHARACTER

Trails and trail management activities have effects on all the qualities of wilderness character. Below, the interactions of trails and trail management activities are discussed for each of the qualities, along with some principles of how to manage effects.

Natural Quality

The presence of a trail can affect the natural quality of wilderness character by altering the composition, ecosystem structure, and ecological functionality of the soil, aquatic systems, and native plant and animal communities through which the trail runs. Effects of the trails as a landscape feature include vegetation loss and creation of bare ground, soil compaction and erosion, diversion or concentration of water flows, increased water turbidity and sedimentation, travel barriers to very small wildlife (e.g., insects in meadows), and travel corridors for larger animals (e.g., bears). Wilderness users may introduce non-native plants, animals, or pathogens, displace or startle wildlife (e.g., bighorn sheep), step on wildlife (e.g., amphibians), and deposit urine and feces (stock and hiker), and these effects are concentrated along trails. The overall effects of these changes can alter local plant and animal habitats along trails, sometimes in a way that facilitates the establishment of non-native plants. River and creek banks, wetlands, meadows, and steep terrain are particularly vulnerable to visitor-induced impacts, and increasing visitor use can increase the width and severity of trail impacts. On the positive side, trails can concentrate visitor use on a hardened pathway, preventing more dispersed and randomized impacts to vegetation and other natural resources, and reducing impacts overall.

Materials for trail maintenance and construction may be scavenged locally from the trail area, disturbing the vegetation and soil. Trail crew camps have localized impacts on vegetation and wildlife, particularly any camps that are made on recently undisturbed land or where the crew has campfires. Trail crew members' effects on wildlife are similar to those of visitors, and trail crews also deposit urine and feces in wilderness. Helicopters supporting trail crews create noise that can influence wildlife, and livestock

supporting trail crews can impact the natural quality by trampling, grazing, and depositing urine and manure in wilderness.

Informal and abandoned trails are often on alignments that are particularly prone to erosion (steep, low slope-angle trails), and often lack tread-hardening structures to prevent erosion. Because of these things, informal and abandoned trails have many of the same effects on vegetation and wildlife as maintained trails do, but ongoing natural resources damage can be worse. The various effects of active trail management activities on informal and abandoned trails are essentially absent compared to maintained trails.

Principles to Manage Impacts – Trail management will focus on creating and maintaining trails on sustainable alignments where trail widening and tread erosion are minimized and natural water flow patterns are preserved. Disturbed lands along trail corridors that are not necessary for the trail system will be targeted for restoration. Trail management crews will be exemplary in using "Leave No Trace" principles to camp and travel in wilderness. Trail management crews will work to minimize helicopter and livestock impacts. Where informal or abandoned trails are creating unacceptable impacts on the natural quality, they may be restored to natural-functioning conditions or adopted into the maintained trail system (with appropriate compliance per Attachment 2, the Trails Maintenance Programmatic Exemption).

Untrammeled Quality

Interactions – As trails are intended to provide access to wilderness, they do not constitute a trammeling action, and do not affect the untrammeled quality. Several trail management activities, however, contribute to trammeling of wilderness. The most obvious of these is landscape restoration on informal or abandoned trail segments, which seeks to alter the natural processes of erosion and succession. Installation of water bars and erosion control structures on trails could be construed as trammeling actions seeking to alter the natural processes of hydrology and erosion. Occasionally in the past, logjams have been removed to keep watercourses flowing under bridges.

Principles to Manage Effects – Landscape restoration on informal or abandoned trail segments will typically be done as the result of a Minimum Requirements Analysis showing a long-term benefit to wilderness character from a short-term trammeling action. Installing water bars and erosion control structures will normally be considered a net benefit to wilderness character because of the protection given to the natural quality.

Undeveloped Quality

Interactions –According to Keeping It Wild: An Interagency Strategy to Monitor Trends in Wilderness Character across the National Wilderness Preservation System, the trail as a whole should be treated as affecting primarily the "Opportunities for Solitude and Primitive or Unconfined Recreation," and not as a "Development." However, the amount and kind of structures on a trail can have a large effect on trail users' perception of development. Causeways, steps, bridges, large rock or log structures, and signs are all typically recognizable as built structures, and trails where structures are less frequent feel less developed and wilder.

Trail management crews also sometimes use motorized tools or mechanized transport to perform work, diminishing the Undeveloped Quality. Some trail management activities involve placement of temporary installations such as signs, camps, tool caches and the like.

Informal or abandoned trails can impact visitors' sense of solitude, and the presence of abandoned trails and associated structures can impact the Undeveloped Quality.

Principles to Manage Effects – The trail classes adapted from the U.S. Forest Service (USFS) trail management framework provide a summary measure of overall development of a trail, including trail width, signage, bridges, and amount of other trail structures. The Undeveloped Quality will be preserved at these parks by maintaining trails to the appropriate trail class for the levels of use and recreational experience desired. Trail crews will perform the far greater part of trail management activities using primitive tools, with motorized equipment, mechanized transport, and temporary installations only being done as the result of a Minimum Requirements Analysis showing a net benefit to wilderness character.

Opportunities for Solitude or Primitive and Unconfined Recreation Quality (O-SPUR)

Interactions – The formal trail system in the parks predates wilderness designation. This trail system has a dual effect on O-SPUR: it facilitates opportunities for primitive recreation for many user groups by providing access to wilderness; however, trails tend to channel and concentrate use, which typically diminishes opportunities for solitude available along the trail.

A consequence of the fact that most wilderness users choose to travel on trail is that opportunities for solitude off-trail are enhanced over what they would be in a trail-less wilderness.

The fact that stock are generally permitted on trails and generally prohibited off trails means that trail-corridor based recreation is significantly more unconfined (has fewer rules) than off-trail recreation.

As discussed in greater detail under "Trail Classification," the development class of a trail has a strong effect on O-SPUR. Class 3 trails require the least self-reliance, and provide opportunities for primitive recreation to people needing or seeking less challenging travel in wilderness. Class 2 trails are typically more challenging to travel and provide access to less-visited areas of the park, providing opportunities for primitive recreation to people who are seeking more challenge and/or solitude. Class 1 trails provide another step in increasing challenge and solitude. Trail-less areas of the parks are typically the most challenging and provide the greatest opportunities for solitude and the most self-reliant type of recreation (although some popularized off-trail areas provide less opportunity for solitude than most of the Class 1 and Class 2 trails do). Abandoned trails have effects on solitude similar to Class 1 trails, although since they do not generally appear on maps and tend to see less travel, there may be greater opportunities for solitude. Informal trails are similar to abandoned trails, although areas with a dense network of informal trails suffer a diminished sense of solitude.

Recent trends in wilderness use show overnight recreation concentrating on "destination trails" such as the Pacific Crest, John Muir (with feeder trails), High Sierra, Rae Lakes Loop, and North Lake/South Lake Loop, leaving much of the rest of the trail system less-visited than in past decades. Similarly, day use is concentrated on a few "destination" trails like Mist Falls, Lakes, and Monarch Lake trails.

Principles to Manage Effects – Since the above-described range of trail-based primitive recreational opportunities were available when the parks' wildernesses were designated, trail management efforts will seek to preserve this diversity through conscious management of different trails for varied opportunities. Each trail is assigned a development class, and trail management will be appropriate to the trail class – Class 1 and 2 trails will not be reconstructed to achieve Class 3 conditions (although some trail management actions to protect the natural quality of wilderness character may have a side effect of making a Class 1 or Class 2 trail less challenging in spots). Any decision made to change the development class of a trail in order to protect other aspects of wilderness character will typically require separate National Environmental Policy Act (NEPA) compliance.

In addition to trail class, trails will typically be maintained for the allowed use requiring the most construction. For example, trails where stock is allowed will have maintenance guided by the Design Parameters for Stock Trails and trails with only hiker use allowed will have maintained guided by the Design Parameters for Hiker Trails.

Other Features of Value

Interactions – The parks' wilderness possesses a rich history of human use, including American Indian tribes, explorers, military, prospectors, sheepherders, scientists, educators, and recreationists. Trails have two potential effects on the historic legacy: they are reminders of the past, and relics themselves, and they have the potential to affect cultural resources located within and adjacent to the trail corridors.

Although all of the trails in the parks' wilderness have some historic context, very few of them have been formally evaluated under the National Historic Preservation Act (NHPA). Many currently abandoned trails were originally constructed and maintained by explorers, prospectors, sheepherders, loggers, and the military. Most existing maintained trails have been modified by maintenance and other management actions in pursuit of continued recreational access and to protect the natural quality of wilderness character. For both abandoned and maintained trails, it is unknown whether the historic features of any given trail are intact enough to warrant protection under the NHPA.

In places, trails cross historic and prehistoric sites, and trail-associated soil erosion can threaten those cultural resources. Cultural sites with trail access can also be more vulnerable to intentional or unintentional damage from visitors and trail maintenance activities.

Depending on their location and level of construction, trails may have a negative effect on the scenic features of wilderness.

The trail system does not have a known effect on other Features of Value other than providing access to visitors who wish to experience wilderness resources.

Principles to Manage Effects – As resources become available, a formal evaluation of the historic value of each trail segment in the parks should be conducted. In the interim, a first-round survey of trail segments by staff knowledgeable of the parks has been done to identify trails with particularly compelling historic context or whose historic character is largely intact, and trails have been prioritized for evaluation and preservation of possibly historic features. For all trails, trail management actions will minimize adverse effects on trail features that could contribute to the historic value of a trail segment, such as: unique or large rock walls and distinctive alignments. Particular effort will be made to preserve features of trails with compelling context or intact character.

Where trails cause impacts to cultural sites, trail management actions to preserve sites will be given equal priority to actions preserving the natural quality of wilderness character.

Any actions taken to erase abandoned trails will require appropriate NEPA and NHPA analysis.

PROVIDE FOR VISITOR ACCESS

The parks' trail system primarily serves the public purpose of recreation under the Wilderness Act by providing recreational access to wilderness areas of the parks. (The purposes of conservation, science, and education are also served, as the trail system also provides access for administration, research, and learning.) As discussed previously, and in the trail classification section later, the maintained trail system provides for a diverse range of opportunities for solitude and self-reliance. The maintained trail system

also provides access to a diversity of destinations (canyons, peaks, rivers, lakes, meadows, scenic features and vistas), environments (foothill shrub lands and woodlands, lower and upper mixed-conifer forests, subalpine areas, and alpine tundra), and for a diversity of activities (stock use, boating, foot travel and climbing). Much of the parks' wilderness would be impossible for stock users to access without trails, due to the difficulty of the terrain.

ACHIEVE OPERATIONAL EFFICIENCY AND EFFECTIVENESS

The parks' wilderness provides many logistical challenges for trail management and maintenance, from winter snowfall and timing of spring snowmelt to multi-day travel times to access project sites. Because of these challenges, trail crew operations must make efficient use of resources to keep the trails open for access and to protect wilderness character. Efficiency also supports opportunities for solitude by reducing administrative crew time in wilderness.

Some ways to achieve efficiency and effectiveness include building to the trail class and design use (and not beyond), working on trails seasonally (typically May-September), starting at low elevations and working higher elevation trails later, using work itineraries that minimize travel time, carefully considering use of 4(c) generally prohibited methods (such as helicopter and mechanized tools), coordinating logistics with other wilderness operations, and prioritizing work based on the trail class and designed use, with resources allocated to more heavily traveled trails, and to trails where negative impacts on wilderness character are ongoing and rapid.

SPECIFICS OF TRAIL MANAGEMENT

TRAIL CLASSIFICATION AND TERMINOLOGY

The Sequoia and Kings Canyon National Parks trail system will be managed to provide a range of diverse recreational experiences to wilderness visitors. The USFS Trails Management Handbook (Forest Service Handbook 2309.18 "USFS Trails Handbook") describes how this can be achieved through trail planning and development. Three of the organizing concepts of the USFS Trails Handbook are "Trail Type", "Trail Design Use", and "Trail Development Class" (trail class), which together lead to a set of design parameters for trail construction and maintenance. Trail management at the parks will use an adapted version of trail class to guide trail management decisions, and will be informed by the "Design Parameters for Hiker and Stock Use" trails.

Trail type describes if a trail is on soil (motorized or non-motorized terra trails), water, or snow. SEKI wilderness trails will be non-motorized terra or snow trails.

Trail design use incorporates construction and maintenance requirements of a trail based on the allowed uses of the trail. This ensures that the trail is suitable for the kinds of traffic that are allowed. SEKI wilderness trails will be designed, constructed, and maintained to be suitable for foot travel or various stock use types.

Trail class is a general description of the level of development on a given trail, graded on a continuum from Class 1 (minimally developed) through Class 5 (fully developed). Trail classes 4 and 5 would often be located near developed areas in the frontcountry, or in urban settings. These trails have wide, smooth tread surface - often composed of gravel or pavement. There could be many signs, railings, and interpretive displays, and they often include trailside amenities like benches or picnic tables. These two classes will not be used in these parks' wilderness. Trail classes 1, 2 and 3 describe appropriate development levels for the parks' wilderness trails and are described below.

Class 1 (Minimally Developed) – **These** trails are as much routes as trails. The trail can be indistinct and difficult to find in places, and may require route-finding skills to follow. The trail surfaces may be very rough and rocky, and logs, brush and limbs may only infrequently be cleared. Structures such as walls and water bars are essentially absent, and there are no bridges. Signing is typically only at junctions, and route markers are typically no more than old blazes in locations where the trail is not otherwise evident. Examples of existing trails in the parks in this class include Kennedy Canyon, Blue Canyon, and Milestone Basin. Although the USFS Trails Handbook indicates that Class 1 trails are not typically hardened adequately to accept unrestricted stock use, some Class 1 trails at Sequoia and Kings Canyon National Parks that traverse suitable landscapes will continue to be open to low levels of stock use.

Class 2 (Moderately Developed) – These trails are constructed and maintained so that the tread is continuously visible and can typically be followed without needing route-finding skills. Trail surfaces may be rough and include substantial obstacles. Logs and fallen rocks are cleared periodically. Structures like walls, water bars, and causeways are of limited size, scale, and quantity, and water crossings do not typically have bridges. Junctions are typically signed; regulatory and resource protection signing may be present, but is uncommon. Examples of existing trails in the parks that are in this class include the Middle Fork of the Kings, State Lakes Loop and the south side of Colby Pass.

Class 3 (Developed) – These trails are constructed and maintained so that the tread is continuously obvious. The trail surface is natural, with no substantial obstacles. Logs, fallen rocks, and encroaching vegetation are cleared regularly. Structures like walls, water bars, and causeways are common to protect the parks' resources from damage and to provide for appropriate access. Bridges are present where needed to protect resources or provide appropriate access. Junctions are signed; regulatory and resource protection signing may be common. Examples of existing trails in the parks that meet the standards for this class include the Pacific Crest Trail, Paradise Valley Trail, and the High Sierra Trail.

The maintained system of formal trails in SEKI wilderness will include Class 1, 2, o3 3 hiker or stock use trails, and Class 2 snowshoe trails.

Besides the formal trail system, there are other trail-like features in wilderness. Some of these features are remains of trails that were once constructed and maintained; others were never formally maintained and are the result of wilderness users traveling across the landscape in high densities. Also, specific off-trail travel routes have been popular at different times in the parks' wilderness. For clarity of communication, the following terminology is used throughout the WSP/FEIS:

- ***Formal Trail*** – Designated and regularly maintained trail. These can be Class 1, Class 2, Class 3, Class 4, or Class 5 (Class 4 and 5 are not in wilderness).
- ***Abandoned Trail*** – A trail that was once a formal, maintained trail, but maintenance has been discontinued.
- ***Informal Trail*** – A landscape impact created by users that looks like a segment of trail.
- ***Route*** – A travel corridor of social value with no designated trail. Traffic may create informal trails in parts of a route.
- ***Restored Trail*** – A trail that was at one point a formal or informal trail that has had restoration work done attempting to restore the landscape to its natural condition.

TRAIL MAINTENANCE FUNDING AND PRIORITIES

Attachment 2 is a list of projects that are needed to transition current conditions of the trail system to the desired conditions described in the preferred alternative of the Wilderness Stewardship Plan. The desired

conditions will be realized only as funding becomes available to perform the compliance, construction, and maintenance work necessary. Similarly, annual maintenance of formal trails will be prioritized within the constraints of funding and may therefore deviate from the ideal conditions described below.

There are two primary types of funding: base appropriated NPS funds and specialized project funds. Base-funded trail operations typically include the salaries of permanent staff, vehicle costs, supplies and materials, and a small seasonal trail-clearing crew. The initial trail clearing and basic drainage maintenance is the priority for these funds.

Project fund sources include cyclic maintenance, repair / rehabilitation, Federal Lands Recreation Enhancement Act (FLREA), and donations used to perform more extensive maintenance and reconstruction, such as:

- ***Cyclic Maintenance*** – Clearing vegetation from the trail corridor, replacing trail structures and repairing tread as needed on a cyclic basis (every 3-5 years on a given trail segment).
- ***Major Trail Reconstruction*** – Reconstructing trail segments when resource or trail conditions have deteriorated due to inadequate annual or cyclic maintenance. This work could include major tread repair, replacement and construction of trail structures, and minor reroutes.
- ***Trail Rerouting*** – Moving a trail segment to a more sustainable alignment, and performing landscape restoration work on the abandoned trail segment.
- ***Abandoned Trail Restoration*** – performing landscape restoration work on an abandoned trail segment, or on areas with multiple parallel trail treads.

As funding allows, the different trail classes will receive the following levels of regular maintenance:

- Class 1 trails will receive maintenance semiannually to every few years. Most trails in this class are remote and receive little use by hikers and little to no use by stock. Work is primarily to protect the natural quality of wilderness along with ensuring the trail remains appropriately apparent on the landscape. The goal of project work is to control negative impacts on the natural quality of wilderness character and to establish sustainable alignments.
- Class 2 trails have a higher priority and will typically be cleared and drainages maintained annually. These trails are more frequently used by both hikers and stock and more frequent maintenance is important early in the use season to ensure access and to better protect the natural quality of wilderness character. The goal of the project work is to control negative impacts on the natural quality of wilderness character and to establish sustainable alignments.
- Class 3 trails will be the highest priority to clear and repair in a timely manner, since impacts to the natural quality can occur rapidly on these heavily used trails if action is not taken. These trails may be cleared several times in a year to keep them open and to protect the adjacent landscape from trampling. This trail class will receive the priory for project funding. Work typically includes controlling negative impacts on the natural quality of wilderness character, establishing sustainable alignments, and maintaining the desired visitor access.
- Class 4 and 5 trails do not occur within wilderness.
- Abandoned or informal trails may be adopted into the formal trail system (per this Wilderness Stewardship Plan or with additional compliance) and appropriate construction work undertaken to achieve the desired trail class. If not adopted into the formal trail system, these trails will be analyzed under the NHPA and considered for landscape restoration.

- Changing the development class of a trail, or abandoning a formal trail is an action that would require additional compliance and public input.

TRAIL CONDITION MONITORING AND RESPONSE OPTIONS

Formal Trails – A comprehensive condition assessment will be performed at least every five years on each Class 1, 2 and 3 trail segment. This condition assessment will look at the condition of the trail tread and trail structures to identify deficiencies relative to the desired conditions for that trail class. Deficiencies could include: tread erosion, multiple parallel tread development, failed trail structures (e.g., bridges, water bars, retainer bars, walls, and cribbing), washouts or rockfalls, encroaching vegetation, and informal trail development. The deficiencies will be documented in the Facilities Management Software System (FMSS), cost estimates prepared, and funding requests prioritized according to current procedures. Trail maintenance funding requests may be for primarily facility-based deficiencies, or for repairing trail-related natural resource impacts.

Solutions to formal trail deficiencies will be designed to match the relevant trail development class, while minimizing constructed features to the extent possible. For Class 1 and Class 2 trails, the solution to tread erosion and other natural resource impact problems will favor rerouting to a sustainable alignment over construction of structures that would alter the development level of a trail. Class 3 trails, with their higher existing level of development and landscape impact, may require solutions that involve additional trail structures on the existing alignment. Constructing a new Class 3 trail segment involves more landscape impact than needed for a new Class 1 or Class 2 trail segment, and restoring the greater landscape impacts likely present on a problematic Class 3 trail would require extensive work. Despite these general rules, balancing short- and long-term impacts will result in reroutes or trail development solutions being recommended for Class 1, 2, and 3 trails in different situations.

Informal Trails – Systematic monitoring of informal trail impacts over the entire parks' landscape is not possible at current or expected staffing levels. An interdivisional team will meet annually to revise and update a list of routes and destinations of concern for monitoring. A first-year list and map of routes and destinations of concern is in Attachment 5. Observations by wilderness staff will be used to detect undesirable changes over time where corrective actions are needed.

Suggested levels of monitoring and examples of possible management responses to informal trail development are as follows:

Level of Informal Trail Impacts

Level 1 Impacts:	Trail distinguishable; slight loss of vegetation cover and /or minimal disturbance of organic litter.
Level 2 Impacts:	Trail obvious; vegetation cover lost and/or organic litter pulverized in primary use areas. Rocks/gravel disturbed on barren ground.
Level 3 Impacts:	Vegetation and organic litter lost across the majority of the tread. Rocks/gravel displaced from tread on barren ground.
Level 4 Impacts:	Soil erosion in the tread beginning in some places.
Level 5 Impacts:	Soil erosion is common along the tread. Trail braiding exists where parallel informal trails are easily visible from each other.

Monitoring Informal Trails Along Routes – Traffic along a route can create visible trail impacts on sensitive ground such as slopes, wetlands, and areas with fragile vegetation. Monitoring will consist of traveling identified routes once per season (near the end of the season when possible), and recording locations of Level 2 or greater impact with braiding and any Level 4 or Level 5 impacts. Minimal recording would include a brief narrative of the condition, GPS readings, and digital photos of the problem spots.

Monitoring Informal Trails at a Destination – Examples of informal trails at a destination include informal trails used by anglers, campsite trails (to water and between sites), shore-side trample zones, rock climbing access trails, and trails in and around alpine basins. Monitoring will focus on specific, known high-use areas identified by the interdivisional team. Monitoring will involve a survey of current conditions repeated every five years as funding allows. The survey will record a GPS line feature and Impact Level for each segment in the informal trail network. Representative photos may be taken and referenced to each informal trail segment.

Monitoring Results Analysis and Management Options – Results of monitoring will be presented and reviewed annually by the interdivisional team. If recommended at that meeting, a subgroup will be assigned to develop options for management intervention to prevent or mitigate unacceptable informal-trail impacts. Some options include:

- Visitor education
- Blocking a trail and doing local site restoration
- Destination permitting requirements and quotas.
- Area closure (e.g., no camping in area, such as at Bullfrog Lake and Timberline Lake)
- Lower trailhead permit quotas.
- Travel type restrictions (for example, prohibiting off-trail stock travel, or off-trail travel of any type).
- Appropriate NEPA compliance to adopt the informal trail into the formal trail system and funding requests to perform any construction needed to ensure environmental sustainability of the new trail.

REFERENCES

Agate, E

1996 *Footpaths: a Practical Handbook. British Trust for Conservation Volunteers*. The Eastern Press Ltd, London

Bayfield, N.G.

1986 Penetration of the Cairngorm Mountains, Scotland, by vehicle tracks and footpaths: impacts and recovery. In R.C. Lucas (Comp.), *Proceedings-National Wilderness Research Conference: Current Research.* Ogden, UT: USDA Forest Service, Intermountain Research Station. pp. 121-128.

Benninger-Truax, M., J. L. Vankat and R. L. Schaefer

1992 Trail corridors as habitat and conduits for movement of plant species in Rocky Mountain National Park, Colorado. Landscape Ecology 6(4): 269-278.

Birkby, R.C.

1996 *Lightly on the Land: the SCA Trail-Building and Maintenance Manual*. Student Conservation Association, Inc. The Mountaineers, Seattle, Washington, DC

Bright, J.A.

1986 Hiker impact on herbaceous vegetation along trails in an evergreen woodland of central Texas. *Biological Conservation* 36, 53-69.

Bryan, R.B.

1977 The influence of soil properties on degradation of mountain hiking trails at Grovelsjon. *Geografiska Annaler* 59A(1-2), 49-65.

Cole, D.N.

1983 *Assessing and monitoring backcountry trail conditions*. Research Paper INT-303. Ogden, UT: USDA Forest Service, Intermountain Forest and Range Experiment Station.

1991 *Changes on trails in the Selway-Bitterroot Wilderness, Montana, 1978-1989*. Research Paper INT-212. Ogden, UT: USDA Forest Service, Intermountain Research Station.

Cole, D.N. and D.R. Spildie

1998 Hiker, horse, and llama trampling effects on native vegetation in Montana, USA. Journal of *Environmental Management* 53, 61-71.

Dale, D. and T. Weaver

1974 Trampling effects on vegetation of the trail corridors of North Rocky Mountain forests. *Journal of Applied Ecology* 11: 767-772.

DeLuca, T.H., W. A.I. Patterson, W.A., Freimund, and D.N.

1998 Influence of llamas, horses, and hikers on soil erosion from established recreation trails in western Montana, USA. *Environmental Management* 22, 255-262.

Fritz, J.D.

1993 Effects of trail-induced sediment loads on Great Smoky Mountains National Park high gradient trout streams. M.S. Thesis. Cookville, TN: Tennessee Technological University.

Gomez-Limon, F.J. and J.V. de Lucio

1995 Recreational activities and loss of diversity in grasslands in Alta Manzanares Natural Park, Spain. Biological Conservation, Volume 74, Issue 2, 1995, Pages 99-105

Hall, C.N. and F.R. Kuss

1989 Vegetation alteration along trails in Shenandoah National Park, Virginia. *Biological Conservation* 48, 211-227.

Hammit, W.E. and D.N. Cole

1998 *Wildland recreation: ecology and management*. New York: John Wiley and Sons.

Hartley, E.

1976 Visitor impact on subalpine meadow vegetation in Glacier National Park, Montana. In R.M. Linn (Ed.), *Proceedings of the 1st Conference on Scientific Research in National Parks.* American Institute of Biological Sciences and USDI National Park Service. pp. 1279-1286.

Kasworm, W.F. and T.L. Monley

1990 Road and trail influences on grizzly bears and black bears in northwest Montana. In L.M. Darling, & W.R. Archibald (Eds.), Be*ars: Their biology and management: Proceedings of the 8th International Conference*. Victoria, BC: International Association for Bear Research and Management. pp. 79-84.

Lance, A.N., I.D. Baugh, and J.A. Love

1989 Continued footpath widening in the Cairngorm mountains, Scotland. *Biological Conservation* 49, 201-214.

Landres, P., S. Boutcher, L. Dean, T. Hall, T. Blett, T. Carlson, A. Mebane, C. Hardy, S. Rinehart, L. Merigliano, D.N. Cole, A. Leach, P. Wright, and D. Bumpus

2009 *Technical Guide for Monitoring Selected Conditions Related to Wilderness Character*. United States Department of Agriculture Forest Service General Technical Report WO-80 June 2009.

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.

Leung, Y.F. and J.L. Marion

1996 Trail degradation as influenced by environmental factors: A state-of-knowledge review. *Journal of Soil and Water Conservation* 51(2), 130-136.

1999 Assessing trail conditions in protected areas: An application of a problem-assessment method in Great Smoky Mountains National Park, USA. *Environmental Conservation* 26, 270-279.

2000 Recreation impacts and management in wilderness: A state-of-knowledge review. In D.N. Cole, S.F. McCool, W.T. Borrie, & J. O'Loughlin (Comps.), *Wilderness Science in a Time of Change Conference - Volume 5: Wilderness Ecosystems, Threats, and Management* (Proceedings RMRSP-15-VOL5) Ogden, UT: USDA Forest Service, Rocky Mountain Research Station. pp. 23-48.

Liddle, M.J.

1997 *Recreation ecology: the ecological impact of outdoor recreation and ecotourism.* London: Chapman and Hall.

Marcus, W. Andrew; Milner, Gary; Maxwell, Bruce 1998. Spotted knapweed distribution in stock camps and trails of the Selway-Bitterroot Wilderness. Great Basin Naturalist. 58(2): 156-166.

Marion, J.L.

1994 *An assessment of trail conditions in Great Smoky Mountains National Park.* Research/Resources Management Report. Atlanta, GA: USDI National Park Service, Southeast Region.

Marion, J.L. and Y.F. Leung

2001 Trail resource impacts and an examination of alternative assessment techniques. *Journal of Park and Recreation* Administration 19 (3) (Special issue on trails and greenways).

2004 Environmentally sustainable trail management. Environmental Impacts of Ecotourism. Patuxent Wildlife Research Center. CABI Publishing, Cambridge, MA. Buckley, Ralf (editor)

Marion, Jeffrey L., Jeremy Wimpey

2011 *Formal and Inormal Trail Monitoring Protocols and Baseline Conditions: Great Falls Park and Potomac Gorge.* Virginia Tech, College of Natural Resources, Department of Forest Resources & Environmental Conservation. Research Report. January.

Marion, Jeffrey L., Jeremy Wimpey, and Logan Park

2009 *Informal and Formal Trail Monitoring Protocols and Baseline Conditions: Acadia National Park.* Virginia Tech, College of Natural Resources, Department of Forest Resources & Environmental Conservation. Research Report. September.

Miller, S. G., R. L. Knight and C. K. Miller. 1998. Influence of recreational trails on breeding bird communities. Ecological Applications 8:162-169.

Monz, C.A., T. Pokorny, J. Freilich, S. Kehoe, and D. Ayers-Baumeister

1996 The consequences of trampling disturbance in two vegetation types at the Wyoming Nature Conservancy's Sweetwater River Project Area. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. 2000. *Wilderness science in a time of change conference—Volume 5: Wilderness ecosystems, threats, and management*; 1999 May 23–27; Missoula, MT. Proceedings RMRS-P-15-VOL-5. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

National Park Service (NPS)

2006a *Management Policies 2006*. U.S. Government Printing Office, Washington, DC.

2007a *Final General Management Plan and Comprehensive River Management Plan/Environmental Impact Statement. Sequoia and Kings Canyon National Parks, Three Rivers, CA.* 657 pp.

2009 *NPS Asset Management, Asset Management Handbook: Trail, Trail Bridge, Trail Tunnel*. Park Facility Management Division. NPS Trails Working Group. April.

Newsome, D., S.A. Moore, and R.K. Dowling

2013 *Natural area tourism: ecology, impacts and management*. 2nd edition. Channel View Publications, Bristol, UK.

Newsome, D., D.N. Cole, and J.L. Marion

2004 Environmental impacts associated with recreational horse riding. In R. Buckley (ed.) *The Environmental Impacts of Tourism.* Wallingford: CABI Publishing. pp.61-82.

Newsome, D., R. Dowling, and S. Moore

2005 *Wildlife tourism*. Clevedon: Channel View Publications.

Newsome, D., A. Smith, and S. Moore

2008 Horse riding in protected areas: A critical review and implications for research and management. *Current Issues in Tourism* Vol 11, No. 2, 144-166.

Noss, R.F. and A.Y. Cooperrider

1994 *Saving Nature's Legacy: Protecting and Restoring Biodiversity*. Island Press, Washington, D.C.

Park, Logan O., Robert E. Manning, Jeffery L. Marion, Steven R. Lawson, Charles Jacobi

2008 Managing Visitor Impacts in Parks: A Multi-Method Study of the Effectiveness of Alternative Management Practices. *Journal of Park and Recreation Administration*. Volume 26, Number 1 pp. 97-121 Spring 2008.

Pickering, C.M., W. Hill, D. Newsome, and Y-F. Leung

2010 Comparing hiking, mountain biking and horse riding impacts on vegetation and soils in Australia and the United States of America. *Journal of Environmental Management* 91, 551-562.

Prideaux, B.

2009 *Resort destinations: evolution, management and development*. Oxford: Butterworth-Heinemann.

Tyser, R.W. and C.A. Worley

1992 Alien flora in grasslands adjacent to road and trail corridors in Glacier National Park, Montana (USA). *Conservation Biology* 6, 253-262.

U.S. Department of Agriculture Forest Service (USDA)

1982 *Comprehensive Management Plan for the Pacific Crest National Scenic Trail*. January.

2008 *Trails Management Handbook*. Forest Service Handbook FSH 2309.18.

Weaver, T and D. Dale 1978. Trampling Effects of Hikers, Motorcycles and Horses in Meadows and Forests. Journal of Applied Ecology Vol. 15, No. 2 (Aug., 1978), pp. 451-457.

Wilson, J.P. And J.P. Seney

1994 Erosional impact of hikers, horses, motorcycles, and off-road bicycles on mountain trails of Montana. *Mountain Research and Development* 14, 77-88.

Wimpey, Jeremy F. and Jeffrey L. Marion

2010 The influence of use, environmental and managerial factors on the width of recreational trails. *Journal of Environmental Management* 91 (2010) 2028e2037.

2011 A spatial exploration of informal trail networks within Great Falls Park, VA. *Journal of Environmental Management* 92 (2011) 1012e1022.

Wischmeier, W. H. and D.D. Smith

1978 *Predicting rainfall erosion losses—a guide to conservation planning.* U.S. Department of Agriculture.

Yorks, Terrence P.; West, Neil E.; Mueller, Richard J. and others 1997. Toleration of traffic by vegetation: Life form conclusions and summary from a comprehensive data base. Environmental Management. 21(1): 121-131.

ATTACHMENT 1:
TRAIL SYSTEM DESCRIPTION/INVENTORY

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Table K-1: Trail Classification and Design Use for All Alternatives

Trail Name	Miles	Beginning	End	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
EAST FORK KAWEAH WATERSHED								
Aspen Flat	0.40	Crystal Creek	Aspen Flat	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Atwell-Hockett	9.74	Atwell Campground	Hockett Meadow	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Cahoon Rock	2.58	Hockett Meadow Junction	Cahoon Rock	1,2 Stock	1,2 Stock	2,3 Stock	1,2 Stock	1,2 Stock
Eagle Lake	1.41	Eagle-Mosquito Junction	Eagle Lake	2 Stock	2 Stock	3 Stock	2 Hiking	2 Stock
Eagle-Mosquito Lakes	0.93	White Chief Jct	Eagle-Mosquito Junction	2 Stock	2 Stock	3 Stock	2 Hiking	2 Stock
Evelyn Lake	1.05	Cahoon Rock Jct	Evelyn Lake	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Farewell Gap	2.65	Franklin Pass Junction	Farewell Gap	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Farewell/Franklin Lakes	2.65	Aspen Flat Junction	Franklin Pass Junction	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Franklin Pass - Franklin Lakes	4.78	Franklin Pass Junction	Franklin Pass	3 Hiking	3 Stock	3 Stock	3 Stock	3 Stock
Hockett-Sand Meadow	0.85	Hockett Mdw	Sand Meadow Junction	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Mineral King Valley	0.41	Disney Prkg-road end trailhead	Aspen Flat Junction	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Monarch Lakes	3.33	Timber Gap Jct	Lower Monarch Lake	3 Stock	2 Hiking	3 Hiking	2 Hiking	3 Hiking
Mosquito Lakes	1.58	Eagle-Mosquito Junction	Mosquito Lakes	2 Stock	2 Stock	3 Stock	2 Hiking	2 Stock
Paradise Ridge	3.31	Atwell Mill CG Trailhead	Top of Paradise Ridge	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Sawtooth Pass West	1.51	Monarch Lakes	Sawtooth Pass	Informal	1 Hiking	1 Hiking	1 Hiking	1 Hiking
Tar Gap	6.95	Trailhead Cold Springs CG	Atwell Hockett trail	2 Stock	2 Stock	3 Stock	2 Hiking	3 Stock

Table K-1: Trail Classification and Design Use for all Alternatives (continued)

Trail Name	Miles	Beginning	End	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Timber Gap	1.02	Sawtooth Prkg Trailhead	Timber Gap	3 Stock	2 Stock	3 Stock	2 Stock	3 Stock
White Chief	2.41	Disney Prkg-road end trailhead	White Chief	2 Stock	2 Stock	3 Stock	2 Hiking	2 Stock
KERN WATERSHED								
Big Five-Little Five Lakes	4.38	Lost Canyon	Little Five Lakes	3 Stock	2 Stock	3 Stock	2 Stock	3 Stock
Bighorn Plateau	4.14	Tyndall Creek	Wallace Creek	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Blackrock Pass - Little Five Lakes	1.58	Little Five Lakes	Blackrock Pass	3 Stock	2 Stock	3 Stock	2 Stock	3 Stock
Chagoopa Plateau	11.00	Big Arroyo Patrol Cabin	Upper Funston Mdw	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Cottonwood Pass	5.00	Rock Creek Junction	Park Boundary	2 Stock	2 Stock	3 Stock	2 Stock	3 Stock
Coyote Lake	2.22	Coyote Pass/Coyote Lakes Junction	Park Boundary	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Coyote Pass	5.31	Kern Station	Coyote Pass	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Crabtree - Rock Creek	3.30	Lower Crabtree Mdw	Rock Creek	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Crabtree Lakes	1.78	Lower Crabtree Mdw	Crabtree Lakes	2 Stock	1 Stock	2 Stock	Abandon	2 Stock
Crabtree Sand Flats	0.80	Crabtree Sand Flats	Crabtree Ranger Station Jct	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Forester Pass South	5.02	Forester Pass	Tyndall Creek	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Forgotten Creek	3.46	Siberian Pass Creek	Funston Lake	Unmaint	Abandon	Abandon	Abandon	Abandon
Franklin Pass - Upper Rattlesnake	2.44	Forester Lake Junction	Franklin Pass	3 Stock	2 Stock	3 Stock	2 Stock	3 Stock
Funston Lake	5.10	Siberian Pass	Funston Lake	Unmaint	1 Stock	1 Stock	1 Stock	1 Stock
John Dean Cutoff	2.54	Upper Kern	Tyndall Ranger Station	Unmaint	1 Stock	1 Stock	Abandon	1 Stock

Table K-1: Trail Classification and Design Use for all Alternatives (continued)

Trail Name	Miles	Beginning	End	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Kern Canyon	9.37	Upper Funston	Junction Meadow (Kern)	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Kern Kaweah	7.82	Junction Meadow (Kern)	Colby Pass	2 Stock	2 Stock	2 Stock	1 Hiking	2 Stock
Lake South America	5.34	Tyndall Cutoff	Upper Kern Canyon	1 Stock	1 Stock	2 Stock	Abandon	2 Stock
Little Five - Big Arroyo	2.64	Little Five Lakes	Big Arroyo Patrol Cabin	3 Stock	2 Stock	3 Stock	2 Stock	3 Stock
Lost Canyon	5.12	Soda Creek	Columbine Lake	2 Stock	2 Stock	3 Stock	1-2 Mixed	2-3 Stock
Lower Big Arroyo	6.14	Big Arroyo Patrol Cabin and HST Jct	Soda Creek/Willow Meadow Junction	1 Stock	Abandon	Abandon	Abandon	Abandon
Lower Crabtree	0.67	Crabtree Sand Flats	Lower Crabtree Meadow	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Lower Kern	8.52	South Boundary of Kern Station	HST at Upper Funston Meadow	3 Stock	3 Stock	3 Stock	2 Stock	3 Stock
Lower Kern Bridge	0.26	Lower Kern RS	Kern Bridge	3 Stock	3 Stock	3 Stock	2 Stock	3 Stock
Lower Rattlesnake	7.77	Jct of Kern Trail	Forester Lake Junction	3 Stock	2 Stock	3 Stock	2 Stock	3 Stock
Lower to Upper Crabtree Meadows	1.09	Crabtree Ranger Station	Lower Crabtree Mdw	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Lower Whitney Creek Use	0.75	Lower Crabtree Mdw	Lower Whitney Creek	2 Stock	2 Stock	2 Stock	2 Stock	2 Stock
Milestone Basin	0.50	Upper Kern Jct	Milestone Basin	2 Stock	Abandon	1 Stock	Abandon	Abandon
Miter Basin	2.30	Upper Rock Creek	11,300' Elevation	Unmaint	1 Stock	1 Stock	1 Stock	1 Stock
Moraine Lake	3.68	Sky Parlor Meadow	Upper Chagoopa Plateau	2 Stock	2 Stock	3 Stock	2 Stock	3 Stock
Mount Langley	1.45	Army Pass Junction	Summit Mount Langley	Informal	1 Hiking	1 Hiking	1 Hiking	1 Hiking
Mount Whitney	7.05	Crabtree Station	Mt Whitney Summit	3 Mixed	3 Mixed	3 Mixed	3 Mixed	3 Mixed

Table K-1: Trail Classification and Design Use for all Alternatives (continued)

Trail Name	Miles	Beginning	End	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
New Army Pass	2.64	Upper Rock Creek	New Army Pass	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Rattlesnake - Soda Creek	2.92	Forester Lake Junction	Soda Creek	3 Stock	2 Stock	3 Stock	2 Stock	3 Stock
Rock Creek	3.54	Rock Creek	Cottonwood Pass Jct	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Rock Creek Lake	3.12	Cottonwood Pass Jct	Soldier Lake	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Sandy Meadow	3.34	Wallace Ck	Crabtree Sand Flats	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Sawtooth Pass East	1.04	Columbine Lake	Sawtooth Pass	Informal	1 Hiking	1 Hiking	1 Hiking	1 Hiking
Shepherd Pass	3.38	JMT-PCT Tyndell Ck	Shepherd Pass	2 Stock	2 Stock	3 Stock	1 Hiking	2 Stock
Shotgun Pass	1.81	Shotgun/Upper Rattlesnake Jct	Shotgun Pass	1 Stock	1 Stock	2 Stock	Abandon	1 Stock
Siberian Pass	0.70	Siberian Junction	Siberian Pass	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Siberian Pass Creek	2.01	Pacific Crest Trail	Funston Lake Route	Unmaint	Abandon	Abandon	Abandon	Abandon
Soda Creek	4.29	Lower Big Arroyo	Upper Soda Creek	3 Stock	2 Stock	3 Stock	2 Stock	3 Stock
Soldier Lake	0.26	Upper Rock Creek	Soldier Lake	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Trail Crest	0.15	Trail Crest Trail	Park Boundary	3 Hiking	3 Hiking	3 Hiking	3 Hiking	3 Hiking
Tyndall Ranger Station	0.59	Pacific Crest Trail	Tyndall Ranger Station	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Upper Big Arroyo	3.38	Kaweah Gap	Big Arroyo Patrol Cabin	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Upper Big Five Lakes	1.66	Lower Big Five Lake	Upper Big Five Lake	2 Stock	2 Stock	2 Stock	Abandon	1 Stock
Upper Crabtree Meadow	0.19	JMT-PCT Junction	Crabtree Ranger Station	2 Stock	2 Stock	2 Stock	2 Stock	2 Stock

Table K-1: Trail Classification and Design Use for all Alternatives (continued)

Trail Name	Miles	Beginning	End	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Upper Kern Canyon	4.44	HST Wallace Ck	Tyndall Cut-off	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Upper Kern -Tyndall Cutoff	2.93	Upper Kern	JMT-PCT Tyndall Ck	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Upper Milestone Basin	2.13	Milestone Basin Trail	Milestone Lakes	Unmaint	Abandon	1 Stock	Abandon	Abandon
Upper Rock Creek	1.73	Soldier Lake	Junction with PCT	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Upper Soldier Lake	2.00	Soldier Lake	Junction with Mt Langley Trail	Abandon	1 Hiking	1 Hiking	Abandon	Abandon
Wallace Creek	4.11	Junction Meadow (Kern)	JMT-PCT Wallace Ck Jct	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Wallace Lakes	2.53	PCT Junction	Wallace Lakes	Unmaint	1 Stock	1 Stock	1 Stock	1 Stock
Willow Meadow Cut-off	4.69	Soda Creek	Rattlesnake Creek	1 Stock	1 Stock	2 Stock	Abandon	2 Stock
Wright Lakes	1.90	PCT Junction	Wright Lakes	Unmaint	1 Stock	1 Stock	Abandon	1 Stock
MARBLE FORK KAWEAH WATERSHED								
Admiration Point	0.70	Colony Mill Road	Admiration Point overlook	2 Stock	2 Hiking	3 Stock	1 Stock	3 Stock
Hump	0.73	Lakes Trail Jct	Heather Lake	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
JO Pass	1.79	Jct off Twin Lk Trail	JO Pass	2 Stock	2 Stock	3 Stock	2 Hiking	2 Stock
Lakes	2.94	Wolverton Prkg Trailhead	Pear Lake	3 Mixed	3 Mixed	3 Mixed	3 Mixed	3 Mixed
Little Baldy	0.20	Baldy Saddle Gen Hwy	Little Baldy Dome	2 Stock	2 Hiking	3 Stock	2 Hiking	3 Hiking
Marble Falls	2.73	Potwisha Campground	Marble Falls, Marble Fork	2 Hiking	2 Hiking	3 Hiking	2 Hiking	2 Hiking
Old Colony Mill Road	2.48	North Fork Road	Crystal Cave Road	3 Stock	2 Stock	3 Stock	2 Stock	3 Stock

Table K-1: Trail Classification and Design Use for all Alternatives (continued)

Trail Name	Miles	Beginning	End	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Pear Lake Ranger Station	0.34	Pear Lake Trail	Pear Lake Ranger Station	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Pear Lake Ski	2.50	Wolverton Prkg Trailhead	Pear Lake	2 Snowshoe	2 Snowshoe	2 Snowshoe	2 Snowshoe	2 Snowshoe
Silliman Pass South	2.61	JO Pass/Twin Lakes Jct	Silliman Pass	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Sunset Rock	0.35	Museum area	Sunset Rock	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Tokopah Falls	0.36	Lodgepole CG trailhead	Tokapah Falls	3 Stock	3 Hiking	3 Hiking	3 Hiking	3 Hiking
Twin Lakes	3.51	Trailhead Lodgepole CG	JO/Twin Lakes Junction	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
MIDDLE FORK KAWEAH WATERSHED								
Alta - Panther Gap	1.94	Giant Forest	Alta Meadow/Peak Jct	3 Stock	2 Stock	3 Stock	2 Stock	3 Stock
Alta Meadow	1.70	Panther Gap Junction	Alta Meadow	2 Stock	2 Stock	2 Stock	2 Stock	2 Stock
Alta Peak	1.81	Alta Meadow Junction	Alta Peak Summit	2 Stock	2 Stock	2 Stock	2 Stock	2 Stock
Alta-High Sierra Cut-off	1.99	Cut-off between Alta & HST	Cut-off between Alta and HST	3 Stock	2 Stock	3 Stock	2 Stock	3 Stock
Bearpaw Cut-off	1.55	Middle Fork Kaweah	Little Bearpaw Meadow	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Bearpaw Meadow	0.34	HST	Redwood/Bearpaw Trail	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Blackrock Pass - Pinto Lake	7.76	Timber Gap Jct	Blackrock Pass	3 Stock	2 Stock	3 Stock	2 Stock	3 Stock
Bobcat Point	0.20	High Sierra Trail	Sugar Pine Trail	3 Hiking	3 Hiking	3 Hiking	3 Hiking	3 Hiking
Cliff Creek	3.25	Redwood Mdw	Blackrock Pass Junction	3 Stock	2 Stock	3 Stock	2 Stock	3 Stock
Crescent Mdw-Bearpaw	10.40	Crescent Meadow Trailhead	Bearpaw	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock

Table K-1: Trail Classification and Design Use for all Alternatives (continued)

Trail Name	Miles	Beginning	End	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Elizabeth Pass South	3.72	Over the Hill Junction	Elizabeth Pass	2 Stock	2 Stock	3 Stock	2 Hiking	2 Stock
Granite Creek	3.30	Redwood Mdw-Bearpaw Trail	Granite Creek lake	Unmaint	Abandon	Abandon	Abandon	Abandon
Hamilton Lakes	3.81	Bearpaw	Hamilton Lakes	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Kaweah Gap	4.06	Hamilton Lakes	Kaweah Gap	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Kaweah Middle Fork Cut-off	0.91	Redwood Mdw-Bearpaw Trail	Middle Fork Kaweah Bridge	3 Stock	2 Stock	3 Stock	2 Stock	3 Stock
Lone Pine Creek	1.92	Elizabeth Pass Junction	Tamarack Lake	2 Stock	2 Stock	2 Stock	2 Hiking	2 Stock
Middle Fork Kaweah	11.32	Moro Creek	Middle Fork Bridge	3 Stock	2 Stock	3 Stock	2 Stock	3 Stock
Over the Hill	1.47	High Sierra Trail	Elizabeth Pass South Trail	2 Stock	2 Stock	3 Stock	2 Hiking	2 Stock
Paradise Creek	2.02	Buckeye Flat CG	2 miles up from Middle Fork	2 Stock	2 Hiking	2 Stock	2 Hiking	2 Hiking
Paradise Ridge-Redwood Mdw	5.94	Redwood Mdw	Paradise Gap	2 Stock	2 Stock	2 Stock	2 Stock	2 Stock
Potwisha-Hospital Rock	1.52	Potwisha Dump station	Hospital Rock Picnic Area	3 Stock	2 Hiking	3 Hiking	2 Hiking	2 Hiking
Redwood Mdw Cut-off	0.89	Middle Fork Kaweah	Redwood Mdw	2 Stock	2 Stock	2 Stock	2 Stock	2 Stock
Redwood Mdw-Bearpaw	4.64	Bearpaw	Redwood Mdw	2 Stock	2 Stock	3 Stock	2 Stock	2-3 Stock
Timber Gap Cliff Creek	2.91	Cliff Creek	Timber Gap	3 Stock	2 Stock	3 Stock	2 Stock	3 Stock
Twenty-Seven Switchback Cut-off	0.91	High Sierra Trail	Over the Hill Trail	2 Stock	2 Stock	2 Stock	2 Hiking	2 Stock
Wolverton Cutoff	1.04	Alta Trail	High Sierra Trail	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
MIDDLE FORK KINGS WATERSHED								

Table K-1: Trail Classification and Design Use for all Alternatives (continued)

Trail Name	Miles	Beginning	End	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Blue Canyon	6.19	Kettle Ridge Entrance	Blue Canyon Meadow	1 Stock	1 Stock	2 Stock	Abandon	1 Stock
Cartridge Pass	10.43	Middle Fork Kings River	Muro Blanco Trail	Unmaint	Abandon	Abandon	Abandon	Abandon
Cataract Creek	1.54	PCT Near Deer Meadow	Amphitheater Lakes	Unmaint	Abandon	Abandon	Abandon	Abandon
Dusy Basin	3.49	Lip of Dusy Basin	Bishop Pass	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Dusy Switchbacks	2.77	Dusy Switchbacks/PCT Junction	Lip of Dusy Basin	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Granite Pass North	5.21	Northern State Lakes Loop Junction	Granite Pass	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Horseshoe Lakes	0.95	Spur Trail	Horseshoe Lakes	1 Stock	1 Stock	2 Stock	Abandon	2 Stock
Kennedy Canyon	8.12	Outlet of Volcanic Lakes Crossing	Kennedy Pass	1 Stock	1 Stock	2 Stock	1 Hiking	2 Stock
Lower LeConte Canyon	3.48	Palisade Creek Crossing	Dusy Switchbacks/PCT Junction	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Lower Middle Fork Kings	10.82	Crown Creek Crossing	Simpson Junction	2 Stock	2 Stock	2 Stock	1 Stock	1 Stock
Palisade Creek	6.11	Palisade Creek Crossing	Outlet of Palisade Lakes	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Palisade Lakes	3.69	Outlet of Palisade Lakes	Mather Pass	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
State Lakes Loop	4.23	North State Lakes Junction	South State Lakes Junction	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Tehipite Switchbacks	4.59	Gnat Meadow Entrance	Crown Creek Crossing	2 Stock	2 Stock	2 Stock	1 Stock	1 Stock
The Bitch	5.93	Simpson Meadow Junction	Northern State Lakes Loop Junction	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Upper Blue Canyon	1.00	Blue Canyon Meadow	Blue Canyon Lakes	Unmaint	1 Stock	1 Stock	Abandon	1 Stock
Upper LeConte Canyon	7.34	Dusy Switchbacks/PCT Junction	Muir Pass	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Upper Middle Fork Kings	8.09	Simpson Junction	Palisade Creek Junction	2 Stock	2 Stock	2 Stock	2 Stock	2 Stock

Table K-1: Trail Classification and Design Use for all Alternatives (continued)

Trail Name	Miles	Beginning	End	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Volcanic Lakes	1.90	Granite Pass North Trail	Outlet of Volcanic Lakes Crossing	2 Stock	1 Stock	2 Stock	1 Stock	2 Stock
NORTH FORK KAWEAH WATERSHED								
Big Baldy	2.06	Big Baldy Trailhead	Top of Big Baldy	3 Stock	3 Stock	3 Stock	3 Hiking	3 Stock
Big Baldy Ski	2.06	Big Baldy Trailhead	Top of Big Baldy	2 Snowshoe	2 Snowshoe	2 Snowshoe	2 Snowshoe	2 Snowshoe
Buena Vista	0.86	Buena Vista Trailhead	Top of Buena Vista Peak	3 Stock	3 Stock	3 Stock	3 Hiking	3 Stock
Dorst/Lost Grove	2.06	Muir Grove Trail/Lost Grove Trail Junction	Lost Grove	1 Hiking	1 Hiking	1 Hiking	1 Hiking	1 Hiking
Hidden Springs	13.87	North Fork Kaweah Trailhead	Hidden Spring	1-2 Stock	1 Stock	2 Stock	1 Stock	1 Stock
Little Baldy	1.35	Baldy Saddle Gen Hwy	Little Baldy Dome	2 Stock	2 Hiking	3 Stock	2 Hiking	2 Hiking
Muir Grove	2.53	Dorst CG Trailhead	Muir Grove	3 Stock	2 Hiking	3 Stock	2 Hiking	3 Hiking
Old Colony Mill Road	7.28	North Fork Road	Crystal Cave Road	3 Stock	2 Stock	3 Stock	2 Stock	3 Stock
Redwood Canyon	2.14	Redwood Saddle Trailhead	Hart Tree Junction on Redwood Creek	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Redwood Canyon Big Springs	3.62	Redwood Canyon/Hart Tree Junction	Big Springs	2 Stock	2 Stock	2 Stock	1 Hiking	2 Stock
Redwood Canyon Hart Tree	4.76	Upper Hart Junction	Lower Hart Junction	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Redwood Canyon Sugar Bowl	4.42	Redwood Saddle Trailhead	Sugarbowl Junction along ridge	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
SAN JOAQUIN WATERSHED								
Evolution Basin	6.44	Lamarck Col/PCT Junction	Muir Pass	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Evolution Valley	7.43	Goddard Canyon Junction	Lamarck Col Junction	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Goddard Canyon	5.08	Goddard Canyon Junction	Hell for Sure/Martha Lake Junction	2 Stock	2 Stock	3 Stock	1 Mixed	2 Stock

Table K-1: Trail Classification and Design Use for all Alternatives (continued)

Trail Name	Miles	Beginning	End	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Hell for Sure Pass	3.70	Hell for Sure/Martha Lake Junction	Hell for Sure Pass	1 Stock	1 Stock	2 Stock	1 Hiking	2 Stock
Lake 11,106	1.56	McClure Meadow	Lake 11106	Unmaint	1 Stock	1 Stock	1 Stock	1 Stock
Lamarck Col	3.29	Lamarck Col/PCT Junction	Lamarck Col	Informal	1 Hiking	1 Hiking	1 Hiking	1 Hiking
Lower Goddard Canyon	3.54	Piute Creek Entrance	Goddard Canyon Junction	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Martha Lake	2.8	Hell for Sure/Martha Lake Junction	Martha Lake	Unmaint	1 Stock	1 Stock	1 Stock	1 Stock
McGee Canyon	2.71	PCT above McClure Meadow	Lower McGee Lakes	Unmaint	Abandon	Abandon	Abandon	Abandon
SODA SPRINGS CREEK WATERSHED								
Farewell Gap	0.42	Quinn Mdw	North Boundary	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
South Fork Meadows	1.08	Sand Mdw-Hockett Lakes Jct	Windy Gap Jct	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Windy Gap	1.99	Blossom Lk Jct	Quinn Mdw (Ranger Station)	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Windy Ridge	0.86	Tuohy Gap	Blossom Lake Jct	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
SOUTH FORK KAWEAH WATERSHED								
Blossom Lake	2.71	Hunter Creek Junction	Blossom Lk	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Cyclone Meadow	1.73	Windy Ridge/Cyclone Meadow Jct	Windy Ridge	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Hockett Lakes	0.72	South Fork Crossing	Hockett Lakes Junction	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Hockett Lakes Cutoff	1.00	Hockett Lakes Junction	South Fork Meadows	2 Stock	Abandon	3 Stock	Abandon	2 Stock
Hockett-Sand Meadow	0.29	Hockett Mdw	Sand Meadow Junction	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Hockett-South Fork Crossing Cutoff	0.98	Sand Meadow Junction	Hockett Lakes Junction	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock

Table K-1: Trail Classification and Design Use for all Alternatives (continued)

Trail Name	Miles	Beginning	End	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Hockett-South Fork Meadow	0.89	Sand Meadow Junction	South Fork Meadows	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Ladybug	1.73	South Fork Campground Trailhead	Whiskey Log Junction	2 Stock	2 Stock	3 Stock	2 Hiking	3 Stock
South Fork Kaweah	9.73	South Fork Campground Trailhead	South Fork Kaweah Crossing	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
South Fork Meadows	0.19	South Fork Meadows	South Fork Kaweah Trail	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Tuohy	1.94	South Fork Crossing	South Boundary	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Tuohy Cutoff	1.92	South Fork Mdw	Tuohy Gap Jct	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Wet Meadow	0.68	Quinn Mdw	Boundary at Wet Mdw	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Whiskey Log	1.26	Ladybug Trail	Cedar Creek	2 Stock	2 Stock	2 Stock	2 Hiking	2 Stock
Windy Gap	2.17	Hunter Creek Junction	Quinn Meadow (RS)	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Windy Ridge	4.64	Tuohy Gap	Blossom Lake-Windy Ridge Junction	2 Stock	Abandon	3 Stock	Abandon	3 Stock
SOUTH FORK KINGS WATERSHED								
Avalanche Pass - Sphinx	5.00	Sphinx Junction	Avalanche Pass	2 Stock	2 Stock	2 Stock	1 Stock	2 Stock
Avalanche Pass Roaring River	5.80	Avalanche Pass/Cloud Canyon Junction	Avalanche Pass	2 Stock	2 Stock	2 Stock	1 Stock	2 Stock
Baxter Pass	4.57	Baxter Pass/PCT	Baxter Pass	1 Stock	1 Hiking	1 Hiking	1 Hiking	1 Hiking
Bell Canyon - Comanche Cutoff	1.53	Seville Lake Junction	Comanche Junction	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Bell Canyon Entrance	1.46	Bell Canyon Entrance	Seville Lake Junction	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Bench Lake	2.00	Bench Lake/PCT Junction	Bench Lake	2 Stock	2 Stock	2 Stock	1 Stock	2 Stock

Table K-1: Trail Classification and Design Use for all Alternatives (continued)

Trail Name	Miles	Beginning	End	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Beville Lake	0.07	Silliman Pass/Beville Lake Trail Junction	Beville Lake	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Bubbs Creek	6.20	Sphinx Junction	Junction Meadow (East Lake Jct)	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Bubbs Creek Switchbacks	1.42	Bailey Bridge Junction (north side)	Sphinx Junction	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Bullfrog Lake	2.29	Bullfrog/PCT Junction	Kearsarge Lakes/Bullfrog Junction	3 Hiking	3 Stock	3 Hiking	3 Hiking	3 Stock
Cedar Grove Overlook	0.46	Cedar Grove Overlook/Hotel Creek Junction	Cedar Grove Overlook	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Cedar Grove Sand Flats	1.73	Roads End	Bailey Bridge Jct	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Charlotte Lake	1.64	Charlotte Lake/PCT Junction	Charlotte Creek Stock Camps	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Cloud Canyon	6.17	Roaring River Ranger Station	Creek Crossing @ Grand Palace	3 Stock	3 Stock	3 Stock	2 Stock	3 Stock
Colby Pass North	4.05	Creek Crossing @ Grand Palace	Colby Pass	2 Stock	2 Stock	2 Stock	2 Hiking	2 Stock
Deadman Canyon	5.81	Roaring River Ranger Station	Creek between Lower and Upper Ranger	3 Stock	3 Stock	3 Stock	2 Stock	3 Stock
Don Cecil	3.50	Cedar Grove Bike Path	Summit Mdw	3 Stock	2 Stock	3 Stock	2 Stock	3 Stock
East Lake	2.75	Junction Meadow	East Lake Drift Fence	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Elizabeth Pass North	3.62	Creek between Upper and Lower Ranger	Elizabeth Pass	2 Stock	2 Stock	2 Stock	2 Hiking	2 Stock
Frypan Entrance	0.40	Park Boundary @ Wildman Meadow	Kennedy Pass Trail	2 Stock	2 Stock	2 Stock	2 Stock	2 Stock
Glen Pass South	1.90	Kearsarge Pass/PCT Junction	Glen Pass	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Granite Basin	3.18	Lip of Granite Basin (benchmark)	Granite Pass	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock

Table K-1: Trail Classification and Design Use for all Alternatives (continued)

Trail Name	Miles	Beginning	End	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Granite Lake	0.52	Granite Basin Trail	Granite Lake	1 Stock	1 Stock	1 Stock	1 Stock	1 Stock
Grouse Lake	0.63	Copper Creek Trail	Grouse Lake	Unmaint	1 Stock	1 Stock	1 Stock	1 Stock
Grizzly Lake	0.36	Park Boundary	Kennedy Pass Trail	2 Stock	2 Stock	2 Stock	2 Stock	2 Stock
Hotel-Creek	2.56	Hotel Creek Trailhead	Hotel/Lewis Junction	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Junction Meadow Switchbacks - Bubbs	2.27	Junction Meadow on Bubbs	Vidette Meadow Junction	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Kanawyers Gap	3.30	Kanawyers Gap	Comanche Junction	2 Stock	2 Stock	3 Stock	Abandon	2 Stock
Kearsarge Lakes	0.57	Bullfrog Lake/Kearsarge Lakes Junction	Kearsarge Lakes	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Kearsarge Pass	2.87	Kearsarge Pass/PCT Junction	Kearsarge Pass	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Kennedy Pass South	3.75	Frypan Meadow	Kennedy Pass	2 Stock	2 Stock	2 Stock	1 Hiking	2 Stock
Lake Reflection	1.09	East Lake Drift Fence	Lake Reflection	Abandon	1 Stock	1 Stock	Abandon	Abandon
Lost Lake	0.70	Lost Lake Junction	Lost Lake	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Lower Copper Creek Switchbacks	3.69	Roads End Cedar Grove	Lower Tent Mdw crossing	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Lower Lewis Creek	0.91	Lewis Creek Trailhead	Hotel/Lewis Junction	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Lower Sixty Lake Basin	1.65	First Lake in Sixty Lake Basin	Lower Sixty Lake Basin	1 Hiking	1 Hiking	1 Hiking	Abandon	1 Hiking
Mist Falls	3.16	Bailey Bridge Jct	Lower Paradise Camping	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Paradise Valley	3.30	Lower Paradise Valley Camping	South Fork Bridge @ Upper Paradise	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Pinchot Pass North	3.83	South Fork Kings Crossing	Pinchot Pass	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock

Table K-1: Trail Classification and Design Use for all Alternatives (continued)

Trail Name	Miles	Beginning	End	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Pinchot Pass South	7.38	Woods Creek Crossing	Pinchot Pass	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Rae Lakes	4.93	Dollar Lake Outlet	Glen Pass	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Ranger Lake	0.14	Silliman Pass/Ranger Lake Junction	Ranger Lake	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Sawmill Pass	3.22	Sawmill Pass/PCT Junction	Sawmill Pass	1 Stock	1 Stock	2 Stock	1 Hiking	2 Stock
Seville Lake	1.14	Seville Junction	Seville Lake	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Seville Lake Boy Scout	1.27	Bell Canyon Entrance	Seville Lake	Informal	-	1 Hiking	-	-
Silliman Pass North	4.90	Seville Junction	Sillman Pass	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
South Side Cedar Grove Sand Flats	1.88	Bailey Bridge Jct	Red Bridge @ Roads End	3 Stock	3 Stock	3 Hiking	3 Hiking	3 Hiking
Sphinx Lakes	2.08	Screwball Meadow	Sphinx Lakes	Unmaint	Abandon	1 Hiking	Abandon	Abandon
Sugarloaf Entrance	2.22	Sugarloaf Entrance	Comanche Junction	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Sugarloaf Valley	7.45	Comanche Junction	Roaring River Ranger Station Junction	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Taboose Pass	2.36	Taboose Pass/PCT Junction	Taboose Pass	2 Stock	2 Stock	2 Stock	2 Stock	2 Stock
Upper Basin	5.74	South Fork Kings Crossing	Mather Pass	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Upper Bubbs Creek - Forester Pass North	4.95	Center Basin/PCT Junction	Forester Pass	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Upper Copper Creek Switchbacks	3.26	Lower Tent Meadow crossing	Lip of Granite Basin (benchmark)	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Upper Lewis Creek	4.06	Hotel/Lewis Junction	Frypan Meadow	2 Stock	2 Stock	2 Stock	2 Stock	2 Stock
Upper Sixty Lake Basin	1.42	Sixty Lake/PCT Junction	Outlet of first lake in Sixty Lake Basin	2 Stock	2 Stock	2 Stock	1 Stock	2 Stock

Table K-1: Trail Classification and Design Use for all Alternatives (continued)

Trail Name	Miles	Beginning	End	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Vidette Meadow	3.05	Vidette Meadow Junction	Center Basin/PCT Junction	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Vidette Switchbacks	1.74	Vidette Meadow Junction	Kearsarge Pass/PCT Junction	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Woods Creek	5.10	South Fork Kings Bridge	Woods Creek Crossing	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
Woods Creek Crossing - Dollar Lake	3.96	Woods Creek Crossing	Dollar Lake Outlet	3 Stock	3 Stock	3 Stock	3 Stock	3 Stock
TULE WATERSHED								
Summit Lake	0.39	Windy Ridge	Summit Lake	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Tuohy	1.05	South Fork Crossing	South Boundary	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock
Windy Ridge	1.45	Tuohy Gap	Blossom Lk Jct	2 Stock	2 Stock	3 Stock	2 Stock	2 Stock

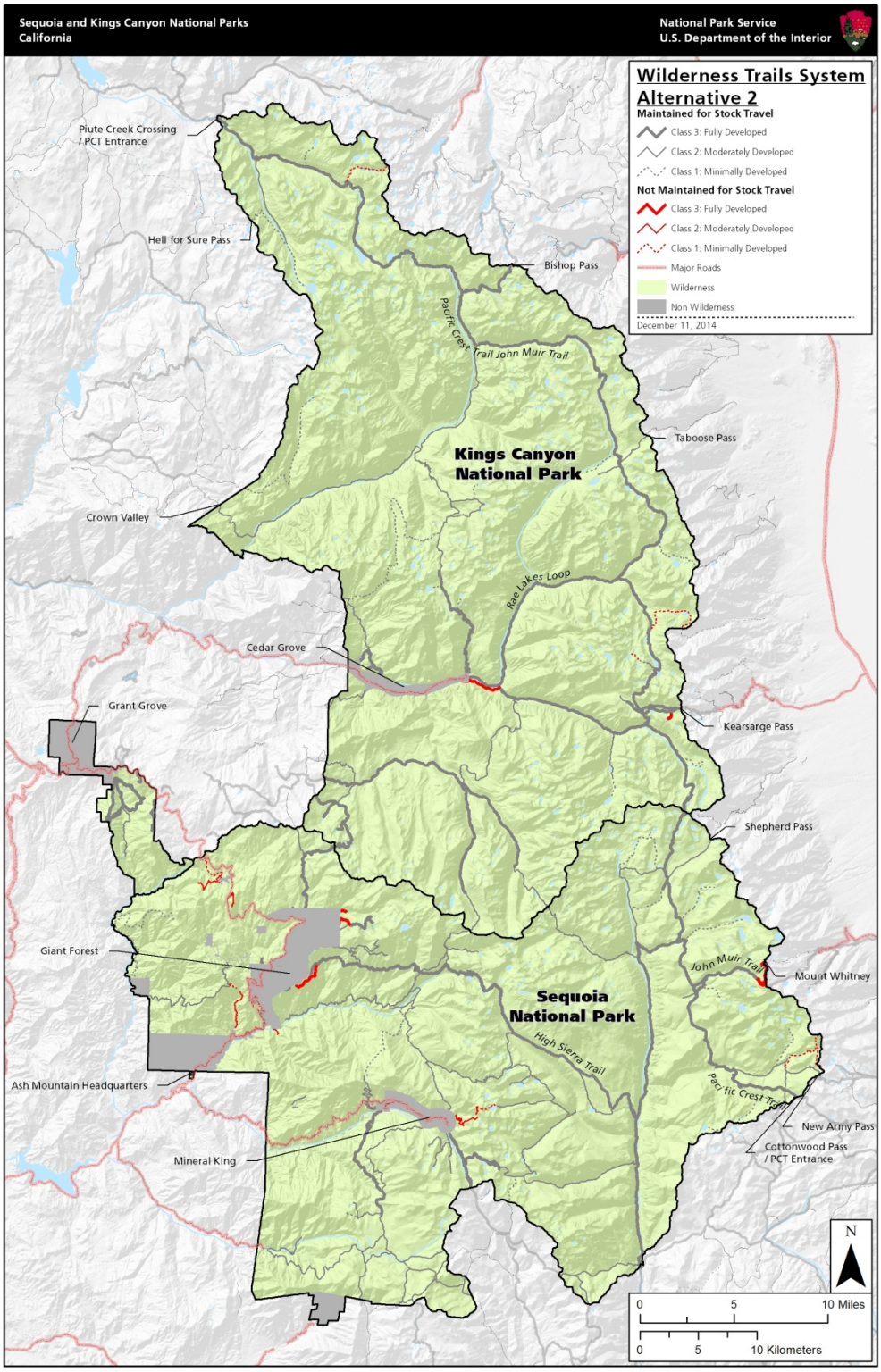


Figure K-1: Wilderness Trails System - Trail Segments and Planned Class and Design Use under the Preferred Alternative

ATTACHMENT 2:
"MAJOR PROJECT" LIST TO BRING TRAIL SYSTEM TO DESIRED CLASS AND DESIGN USE FROM CURRENT CONDITIONS

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MAJOR PROJECT LIST TO BRING TRAIL SYSTEM TO DESIRED CLASS AND DESIGN USE FOR CURRENT CONDITIONS

The Trail Management and Classification System outlines desired conditions for the trail system of Sequoia and Kings Canyon National Parks that are different from current conditions in many places. In some locations, trails have been abandoned and restoration work may be needed on the abandoned trail segments. In other locations, new trails are called for, or current trail development is more than or less than called for in the plan. Much of the work needed to realize the desired conditions can be done within the constraints of the Programmatic Categorical Exemption (attachment 3). The more extensive work needed in other places may require additional site-specific compliance under NEPA or NHPA. This attachment contains a listing and map of those projects where more extensive work is needed.

Table K-2: Large Project List to Bring Trail System to Desired Class and Design Use for the Preferred Alternative

Project Map Number	Project Name	Description	Wilderness Qualities	Access	Sustainability
1	Lamarck Col Trail Establishment	Numerous informal trails have developed from hiker and mountaineer use in the Lamarck Col and Darwin Bench area. This project would establish a Class 1 hiker only trail to channel use onto one route, and would do landscape restoration on the rest of the informal trails.	Nat UnD Sol	Yes	Yes
2	Hell For Sure Pass Trail Reroute	Near the top of Hell for Sure Pass, the trail ascends straight up a wet hillside meadow. This project would reroute the trail out of the meadow onto dry, stable slopes and do landscape restoration on the abandoned section of trail.	Nat		Yes
3	Martha Lake Trail Alignment	The Martha Lake Trail traverses several wet meadows below Martha Lake. These meadows are known habitat for the Yosemite toad. Under the WSP this trail will be a Class 1 trail open to stock travel. This project would relocate the trail from ground that is not suitable for a Class 1 stock use trail, including impacts to wet meadows and possible impacts to Yosemite toad populations. Landscape restoration would be done on the abandoned trail sections.	Nat UnD Sol	Yes	Yes
4	Dusy Basin Trail Reroute	Near the west end of Dusy Basin, the trail drops steeply down mixed meadow and bedrock benches where the trail is heavily braided and eroded. After reaching the level of the lakes, the trail crosses level meadow areas where traffic has established multiple routes. This project would establish a Class 3 stock use trail on a sustainable alignment, and would do landscape restoration on the abandoned sections of trail.	Nat UnD Sol		Yes

Project Map Number	Project Name	Description	Wilderness Qualities	Access	Sustainability
5	Cartridge Pass Trail Restoration	Cartridge Pass was the original route for the John Muir Trail. Since construction of the Golden Staircase and Mather Pass Trail as the current JMT, Cartridge Pass has seen little maintenance, and under the WSP this trail will no longer be a stock travel route or a maintained trail. Portions of the trail near Triple Falls, through the meadows of Lake Basin, over the pass, and down to the Muro Blanco Trail are still evident as abandoned trail segments, and in places cause active erosion. This project would assess the Cartridge Pass Trail under NHPA, then perform landscape restoration or historic preservation as appropriate.	Nat UnD Sol		
6	Kennedy Canyon Trail Alignment	The Kennedy Pass Trail traverses several wet meadows in Kennedy Canyon. In addition, the trail is indistinct in many spots and even light levels of use are creating informal trails to dead ends. Under the WSP this trail will be a Class 1 trail open to stock travel. This project would relocate the trail from ground that is not suitable for a Class 1 stock use trail, including impacts to wet meadows and replacing dead end informal trails with trails that allow through stock traffic. Landscape restoration would be done on the abandoned trail sections.	Nat UnD Sol	Yes	Yes
7	Pinchot Pass North Trail Reroute	Between Marjorie Lake and Pinchot Pass, the John Muir/Pacific Crest Trail climbs steeply up several vegetated benches. Past efforts to stabilize the trail with structures have failed, as the trail is too steep for sustained use. This project would construct a series of reroutes to put the trail on a sustainable alignment by lowering the grade. Landscape restoration would be performed on the abandoned sections of trail.	Nat	Yes	Yes
8	Pinchot Pass South Deferred Restoration	During the summers of 1982-1985, over a mile of the John Muir/Pacific Crest Trail was rerouted from wet meadows and steep alignments onto more stable ground and lower trail grades. The abandoned trail through the wet meadows never had landscape restoration work done, and is still an apparent and eroding scar. This project would perform landscape restoration work on the trail section abandoned in 1982-1985.	Nat UnD Sol		
9	Sawmill Pass Trail Alignment	The Sawmill Pass Trail traverses several wet sidehill meadows between Woods Lake and Sawmill Pass. In addition, near the pass the trail has a fall-line alignment where erosion has created features several feet deep and a dozen feet wide. This project would relocate the trail from ground that is not suitable for a Class 1 stock use trail, and would address the ongoing erosion near Sawmill Pass.	Nat UnD Sol	Yes	Yes

Project Map Number	Project Name	Description	Wilderness Qualities	Access	Sustainability
10	Gardiner Pass Trail Restoration	The Gardiner Pass Trail will no longer be a stock travel route or a maintained trail under the WSP. Portions of the trail near in Charlotte Creek, over Gardiner Pass, and into Gardiner Basin are still evident on the landscape, and in places cause active erosion. This project would assess the Gardiner Pass Trail under NHPA, then perform landscape restoration or historic preservation as appropriate.	Nat UnD Sol		
11	Dragon Lake Trail Restoration	The Dragon Lake Trail will no longer be a stock travel route or a maintained trail under the WSP. Portions of the trail evident on the landscape and in places cause active erosion. This project would assess the Dragon Lake Trail under NHPA, then perform landscape restoration or historic preservation as appropriate.	Nat UnD Sol		
12	Junction Pass Restoration	The Junction Pass Trail will no longer be a stock travel route or a maintained trail under the WSP. Portions of the trail evident on the landscape and in places cause active erosion. This project would assess the Junction Pass Trail under NHPA, then perform landscape restoration or historic preservation as appropriate.	Nat UnD Sol		
13	Milestone Basin Restoration	The Milestone Basin Trail will no longer be a stock travel route or a maintained trail under the WSP. Portions of the trail evident on the landscape and in places cause active erosion. This project would assess the Milestone Basin Trail under NHPA, then perform landscape restoration or historic preservation as appropriate.	Nat UnD Sol		
14	JMT-PCT Tyndall Reroute	This Class 2 trail is on a hillside meadow and the trail is deeply rutted by a stream crossing. This project would reroute the trail to higher, more stable ground and perform landscape restoration on the abandoned trail segments.	Nat		Yes
15	Elizabeth Pass South Reroute	Existing trail alignment is not sustainable for a Class 2 trail due to steep terrain, meadows, and wetlands. Tread erosion is severe in places and ongoing. Establish a sustainable alignment and restore abandoned trail sections.	Nat Sol	Yes	Yes
16	Coppermine Pass Trail Restoration	Coppermine Pass Trail connects upper Cloud Canyon and upper Deadman Canyon over Coppermine Pass. The trail was originally constructed to access copper deposits in those areas. Under the WSP, this trail will not be maintained. Portions of the trail are still evident on the landscape and in places cause active erosion. This project would assess the Coppermine Pass Trail under NHPA, then perform landscape restoration or historic preservation as appropriate.	Nat UnD Sol		

Project Map Number	Project Name	Description	Wilderness Qualities	Access	Sustainability
17	Upper Wallace Creek Alignment	The Upper Wallace Creek Trail is being established in the WSP as a Class 1 trail open to stock use. There is a meadow between the High Sierra Trail and Waterfall Meadow where the existing "designated unmaintained route" cannot sustainably carry stock traffic. This project would relocate the trail from ground that is not suitable for a Class 1 stock use trail. Landscape restoration would be done on the abandoned trail sections.	Nat UnD Sol	Yes	Yes
18	Kern Bridge "Maze" restoration	During the 1990s, this trail was rerouted onto stable ground. The abandoned trail near the river never had landscape restoration work done. This project would perform landscape restoration work on the trail section abandoned in 1982-1985.	Nat UnD Sol		
19	Lower Kern Reroute	The Kern river has moved to the west and seasonally floods many sections of the trail. This project would reroute the trail to higher ground in two locations totaling about 2000 LF and perform landscape restoration on the abandoned trail segments	Nat	Yes	Yes

Nat = Natural
UnD = Undeveloped
UnT = Untrammeled
Sol = Solitude
Oth = Other

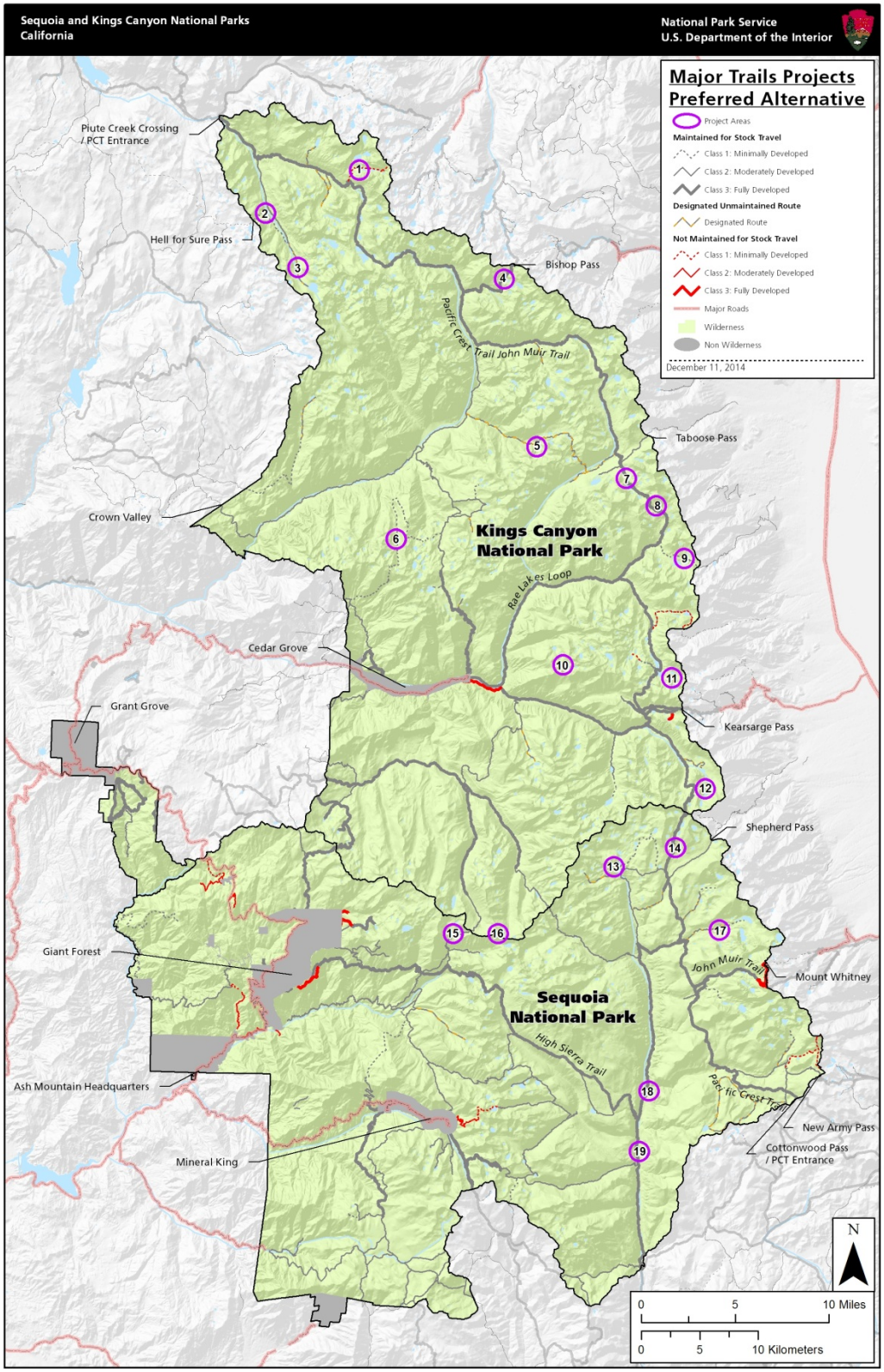


Figure K-2: Major Trail Projects for the Preferred Alternative

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ATTACHMENT 3:
PROGRAMMATIC CATEGORICAL EXCLUSION

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PROGRAMMATIC CATEGORICAL EXCLUSION

The Programmatic Categorical Exclusion (PCE) for Routine Maintenance and Repairs to Trails for the Preferred Alternative. This PCE will be updated annually to identify significant new work projects covered, reflect any changes in best management practices, and to ensure it remains compliant with law, regulation, and policy.

Since the trail maintenance programs at Sequoia and Kings Canyon National Parks are also expected to perform maintenance on non-wilderness trails, drift fences, and wilderness camps, those topics are also included in the PCE.

Other Sequoia and Kings Canyon National Parks documents referenced in this PCE include:

- Management Directive 009 - Wilderness Stock Use and Group Size Management (MD-9)
- Management Directive 049 - Minimum Requirement Analysis – Determination (MD-49)

TRAILS AND TRAIL BRIDGE MANAGEMENT PROJECT DESCRIPTION

PROGRAMMATIC CATEGORICAL EXCLUSION FOR ROUTINE MAINTENANCE AND REPAIRS TO TRAILS, SEQUOIA AND KINGS CANYON NATIONAL PARKS

The purpose of the trail maintenance program at Sequoia and Kings Canyon National Parks is to provide for visitor access and a diversity of recreational experiences, to ensure visitor safety and enjoyment, and to promote resource protection by encouraging trail use. The purpose of wilderness trails is to protect wilderness character and provide outstanding opportunities for primitive and unconfined wilderness recreation and visitor enjoyment.

This categorical exclusion document (CE) will serve as a formal record for routine trail operation and maintenance activities for the years 2010-2014. The Council on Environmental Quality (CEQ) directs agencies to use CEs for actions "which do not individually or cumulatively have a significant effect on the human environment and which are therefore exempt from requirements to prepare an environmental impact statement" (40 CFR §1500-1508). This project is categorically exempt under NPS Director's Order #12, Action 3.4 C. 3: *Routine maintenance and repairs to non-historic structures, facilities, utilities, grounds, and trails.*

The National Park Service (NPS) maintains a trail system of approximately 800 miles of foot and horse routes in the wilderness and frontcountry areas of the parks.

Activities covered under this programmatic document include: maintaining, repairing, and rebuilding damaged/deteriorated walls, trail tread, drainage structures, signs, and other structural elements; rebuilding and repairing trail bridges including decking, railings, approaches, abutments, and stringers; removing fallen trees and rocks and debris from the trail corridor; repairing sections where erosion and other landscape processes have compromised trail integrity; creating barriers to discourage trail shortcutting, trail widening, and use of informal trails; restoring landscape damage from abandoned trail segments; and maintaining/repairing asphalt paths and multi-use trails. This project also covers the maintenance and repairs to stairs, railings, and other trail features; repair and replacement of benches; repair, maintenance, and replacement of drift fences; and repair and replacement of signs, kiosks, and wayside exhibits located along the parks' trails.

It is also the intention of this CE to cover trail crew camps.

This CE can cover minor trail reroutes as long as they are evaluated in accordance with the guidance provided by D0-12, Section 3.4 C. 11. Examples include, but are not limited to: reconstructing trails around or through landslides and similar events that render the existing trail impassable, rerouting trails where erosion and ongoing trail or resource damage cannot be controlled through hardening in the existing alignment, taking preventative measures to ensure further erosion impact is alleviated or controlled, and relocating a small section of a trail for resource or visitor protection. Additional analysis would be necessary when there is potential for more than minor resource damage to occur or for major trail reroutes. Consultation with the Environmental Review Team (ERT) and subject matter experts (SMEs) is warranted to determine the level of impact from more than minor trail reroutes.

This CE is not intended to cover major off-trail drainage redirection, new trail construction, bridge abutment relocation, and new bridge construction.

COMPLIANCE PROCEDURES

This programmatic CE will be reviewed by the project leaders (Roads and Trail Supervisor and Trail Supervisors) and the Environmental Protection Specialist yearly to ensure consistency and to determine if conditions have changed. Work performed under this CE must apply the techniques, protocols, and methodologies described below. Work must also occur without significant changes in technology, location, capacity, or appearance.

If new techniques or significant changes in the scope of work are proposed, the project lead will consult with the Environmental Protection Specialist to request an amendment to the CE to cover the proposed changes. The proposed changes would be reviewed by the parks ERT and subject matter experts as warranted, to assure the changes are within the scope of this programmatic CE. The standard for determining a significant change is based on the potential for increasing environmental impacts, as determined by the Environmental Screening Form (ESF).

An annual work plan for work to be performed under this programmatic CE will be submitted each year to the Environmental Compliance Office and posted on the internal Planning, Environment, and Public Comment (PEPC) website. Any non-routine projects proposed under this programmatic document will be reviewed by the Environmental Protection Specialist to determine if these non-routine projects fall within the scope of the programmatic CE. If non-routine project work is added to the programmatic CE, this information will be updated in PEPC and provided to the parks' ERT and subject matter experts for review.

Other documentation, such as Section 106 compliance and a wilderness minimum tool/minimum requirement analysis may be necessary for project work authorized under this programmatic CE.

FRONTCOUNTRY TRAILS ROUTINE MAINTENANCE AND REPAIRS/REHABILITATION

There is a total of approximately 147 miles of frontcountry trails, of which approximately 77 miles of trail are in Sequoia National Park (SEQU) and 70 miles of trail are in Kings Canyon National Park (KICA) (trails located outside of wilderness areas in these parks). There are approximately 36 SEQU bridges/boardwalks on frontcountry trails and 25 in KICA. These trails are usually in or adjacent to developed areas, and some may connect to wilderness. These trails may be constructed of earth, rock, gravel, and logs, and sometimes portions are asphalt or concrete. Constructed features such as bridges, boardwalks, stairs, benches, walls, signs, interpretive displays, and overlooks are made of an assortment of manufactured materials such as steel, aluminum, mortared stone, and milled lumber.

Frontcountry trail maintenance activities are usually conducted by trail crews based in the developed area of the parks. Frontcountry trails generally receive similar maintenance and repairs as wilderness trails, although they typically include more constructed features that need maintenance. The major exception to this is maintenance of asphalt paved trails and winter snow and ice removal.

Asphalt Paths and Multi-Use Trail Maintenance and Repair/Rehabilitation

The routine maintenance and repair of asphalt paved tread with premix asphalt on trails and walks to provide a safe and durable travel surface. Standard asphalt maintenance procedures are as follows:

- Fog sealing: a sealing coat is applied to the trail to prevent water intrusion.
- Crack Sealing: Cracks are sealed with flexible rubberized asphalt that bonds to the crack walls and moves with the pavement to prevent water intrusion.
- Asphalt Patching: Damaged materials are removed, new aggregate road base is installed and compacted, tack oil is applied, and new asphalt material is installed and compacted.
- Asphalt Overlays: Deteriorated sections of asphalt surface are repaired and overlaid with 1 to 3 inch lifts of new compacted asphalt material.
- Shoulder Maintenance and Repair: As road shoulders deteriorate, they are repaired by replacing compacted aggregate road base or other fill material up to the grade of the asphalt surface to provide edge protection and minimize grade change.
- Asphalt Replacement-in-kind: In locations where existing asphalt is extensively deteriorated, the old asphalt may be removed and recycled into the base course or removed from the parks prior to installation of new asphalt.

Equipment – Mid-sized trucks and loaders, 4WD utility vehicle, pavers and compactors, motorized and non-motorized hand tools, welders, generators.

Impacts of Not Performing Activity – Trail surface deteriorates and becomes hazardous to users, and promotes the establishment of off-trail parallel alignments, drainage, erosion, and sedimentation impacts, and vegetative and other possible resource impacts.

Winter Snow and Ice Control

Removal of snow and ice from the Grant Tree Trail and the lower portion of the Sherman Tree Trail and sanding of the trails for footing on bad icy spots. Snow removal takes place after each snowfall event, and road sand is applied as needed by hand on icy spots. In the spring any accumulated sand is swept from the trail.

Equipment – Mid-sized loader and with plow or rotary attachment, motorized and non-motorized hand tools, skid steer with rotary snow blower, walk behind (manually propelled) snow blower, small 4-wheel drive utility vehicle, walk-behind, or vehicle-mounted broom.

Impacts of Not Performing Activity – Loss of trail service to visitors in the winter. Risk of visitor injury from slips and falls.

WILDERNESS TRAILS ROUTINE MAINTENANCE AND REPAIRS/REHABILITATION

There are approximately 665 (395 SEQU, 270 KICA) miles of trail located within the designated or potential/proposed wilderness of the parks, which covers approximately 97% of the park. There are

approximately 15 trail bridges in wilderness within Kings Canyon and 22 trail bridges in Sequoia. The goal of this program is to conduct maintenance as needed on all of the parks' trails each year. However, generally, at least 85% of the parks' trails receive some level of maintenance when conditions allow. Work can occur year round; work can be performed in the lower elevations during the fall, winter, and spring, and work can occur in the higher elevations during the summer as conditions allow. Summer is generally the peak season for trail work.

Wilderness trails are maintained and improved by trail work crews that are often based in wilderness, with subsequent logistical support facilities and actions. Trails in the parks' wilderness areas are constructed primarily of available native materials including earth, rock, gravel, and logs. Causeways of timber, rock and earth may be constructed in wet areas. Trails are generally 2-3 feet wide, but may be wider in areas of heavy use or rough terrain, where additional space is required for appropriate uses (e.g., stock with pack boxes, or extreme exposures). The trail prism is generally defined as the corridor through which the trail passes, no greater than 8 feet either side of the centerline of the trail, and 12 feet high.

To support recreational use of these trail systems and to manage human impacts associated with use, in addition to the trails, the parks also maintain the following trail-associated items:

- Trail crew camp facilities (food storage lockers, stock accoutrements) at existing wilderness camp sites
- Signing (directional)
- Footlogs and bridges
- Some locations have designated trailside camps with limited improvements (site markers, food storage lockers, campfire rings, hitching rails, and other stock amenities)

Trail maintenance includes clearing trails (brushing, limbing, downed tree removal, live tree removal, rock and debris removal, and scaling), maintaining drainages, walls, and other trail structures (cleaning drainage structures and replacement/repair/installation of rock and log trail structures), general trail maintenance (tread maintenance and repair, trail delineation, safety railing repairs, sign repair/replacement, drift fence and designated campsite maintenance, trail condition assessments), maintaining bridges (bridge maintenance and repairs), safety rail repairs, minor reroutes (minor reroutes and abandoned trail restoration), operational support (camping, livestock packing, helicopter use, staging areas, other operational support), and various tasks incidental to trail work (blasting, rock quarrying, winching and rigging, trail closures).

Specific activities that will always require additional consultation or approval include: generally prohibited acts in wilderness (minimum requirements analysis, or MRA is required), variances from the Superintendent's Compendium restrictions (including variances to groups size limits and campfire prohibitions), variances from the Stock Use and Meadow Management Plan, or work in known areas of sensitive resources. Also, it should be noted that although tool/equipment lists are provided under each activity below to give an idea of what is typically used for a given job, actual tools used may include any wilderness-appropriate tool that is appropriate for a listed activity.

CLEARING TRAILS

Trail clearing includes many of the trail maintenance activities described as follows:

Brushing

Brushing is the clearing and disposal of limbs and brush to provide adequate lateral and vertical clearance on the trail corridor. This is in addition to spring opening. Limbs and brush are disposed of off-trail, out of drainages, and out-of-sight. The width of the vegetation removal varies considerably, depending on elevation, aspect, vegetation type, and other factors. On brushy south-facing slopes where annual growth can be in excess of three feet per year, the trail is cleared wider. In higher alpine areas where growth is slow, a narrower corridor is brushed. On Class 2 or Class 3 stock use trails, the standard applied is approximately 8' wide from centerline and 10' high. On Class 2 or Class 3 hiker trails, the standard applied is approximately 6' wide and 8' high. Class 1 trail brushing varies. The cuts are made to the ground or to nearest fork in a branch. All cuts are made cleanly, avoiding any shredding or tearing. Tree branches are cut flush with the trunk. Trees with the potential to encroach upon the trail corridor are removed. Young trees are also removed to preserve the integrity of the trail corridor. Stumps are flush-cut. Slash is stashed out of sight whenever possible for aesthetic reasons. It may also be used to block trail shortcuts.

Limbing

A limbing saw is used to cut low-hanging branches that intrude into the trail corridor. The standard is generally to cut anything that hangs down to within about 10 feet of the ground. Cuts are made cleanly and flush with the trunk. Slash is stashed out of sight of the trail whenever possible for aesthetic reasons. It may also be used to block trail shortcuts.

Downed Tree Removal

The clearing of downed/windfall trees that cross/block a trail to provide adequate lateral and vertical clearance on the trail corridor. This is performed as part of spring opening, and throughout the year as needed on trails that are open year round. Depending on the circumstance this involves simply moving the log or cutting an opening through it to provide adequate lateral clearance, or removing a larger portion of an overhanging tree. Downed trees are cut to a width which allows enough space for the user group of any given trail segment to pass easily and safely. Cut rounds are rolled off the trail. Worker safety is of primary concern in deciding the approach to take.

Live Tree Removal

Trees that interfere with the trail corridor are considered for removal. This includes leaners, and live trees that will interfere with the integrity of the trail corridor in the near future. Leaners may be of any size, but live trees removed will typically be under 12" diameter at breast height (dbh).

Rock and Debris Removal

In order to keep the trail corridor clear, the trails program uses a number of techniques to remove rocks and debris that have fallen in the trail:

- Move rocks or debris off the trail using muscle or hand tools.
- Move rocks to the side of the trail using hand winches (e.g., grip hoists) to drag the rocks out of the corridor.
- Blast rock or debris off the trail with surface charges.
- Drill rocks with gas or air powered rock drills and split the rocks with steel wedges (plugs and feathers) so that they are more manageable to move by hand or with grip hoists.

- Drill rocks and use explosives or other explosive-like products to break rocks into smaller pieces so that they are more manageable to move by hand or with grip hoists.

Scaling

Scaling involves the light use of a rake or shovel on the uphill side of the trail to bring down loose rocks and branches that are likely to wash, roll or fall down onto the trail within the following year. These materials are removed so they will not end up impeding the function of drainage structures or become obstacles to trail users. These materials are disposed of by being moved off the trail; or by being used in trail repair, shortcut blocking, back-filling, or some combination of these.

Equipment – Motorized and non-motorized hand tools, winching and rigging equipment, livestock and tow ropes, explosives.

Impacts of Not Performing Activity – Trails remain blocked by limbs, brush, windfall trees and rocks. Hikers and stock users establish alternate non-maintained routes around blocked trail segments causing multiple trails, erosion and drainage impacts, vegetative and other possible resource impacts. Drainage systems may fail resulting in impacts to the trail and off-trail resources.

MAINTAINING DRAINAGES, WALLS, AND OTHER TRAIL STRUCTURES

This includes annual clearing of drainage structures, as well as repair, replacement, and installation of various log and rock trail structures (drainage structures, retainer bars, trail tread riprap, retaining walls, and cribbing). Typically new structures are installed in the trail to slow trail tread erosion and provide for adequate footing for allowed trail users (foot or stock traffic, as appropriate).

Maintaining Drainages

This activity involves maintaining, restoring, or establishing trail drainage structures to proper depth and shape for optimum performance. Maintaining drainage structures and digging new ones are performed on the trail tread and the immediately adjacent uphill and downhill slopes. In some cases, off-trail drainages have been established to help keep the flow of water within the drainage structures. Maintenance of these structures is limited to digging out accumulated dirt, rock, and organic material, within the confines of the previously impacted area.

Replacement/repair/installation of Rock and Log Trail Structures

Repairs are made to damaged, non-functioning trail structures. Drainage, retaining, or tread structures are constructed within the trail prism to preserve the tread, prevent resource damage, maintain drainage, and provide for visitor safety. Trail structures are repaired/constructed using local, native materials, and traditional methods.

For stone structures, dry stone masonry techniques are typically used. Wet masonry is used in rare instances, essentially only for bridge abutments and frontcountry trails. Historic building techniques are replicated whenever possible.

Onsite stone used for these structures is (in order of preference): rocks that are loose and within the trail corridor; rocks close to the trail lying atop the ground; and rocks close to the trail that are partially buried. Any movement of rocks includes subsequent and immediate restoration of the area from which the rock is removed. Where no rock of the appropriate size and shape is available, rocks may be quarried (see Rock Quarrying) or in the case of frontcountry work, purchased or brought in from one of various rock caches

within the park. Standard procedures of the parks will be followed to ensure that all equipment and materials brought into the parks are free of non-native, invasive plants and animals, and noxious weeds. All staff working on site shall be informed of and follow best management practices for preventing the introduction and spread of non-native, invasive species.

Structures are repaired in-kind, although log structures are often replaced with rock for longevity. Logs are sometimes used where no rock is available. The material comes from fallen, standing dead, or live trees (where felling will not have an adverse effect on the forest). All stumps are flush cut with the ground and disguised.

Where new raised causeways are required to prevent increasing trail-associated resource damage or to provide adequate trail footing, they will be constructed so as to minimize the effects on natural hydrologic processes. Where a raised causeway that might have an impact on natural hydrologic processes is seen as the only possible trailwork solution by the crew leader on site, then the Trails Supervisor and appropriate subject matter experts from the Division of Resources Management and Science will be consulted before proceeding.

Equipment – Motorized and non-motorized hand tools, grubbing tools, winching and rigging equipment, livestock, explosives.

Impacts of Not Performing Activity – Trails degrade beyond usability. Hikers and stock users establish alternate non-maintained routes around impassible trail segments causing multiple trails, erosion and drainage impacts, vegetative and other possible resource impacts. Uncorrected small trail structure failures become large problems. Drainage systems may fail resulting in impacts to the trail and off trail resources. Failing drainage structures lead to increased erosion and resource impact.

GENERAL TRAIL MAINTENANCE

Tread Maintenance and Repair

This activity involves repairing the trail surface by replacing material lost to natural processes. On sidehills, the trail bench is restored by "re-hinging" the trail: cutting slough out of the inside hinge and spreading it on the trail and pulling the outside berm back into the trail. At other locations where rock and soil fill need to be brought in to replace material lost to erosion, rock will be used as described above for constructing stone trail structures. Soil will be used (in order of preference): from any trailside berm or deposition at trail drainage outwashes, from the trail tread, from barren or freshly disturbed areas near the trail (e.g., avalanche debris, bases of uprooted trees), and from lightly vegetated areas. Any areas of soil "borrow" will be immediately restored. Soil will not be replaced on an eroded trail unless accompanied by trail construction to ensure it will not be lost again.

Trail Delineation

In areas where there are problems with trail visibility or where the trail width is a concern, trails may be delineated with border rocks, and/or border/barricade logs. Informal trails, shortcuts, and trail braids may be disguised using branches, duff, or rocks. Temporary signing may be installed in locations where shortcutting is a major resource damage concern. The temporary signing will be removed when the vegetation in the area has recovered.

Safety Railing Repairs and Replacement

This work involves the repair of existing safety railings and fencing of various types at a variety of frontcountry and wilderness locations. This work sometimes includes the drilling of new holes in rock to support replacement sections of railing.

Sign Repair/Replacement

Work involves replacing existing wilderness trail signs that have been lost or damaged and straightening or resetting existing signs. Only wilderness-type trail signs are covered by this CE.

Drift Fence and Designated Campsite Maintenance

Drift fences are installed in various locations in the parks to manage recreational livestock grazing and protect opportunities for solitude or primitive and unconfined recreation. Fences are typically constructed from native wood posts and imported fence wire and fasteners, although some locations have metal T-posts and other locations have "spookums" constructed from logs and rock. Maintenance to these fences consists of annual setting up and dropping the wire, replacing posts in-kind as they become unserviceable, and splicing wire. Drift fence locations will not be changed without following the procedures outlined in the WSP and MD-9.

Designated campsites may have site markers, native stone fire pits, metal bear-proof food storage boxes, and stock hitchrails. Site markers are maintained similarly to other trail signs. Stone fire pits may be cleaned of ashes and the ashes scattered in hidden locations (typically in brush) after trash is removed. Otherwise stone firepits are maintained as are stone trail structures. Bear-proof food storage boxes have hinges oiled and latches replaced as needed, and dents pounded out. Any other repairs to food storage boxes typically require replacement, which requires ERT review. Stock hitchrails are freestanding native wooden rails fastened to native wood posts. They are replaced in-kind as rails or posts rot out.

Condition Assessments

Trails are generally assessed on a 5-year rotation for deferred maintenance. An aggregate inventory is also maintained of the existing trail structures. Global Positioning System (GPS) locations and photos are used where warranted as a means of documenting trail conditions for assessing work and recording completed work.

Equipment – Non-motorized and motorized hand tools, livestock, explosives, winching and rigging gear may all be utilized for general trail maintenance activities.

Impacts of Not Performing Activity – Trail alignment and surface deteriorates and becomes hazardous to users, and promotes the establishment of multiple trails, drainage, erosion, and sedimentation impacts, and vegetative and other possible resource impacts. Visitor safety may be at-risk from not conducting these activities. Desired primitive recreational opportunities are lost. Campers create new sites when existing ones are poorly maintained. Stock impacts increase due to inability to hold stock as required by MD-9.

Bridge Maintenance, Repairs, and Replacement

Maintenance and replacement in-kind of all or parts of a bridge or footlog to ensure a safe and stable trail surface.

Equipment – pack stock, motorized and non-motorized hand tools; cement mixer, generator; helicopter transport of materials and equipment may be required

Note: Major bridge replacement will likely require a separate analysis and compliance.

Impacts of Not Performing Activity – If bridges, footlogs, or boardwalk segments are not repaired or replaced, extreme safety hazards for trail users may occur which could result in a loss of diversity in primitive recreational opportunities. Damage to riparian environments may occur as trail users search for alternative routes across rivers and drainages. Around wet segments of trail, alternate informal trails may be established resulting in: erosion and drainage impacts, vegetative and other possible resource impacts, and impacts to visitors' enjoyment of the scenic quality of wilderness.

MINOR REROUTES

Constructing Reroutes

Reroutes are constructed so as to minimize resource damage and landscape and scenery impacts. Routes are selected that require the minimum of construction and trail-related structures, and construction is performed to match the character of the trail around it. All phases of construction are performed according to the relevant guidelines in this document.

Restoring Abandoned Trails

Restoration of abandoned trail segments will be completed immediately on completion of a new trail reroute, and may also be performed on long-abandoned trails that exist as landscape scars. Restoration efforts focus on restoring natural processes, ecological function, and scenery. Soil and rock fill needed to restore contour will be gathered as outlined in tread repair above. Local native vegetation will be used for plantings. "Borrow" sites for fill and vegetation will be restored to natural appearance and ecological function.

Equipment – Motorized and non-motorized hand tools, winching and rigging equipment, livestock, explosives.

Impacts of Not Performing Activity – Trails on unsustainable alignments continue to damage the parks' resources and provide poor recreational opportunities. Hikers and stock users establish alternate informal trails around difficult trail segments causing erosion and drainage impacts, vegetative and other possible resource impacts, and impacts to visitors' enjoyment of the scenic quality of wilderness. Abandoned trails continue to scar landscape and erosion continues unchecked.

OPERATIONAL SUPPORT:

Trail Camps

Trail crews will camp and use the wilderness in accordance with "Leave No Trace" techniques and regulations of the parks for public camping in wilderness areas. Exceptions to this are that crews (and crew members on lieu days in wilderness) are exempt from permitting requirements and camp duration limits, and trail crew camps may require "hardening" before use and restoration afterwards. Large crew/long duration adaptations of "Leave No Trace" include digging latrines and sumps, establishing paths around camp and to water, digging holes to set up poles for rain flies. Prefabricated camp appurtenances are encouraged (e.g., tables, chairs, free standing tents). In some locations, core camp areas and in-camp trails will be hardened with skrim or other fabric.

Where possible, crews use established stock camps, trail crew camps, and backpacker camps. When a project requires that a virgin site be used for crew camping, appropriate Resource Management & Science

and Visitor, Fire, & Resource Protection SMEs will be consulted regarding camp selection. Paramount in selecting a new site will be ability to restore the site once the work project is completed and the camp is no longer needed. A typical camp for 4-6 workers for 2-6 weeks would include a 16'x20' rain fly over a communal cooking area with tables or benches, a fire pit, food storage boxes, a rain fly for tool storage, an open-air pit toilet, a greywater sump, and individual sleeping areas with tents.

Livestock Packing

Trail crews are often resupplied by NPS or commercial pack stock. All grazing and stock use is done within the constraints of the WSP and MD-9, and using "Leave No Trace" stock techniques.

Helicopter Use

Helicopter support is used to resupply crews when a trail camp location is so remote that stock support is infeasible or would cause a greater impact to wilderness than helicopter support would, or when materials needed for work projects cannot be packed by stock. Helicopter support must be approved by the Superintendent on a project basis in accordance with MD-49, and requires the submission of a separate MRA.

Staging Areas

Staging areas may be needed to stockpile materials (primarily stone and aggregate base material), especially in frontcountry locations. Staging areas must be localized to job sites to prevent spread of non-native plants from one area of the parks to another. Pollution prevention measures and erosion control measures must be in effect, and natural features protected from scarring or damage while staging areas are in use. The only soil disturbance that may occur is on the surface. Upon project completion all areas must be restored back to their original condition.

Other Operational Support Functions

The trails program has various activities that would be classified as operational support including.

- Cleaning, maintaining tools – including repair to motorized and non-motorized tools such as chainsaws, rock drills, pumps, shovels, axes, and hammers.
- Transportation of equipment, food, supplies, stock and personnel in motor vehicles on roads.
- Fabrication work in support of trail work such as cutting of metal backcountry trail signs and fabricating camp gear or bridge parts.

TASKS INCIDENTAL TO TRAIL WORK

Blasting

All blasting activities will adhere to *NPS Director's Order 65. Explosives Use and Blasting Safety* (DO-65). In order to provide for public safety, trails will be closed by trail crews for the duration of blasting operations, with adequate site security and communication as determined by the Blaster in Charge. The crew will alert the parks' Dispatch Office at the beginning and the end of all blasting operations per DO-65 protocol.

Rock Quarrying

Where building material is unavailable, crews may have to quarry for building stone. In the backcountry, nearby rock sources are used. In the frontcountry, approved rockfall locations and previously stockpiled rock may also be used. Rocks are chosen that are the right size so that all of the rock can be used on the project and no cut rock faces are left behind.

Equipment – Gas- or air-powered rock drills for drilling freestanding rocks, steel wedges (plugs and feathers) or explosives to split rocks. Blasting equipment, motorized and non-motorized hand tools, stock, pack boxes, stoneboats.

Winching and Rigging

Rigging is used to move materials to where they are needed. Various powered and non-powered winches are used (e.g., comealong, Griphoist, chain hoist, chainsaw winch). Rocks and trees are used to provide anchors for rigging. Holes may be drilled in rock to support an anchor for rigging. As discreet a location as possible is chosen for this. Winching and rigging operations may require short-duration trail closures while objects are suspended above the trail.

Trail Closures

Trails have various levels of closure during repairs. If visitors can safely pass through the work zone while the work is going on, then the workers notify each other when visitors are coming and stop any activities that would have potential to hurt the visitors (hammer swinging or rock moving) until the visitors pass. Some situations are too dangerous to allow visitors to pass while work is going on (e.g., highline operation or moving stones on a switchback); in this case, a trail worker will hold the visitors until work can be stopped and conditions allow safe passage. Popular trails may need to be completely closed during working hours to allow for visitor safety. If a trail is to be closed, the trailhead is signed and, where possible, an alternate route is established. The Wilderness Management Office, Public Information Office, Visitor Centers, and Gateway Partners are also notified. All seasonal and natural hazard (e.g., rockfall) closure decisions are made by the Division of Visitor, Fire, and Resource Protection in consultation with other divisions of the parks as warranted.

STANDARD MITIGATIONS AND BEST MANAGEMENT PRACTICES FOR TRAILWORK

Protect Wilderness Character

- Appropriate actions should be taken to protect wilderness character. Any mechanized equipment use, installation, or other 4(c) prohibitions, shall be analyzed for compliance with the Wilderness Act.
- Prepare a minimum requirement analysis as soon as practicable, and submit to the Wilderness and Environmental Compliance offices allowing at least 3 weeks for review.
- Helicopter support must be approved by the Superintendent on a project basis in accordance with MD-49, and requires the submission of a separate supplemental MRA.
- Camp and travel in wilderness using Leave No Trace techniques.

Protect Health and Safety

- Tree hazards should be considered in selection/ maintenance of wilderness administrative camps.

Protect Cultural Resources

- The locations of trail camps, trail reroutes, and similar areas of potential impact may have to be surveyed on a case-by-case basis. Contact the parks' Cultural Resource Specialist for case-by-case guidance.
- Avoid work in areas where known cultural resources exist.

Protect Native Wildlife

- Trail realignments in bighorn sheep critical habitat require separate compliance and consultations with US Fish and Wildlife Service. See attached map in PEPC.
- Bear-proof food storage boxes have hinges oiled and latches replaced as needed, and dents pounded out. Any other repairs to food storage boxes typically require replacement, which requires Environmental Review Team review and Minimum Requirements Analysis under the WILDERNESS STEWARDSHIP PLAN and MD-9.
- Comply with food-storage and garbage disposal requirements at all times.

Protect Wild and Scenic Rivers

- Comply with the parks' General Management Plan-specified "river protection measures."

Protect Water Quality and Aquatic Ecosystems

- Avoid in-stream work.
- Where new raised causeways are required to prevent increasing trail-associated resource damage or to provide adequate trail footing, they will be constructed so as to minimize the effects on natural hydrologic processes. Where a raised causeway might have impacts on natural hydrologic processes and is seen as the only possible trailwork solution by the crewleader on site, the Trails Supervisor and the Branch Chief, Biodiversity and Ecological Resilience, Division of Resources Management and Science, will be consulted before proceeding.

Prevent Introduction and Spread of Non-Native Plants- Stock

- Prior to entering the parks for the season, the exterior of all stock vehicles and trailers will be pressure-washed or steam-cleaned to remove mud and plant material. Inspect and clean truck and trailer interiors; contain and dispose of sweepings.
- Before returning from winter pastures outside the parks, the hooves and hair of stock animals will be thoroughly cleaned to remove all mud and vegetative matter.
- Arrange with Invasive Plant Management staff to periodically inspect winter pastures for invasive plants before moving animals into the parks' pastures.
- Before leaving a pack station and entering wilderness, or prior to leaving a low-elevation pack station for a high-elevation pack station, animals will be inspected and cleaned of mud and vegetative matter, particularly for pack stations that do not have regular weed control activities, such as Ash Mountain. Inspect and clean tack and equipment.
- Consult with Invasive Plant Management staff to control weeds at frontcountry pack stations.

- In the frontcountry, stock will be fed California certified weed-free feed. Any stock feed used in wilderness will be processed to eliminate viable seeds (e.g., steam-rolled grains, pellets, Chaffhaye).
- As practical, for example when there is only one or two head of stock, feed stock on top of tarps rather than on bare ground. Pack out or burn residue or feed.
- Tie or hold stock in ways that minimize soil disturbance and avoid loss of desirable native vegetation.

Prevent Introduction and Spread of Non-Native Plants- Import Materials

- Use on-site fill materials whenever possible, without adverse impacts to local site. If import fill is necessary, consult with Invasive Plant Management staff prior to beginning procurement to ensure purchase of clean material. Do not move stockpiled earth materials from lower to higher elevations without consulting with Invasive Plant Management staff.

Prevent Introduction and Spread of Non-Native Plants- Equipment

- Before moving vehicles or equipment (such as Off Road Vehicles, backhoes, bobcats, etc.) to a new job site, particularly from lower to higher elevations, inspect and clean equipment thoroughly to remove all mud, dirt, and plant parts. Consult with Invasive Plant Management staff for cleaning techniques and procedures. If possible, clean vehicles before leaving each job site.
- Ensure that rental equipment is free of mud, dirt, and plant parts before the contracting officer's representative accepts it.

Prevent Introduction and Spread of Non-Native Plants- Tools

- Thoroughly inspect and clean dirt, mud, and plant parts from tools (shovels, pulaskis, winches, saws, weed eaters, etc) prior to mobilizing to a new job site, particularly when moving within the foothills or from a lower to higher elevation. A sufficient cleaning typically involves scrub brushes and picks to get out all seeds. Pay particular attention to chainsaws and other types of fast action equipment that have compartments that transport seed. Once mobilized, inspect and clean tools ON SITE, before leaving a job site.

Prevent Introduction and Spread of Non-Native Plants- Crews

- Inspect and clean shoes, clothing, and camping equipment of dirt, mud, and plant parts before mobilizing to a new job site, particularly when moving from lower to higher elevations. Clean shoes and lower extremities prior to leaving job site, particularly if there are known weed infestations in area (such as cheatgrass on Kings Middle Fork Trail and High Sierra Trail).
- Arrange for weed awareness training annually between trail crews and Invasive Plant Management staff. Coordinate with the parks' Invasive Plants Specialist.

Protect Native Vegetation and Soils

- Staging areas must be localized to job sites to prevent spread of non-natives from one area of the parks to another. Pollution prevention measures and erosion control measures must be in effect, and natural features protected from scarring or damage while staging areas are in use. The only

soil disturbance that may occur is on the surface. Upon project completion, all areas must be restored back to their original condition.

- All grazing and stock use is done within the constraints of MD-9 and using "Leave No Trace" stock techniques.
- Drift fence locations will not be changed without following the procedures outlined in the WILDERNESS STEWARDSHIP PLAN and MD-9.

Protect Native Vegetation and Soils- Crew Camps

- Where possible, crews use established stock camps, trail crew camps, and backpacker camps. When a project requires that a virgin site be used for crew camping, appropriate Resource Management & Science and Visitor, Fire, & Resource Protection subject matter experts will be consulted regarding camp selection. Paramount in selecting a new site will be ability to restore the site once the work project is completed and the camp is no longer needed.

Protect Native Vegetation and Soils- Restoration

- Consult with Restoration Ecologist on restoration techniques.

Protect Native Vegetation and Visual Resources

- Minor trail reroutes will be constructed to minimize resource damage and landscape and scenery impacts. Routes are selected that require the minimum of construction and trail-related structures, and construction is performed to match the character of the trail around it.
- Restoration of abandoned trail segments will be completed immediately on completion of a new trail reroute, and may also be performed on long-abandoned trails that exist as landscape scars. Local native vegetation will be used for plantings.
- All cuts are made cleanly, avoiding any shredding or tearing. Tree branches are cut flush with the trunk and stumps are flush-cut.
- Informal trails, shortcuts, and trail braids may be disguised using branches, duff, or rocks. Temporary signing may be installed in locations where shortcutting is a major resource damage concern. The temporary signing will be removed when the vegetation in the area has recovered.
- Limbs and brush (slash) are disposed of off-trail, out of drainages, and out-of-sight. Cut vegetation is hidden from trail users and dispersed into native vegetation.

ATTACHMENT 4:
LIST OF TRAILS WITH PARTICULARLY COMPELLING HISTORIC CONTEXT OR WHOSE HISTORIC CHARACTER IS LARGELY INTACT

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LIST OF TRAILS WITH PARTICULARLY COMPELLING HISTORIC CONTEXT OR WHOSE HISTORIC CHARACTER IS LARGELY INTACT AND PRIORITY FOR EVALUATION PER NPS-28 CULTURAL RESOURCE MANAGEMENT GUIDELINE AND SECTION 110 OF THE NATIONAL HISTORIC PRESERVATION ACT (NHPA)

Trails are divided into 5 tiers for the purposes of prioritizing needs for evaluation of historic properties/features per NPS-28 Cultural Resource Management Guideline and Section 110 of the NHPA and for preservation of trail features:

- Tier 1: Previously assessed per NPS-28 Cultural Resource Management Guideline; either by preparation of a determination of eligibility (DOE) or by inclusion on the NPS List of Classified Structures (LCS). Trail exhibits significant historical integrity/context; intact features. These would have the highest priority for preservation.
- Tier 2: First priority for assessment per NPS-28 and next level of priority for preservation of identified historical features. Trail exhibits some integrity with significant historical context, intact features may need preservation.
- Tier 3: Second priority for assessment per NPS-28; intact features identified to preserve. Trail may exhibit possibly significant historical context; however, known intact features are not threatened by planned management action.
- Tier 4: Abandoned/moldering trails - assessment per NPS-28 when project work is proposed.
- Tier 5: All other formal trails: Lowest priority for assessment, little known or identified cultural significance; no identifiable historic features to preserve.

Tiers 1, 2, 3, and 5 apply to formal trails; Tier 4 applies to abandoned trails.

Earlier in this Trail Management and Classification System, a distinction was made between routes (travelways of social importance) and formal trails (built and maintained structures). The majority of the routes within the boundaries of Sequoia and Kings Canyon National Park have been used for over 50 years and many routes have been in use for thousands of years. This plan is concerned specifically with trails as constructed facilities and consisting of built features (alignment, bridges, culverts, etc.). In most cases, the contemporary trail does not possess integrity of location, design, setting, materials, workmanship, feeling, and association with the route's earlier history. For example, the Bubbs Creek Trail in Kings Canyon National Park is in a canyon that was used for travel in prehistoric times. The first EuroAmericans to go up Bubbs Creek were J. H. Johnson and Party in 1858. Later, William Brewer and the California Geological Survey crossed the Sierra using Bubbs Creek in 1865. John Muir crossed the Sierra by this route in 1873, and Bubbs Creek was part of the Visalia-Independence Trail in the 1870s. However, as a built structure, the current Bubbs Creek Trail was constructed subsequent to these uses and there are no identifiable historic features to preserve. Because of this, Bubbs Creek has been placed in Tier 5: Lowest priority for assessment.

Table K-3 shows Sequoia and Kings Canyon trails organized by historic priority tier. Although there are many abandoned trails in Sequoia and Kings Canyon, only a small sample with identified potential historic significance was included in the list below. Even though other abandoned trails are not on the list, all abandoned trails will be given consideration as Tier 4 priority for assessment and for preservation of features.

Figure K-3 shows where these trails are in wilderness. Abandoned trails were not shown on the map for two reasons: the geospatial information in hand is incomplete, and most management actions covered by this plan will be taking place on formal trails.

Historical stories that were considered in generating the priority list include:

- Prehistoric uses
- Exploration of the American West and California
- Regional economic development and extractive uses such as mining, grazing, logging, and trapping
- Early history of the parks, administration, and development, including the military administration of Sequoia National Park
- Development of recreational trails
- Sierra Club and pioneering recreationists of the 1890s–1930s

Finally, this list is necessarily a work in progress, as the parks have not yet secured resources to perform a comprehensive inventory of the potential historic value of formal and abandoned trails on park lands.

Table K-3: Wilderness Historic Trails Preservation Priorities

Tier	Trail Name	Wilderness	Significance	Suspected Contributing Features (existing/intact)	Known Compromised Features
1	Colony Mill Road	yes	Recreation/Logging	DOE - CA SHPO - 9/25/1978 The Colony Mill Road is on the LCS (ID 9506).	Documented in DOE
1	Crystal Cave Trail	no	Recreation/CCC	DOE for Crystal Cave Historic District, including the Crystal Cave Road, Parking Lot, Access Trail, Appurtenant Structures, Spiderweb Gate, and Cave Trail System submitted to CA SHPO 5/4/12 The POS is 1938 to 1941 The CC Barrier Gate (LCS ID 58113), CC Comfort Station & Generator Room (LCS ID 58116) and CC Trail (LCS ID 58117) are all on the LCS.	Documented in DOE
1	Moro Rock Trail	no	Recreation/CCC	The Moro Rock Stairway (includes rock walls and stairs) is on the LCS (ID 5026).	Documented in DOE
2	John Muir Trail	yes	Recreation Pre-JMT Histories	Muir/Mather/Forester Passes - Rock walls, alignment Whitney Summit - Rock walls, route Golden Staircase - route Boulder in Lower Goddard Canyon	Rerouted in many places; Lots of later construction/structures
2	High Sierra Trail	yes	Recreation	Alignment Cliff routes, rock walls, Kaweah Gap, Kern switchbacks	Rerouted in many places; Lots of later construction/structures
2	Lakes Trail	yes	Recreation/CCC	Cliff route, rock walls Pear Lake Cabin	Much later construction/structures
2	Hockett-Atwell Trail	yes	Regional commercial development Cattle/grazing Early recreation Early park administrative transportation	Alignment from Atwell to Hockett Meadow East Fork Bridge Approaches Deer Creek walls, Blasting on The Bluffs Various structures along 30% of trail length Hockett Ranger Station	Lots of later construction/structures
2	Upper Soldier Lake Trail (Army Pass)	yes	Early park administration by military	Route Trail tread Rock Walls	Much of trail missing
3	Alta Trail	yes	Early park recreation	Alignment	No structures
3	Marble Falls Trail	yes	Early power development Early park recreation	Mostly original alignment Last half mile has walls	Reroutes in drainages below falls

Table K-3: Wilderness Historic Trails Preservation Priorities (continued)

Tier	Trail Name	Wilderness	Significance	Suspected Contributing Features (existing/intact)	Known Compromised Features
3	White Chief Trail	yes	Mining	Route for access of historic mines, dams	Some later construction/structures
3	Timber Gap Trail	yes	Mining Early park development	Mostly original alignment Switchbacks and walls	Some later construction/structures
3	Timber Gap Cliff Creek Trail	yes	Mining Early park development	Mostly original alignment	Some later construction/structures
3	Franklin Lakes	yes	Mining	Access to mines and dam	Some later construction/structures
3	Tehipite Switchbacks (Winchell-Dusy)	yes	Mining/cattle (Winchell/Dusy)	Original route, unmodified construction	
3	Blue Canyon (beginning of Tunemah)	yes	Sheepherding/cattle	Original route, unmodified construction	Trail moves around within general original route.
3	Non-wilderness Giant Forest Trails	no	Early park recreation	Some parts of alignment	Lots of later construction
4	Little Tehipite Trail (abandoned)	yes	Mining	Route, mines	Trail overgrown and missing in many places
4	Cartridge Pass Trail (abandoned)	yes	Original JMT	Route	Trail overgrown and missing in many places
4	Tunemah Trail (abandoned)	yes	Sheepherding	Route	No trail exists
4	River Valley Trail (HST Construction)	yes	Contributing to HST	Route, walls	Trail overgrown with brush
4	Visalia-Lone Pine Trail (Abandoned)	yes	1860s travel route	Parts of Hockett Trails follow route	Trails mostly not on historic alignment
4	Visalia-Independence Trail (parts of Bubbs/ Kearsarge)	yes	1870s travel route	Parts of Bubbs Creek, Kearsarge Pass	Trails mostly not on historic alignment
4	Junction Pass Trail (Abandoned)	yes	Original JMT	Route	Trail deteriorated and missing in many places

Table K-3: Wilderness Historic Trails Preservation Priorities (continued)

Tier	Trail Name	Wilderness	Significance	Suspected Contributing Features (existing/intact)	Known Compromised Features
4	Cataract Creek	yes	Mining	Route, Trail structures	Trail overgrown and missing in many places
4	Black Oak Trail (abandoned)	yes	Middle park recreation, 1920s	Route	Trail overgrown and missing in many places
4	Coppermine Pass Trail (abandoned)	yes	Mining Early recreation (Stewart E White)	Route Abandoned mines	Missing in many places
5	All other formal trails	Current constructed trail has no known connection to historic uses of the routes they may follow.			

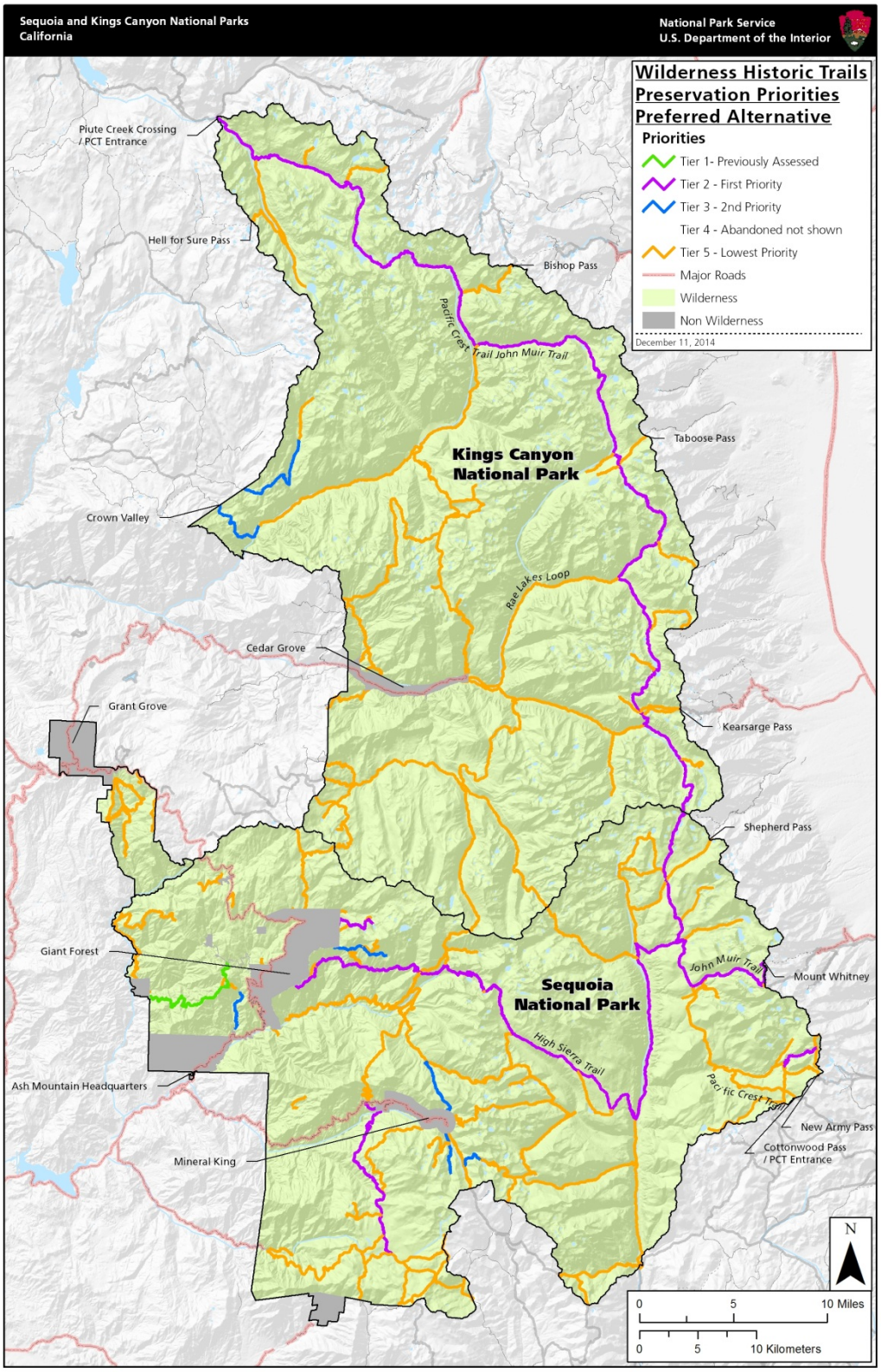


Figure K-3: Preservation Priorities of Historic Wilderness Trails for the Preferred Alternative

ATTACHMENT 5:
ROUTES AND DESTINATIONS OF CONCERN FOR MONITORING INFORMAL TRAIL IMPACTS

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2015 ROUTES AND DESTINATIONS OF CONCERN FOR MONITORING INFORMAL TRAIL IMPACTS

This attachment contains a list and map of routes and destinations of concern where the parks' staff will attempt to make observations to detect undesirable changes to prompt management action.

ROUTES

- High Route (Milestone Basin to Tablelands section)
- Lamarck Col/Darwin Bench
- Miter Basin-Crabtree
- Roper's Route
- Silliman Creek
- South Side Mt Langley
- Tableland Divide
- Glacier Pass to Spring Lake

DESTINATIONS OF CONCERN

- Crabtree Pass
- Crabtree Lakes
- Barrett Lakes
- Dusy Basin
- Guitar Lake
- Rae Lakes
- Moose Lake
- Miter Basin

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Appendix L

Analysis of Special-status Animal Species

ON THE PREVIOUS PAGE
Looking at Timberline Lake
NPS Photo

APPENDIX L:

ANALYSIS OF SPECIAL-STATUS ANIMAL SPECIES

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ANALYSIS OF SPECIAL-STATUS ANIMAL SPECIES

The table below provides an analysis of the federal and state listed and sensitive vertebrate species listed above. Those species that likely would not be measurably affected by the proposed actions were dismissed from further analysis. Those species that have the potential to be measurably affected by the proposed actions were evaluated in the "Special-status Species" or "Wildlife" sections in chapter 4.

Federal Agencies
FE = Endangered
FT = Threatened
FC = Candidate
FSS = Forest Service Sensitive
BLMS = Bureau of Land Management Sensitive

California State Agencies
CE = Endangered
CT = Threatened
CC = Candidate
CSC = Special Concern
CP = Protected
CWL = Watch List
DFS = Department of Forestry Sensitive

Table L-1: An Analysis of the Potential for Proposed Actions to Measurably Affect the Federal and State Listed and Sensitive Vertebrates That are Known to Occur in Sequoia and Kings Canyon National Parks

Common Name	Latin Name	T&E Listed		Other Status		Analysis	Result
		Federal	State	Federal	State		
Fish							
California roach	*Lavinia symmetricus*				CSC	The California roach is a small minnow that is uncommon, and found in rocky pools of small intermittent tributaries and larger streams at low elevations. California roach have been found to congregate in warm pools, which could indicate that they are able to survive at low oxygen levels during the summer (Moyle and Nichols 1973, 484). Visitor use and administrative activities can cause disturbances to this species. However, because disturbances would be short-term, infrequent, and of a negligible impact, this species has been dismissed from further analysis.	Dismissed
Hardhead	*Mylopharodon conocephalus*	-	-	FSS	CSC	There are no records of this species occurring within SEKI; therefore it will not be further evaluated.	Dismissed

Table L-1: An Analysis of the Potential for Proposed Actions to Measurably Affect the Federal and State Listed and Sensitive Vertebrates That are Known to Occur in Sequoia and Kings Canyon National Parks (continued)

Common Name	Latin Name	T&E Listed		Other Status		Analysis	Result
		Federal	State	Federal	State		
California golden trout	*Oncorhynchus mykiss aguabonita*	-	-	FSS	CSC	The California golden trout is native outside the parks in the Golden Trout Wilderness, but has been introduced to many high elevation locations within the parks (NPS 2013b, appendix F, 375; NPS 2013h). Visitor use and administrative activities can cause disturbances to this species. However, because disturbances would be short-term and of a negligible impact, this species has been dismissed from further analysis.	Dismissed
Kern rainbow trout Also called the "Kern golden trout"	*Oncorhynchus mykiss gilberti*	-	-	-	CSC	The Kern rainbow trout is endemic to the Kern River basin, and occupies the mainstem of the Kern River and its tributaries. This species is restricted to mid-elevations due to steep cascades and waterfalls. It was stocked in areas above its range, and it is considered nonnative in those areas (NPS 2013a, 202). Visitor use and administrative activities can cause disturbances to this species. However, because disturbances would be short-term and of a negligible impact, this species has been dismissed from further analysis.	Dismissed
Little Kern golden trout	*Oncorhynchus mykiss whitei*	FT	-	-	-	The Little Kern golden trout is endemic to the Little Kern River basin, which occurs primarily in the Golden Trout Wilderness of Sequoia National Forest, and in a small area of the drainage in Sequoia National Park. Visitor use and administrative activities can cause disturbances to this species. However, because disturbances would be short-term and of a negligible impact, this species has been dismissed from further analysis.	Dismissed
Amphibians							
Yosemite toad	*Anaxyrus (Bufo) canorus*	FT	-	FSS	CSC	This taxon, a federally listed endangered species, may be affected by the alternatives; therefore it will be evaluated in chapter 4.	Evaluated
Mount Lyell salamander	*Hydromantes platycephalus*	-	-	-	CSC	The Mount Lyell salamander is found in the parks but it is uncommon (NPS 2013b, appendix F, 375; NPS 2013h). The Mount Lyell salamander can be found foraging in high elevation aquatic ecosystems, though it is most often found in seeps and the spray zones of waterfalls, or under low-growing plants (NPS 2013b, 32, 382). This taxon would not be affected by the alternatives; therefore it will not be further evaluated.	Dismissed
Mountain yellow-legged frog (Sierra Nevada DPS)	*Rana muscosa*	FE	CE	FSS	CSC	This taxon, a federally and state listed endangered species, may be affected by the alternatives; therefore it will be evaluated in chapter 4.	Evaluated

Table L-1: An Analysis of the Potential for Proposed Actions to Measurably Affect the Federal and State Listed and Sensitive Vertebrates That are Known to Occur in Sequoia and Kings Canyon National Parks (continued)

Common Name	Latin Name	T&E Listed		Other Status		Analysis	Result
		Federal	State	Federal	State		
Sierra Nevada yellow-legged frog	*Rana sierrae*	FE	CT	FSS	CSC	This taxon, a federally listed endangered species and state listed threatened species, may be affected by the alternatives; therefore it will be evaluated in chapter 4.	Evaluated
Reptiles							
Western pond turtle	*Emys marmorata*	-	-	FSS BLMS	CSC	The western pond turtle is commonly found in two low elevation streams within the parks (NPS 2013h). Visitor use and administrative activities can cause disturbances to this species. However, because disturbances would be short-term and of a negligible impact, this species has been dismissed from further analysis.	Dismissed
California legless lizard	*Anniella pulchra*	-	-	FSS	CSC	There are no records of this species occurring within SEKI; therefore it will not be further evaluated.	Dismissed
Coast horned lizard	*Phrynosoma coronatum*	-	-	FSS BLMS	CSC	There are no records of this species occurring within SEKI; therefore it will not be further evaluated.	Dismissed
Birds							
Cooper's hawk	*Accipiter cooperii*	-	-		CWL	Visitor use and administrative activities can cause disturbances to this species. However, because disturbances would be short-term, infrequent, and of a negligible impact, this species has been dismissed from further analysis.	Dismissed
Northern goshawk	*Accipiter gentilis*	-	-	FSS BLMS	CSC DFS	Same as above.	Dismissed
Sharp-shinned hawk	*Accipiter striatus*			-	CWL	Same as above.	Dismissed
Golden eagle	*Aquila chrysaetos*	-	CP	-	DWL DFS	Same as above.	Dismissed
Short-eared owl	*Asio flammeus*	-	-	-	CSC	Same as above.	Dismissed
Long-eared owl	*Asio otus*	-	-	-	CSC	Same as above.	Dismissed
Ferruginous hawk	*Buteo regalis*	-	-	-	CWL	Same as above.	Dismissed
Swainson's hawk	*Buteo swainsoni*	-	CT	FSS	-	Same as above.	Dismissed
Vaux's swift	*Chaetura vauxi*	-	-	-	CSC	Same as above.	Dismissed
Northern harrier	*Circus cyaneus*	-	-	-	CSC	Same as above.	Dismissed

Table L-1: An Analysis of the Potential for Proposed Actions to Measurably Affect the Federal and State Listed and Sensitive Vertebrates That are Known to Occur in Sequoia and Kings Canyon National Parks (continued)

Common Name	Latin Name	T&E Listed		Other Status		Analysis	Result
		Federal	State	Federal	State		
Black swift	*Cypseloides niger*	-	-	-	CSC	Same as above.	Dismissed
Yellow warbler	*Dendroica petechia*	-	-	-	CSC	This species is a known host for brown-headed cowbirds and there is a potential for measurable negative impacts as a result of nest parasitism. Therefore this species will be evaluated (collectively with other bird species that are hosts for brown-headed cowbirds).	Evaluated
White-tailed kite	*Elanus leucurus*	-	CP	-	-	Visitor use and administrative activities can cause disturbances to this species. However, because disturbances would be short-term, infrequent, and of a negligible impact, this species has been dismissed from further analysis.	Dismissed
Willow flycatcher	*Empidonax traillii*	-	SE	FSS	-	This species is a known host for brown-headed cowbirds and there is a potential for measurable negative impacts as a result of nest parasitism. Therefore this species will be evaluated (collectively with other bird species that are hosts for brown-headed cowbirds).	Evaluated
Horned lark	*Eremophila alpestris*	-	-	-	CWL	This species is a known host for brown-headed cowbirds and there is a potential for measurable negative impacts as a result of nest parasitism. Therefore this species will be evaluated (collectively with other bird species that are hosts for brown-headed cowbirds).	Evaluated
Merlin	*Falco columbarius*	-	-	-	CWL	Visitor use and administrative activities can cause disturbances to this species. However, because disturbances would be short-term, infrequent, and of a negligible impact, this species has been dismissed from further analysis.	Dismissed
Prairie falcon	*Falco mexicanus*	-	-	-	CWL	Same as above.	Dismissed
Peregrine falcon	*Falco peregrinus*	Delisted	CP	-	DFS	Same as above.	Dismissed
California condor	*Gymnogyps californianus*	FE	CE	-	DFS	Same as above.	Dismissed
Bald eagle	*Haliaeetus leucocephalus*	Delisted	SE CP	FSS	DFS	Same as above.	Dismissed
Harlequin duck	*Histrionicus histrionicus*	-	-	-	CSC	Same as above.	Dismissed
Northern shrike	*Lanius excubitor*	-	-	-	CSC	This taxon is not found in project area.	Dismissed

Table L-1: An Analysis of the Potential for Proposed Actions to Measurably Affect the Federal and State Listed and Sensitive Vertebrates That are Known to Occur in Sequoia and Kings Canyon National Parks (continued)

Common Name	Latin Name	T&E Listed		Other Status		Analysis	Result
		Federal	State	Federal	State		
California gull	*Larus californicus*	-	-	-	CWL	Visitor use and administrative activities can cause disturbances to this species. However, because disturbances would be short-term, infrequent, and of a negligible impact, this species has been dismissed from further analysis.	Dismissed
Osprey	*Pandion haliaetus*	-	-	-	CWL DFS	Same as above.	Dismissed
Purple martin	*Progne subis*	-	-	-	CSC	This species is a known host for brown-headed cowbirds and there is a potential for measurable negative impacts as a result of nest parasitism. Therefore this species will be evaluated (collectively with other bird species that are hosts for brown-headed cowbirds).	Evaluated
Great gray owl	*Strix nebulosa*	-	SE	FSS	DFS	Visitor use and administrative activities can cause disturbances to this species. However, because disturbances would be short-term, infrequent, and of a negligible impact, this species has been dismissed from further analysis.	Dismissed
Spotted owl	*Strix occidentalis*	-	-	FSS BLMS	CSC	Same as above.	Dismissed
Mammals							
Pallid bat	*Antrozous pallidus*	-	-	FSS BLMS	CSC	Visitor use and administrative activities can cause disturbances to this species. However, because disturbances would be short-term, infrequent, and of a negligible impact, this species has been dismissed from further analysis.	Dismissed
Sierra Nevada mountain beaver	*Aplodontia rufa californica*	-	-	-	CSC	Same as above.	Dismissed
Townsend's big-eared bat	*Corynorhinus townsendii*	-	-	FSS BLMS	CSC	Same as above.	Dismissed
Spotted bat	*Euderma maculatum*	-	-	BLMS	CSC	Same as above.	Dismissed
Western Mastiff bat	*Eumops perotis*	-	-	BLMS	CSC	Same as above.	Dismissed
Wolverine	*Gulo gulo*	FC	ST CP	FSS	-	This species is likely extirpated from the parks.	Dismissed

Table L-1: An Analysis of the Potential for Proposed Actions to Measurably Affect the Federal and State Listed and Sensitive Vertebrates That are Known to Occur in Sequoia and Kings Canyon National Parks (continued)

Common Name	Latin Name	T&E Listed		Other Status		Analysis	Result
		Federal	State	Federal	State		
Western red bat	*Lasiurus blossevillii*	-	-	FSS	CSC	Visitor use and administrative activities can cause disturbances to this species. However, because disturbances would be short-term, infrequent, and of a negligible impact, this species has been dismissed from further analysis	Dismissed
White-tailed jack rabbit	*Lepus townsendii*	-	-	-	CSC	Same as above.	Dismissed
Marten	*Martes americana sierrae*	-	-	FSS	-	Same as above.	Dismissed
Fisher	*Martes pennanti*	FC	-	FSS BLMS	CSC	Same as above.	Dismissed
Small-footed myotis	*Myotis leibii*	-	-	BLMS	-	Same as above.	Dismissed
Long-eared myotis	*Myotis evotis*	-	-	BLMS	-	Same as above.	Dismissed
Fringed myotis	*Myotis thysanodes*	-	-	BLMS	-	Same as above.	Dismissed
Yuma myotis	*Myotis yumanensis*	-	-	BLMS	-	Same as above.	Dismissed
Sierra Nevada bighorn sheep	*Ovis canadensis sierrae*	FE	SE CP	-	-	Some bighorn sheep populations in the US have experienced significant negative effects as a result of human disturbance. Such impacts could potentially occur in SEKI as well; therefore, this species is being evaluated under Special-Status Species in chapter 4.	Evaluated
American badger	*Taxidea taxus*	-	-	-	CSC	Visitor use and administrative activities can cause disturbances to this species. However, because disturbances would be short-term, infrequent, and of a negligible impact, this species has been dismissed from further analysis.	Dismissed
Sierra Nevada red fox	*Vulpes vulpes necator*	-	ST	FSS	-	Visitor use and administrative activities can cause disturbances to this species. However, because disturbances would be short-term, infrequent, and of a negligible impact, this species has been dismissed from further analysis.	Dismissed



Appendix M

Programmatic Minimum Requirements Analysis

ON THE PREVIOUS PAGE
Wilderness in Sequoia and Kings Canyon National Parks
NPS Photo

APPENDIX M:

PROGRAMMATIC MINIMUM REQUIREMENT ANALYSIS

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SEQUOIA AND KINGS CANYON NATIONAL PARKS WILDERNESS STEWARDSHIP PLAN MINIMUM REQUIREMENTS ANALYSIS FRAMEWORK

Part 1 - What Actions are Necessary in Wilderness?

The MRA Worksheet is based on the requirements of both the Wilderness Act and NPS Management Policies (2006):

Section 4(c) of the Wilderness Act states: " . . .except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be . . no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area."

Section 6.3.5 of NPS Management Policies 2006 states that the Minimum Requirement concept will be a two-step process to [1] determine if the management action is necessary "for administration of the area as wilderness and does not cause a significant impact to wilderness resources and character; and [2] the techniques and types of equipment needed to ensure that impacts on wilderness resources and character are minimized." Also: "When determining minimum requirements, the potential disruption of wilderness character and resources will be considered before, and given significantly more weight than, economic efficiency and convenience."

This MRA process was used to help screen alternatives in anticipation of the need to authorize actions in the future while ensuring the preservation of wilderness resource and character. The MRA serves as a single analysis to determine the necessity for similar, current, and/or future actions where the social and biophysical values and potential effects will be nearly identical, and to assess the necessity for action involving the Section 4(c) uses as similar needs come along in the future.

Range of Reasonable and Feasible Alternatives per NEPA

The Sequoia and Kings Canyon National Parks (SEKI) Wilderness Stewardship Plan (WSP) will develop and analyze a range of reasonable and feasible alternatives to wilderness management. According to CEQ, the phrase "range of alternatives...includes all reasonable alternatives, which must be rigorously explored and objectively evaluated, as well as those other alternatives, which are eliminated from detailed study with a brief discussion of the reasons for eliminating them."

Alternative 2		Alternative 3		Alternative 4		Alternative 5	
This alternative recognizes that SEKI wilderness can be broadly understood as three different types of locations: day use areas close to frontcountry, highest-use overnight areas like the HST, RLL, and PCT, and low-use overnight areas like the Middle Fork of the Kings and the Hockett Plateau. It further recognizes that current and projected visitor use levels pose few threats to wilderness character in the low-use areas under current management, but that there are some threats in highest use areas (or areas with very sensitive resources) that can be mitigated through targeted improvements to current management.		This alternative seeks to increase opportunities for primitive recreation by allowing additional use, which is mostly expected to occur at high-demand areas. Allowing increased use could result in decreased opportunities for solitude wilderness-wide. In order to preserve the natural quality of wilderness, SEKI's high use areas would require additional development and restrictions on visitor behavior.		This alternative seeks to emphasize the undeveloped and non-commercial qualities of SEKI wilderness. Removal of development and reduction of commercial services would increase the self-reliant nature of wilderness recreation. In order to preserve the natural quality of wilderness with less resource-protecting development, the amount of use would need to be reduced.		This alternative seeks to enhance the quality of solitude available in SEKI wilderness. Total numbers of visitors allowed and party sizes would be reduced, which would mean that reduced levels of development and reduced restrictions on visitor behavior would serve to protect natural resources.	
Trail Structures	Allowable installations dependent upon trail classification and subject to MRA.	**Trail Structures**	Allowable installations dependent upon trail classification and subject to MRA.	**Trail Structures**	Allowable installations dependent upon trail classification and subject to MRA.	**Trail Structures**	Allowable installations dependent upon trail classification and subject to MRA.
Signs and Bulletin Boards	Allowable installations dependent upon trail classification and subject to MRA.	**Signs and Bulletin Boards**	Allowable installations dependent upon trail classification and subject to MRA.	**Signs and Bulletin Boards**	Allowable installations dependent upon trail classification and subject to MRA.	**Signs and Bulletin Boards**	Allowable installations dependent upon trail classification and subject to MRA.

Food Storage	Some proposed number (or range) of wilderness installations subject to MRA		**Food Storage**	Some proposed number (or range) of wilderness installations subject to MRA		**Food Storage**	no proposal for prohibited uses		**Food Storage**	no proposal for prohibited uses
Human Waste Mgmt.	Some proposed number (or range) of wilderness installations subject to MRA		**Human Waste Mgmt.**	Some proposed number (or range) of wilderness installations subject to MRA		**Human Waste Mgmt.**	no proposal for prohibited uses		**Human Waste Mgmt.**	no proposal for prohibited uses
Designated Campsites	Some proposed number (or range) of wilderness installations subject to MRA		**Designated Campsites**	Some proposed number (or range) of wilderness installations subject to MRA		**Designated Campsites**	no proposal for prohibited uses		**Designated Campsites**	no proposal for prohibited uses
Recreational and Administrative Stock Management	Some proposed number (or range) of wilderness installations subject to MRA		**Recreational and Administrative Stock Management**	Some proposed number (or range) of wilderness installations subject to MRA		**Recreational and Administrative Stock Management**	no proposal for prohibited uses		**Recreational and Administrative Stock Management**	no proposal for prohibited uses

Administrative and Recreational Structures (Non-Historic)	Some proposed number (or range) of wilderness installations subject to MRA	**Administrative and Recreational Structures (Non-Historic)**	Some proposed number (or range) of wilderness installations subject to MRA	**Administrative and Recreational Structures (Non-Historic)**	Some proposed number (or range) of wilderness installations subject to MRA	**Administrative and Recreational Structures (Non-Historic)**	Some proposed number (or range) of wilderness installations subject to MRA
Administrative and Recreational Structures (Historic)	Some proposed number (or range) of wilderness installations subject to MRA	**Administrative and Recreational Structures (Historic)**	Some proposed number (or range) of wilderness installations subject to MRA	**Administrative and Recreational Structures (Historic)**	Some proposed number (or range) of wilderness installations subject to MRA	**Administrative and Recreational Structures (Historic)**	Some proposed number (or range) of wilderness installations subject to MRA

Minimum Requirements Analysis per Wilderness Act

The Wilderness Act requires that the parks demonstrate the necessity for an otherwise prohibited use of wilderness, such as permanent and temporary installations in wilderness. This stems from Section 4 (c): "Except as specifically provided for in this Act, and subject to existing private rights, there shall be no commercial enterprise and no permanent road within any wilderness area designated by this Act and, **except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act** (including measures required in emergencies involving the health and safety of persons within the area), **there shall be** no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and **no structure or installation within any such area**."

The Wilderness Act prohibits specific activities—the use of motor vehicles, motorized equipment, and mechanical transport, the landing of aircraft, and the installation of structures and equipment—when other reasonable alternatives are available. The MRA worksheet provides a formalized method for developing alternative ways to address an issue by evaluating and comparing the effects of various actions on wilderness character. Per NPS Management Policies, any proposed administrative activity that has the potential to affect the wilderness or potential wilderness additions will be analyzed through the minimum requirement process.

Part 1 of this Minimum Requirement Analysis determines if any administrative action in wilderness is necessary. If an action is determined necessary, Part 2 of the analysis determines which alternatives best meet the goals and objectives developed through the Wilderness Stewardship Plan process. Part 3 is the evaluation of effects of each alternative, including fully exploring the alternatives and analyzing the effects on wilderness character, which is contained within the WSP/FEIS. Step 1 answers the following questions:

A. Options Outside of Wilderness - Can actions taken outside of wilderness adequately address the situation and meet project goals?

B. Valid Existing Rights or Special Provisions of Wilderness Legislation - Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws)?

C. Requirements of Other Legislation - Is action necessary to meet the requirements of other federal laws?

D. Wilderness Character - Is action necessary to preserve one or more qualities of wilderness character?

E. Public Purposes - Is action necessary to achieve one or more of the public purposes for wilderness (as stated in Section 4(b) of the Wilderness Act): "recreational, scenic, scientific, educational, conservation, and historical use"?

F. Other Guidance - Is action necessary to conform to direction contained in agency policy, unit and wilderness management plans, species recovery plans, or agreements with tribal, state and local governments or other federal agencies?

G. Is the action necessary in wilderness?

H. Options and Criteria for Action

After determining if the 4(c) administrative action is necessary in wilderness, the actions will be evaluated through the WSP/FEIS process to determine how each prohibited action would affect wilderness character and meet the objectives of the proposed preferred alternative. The NEPA alternative that is identified as the preferred alternative must be congruent with the finding. The analysis contained within the MRA is interdependent with the NEPA analysis and with the logic behind the identification of the preferred alternative.

Minimum Requirements Analysis for Trails and Trail Structures per Wilderness Act
A. Options Outside of Wilderness - Can actions taken outside of wilderness adequately address the situation and meet project goals?
Visitors to wilderness have diverse appropriate recreational desires, including mountaineering and cross-country travel, travel on primitive and challenging trails, travel on trails that are easy to find, and travel by foot, horseback, or boat. Their desires for solitude range from no sight or sound of other people for days on end to the companionable solitude found on the Pacific Crest Trail. Wilderness travel can create landscape impacts, including denudation of vegetation with accompanying soil compaction and erosion. Since the recreational uses occur in wilderness, any measures taken to accommodate use or mitigate impacts must also happen wilderness.
B. Valid Existing Rights or Special Provisions of Wilderness Legislation - Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws)?
None.
C. Requirements of Other Legislation - Is action necessary to meet the requirements of other federal laws?
The Organic Act of the National Park Service: "Sec.1. …. The service thus established shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations hereinafter specified by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Kings Canyon Enabling Act of 1940 – Sec. 3: "That the National Park Service shall… administer for public recreational purposes the lands withdrawn." and "to insure (sic) the permanent preservation of the wilderness character of the Kings Canyon National Park." Sequoia Enabling Act of 1890 – Preamble: "…dedicated .and set apart as a public park, or pleasure ground for the benefit and enjoyment of the people…" and to "…provide for the preservation from injury of all timber, mineral deposits, natural curiosities or wonders within said park, and their retention in their natural condition" (Sec. 2). National Trail System Act: Sec.3.(2):" (2) National scenic trails, established as provided in section 5 of this Act, which will be extended trails so located as to provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities of the areas through which such trails may pass. Sec. 7 (j) (j) Potential trail uses allowed on designated components of the national trails system may include, but are not limited to, the following: bicycling, cross-country skiing, day hiking, equestrian activities, jogging or similar fitness activities, trail biking, overnight and long-distance backpacking, snowmobiling, and surface water and underwater activities.
D. Wilderness Character - Is action necessary to preserve one or more qualities of wilderness character?
Yes. The formal trail system in SEKI predates wilderness designation. The trail system and structures both protect the natural quality by focusing use, but may also create adverse effects on the natural quality (barrier or attractant to wildlife, protect or modify hydrologic systems, etc.). The SEKI trail system has a dual effect on opportunities for solitude or primitive and unconfined recreation: on the one hand it facilitates opportunities

for primitive recreation for many user groups by providing access to wilderness; on the other hand trails tend to channel and concentrate use, which typically diminishes the unconfined and solitary nature of recreation available along the trail.

E. Public Purposes - Is action necessary to achieve one or more of the public purposes for wilderness (as stated in Section 4(b) of the Wilderness Act): "recreational, scenic, scientific, educational, conservation, and historical use"?

Yes. The trail system supports the recreational purpose of wilderness, and indirectly supports the scientific, education, and conservation uses by facilitating access to wilderness for those purposes.

F. Other Guidance - Is action necessary to conform to direction contained in agency policy, unit and wilderness management plans, species recovery plans, or agreements with tribal, state and local governments or other federal agencies?

SEKI General Management Plan Record of Decision: "Use of stock continues, both as a means of access to wilderness by visitors, and for the administration of wilderness and protection of wilderness values." "The parks' designated wilderness and other areas managed as wilderness are zoned to reflect the varying intensities of use of different areas. In heavily traveled zones, there exist engineered trails and bridges, food lockers, designated campsites, and toilets to protect park resources, while in less-used areas, amenities are minimal or non-existent."

NPS Management Policies 2006 and NPS DO-41: 6.3.10.2 Trails in Wilderness. "Trails will be permitted within wilderness when they are determined to be necessary for resource protection and/or for providing for visitor use for the purposes of wilderness. … Trails will be maintained at levels and conditions identified within the approved wilderness management plan or planning document." Trails will be maintained at levels and conditions identified within the approved wilderness management plan or other planning document. Trail maintenance structures (such as water bars, gabions) may be provided, under minimum requirement protocols, where they are essential for resource preservation or where significant safety hazards exist during normal use periods.

9.2.2.9 Trail Bridges
Trail bridges may be used for crossing swift waters areas prone to flash flooding, and other places that present potential safety hazards. Less obtrusive alternatives to bridges (such as, fords) and trail relocation will be considered before a decision is made to build a bridge. A bridge may be the preferred alternative when necessary to prevent stream bank erosion or protect wetlands or fisheries. If a bridge is determined to be appropriate, it will be kept to the minimum size needed to serve trail users, and it will be designed to harmonize with the surrounding natural scene and be as unobtrusive as possible.

Comprehensive Management Plan for the Pacific Crest Trail (1982) – (appendix C): Criteria for Location, Design, Signing, and User Facilities, p12, General Design Criteria) "The design of the Pacific Crest Trail should be in keeping with the nature and purpose of the trail. As a National Scenic Trail, it should exhibit high quality, permanence, and minimize disturbance to the environment. It should be designed, on a segment-by-segment basis, to accommodate, in a safe and enjoyable manner, the volume and types of traffic planned." p 24"Maintenance of the Pacific Crest National Scenic Trail should be of sufficient frequency to ensure that all features of the trail, including drainage, tread clearing, signing, and related structures will be at the standards to which they were designed and constructed."

RM 41: 6.4.10. Accessibility for Persons with Disabilities. The National Park Service has legal obligations to make available equal opportunities for people with disabilities in all programs and activities. This requirement includes the opportunity to participate in wilderness experiences. Management decisions responding to requests for special consideration to provide wilderness use by persons with disabilities must be in accord

with the Architectural Barriers Act of 1968, The Rehabilitation Act of 1973 (as amended in 1978), and Section 507(c) of the Americans with Disabilities Act of 1990. Such decisions should balance the intent of access and wilderness laws and find a way of providing the highest level of protection to the wilderness resource.

Section 17.550 of the Secretary of the Interior's regulations regarding "Enforcement of Nondiscrimination on the Basis of Disability in Department of Interior Programs" (43 CFR Part 17) states that agencies are not required to take any actions nor provide access that would result in a fundamental alteration in the nature of a program or activity. However, the agency has the burden of proving that compliance would result in a fundamental alteration. This concept is also found in Section 507 of the Americans with Disabilities Act.

G. Is the action necessary in wilderness?

Yes. Trails are necessary in SEKI to preserve the natural and primitive and unconfined recreation qualities of wilderness character, and in support of the recreational, scientific, and conservation public purposes of wilderness. Trails are also necessary to comply with the Organic Act of the NPS, the enabling legislation of Sequoia and Kings Canyon national parks, and the National Scenic Trails Act. Construction and maintenance of a trail system to provide diverse recreational opportunities in wilderness is also consistent with the guidance of the SEKI General Management Plan, the 2006 NPS Management Policies, RM 41, and the Comprehensive Management Plan for the Pacific Crest Trail.

H. Options for Action and Criteria for Installations

The only means of providing trail-based recreational experiences is by providing trails. The minimum requirements question is then how many trails and what level of development and maintenance they will receive. Since the goal is to provide a diverse set of recreational opportunities, it is necessary for different trails to have different levels of development. The level of development each trail has must be the minimum necessary to provide the desired balance of solitude and opportunities for primitive and unconfined recreation while protecting the natural quality of wilderness.

Forest Service Handbook 2309.18 - TRAILS MANAGEMENT HANDBOOK describes a range of trail development classes that are appropriate to the recreational opportunities desired for SEKI wilderness. The different alternatives of the WSP describe the number and development level of trails necessary to preserve wilderness character under the different articulated balances of opportunities for solitude and opportunities for primitive and unconfined recreation.

Trails and trail-related structures are the minimum required to preserve wilderness character if they are necessary and appropriate to the trail development class and designed use described in the selected alternative of the WSP.

Constructing new trails or changing the development class of a trail from that described in the selected alternative will require separate MRA, planning, and compliance.

Minimum Requirements Analysis for Signs (including bulletin boards) per Wilderness Act
A. Options Outside of Wilderness - Can actions taken outside of wilderness adequately address the situation and meet project goals?
In order to plan and execute wilderness trips with minimal impact to wilderness character, visitors need information about trails and landscape, about regulations and restrictions, and about current conditions and short-term closures. The purpose of signs is to provide information to visitors about wilderness navigation, current conditions, and wilderness regulations. Education efforts outside wilderness are very effective means of communicating this information. However, site-specific information is sometimes necessary on site to inform visitors who did not get the information, to remind some of those who did, and to answer questions that can only be addressed on-site (e.g. the exact location of a trail junction and which trail goes where).
B. Valid Existing Rights or Special Provisions of Wilderness Legislation - Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws)?
None.
C. Requirements of Other Legislation - Is action necessary to meet the requirements of other federal laws?
Yes. The Organic Act of the National Park Service: "Sec.1. …. The service thus established shall promote and regulate the use of the Federal areas known as national parks,...to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."
D. Wilderness Character - Is action necessary to preserve one or more qualities of wilderness character?
Yes. Without specific information delivered on site, visitors will inadvertently violate regulations to protect the natural and other features of value qualities of wilderness (e.g., trespass onto sensitive resources or into restoration areas, have fires at inappropriate locations, trample large areas in search of trail junctions). In addition, signs can protect opportunities for solitude by defining camp area in high-use areas. Although the presence of signs detracts from the opportunities for solitude for those who do not need them for navigation, they improve opportunities for primitive recreation for less experienced visitors. Signs also provide direction and information to wilderness users that allow them to have opportunities for recreation.
E. Public Purposes - Is action necessary to achieve one or more of the public purposes for wilderness (as stated in Section 4(b) of the Wilderness Act): "recreational, scenic, scientific, educational, conservation, and historical use"?
Yes. Specific information delivered on site in wilderness supports the recreational, educational, and conservation purposes of wilderness by providing wilderness users information that would serve to improve their recreational opportunities, expand their education, and allow them to conform to regulations that serve to protect wilderness resources.
F. Other Guidance - Is action necessary to conform to direction contained in agency policy, unit and wilderness management plans, species recovery plans, or agreements with tribal, state and local governments or other federal agencies?
RM 41: 6.3.10.4 Signs. Signs detract from the wilderness character of an area and make the imprint of man and management more noticeable.

Only those signs necessary for visitor safety or to protect wilderness resources, such as those identifying routes and distances, will be permitted. Where signs are used, they should be compatible with their surroundings and the minimum size possible.

G. Is the action necessary in wilderness?

Yes. Specific information delivered on site is necessary in wilderness to preserve the natural and other features of value qualities of wilderness character, to preserve the desired variety in Opportunities for Solitude or Primitive Recreation quality, and to promote the recreational, educational, and conservation purposes of wilderness. Action is necessary to comply with the Organic Act of the NPS, and signing is allowed by RM 41.

H. Options for Action and Criteria for Installations

The two ways available to provide specific information delivered on site in wilderness are staff contacts and sign installations. Staff contacts are limited by practical reasons as well as by their impacts to opportunities for solitude. Sign installations are an effective means of communicating information, but adversely impact the undeveloped quality of wilderness character.

Informational and regulatory will sometimes be the minimum action required to preserve the natural quality in areas of high visitor use where it is most threatened. Informational and navigational sign installations will also be the minimum action required to provide opportunities for primitive recreation in areas most desired by relatively inexperienced visitors. Because trails are managed to higher levels of trail development in high use areas and to provide opportunities for primitive recreation for inexperienced users, the minimum requirement for sign installations will be the kind and amount of signing that is consistent with the trail development class.

If specific areas need additional regulatory signs (e.g., closures for restoration, other information) then these signs will go through a separate analysis and review prior to placement.

Minimum Requirements Analysis for Food Storage Regulations and Methods per Wilderness Act
A. Options Outside of Wilderness - Can actions taken outside of wilderness adequately address the situation and meet project goals?
Visitors to the wilderness typically bring food with them. As this food is of high energy density, it is appealing to wildlife, and wildlife behavior (notably bear behavior) has been observed to change as a result of the rewards of obtaining human food. Visitors have had their recreational activities disrupted because of altered wildlife behavior and loss of their food. Visitor education efforts outside wilderness have had large effects in improving this problem, but action in wilderness is also necessary since the wildlife-human interactions of concern take place in wilderness.
B. Valid Existing Rights or Special Provisions of Wilderness Legislation - Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws)?
None.
C. Requirements of Other Legislation - Is action necessary to meet the requirements of other federal laws?
Action is necessary to meet the requirements of 16 USC § 1 (the National Park Service Organic Act). Ensuring that adequate food storage options remain available in the SEKI wilderness is necessary to "conserve ... the wild life therein" because food conditioned bears (1) exhibit unnatural behavior, ecology, and distribution and (2) often must be killed because of human safety concerns. It is also necessary to "provide for the enjoyment of the same" because food conditioned bears often become aggressive and destructive, resulting in a negative experience for visitors. Action is necessary to meet the requirements of Section 2(c) of the Wilderness Act. Ensuring that adequate food storage options remain available in the SEKI wilderness is necessary to "preserve its natural conditions."
D. Wilderness Character - Is action necessary to preserve one or more qualities of wilderness character?
Without appropriate food storage technology and techniques, bears will have access to human food sources, and their natural behavior, ecology, and distribution will be altered, impacting the natural quality of wilderness character. Food-conditioned bears would likely be the targets of management actions such as tagging, relocation, or removal, impacting the untrammeled quality. In addition, food-conditioned bears become aggressive and destructive in their search for human food. This behavior negatively impacts solitude and unconfined recreation because (1) bears may eat visitors' food, impacting their ability to complete their trip; (2) persistent bears can require all-day and all-night response from visitors (and as food-conditioned bears associate all humans with food, this will also affect visitors who store their food properly). Food storage regulations negatively impact opportunities for unconfined recreation, and installations (such as food storage boxes) negatively impact the undeveloped quality of wilderness character. Food storage boxes can improve opportunities for primitive recreation by providing some inexperienced visitors the extra security they need to engage in overnight wilderness trips, and in providing extra food storage for the first days of a longer trip. Food storage boxes can negatively affect opportunities for solitude if visitors are attracted to them for camping, but can improve opportunities for solitude at campsites that are not near the boxes.

E. Public Purposes - Is action necessary to achieve one or more of the public purposes for wilderness (as stated in Section 4(b) of the Wilderness Act): "recreational, scenic, scientific, educational, conservation, and historical use"?
Ensuring that adequate food storage options remain available is necessary to protect the recreational purpose of wilderness because without adequate food storage, food-conditioned bears will become aggressive and destructive in their search for human food. This behavior negatively impacts solitude and unconfined recreation because visitors could be dealing with persistent bears at all hours of the day and night-even visitors who store their food properly-since once food-conditioned, bears will associate all humans with food, not just those who store it improperly.
Reliance on alternative methods of food storage is inadequate because: (1) In YOSE, McCurdy and Martin (2007) found that where portable bear resistant containers were required, food was stored by visitors in portable bear resistant containers in only 59% of the nights. This means that even when visitors had portable bear resistant containers with them, they did not necessarily use them. (2) Visitors often carry more food than can fit into portable bear resistant containers. (3) Trash that would normally be placed in lockers-despite this practice being illegal-will be left on the ground. (4) YOSE, which relies almost exclusively on portable food storage containers, consistently has much higher levels of human-bear conflict in wilderness than SEKI does. Adequate food storage: Ensuring that adequate food storage options remain available is necessary to protect the conservation purpose of wilderness because without adequate food storage, (1) food-conditioned bears will be influenced by modem civilization (i.e., human foods)their natural behavior, ecology, and distribution will be altered, and (2) they will need to be manipulated by humans (e.g., radio-collared, ear tagged, or killed) to protect visitor safety.
F. Other Guidance - Is action necessary to conform to direction contained in agency policy, unit and wilderness management plans, species recovery plans, or agreements with tribal, state and local governments or other federal agencies?
Ensuring that adequate food storage options remain available is necessary according to the following policy documents: 1) NPS Management Policies 2006 states in section 4.4.1 that parks will maintain native plants and animals by: • "preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur" and, • "minimizing human impacts on native plants, animals, populations, communities, and ecosystems, and the processes that sustain them." 2) The goal of the SEKI Bear Management Plan is to: • "restore and perpetuate the natural distribution, ecology, and behavior of black bears free of human influences."
Language from the ROD: In heavily traveled zones, there exist engineered trails and bridges, food lockers, designated campsites, and toilets to protect park resources, while in less-used areas, amenities are minimal or non-existent.

G. Is the action necessary in wilderness?

Yes. Maintaining availability of food storage technology and food storage regulations is necessary to protect the natural and opportunities for primitive recreation qualities of wilderness character, and to promote the recreational, conservation, and scientific purposes of wilderness. Action is also necessary to comply with the National Park Service Organic Act, and is consistent with the guidance of the 2006 NPS Management Policies, the SEKI Bear Management Plan, and SEKI's general management plan.

H. Options for Action and Criteria for Installations

Visitor education, food storage restrictions, installation of food storage boxes, and bear removal actions are the options available to achieve the desired condition of minimum development necessary to preserve wild bear populations and opportunities for primitive recreation. In many ways, food storage restrictions are part of education, in terms of emphasizing the importance of proper storage. Education can have a very large beneficial effect on ensuring proper food storage; restrictions reinforce education but have a negative effect on the unconfined quality of wilderness character; food storage boxes are very effective locally at preventing bears from accessing human food but have negative effects on the undeveloped quality and constitute a 4(c) generally prohibited installation in wilderness. Removal of problem bears is a trammeling action and will be a last-resort option when all others have failed.

Education outside of wilderness will always be used to prevent wildlife (including bears) from becoming food-conditioned. Regulations requiring the use of portable bear resistant containers will be part of the minimum action required where an area has a strong history of undesired bear-human interactions. However, a Yosemite study (McCurdy and Martin, 2007) found that regulations requiring use of portable bear resistant containers are inadequate to ensure their proper use. This can be because visitors often carry more food than can fit into portable bear resistant containers (a problem that is worst at ""first night in"" locations), or because they are not experienced enough ensure consistent proper use of portable containers. Installation of food storage boxes is therefore the minimum action required to preserve the natural quality of wilderness and opportunities for primitive recreation in areas with a strong history of undesired bear-human interactions that have not been mitigated by education and food storage restrictions, at ""first night in"" locations (when containers may not hold all scented and food items), and areas of high use/convergence of relatively inexperienced visitors (where numerous trails converge). A rare location where a box installation would be the minimum requirement necessary would be a logistically critical camping area with inadequate trees for counterbalancing food effectively.

Minimum Requirements Analysis for Human-waste Management (including privies, toilets, and pack-out requirements) per Wilderness Act
A. Options Outside of Wilderness - Can actions taken outside of wilderness adequately address the situation and meet project goals?
Visitors need to urinate and defecate while they are in wilderness, therefore human waste must be managed in wilderness.
B. Valid Existing Rights or Special Provisions of Wilderness Legislation - Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws)?
No.
C. Requirements of Other Legislation - Is action necessary to meet the requirements of other federal laws?
Yes. The Organic Act of the National Park Service: "Sec.1. …. The service thus established shall promote and regulate the use of the Federal areas known as national parks,...to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."
D. Wilderness Character - Is action necessary to preserve one or more qualities of wilderness character?
Yes. Improper disposition of human waste in wilderness can negatively impact the natural quality of wilderness by polluting water resources. Opportunities for solitude or primitive and unconfined recreation can be negatively impacted by the presence of human waste and toilet paper, and by increased necessity of treating drinking water.
E. Public Purposes - Is action necessary to achieve one or more of the public purposes for wilderness (as stated in Section 4(b) of the Wilderness Act): "recreational, scenic, scientific, educational, conservation, and historical use"?
Yes. Proper disposal of human waste in necessary to achieve the conservation purpose, and effective management of toilet paper and waste piles is necessary to achieve the scenic and recreational purposes.
F. Other Guidance - Is action necessary to conform to direction contained in agency policy, unit and wilderness management plans, species recovery plans, or agreements with tribal, state and local governments or other federal agencies?
"RM-41: 6.4.3 Recreation Use Management in Wilderness. Recreational uses of National Park Service wilderness are generally those traditionally associated with wilderness and identified by Congress in the legislative record for the development of the Wilderness Act and in keeping with the language provided by Sections 2(a) and 2(c) of the Act itself. These recreational uses of wilderness will be of a type and nature that ensure its use and enjoyment will leave it unimpaired for future use and enjoyment as wilderness, provide for the protection of the area as wilderness, and provide for the preservation of the wilderness character. Recreational uses in National Park Service wilderness areas will be of a nature that enables the areas to retain their primeval character and influence; protect and preserve natural conditions; leave the imprint of man's work substantially unnoticeable; provide outstanding opportunities for solitude or primitive and unconfined types of recreation; and preserve wilderness in an unimpaired condition.

RM-41:6.3.10.3 Although the development of facilities to serve visitors will generally be avoided, campsites may be designated when essential for resource protection and preservation or to meet other specific wilderness management objectives. In keeping with the terms of the park's wilderness management plan, campsite facilities may include a site marker, fire rings, tent sites, food-storage devices, and toilets if these are determined by the superintendent to be the minimum facilities necessary for the health and safety of wilderness users, or for the preservation of wilderness resources and values. Toilets will be placed only in locations where their presence and use will resolve health and sanitation problems or prevent serious resource impacts, especially where reducing or dispersing visitor use is impractical or has failed to alleviate the problems. Picnic tables will not be allowed in wilderness

Recreational uses in National Park Service wilderness areas will be of a nature that enables the areas to retain their primeval character and influence; protect and preserve natural conditions; leave the imprint of man's work substantially unnoticeable; provide outstanding opportunities for solitude or primitive and unconfined types of recreation; and preserve wilderness in an unimpaired condition.

Language from the ROD: In heavily traveled zones, there exist engineered trails and bridges, food lockers, designated campsites, and toilets to protect park resources, while in less-used areas, amenities are minimal or non-existent.

G. Is the action necessary in wilderness?

Yes. A system for human waste management in wilderness is necessary to preserve the opportunities for primitive recreation and natural qualities of wilderness character, and to support the public purposes of conservation, scenic value, and recreation. Action is necessary to comply with the Organic Act of the NPS and is consistent with the guidance of RM-41 and with the Record of Decision for the SEKI General Management Plan.

H. Options for Action and Criteria for Installations

Options for action to preserve wilderness character include visitor education about Leave No Trace practices, restrictions on methods of waste disposal (e.g., minimum distances from surface waters), requirements to pack out waste, and provision of privies or restrooms.

Visitor education will always be a method used, with restrictions on methods of waste disposal used to reinforce the educational messages. These two actions have minimal adverse effects on wilderness character, but can be inadequate to preserve opportunities for solitude and the natural quality where use is so concentrated that LNT techniques are inadequate for the volume of waste generated, where soil types do not allow for sufficient burial of waste, or where camp areas are close to water sources or other sensitive resources. At these locations pack-out requirements may be imposed, with the preservation of the natural quality and opportunities for solitude more than offsetting the impacts to the unconfined quality of recreation.

In some places with high visitor concentrations and/or soils unsuitable to burying waste, travel and use patterns make packing out waste impractical. In these locations the installation of a privy or toilet may be the minimum action required to preserve the natural and opportunities for solitude qualities of wilderness character. These locations may be evaluated in the WSP or through testing of pack-out requirements during implementation of the WSP as to whether installation of a toilet or privy is the minimum action required to preserve wilderness character.

Minimum Requirements Analysis for Managing Camping and Campsite Impacts (designated campsites) per Wilderness Act
A. Options Outside of Wilderness - Can actions taken outside of wilderness adequately address the situation and meet project goals?
Some routes and areas in SEKI wilderness are more popular with visitors than others. In these areas, concentrated camping can lead to proliferation of campsites. Since the camping occurs in wilderness, actions to influence camping patterns must take effect in wilderness.
B. Valid Existing Rights or Special Provisions of Wilderness Legislation - Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws)?
No.
C. Requirements of Other Legislation - Is action necessary to meet the requirements of other federal laws?
Yes. The Organic Act of the National Park Service: "Sec.1. …. The service thus established shall promote and regulate the use of the Federal areas known as national parks,...to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."
D. Wilderness Character - Is action necessary to preserve one or more qualities of wilderness character?
Yes. Concentrated camping at popular areas leads to proliferation of campsites, with impacts to opportunities for solitude and the natural qualities of wilderness character.
E. Public Purposes - Is action necessary to achieve one or more of the public purposes for wilderness (as stated in Section 4(b) of the Wilderness Act): "recreational, scenic, scientific, educational, conservation, and historical use"?
Yes. Preventing concentrated camping impacts is necessary to achieve the conservation and scenic purposes of wilderness. Provision of appropriate camping opportunities is necessary to achieve the recreational purpose of wilderness.
F. Other Guidance - Is action necessary to conform to direction contained in agency policy, unit and wilderness management plans, species recovery plans, or agreements with tribal, state and local governments or other federal agencies?
RM 41: 6.3.10.3 Campsites and Shelters. The construction of new shelters for public use will generally not be allowed, in keeping with the values and character of wilderness. An existing shelter may be maintained or reconstructed only if the facility is necessary to achieve specific wilderness management objectives as identified in the park's wilderness and cultural resources management plans. The construction, use, and occupancy of cabins and other structures in wilderness areas in Alaska are governed by applicable provisions of ANILCA and by National Park Service regulations in 36 CFR 13, and may be permitted only under conditions prescribed in the park's wilderness management plan. Although the development of facilities to serve visitors will generally be avoided, campsites may be designated when essential for resource protection and preservation or to meet other specific wilderness management objectives. In keeping with the terms of the park's wilderness management plan, campsite facilities may include a site marker, fire rings, tent sites, food-storage devices, and toilets if these are determined by

the superintendent to be the minimum facilities necessary for the health and safety of wilderness users, or for the preservation of wilderness resources and values. Toilets will be placed only in locations where their presence and use will resolve health and sanitation problems or prevent serious resource impacts, especially where reducing or dispersing visitor use is impractical or has failed to alleviate the problems. Picnic tables will not be allowed in wilderness.

Language from the ROD: In heavily traveled zones, there exist engineered trails and bridges, food lockers, designated campsites, and toilets to protect park resources, while in less-used areas, amenities are minimal or non-existent.

G. Is the action necessary in wilderness?

Yes. Action is necessary to preserve the opportunities for solitude and natural qualities of wilderness character, and to achieve the conservation, scenic, and recreational purposes of wilderness. Action is necessary to comply with the Organic Act of the NPS, and is consistent with the guidance of RM-41 and the GMP ROD.

H. Options for Action and Criteria for Installations

Options for action include visitor education on LNT practices, reducing trailhead quotas, imposing destination quotas, and requiring the use of designated campsites. Education will always be used. Reducing trailhead quotas reduces opportunities for primitive recreation while having a questionable effect on camping at the popular areas (since visitors can access popular sites from different trailheads). Imposing destination quotas can reduce number of people at a time in a popular area with less impact on opportunities for primitive recreation than reducing trailhead quotas. However, destination quotas have additional impacts the unconfined nature of primitive recreation and can fail to control proliferation of campsites as any given party may camp on virgin ground in pursuit of greater solitude.

Of the available options to prevent proliferation of campsite impacts in a popular areas, designated campsites has the least impact on opportunities for primitive recreation and similar impact on the unconfined nature of recreation as destination quotas. Designated campsites can preserve opportunities for solitude in popular areas by separating groups from one another. However, designated campsites impact the undeveloped quality of wilderness character, and managing designated campsites may affect the untrammeled quality if site hazards (e.g., hazard trees) require mitigation.

Installing designated campsites is the minimum action necessary to preserve the opportunities for solitude or primitive and unconfined recreation and natural qualities of wilderness character where use is concentrated, limited campsites exist in a given area, there is a risk of rapidly increasing campsite impacts from levels of use, and opportunities for solitude may be compromised, but where site hazards require only minimal mitigation."

[redacted]

Minimum Requirements Analysis for Managing Administrative and Recreational Stock Facilities (drift fences, gates, and hitch rails) per Wilderness Act
A. Options Outside of Wilderness - Can actions taken outside of wilderness adequately address the situation and meet project goals?
No. Recreational and administrative stock use is an allowed activity in SEKI wilderness, and grazing of stock may by allowed. Any structures or methods to manage the effects of wilderness stock use will have occur or be located in wilderness.
B. Valid Existing Rights or Special Provisions of Wilderness Legislation - Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws)?
No.
C. Requirements of Other Legislation - Is action necessary to meet the requirements of other federal laws?
Yes. The Organic Act of the National Park Service: "Sec.1. …. The service thus established shall promote and regulate the use of the Federal areas known as national parks,...to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Installations may be needed to protect natural resources and provide for enjoyment of the park.
D. Wilderness Character - Is action necessary to preserve one or more qualities of wilderness character?
Yes. If stock is allowed to graze, some provision must be made to prevent grazing in inappropriate areas to preserve the natural quality and opportunities for solitude. In order to provide a range of opportunities for recreational stock use, some structures may be needed.
E. Public Purposes - Is action necessary to achieve one or more of the public purposes for wilderness (as stated in Section 4(b) of the Wilderness Act): "recreational, scenic, scientific, educational, conservation, and historical use"?
Yes. Facilitating stock use is necessary to promote the recreational purpose, and controlling stock use is necessary to promote the conservation purpose.
F. Other Guidance - Is action necessary to conform to direction contained in agency policy, unit and wilderness management plans, species recovery plans, or agreements with tribal, state and local governments or other federal agencies?
RM 41: 6.3.10.1 Administrative Facilities. Administrative facilities (e.g., ranger stations and/or patrol cabins, fire lookouts, radio and/or cellular telephone antennas, radio repeater sites, associated storage or support structures, drift fences, and facilities supporting trail stock operations) may be allowed in wilderness only if they are determined to be the minimum requirement necessary to carry out wilderness management objectives and are specifically addressed within the park's wilderness management plan or other supporting environmental compliance documents.
RM 41: 6.4.6. Noncommercial grazing of trail stock used as part of an approved livestock management program within wilderness may be authorized in accordance with National Park Service regulations and conditions outlined in the wilderness management plan or stock use management plan. All approved livestock use must ensure preservation of wilderness resources and character. Superintendents will be responsible

for monitoring livestock use in wilderness to the same degree as human use, and may use the same management tools and techniques, including the application of the minimum requirement concept to manage livestock use that are available for managing other wilderness uses.

RM 41: 6.4.4. The only structures or facilities used by commercial services that will be allowed in wilderness will be temporary shelters, such as tents, or other specifically approved facilities that may be required (within the wilderness management plan) for resource protection and the preservation of wilderness values. Temporary facilities will generally be removed from the wilderness after each trip unless such removal will cause additional degradation of the wilderness resources.

G. Is the action necessary in wilderness?

Yes. Action is necessary to preserve the natural and opportunities for solitude or primitive and unconfined recreation qualities of wilderness character, and to promote the recreational and conservation purposes of wilderness. Action is also necessary to support the NPS Organic Act, and is consistent with the guidance of RM 41.

H. Options for Action and Criteria for Installations

The options for managing impacts associated with stock use include education, use restrictions, and installation of drift fences and hitch rails. Drift fences can preserve the natural quality of wilderness by preventing grazing stock from drifting into areas with sensitive resources. Drift fences can preserve opportunities for solitude by preventing stock from leaving the forage area where they were released and disturbing visitors on trails or in campsites in their travel line. Drift fences can assist in providing opportunities for primitive recreation for relatively inexperienced stock users who cannot effectively use other means of holding stock, and for experienced stock users on challenging trips, and drift fences may be necessary to support administrative action near logistically critical administrative camps. Hitch rails can preserve the natural quality in areas where high-lining would impact sensitive resources, and can assist in providing opportunities for primitive recreation for relatively inexperienced stock users who cannot effectively use other means of holding stock. Both drift fences and hitch rails negatively impact the undeveloped quality, and drift fences impact opportunities for solitude for all visitors who must open and close them to travel.

Installation of a drift fence is the minimum required action where there is significant risk of stock released in an allowed forage area leaving that forage area and impacting sensitive resources or disturbing travelers or campers on their likely travel routes. Installation of drift fences is also the minimum action required to preserve opportunities for primitive recreation in areas chosen to support inexperienced stock users' access to wilderness, and in select locations is the minimum required action to support administration of wilderness. Other options brought forward during the public review of this WSP included using collars or GPS devices to track stock. While these options can be used to track stock, they are not effective in preventing stock travel into places that they are not allowed to go, and would not help protect park resources and visitor experiences. Therefore this option was considered but dismissed.

Minimum Requirements Analysis for Historic Buildings per Wilderness Act
A. Options Outside of Wilderness - Can actions taken outside of wilderness adequately address the situation and meet project goals?
Several historic buildings are located within wilderness, so it is necessary to determine if they are appropriate in wilderness and whether to remove them, maintain them, or allow them to molder. Some of the historic buildings are currently used for wilderness administration (e.g., ranger stations and patrol cabins).
B. Valid Existing Rights or Special Provisions of Wilderness Legislation - Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws)?
No.
C. Requirements of Other Legislation - Is action necessary to meet the requirements of other federal laws?
Yes. The Organic Act of the National Park Service: "Sec.1. …. The service thus established shall promote and regulate the use of the Federal areas known as national parks,...to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations. Historic properties eligible for the National Register of Historic Places that have been included within wilderness will be protected and maintained according to the pertinent laws and policies governing cultural resources, using management methods that are consistent with preservation of wilderness character and values. These laws include the Antiquities Act of 1906 and the Historic Sites Act of 1935, as well as the subsequent historic preservation legislation, including the National Historic Preservation Act, the Archeological Resources Protection Act, the Native American Grave Protection and Repatriation Act, and the American Indian Religious Freedom Act.
D. Wilderness Character - Is action necessary to preserve one or more qualities of wilderness character?
Yes. Historic buildings may contribute to the other features of value quality of wilderness character, and may detract from the undeveloped quality. Maintaining buildings may require the removal of hazard trees, a trammeling action. The Pear Lake Ski Hut supports opportunities for primitive recreation in winter.
E. Public Purposes - Is action necessary to achieve one or more of the public purposes for wilderness (as stated in Section 4(b) of the Wilderness Act): "recreational, scenic, scientific, educational, conservation, and historical use"?
Yes. Historic buildings may support the public purposes of scenic, scientific, educational, and historical use.
F. Other Guidance - Is action necessary to conform to direction contained in agency policy, unit and wilderness management plans, species recovery plans, or agreements with tribal, state and local governments or other federal agencies?
Yes. Management Policies 2006, 6.3.10 Management Facilities Part of the definition of wilderness as provided by the Wilderness Act is "undeveloped federal land retaining its primeval character and influence,

without permanent improvements." Accordingly, authorizations of NPS administrative facilities in wilderness will be limited to the types and minimum number essential to meet the minimum requirements for the administration of the wilderness area. A decision to construct, maintain, or remove an administrative facility will be based primarily on whether or not the facility is required to preserve wilderness character or values, not on considerations of administrative convenience, economic effect, or convenience to the public or park staff.
Management Policies 6.3.8 Cultural Resources - The Wilderness Act specifies that the designation of any area of the park system as wilderness "shall in no manner lower the standards evolved for the use and preservation of" such unit of the park system under the various laws applicable to that unit (16 USC Section 1133(a)(3)). Thus, the laws pertaining to historic preservation also remain applicable within wilderness but must generally be administered to preserve the area's wilderness character. The responsible decision maker will include appropriate consideration of the application of these provisions of the Wilderness Act in analyses and decision-making concerning cultural resources. Cultural resources that have been included within wilderness will be protected and maintained according to the pertinent laws and policies governing cultural resources using management methods that are consistent with the preservation of wilderness character and values. These laws include the Antiquities Act and the Historic Sites, Buildings and Antiquities Act, as well as subsequent historic preservation legislation, including the National Historic Preservation Act, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act. The Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation projects provide direction for protection and maintenance. Cemeteries or commemorative features, such as plaques or memorials, that have been included in wilderness may be retained (including approved access to these sites), but no new cemeteries or additions to existing cemeteries may be made unless specifically authorized by federal statute, existing reservations, or retained rights.
RM 41: 6.3.10.1 Administrative Facilities. Administrative facilities (e.g., ranger stations and/or patrol cabins, fire lookouts, radio and/or cellular telephone antennas, radio repeater sites, associated storage or support structures, drift fences, and facilities supporting trail stock operations) may be allowed in wilderness only if they are determined to be the minimum requirement necessary to carry out wilderness management objectives and are specifically addressed within the park's wilderness management plan or other supporting environmental compliance documents. New roads will not be built in wilderness. Temporary vehicular access may be permitted only to meet the minimum requirements of emergency situations, and will be restored, per an approved restoration plan, as rapidly as possible. Where abandoned roads have been included within wilderness, they may be used as trails, restored to natural conditions, or managed as a cultural resource.
From the GMP: "Within the wilderness, efforts will be made to preserve a sense of remoteness and freedom from human-caused impacts. However, simple amenities such as ranger stations may be present to support administrative activities, reduce or control resource impacts, or provide for research and monitoring. Facilities used to support the administration and protection of wilderness may be provided."
From the GMP: "Preserve or rehabilitate historic ranger cabins, Smithsonian Institution shelter (Mount Whitney shelter), Pear Lake ski hut, and other structures. Preserve and / or stabilize the Shorty Lovelace Historic District cabins or allow them to molder. Evaluate some trails to determine their eligibility for the National Register of Historic Places, plus provide historic trails information."
G. Is the action necessary in wilderness?
Yes. Action is necessary to preserve the other features of value and undeveloped qualities of wilderness character, and in support of the scenic, scientific, educational, and historic public purposes of wilderness. Action is also necessary to comply with the Organic Act of the NPS, the

Antiquities Act of 1906,the Historic Sites Act of 1935, and the National Historic Preservation Act. Action must be consisent with the guidance of the SEKI General Management Plan, the 2006 NPS Management Policies, and RM 41.
H. Options for Action and Criteria for Installations
Any given historic building may be maintained, removed, or allowed to molder. Any building that is necessary for the administration of wilderness under the selected alternative must be maintained. All historic buildings detract from the undeveloped quality of wilderness character, but some may also contribute to the other features of value quality. Removal of an historic building is an adverse action under NHPA. Historic buildings necessary to support administration of wilderness under a given alternative pass the minimum requirement test for installations, and will be maintained. Historic buildings that are not necessary for the administration of wilderness are evaluated under each alternative based on the building's contribution to the other features of value quality and on the weight the alternative gives to the undeveloped quality relative to the other qualities of wilderness character. If their contributions to the other features of value outweigh their impacts to the undeveloped quality, they pass the minimum requirement test. If they do not pass this second test, then the WSP prescribes analysis under NHPA to determine if their contributions under NHPA outweigh their impacts to the undeveloped quality of wilderness character. This final determination will then prescribe maintenance, removal, or moldering for the building in question.

Minimum Requirements Analysis for Non-Historic Recreational and Administrative Structures per Wilderness Act
A. Options Outside of Wilderness - Can actions taken outside of wilderness adequately address the situation and meet project goals?
Several buildings are currently located within wilderness, so it is necessary to determine if they are appropriate in wilderness and whether to remove them or maintain them. Some of the buildings are currently used for wilderness administration as ranger stations; other buildings are not currently used for administration of wilderness, but have been used in the past.
B. Valid Existing Rights or Special Provisions of Wilderness Legislation - Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws)?
No.
C. Requirements of Other Legislation - Is action necessary to meet the requirements of other federal laws?
Yes. The Organic Act of the National Park Service: "Sec.1. …. The service thus established shall promote and regulate the use of the Federal areas known as national parks,...to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Removing unneeded buildings is necessary to conserve scenery, and facilitating wilderness patrol is necessary to protect the natural and cultural resources in wilderness.
D. Wilderness Character - Is action necessary to preserve one or more qualities of wilderness character?
Yes. Buildings in wilderness impact the undeveloped quality of wilderness character, so any removal of buildings would improve that quality. Administrative presence and patrol in wilderness is necessary to preserve all qualities of wilderness character by facilitating natural and cultural resource protection, wilderness character and natural resources monitoring and restoration activities, enforcement of regulations and restrictions to protect wilderness character, prevent unauthorized trammeling actions.
E. Public Purposes - Is action necessary to achieve one or more of the public purposes for wilderness (as stated in Section 4(b) of the Wilderness Act): "recreational, scenic, scientific, educational, conservation, and historical use"?
Yes. Removal of unnecessary buildings supports the scenic and conservation purposes, and facilitating administrative patrol supports the recreational, scientific, educational, and conservation purposes.
F. Other Guidance - Is action necessary to conform to direction contained in agency policy, unit and wilderness management plans, species recovery plans, or agreements with tribal, state and local governments or other federal agencies?
Management Policies 2006, 6.3.10 Management Facilities Part of the definition of wilderness as provided by the Wilderness Act is "undeveloped federal land retaining its primeval character and influence, without permanent improvements." Accordingly, authorizations of NPS administrative facilities in wilderness will be limited to the types and minimum number essential to meet the minimum requirements for the administration of the wilderness area. A decision to construct, maintain, or

remove an administrative facility will be based primarily on whether or not the facility is required to preserve wilderness character or values, not on considerations of administrative convenience, economic effect, or convenience to the public or park staff.
RM 41: 6.3.10.1 Administrative Facilities. Administrative facilities (e.g., ranger stations and/or patrol cabins, fire lookouts, radio and/or cellular telephone antennas, radio repeater sites, associated storage or support structures, drift fences, and facilities supporting trail stock operations) may be allowed in wilderness only if they are determined to be the minimum requirement necessary to carry out wilderness management objectives and are specifically addressed within the park's wilderness management plan or other supporting environmental compliance documents. New roads will not be built in wilderness. Temporary vehicular access may be permitted only to meet the minimum requirements of emergency situations, and will be restored, per an approved restoration plan, as rapidly as possible. Where abandoned roads have been included within wilderness, they may be used as trails, restored to natural conditions, or managed as a cultural resource.
From the GMP: "Within the wilderness, efforts will be made to preserve a sense of remoteness and freedom from human-caused impacts. However, simple amenities such as ranger stations may be present to support administrative activities, reduce or control resource impacts, or provide for research and monitoring. Facilities used to support the administration and protection of wilderness may be provided."
G. Is the action necessary in wilderness?
Yes. Action is necessary to preserve all five qualities of wilderness character, and in support of the recreational, educational, scenic, and scientific purposes of wilderness. Action is required by the Organic Act of the NPS and is consistent with the guidance of the SEKI GMP, the 2006 NPS Management Policies, and RM 41..
H. Options for Action and Criteria for Installations
The methods available for administrative patrol of wilderness are aerial patrol, day patrol by staff stationed in the frontcountry, multi-day trips by staff stationed in the frontcountry, and patrol by staff (hereafter "rangers") stationed in wilderness. Rangers stationed in wilderness may be based out of temporary camps or permanent buildings. Aerial patrol is limited in what it can accomplish, and negatively impacts the undeveloped and opportunities for solitude qualities of wilderness character. Day patrol is very effective in areas close to the frontcountry but is impractical for locations further than 8 or 10 miles from trailheads. Stationing rangers in temporary camps for long periods reduces their effectiveness in patrolling the wilderness due to the large amount of time and effort required to operate temporary camps, and leaves equipment and supplies vulnerable to depredation by wildlife or visitors while the ranger is patrolling. Temporary camps also impact the undeveloped quality of wilderness character, though less than permanent buildings. Due to the added threats to wideness character in relatively high visitor use areas, administrative patrol must be more frequent in those locations. Maintaining buildings for facilitating administrative patrol of wilderness is the minimum required action to preserve wilderness character in heavily used areas of the wilderness more than a half day's travel from a trailhead. In less-visited areas more than a half-day's travel from trailheads, the minimum required action to preserve wilderness character will be installation of temporary camps. In areas closer than a half-day's travel from trailheads, day patrol is the minimum required action. At locations where buildings are not the minimum required action, and where removal will not unduly impact wilderness, non-historic buildings should be removed to improve the undeveloped quality.

SEQUOIA AND KINGS CANYON NATIONAL PARKS WILDERNESS STEWARDSHIP PLAN MINIMUM REQUIREMENTS ANALYSIS FRAMEWORK

Part 2 - How Does Each Alternative Meet the Goals, Objectives, and Desired Conditions of the WSP

Alternatives Comparison Criteria

PLANNING FRAMEWORK

The WSP provides direction for the management of visitors and administrative activities within the parks' wilderness. The framework of this WSP is founded on defining the goals and objectives for wilderness management, defining wilderness character for the parks, describing desired conditions for wilderness, developing visitor use capacity, and determining the types and levels of commercial services that support wilderness purposes.

Goals and Objectives

Goals and objectives are key elements of a wilderness stewardship plan, as they establish and provide the direction for the parks' wilderness management program and reflect the purpose and need for planning. Wilderness goals and objectives flow from law, policies, park and wilderness enabling legislation, GMP objectives, public input, and more. The following identify what the WSP needs to address to achieve long-term successful management and protection of wilderness:

- Preserve ecological, geological, scientific, educational, scenic, and historical values of wilderness, including culturally significant resources and paleontological resources within wilderness, as important and prominent values, consistent with the Wilderness Act, California Wilderness Act, and applicable planning guidance from the GMP.
- Manage archeological, historical, and ethnographic sites in a manner that is compatible with wilderness and historic-preservation laws.
- Preserve dark night skies.
- Preserve natural soundscapes.
- Work to reduce conflicts between user groups as well as between users and sensitive resources.
- Determine the types and levels of commercial services that will be allowed in wilderness and manage these services subject to applicable laws and policies.
- Foster an inspired and informed public and park staff who value preservation of the parks' wilderness.
- Promote the Leave No Trace© minimum-impact practices.
- Promote safety within the context of wilderness where users are expected to be self-reliant.

Desired Conditions

Desired conditions are the natural and cultural resource conditions that the NPS aspires to achieve and maintain over time, and the conditions necessary for visitors to understand, enjoy, and appreciate those resources (from the planner's sourcebook). In the context of a wilderness stewardship plan, desired conditions qualitatively describe an ideal condition of wilderness character. The Wilderness Act requires that as a minimum, wilderness character be preserved from the time of designation, although Management Polices also allows for improvements to wilderness character. In this WSP, desired conditions are defined for the four primary qualities of wilderness character. More specific desired conditions are also provided under the qualities that relate specifically to visitor use management.

- The untrammeled quality of wilderness character would be preserved by limiting deliberate manipulation of ecological systems except as necessary to promote another quality of wilderness character.
- The natural quality of wilderness would be preserved by mitigating the impacts of modern civilization on ecosystem structure, function, and processes. The NPS aspires to minimize or localize adverse impacts caused by visitor use and administrative activities. In the wilderness, natural processes would dominate:
    - ecosystem structure and function
    - native biodiversity
    - water quality and quantity
    - decomposition, nutrient cycling and soil forming processes
    - meadow and wetland productivity
    - fire regimes
    - soundscapes, dark skies and viewsheds
- The undeveloped quality of wilderness character would be preserved through the removal of installations that are unnecessary for the protection of other wilderness character qualities.
- Outstanding opportunities for solitude or primitive and unconfined recreation would be provided to support visitor use and enjoyment of the parks' wilderness areas in balance with the protection of other wilderness character qualities.
    - Visitors with diverse backgrounds and capabilities would have opportunities to use and enjoy wilderness.

These overarching element-specific objectives are:

Visitor-use Levels – Visitor use and enjoyment of wilderness would be balanced with the preservation of wilderness character.

Trails – The trail system would facilitate access for visitor use and enjoyment of the wilderness. Trails would be well suited to the types and levels of visitor use.

Campfires – Visitors would have the opportunity to enjoy campfires where campfires are compatible with the protection of vegetation and downed wood resources.

Food Storage – Native wildlife would subsist only on naturally obtained food, uninfluenced by the presence of human food.

Human-waste Management – Human waste would not contaminate water or create unsanitary or unsightly conditions. Management of waste would not unduly impact the undeveloped quality.

Party Size – Party size would be set at levels high enough to allow for a variety of experiences, but low enough to protect wilderness character from impacts associated with large groups.

Camping/Campsites – Visitors would have the opportunity to choose camping locations, except in areas where camping would result in unacceptable impacts.

Stock Use – Visitors would have opportunities to travel with stock, from day rides to multi-day trips, in a manner that is compatible with the protection of wilderness character.

Administrative Structures and Development – Installations and developments would be the minimum necessary for the administration of wilderness.

Frontcountry Facilities to Support Wilderness – Frontcountry facilities that support activities in wilderness would encourage and/or facilitate visitor use and enjoyment of wilderness.

Commercial Services – Commercial services may be performed to the extent necessary for activities which are proper for realizing the recreational or other wilderness purposes of the areas. Commercial services would support visitor use and enjoyment of wilderness in a variety of appropriate ways.

Alternative 2	Alternative 3	Alternative 4	Alternative 5
This alternative recognizes that SEKI wilderness can be broadly understood as three different types of locations: day use areas close to frontcountry, highest-use overnight areas like the HST, RLL, and PCT, and low-use overnight areas like the Middle Fork of the Kings and the Hockett Plateau. It further recognizes that current and projected visitor use levels pose few threats to wilderness character in the low-use areas under current management, but that there are some threats in highest use areas (or areas with very sensitive resources) that can be mitigated through targeted improvements to current management.	This alternative seeks to increase opportunities for primitive recreation by allowing additional use, which is mostly expected to occur at high-demand areas. Allowing increased use could result in decreased opportunities for solitude wilderness-wide. In order to preserve the natural quality of wilderness, SEKI's high use areas would require additional development and restrictions on visitor behavior.	This alternative seeks to emphasize the undeveloped and non-commercial qualities of SEKI wilderness. Removal of development and reduction of commercial services would increase the self-reliant nature of wilderness recreation. In order to preserve the natural quality of wilderness with less resource-protecting development, the amount of use would need to be reduced.	This alternative seeks to enhance the quality of solitude available in SEKI wilderness. Total numbers of visitors allowed and party sizes would be reduced, which would mean that reduced levels of development and reduced restrictions on visitor behavior would serve to protect natural resources.

Alternative 2		Alternative 3		Alternative 4		Alternative 5	
Element	To what degree does this alternative meet goals, objectives, and desired conditions?	Element	To what degree does this alternative meet goals, objectives, and desired conditions?	Element	To what degree does this alternative meet goals, objectives, and desired conditions?	Element	To what degree does this alternative meet goals, objectives, and desired conditions?
Permits and Quotas		**Permits and Quotas**		**Permits and Quotas**		**Permits and Quotas**	
Trails and Signs		**Trails and Signs**		**Trails and Signs**		**Trails and Signs**	
Campfires		**Campfires**		**Campfires**		**Campfires**	
Food Storage		**Food Storage**		**Food Storage**		**Food Storage**	
Human Waste Mgmt.		**Human Waste Mgmt.**		**Human Waste Mgmt.**		**Human Waste Mgmt.**	
Party Size		**Party Size**		**Party Size**		**Party Size**	
Camping		**Camping**		**Camping**		**Camping**	
Stock use access and travel		**Stock use access and travel**		**Stock use access and travel**		**Stock use access and travel**	
Stock Grazing		**Stock Grazing**		**Stock Grazing**		**Stock Grazing**	
Administrative Structures and development		**Administrative Structures and development**		**Administrative Structures and development**		**Administrative Structures and development**	
Frontcountry Facilities		**Frontcountry Facilities**		**Frontcountry Facilities**		**Frontcountry Facilities**	
Commercial Services		**Commercial Services**		**Commercial Services**		**Commercial Services**	

KEY	
Mostly Meets Goals, Objectives, Desired Conditions	
Partially Meets Goals, Objectives, Desired Conditions	
Does Not Meet Goals, Objectives, Desired Conditions	

SEQUOIA AND KINGS CANYON NATIONAL PARKS WILDERNESS STEWARDSHIP PLAN MINIMUM REQUIREMENTS ANALYSIS FRAMEWORK

Part 3 - How Does Each Alternative Affect Wilderness Character?

This table includes a summary of the analysis. A complete analysis is found in the WSP Chapter 4, Environmental Consequences - Wilderness Character.

Alternative 2	Alternative 3	Alternative 4	Alternative 5
This alternative recognizes that SEKI wilderness can be broadly understood as three different types of locations: day use areas close to frontcountry, highest-use overnight areas like the HST, RLL, and PCT, and low-use overnight areas like the Middle Fork of the Kings and the Hockett Plateau. It further recognizes that current and projected visitor use levels pose few threats to wilderness character in the low-use areas under current management, but that there are some threats in highest use areas (or areas with very sensitive resources) that can be mitigated through targeted improvements to current management.	This alternative seeks to increase opportunities for primitive recreation by allowing additional use, which is mostly expected to occur at high-demand areas. Allowing increased use could result in decreased opportunities for solitude wilderness-wide. In order to preserve the natural quality of wilderness, SEKI's high use areas would require additional development and restrictions on visitor behavior.	This alternative seeks to emphasize the undeveloped and non-commercial qualities of SEKI wilderness. Removal of development and reduction of commercial services would increase the self-reliant nature of wilderness recreation. In order to preserve the natural quality of wilderness with less resource-protecting development, the amount of use would need to be reduced.	This alternative seeks to enhance the quality of solitude available in SEKI wilderness. Total numbers of visitors allowed and party sizes would be reduced, which would mean that reduced levels of development and reduced restrictions on visitor behavior would serve to protect natural resources.

Alternative 2	Alternative 3	Alternative 4	Alternative 5
Natural	**Natural**	**Natural**	**Natural**
Designated campsites could protect the natural quality of wilderness by restricting where people camp. Grazing would be managed so as to maximize protection of natural and cultural resources while allowing visitors traveling with stock continued access to forage for their animals.	Designated campsites could protect the natural quality of wilderness by restricting where people camp. Grazing would be managed so as to maximize protection of natural and cultural resources while allowing visitors traveling with stock continued access to forage for their animals.	No grazing. Improvement to the natural from the removal of developments and the restoration of those areas to natural conditions.	Current methods of grazing management (such as opening dates, head limits and night limits, grazing capacities, and temporary closures) would continue to be implemented.
Protects the natural quality	Protects the natural quality	Protects the natural quality	Protects the natural quality
Untrammeled	**Untrammeled**	**Untrammeled**	**Untrammeled**
Trammeling associated with the restoration of trails, campfires, and the removal of development.	Trammeling associated with the restoration of trails, campfires, and the removal of development.	Trammeling associated with the restoration of trails, campfires, and the removal of development.	Trammeling associated with the restoration of trails, campfires, and the removal of development.
Short-term adverse effect on untrammeled.	Short-term adverse effect on untrammeled.	Short-term adverse effect on untrammeled.	Short-term adverse effect on untrammeled.

Alternative 2	Alternative 3	Alternative 4	Alternative 5
Undeveloped	**Undeveloped**	**Undeveloped**	**Undeveloped**
Development associated with campfires would be restricted (depending on location) above certain elevations. Some privies and restrooms would be removed. The park would retain 48 of the existing 86 food-storage boxes (FSB), and would remove 25. An additional 13 food-storage boxes would be considered for removal. Under this alternative, 29 hitch rails would be retained, and 23 hitch rails would be removed. Also, 42 fences/gates would be retained; 12 would be removed Most ranger stations would be retained; the Monarch tent platform would be removed and the Bearpaw Ranger Station would be relocated and reconstructed. The facilities at the Redwood Canyon cabin would be reduced in size and unnecessary installations would be removed. Existing pastures/fences would remain. Existing crew camps would be retained, but reduced in size and with fewer installations.	Development associated with campfires would be removed above 9,000 ft but would continue to exist below that elevation. FSB would be retained; more could be added. Privies and restrooms would be retained; more may be installed. Designated campsites would be retained and more would be developed. 14 hitch rails would be removed, and 38 would be retained. Under this alternative, 14 hitch rails would be removed and 38 hitch rails would be retained. Five fences/gates would be removed, 49 would be retained, and one new fence with a gate would be constructed All existing ranger stations and patrol cabins would be retained. Some would be improved/ relocated/ converted to hard sided stations. The Redwood Canyon research cabin would be retained. Existing pasture/fences would be retained. The number of crew camps would be increased to support additional trail development.	All evidence of campfires would be removed. All FSB would be removed. All privies and restrooms would be removed. All designated campsites would be removed. All grazing facilities would be removed. Seven ranger stations and two patrol cabins removed. Redwood Canyon Cabin would be removed. Administrative pasture fences would be removed. Permanent crew camps would be removed.	All privies and restrooms removed. Under this alternative, 24 hitch rails would be retained and 28 hitch rails would be removed. A total of 36 fences or gates would be retained, 18 fences and gates would be removed, and one gate would be added Five ranger stations would be removed. Redwood Canyon cabin would be removed. Permanent crew camps would be removed.
Improves undeveloped quality.	Increases development more than any other alternative.	Improves undeveloped quality more than any other alternative.	Improves undeveloped quality.

Alternative 2	Alternative 3	Alternative 4	Alternative 5
Solitude or Primitive and Unconfined Recreation	**Solitude or Primitive and Unconfined Recreation**	**Solitude or Primitive and Unconfined Recreation**	**Solitude or Primitive and Unconfined Recreation**
Quotas would remain similar to current conditions. On-trail party size would remain similar to alternative 1 (no-action), with some reduction in the largest allowable stock party sizes to reduce trail and social impacts. Off-trail party sizes would be reduced for stock and foot parties Camping would be allowed in a few close in areas. Designated campsites would be retains and more may be developed. Stock would be allowed on most trails, and in four off trail areas.	Quotas would be increased. Campfires would be allowed up to 9,000 feet. Party size limits would be increased more than other alternatives. Night limits would be more restrictive than current conditions. Designated campsites would be retained and more may be developed. Stock would be allowed on most trails, and in four off trail areas.	Quotas would be reduced slightly. There would be fewer permits for commercial service providers. No campfires would be allowed wilderness-wide. Party size would be reduced from current conditions. Night limits would be established. Stock would be allowed on most trails. Off trail travel by private stock parties would be allowed in four areas of the wilderness (but prohibited for commercial and admin). Grazing would be prohibited.	Quotas would be reduced and day use permits would be instituted in some locations. Party size most restrictive when compared to other alts. More restrictive night limits than the other alternatives. Designated campsites would be removed. Stock use would be allowed on trail (but not off trail).
Improves solitude in highest use areas; maintains opportunities for primitive and unconfined recreation similar to existing levels.	Decreases solitude; decreases unconfined character of wilderness with increased restrictions. Increases opportunities for primitive recreation.	Increases solitude; decreases opportunities for primitive and unconfined recreation.	Increases solitude; decreases opportunities for primitive and unconfined recreation.
Other features of Value	**Other features of Value**	**Other features of Value**	**Other features of Value**
Retains the historic structures in wilderness. Removes one historic structure (Bearpaw Meadow Ranger Station).	Retains the historic structures in wilderness. Removes one historic structure (Bearpaw Meadow Ranger Station).	Removes four historic structures and one historic district from wilderness.	Retains the historic structures in wilderness. Removes one historic structure (Bearpaw Meadow Ranger Station).
Beneficial and adverse effect on historic features.	Beneficial and adverse effect on historic features.	This alternative results in the removal of the most historic structures.	Beneficial and adverse effect on historic features.

SEQUOIA AND KINGS CANYON NATIONAL PARKS WILDERNESS STEWARDSHIP PLAN MINIMUM REQUIREMENTS ANALYSIS FRAMEWORK

Part 4 - Recommended Alternative and Justification

All of the alternatives serve to protect wilderness character to different degrees.

Some alternatives protect the undeveloped quality better (alternatives 4 and 5); alternative 2 would reduce development slightly; alternative 3 would increase levels of development.

Some alternatives provide more opportunities for solitude by reducing trailhead quotas and commercial services (alternatives 4 and 5). However, alternatives 4 and 5 both limit opportunities for primitive and unconfined recreation. Alternative 2 provides opportunities for primitive and unconfined recreation near current levels, and Alternative 3 expands opportunities. Alternative 2 better protects solitude in popular areas, while alternative 3 would reduce opportunities for solitude. All alternatives have similar levels of trammeling.

All alternatives protect the natural quality of wilderness from the impacts associated with visitor use, however the natural quality is more at risk in alternatives that remove food-storage boxes (alternatives 4 and 5) and other facilities that help the park manage wilderness impacts (such as ranger stations and privies). Alternative 4 protects the natural quality by prohibiting grazing, but it does this at the expense of providing opportunities for primitive and unconfined recreation. Alternative 3 provides the greatest opportunities for primitive and unconfined recreation, but it does so at the expense of opportunities for solitude, particularly in the most popular areas.

Conclusion

Overall, alternative 2 best meets the goals, objectives and desired conditions while preserving wilderness character. While it is does not result in the most reduction in development, the developments maintained in wilderness, such as designated campsites, food storage boxes, privies, ranger stations, and fences, serve to protect the natural quality of wilderness, and promote opportunities for primitive and unconfined recreation. Opportunities for solitude would be enhanced in the most popular areas by reducing use (reductions in trailhead quotas, reductions in commercial services, reduced night limits), while opportunities for a range of primitive and unconfined recreation would continue to be available.

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Appendix N

Strategy for Reducing Nonnative Plants in Wilderness

ON THE PREVIOUS PAGE
Whaleback in Kings Canyon National Park
NPS Photo

APPENDIX N:

STRATEGY FOR REDUCING NONNATIVE PLANTS IN WILDERNESS

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STRATEGY FOR REDUCING NONNATIVE PLANTS IN WILDERNESS

This strategy is based on the parks' best practices established in 2004 (Management Directive 38, Preventing Introduction and Spread of Invasive Nonnative Plants). These practices continue to be improved as additional knowledge is gained from implementation of prevention, early detection, and rapid response procedures.

PURPOSE AND BACKGROUND

This strategy establishes guidelines to (1) prevent the introduction and spread of nonnative plant species within the wilderness of Sequoia and Kings Canyon National Parks, and, (2) where new introductions do occur, to detect and control them early, before they spread. It covers activities performed by government employees, parks' concessioners, permittees, contractors, partners, and visitors.

National Park Service (NPS) policies on preventing the introduction and spread of nonnative plants include the following:

- The NPS is directed by its founding document, the NPS Organic Act (16 USC 1) to "conserve the scenery and the natural and historic objects and wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."
- Sections 2 (a) and (c) of the Wilderness Act (1964) direct managers to protect and preserve various qualities of wilderness character. Nonnative invasive plants threaten the natural quality of wilderness, opportunities for primitive recreation, and features of ecological value.
- Nonnative species will not be allowed to displace native species if displacement can be prevented (NPS Management Policies 2006, 4.4.4).
- New nonnative species will not be introduced into parks, except in specific rare situations (NPS Management Policies 2006, 4.4.4.1).
- Livestock grazing will use best management practices to protect the parks' resources, with particular attention being given to protecting wetland and riparian areas, sensitive species and their habitats . . . Managers must regulate livestock so that ecosystem dynamics and the composition, condition, and distribution of native plants and animal communities are not significantly altered (NPS Management Policies 2006, 8.6.8.2). Note that in these parks grazing is limited to recreational and administrative saddle and packstock, so this policy is applied for stock, not livestock.
- Activities may not be categorically excluded from NEPA if they contribute to the introduction, continued existence, or spread of federally listed noxious weeds (DO-12 Handbook 3.5N, Federal Noxious Weed Control Act).
- Activities may not be categorically excluded from NEPA if they contribute to the introduction, continued existence, or spread of nonnative invasive species or actions that may promote the introduction, growth, or expansion of the range of nonnative invasive species (DO-12 Handbook 3.5O, Executive Order 13112).

By far the most efficient and cost-effective actions that can be taken to keep invasive nonnative plants from displacing native species are to (1) prevent the entry of nonnative plants into the parks, (2) prevent the spread of existing nonnative plant populations within the parks, and (3) detect and control newly

introduced nonnative plants early, before they establish and spread. Preventing the entry of nonnative plants into the parks' frontcountry is the essential first step for preventing their movement into wilderness. This is because many nonnative plants that become established in wilderness first become established in the parks' frontcountry. Once new populations of nonnative plants establish they may multiply rapidly. As a consequence, removal can be extremely difficult and costly, especially in remote wilderness. Sometimes treatment is not even possible. The importance of a strong prevention, early detection, and rapid response program as a vital component in protecting native ecosystems from the impacts of invasive nonnative plants cannot be overstated.

Seeds and other propagative parts (hereafter generalized as "seeds") of nonnative plants can travel wherever and whenever people, stock, vehicles, equipment, or earthen and plant materials are moved from one location to another. Seeds can lodge in the treads of car tires, bicycle tires, or shoes. Soil, sand, or gravel imported for construction or other activities can contain nonnative plant seeds. Hay, used to feed stock, or straw, used for soil stabilization, can contain nonnative plant seeds from the fields where the hay was grown. Some nonnatives, such as puncture vine (*Tribulus terrestris*), have spiny or hook-like seed coats and can arrive in the parks stuck to the fur of pets, wildlife, and stock or on people's clothing, shoelaces, and camping gear. Nonnative plants installed around the parks' residences for landscaping can spread to surrounding natural areas. Seeds can blow in from the gardens of neighboring private landowners or can wash down rivers and streams.

The objectives of this strategy are to:

1. Establish best practices to prevent introduction and spread of invasive plants to wilderness by the following mechanisms:
    a. Soil-disturbing activities resulting from construction, facilities maintenance, disturbed lands restoration, and fire management;
    b. Import of stock and their feed;
    c. Travel to and within wilderness.
2. Establish a framework for planning and implementing an early detection and rapid response program in wilderness.

NEED FOR STRATEGY

Once introduced, invasive nonnative plants can spread across landscapes and quickly become difficult or impossible to control. Invasive plants can out-compete native vegetation, displacing native plants and animals from previously occupied habitat, diminishing native plant diversity, and endangering plant and animal species that are already rare. Invasive plants can reduce or degrade wildlife habitat and forage and cause illness, injury, and sometimes death in wildlife and stock. Invasive plants can alter soil nutrient and moisture levels, increase fire frequency, and change the burning season. These altered environmental conditions may favor further nonnative plant invasions. For example, areas previously dominated by woody vegetation may become dominated by annual nonnative grasses and forbs. Invasive plants can cause the deterioration of wetland meadows. Finally, many invasive plants are spiny and can turn a formerly pleasant recreational experience into a painful encounter for visitors.

One of the primary purposes of Sequoia and Kings Canyon National Parks is to protect, restore and maintain the parks' diverse natural resources against external threats. The parks are committed to preserving the diverse native flora against the threat of invasive plants by using Integrated Pest Management (IPM). Integrated Pest Management provides a framework for planning a comprehensive invasive plant management program and for combining tools (physical/ mechanical, chemical,

cultural/fire, and biological) for controlling existing infestations. Integrated Pest Management strongly emphasizes preventing the introduction and spread of new nonnative plants and the early detection and control of new infestations. Prevention of new introductions requires the cooperative efforts of the parks' staff in all divisions, as well as concessioners, contractors, frontcountry visitors, wilderness users, residents, owners of private inholdings, permittees, and neighboring communities.

One of the outstanding qualities of Sequoia and Kings Canyon National Parks is their large expanse of continuous, intact ecosystems, spanning over 13,000 feet of elevation and diverse vegetation types, and largely unfragmented by roads, dams, or other development. As a result, these parks' middle and high elevations retain diverse habitats that are relatively uninvaded by nonnative plants. In comparison to other areas of California, where native plants can be hard to pick out among the tangle of invaders even in natural preserves, this makes protecting the parks' intact ecosystems through prevention all the more important. Large areas of relatively uninvaded, unfragmented, undeveloped habitat are increasingly rare in the world, and therefore of immense ecological, cultural and other value. Finally, climate change is expected to make some habitats more suitable for some nonnative plants, so invasion rates may increase. Preventing these invasions is one of the few things that can be done to increase ecosystem resistance and resilience in the face of unprecedented human-caused climatic change.

BEST PRACTICES FOR PREVENTING INTRODUCTION AND SPREAD OF NONNATIVE PLANTS INTO WILDERNESS

While this strategy focuses on the protection of wilderness ecosystems, the following best practices include those frontcountry activities and locations that have a strong connection to wilderness. Other activities that have a weaker connection to wilderness nonnative plant introductions, such as landscaping, planting of vegetation, and maintenance of cultural landscapes, are addressed in other documents but excluded here.

These best practices are a menu from which necessary mitigations can be chosen when invasive plant staff are reviewing proposed projects and routine operational activities during planning and compliance. For each project or operational activity, the risk of introducing or spreading nonnative plants will be assessed and best practices prescribed accordingly. For example, a trail construction project at high elevation, with no nearby nonnative plant populations, no use of imported earthen materials, and use of hand tools only, is at low risk of introducing nonnative plants and would not require post-project surveys for invasive plants to be funded by the project. By contrast, a frontcountry road construction project adjacent to invasive plant populations, using imported gravel, and requiring earthmoving equipment is at high risk of introducing nonnative plants and would require pre-project surveys, post-project surveys, and post-project treatment to be funded by the project. The highest-risk situations, for which the practice is most necessary, are described in the descriptions below as applicable. To be most effective, all these practices will require invasive plant staff to provide active outreach to project and operations staff, partners, and the public to explain their importance, describe the high-risk situations where the practice is most necessary, and work together to adjust the practices when they are not feasible.

SOIL-DISTURBING ACTIVITIES

The soil disturbance inherent in construction, coupled with the import of equipment and materials that may harbor nonnative plant seeds, make many construction sites high-risk areas for invasion by nonnative plants. Construction projects affecting the spread of invasive plants into wilderness include projects occurring both in frontcountry and wilderness because invasive nonnative plants can spread rapidly from disturbed frontcountry construction sites into adjacent wilderness ecosystems. Recent disturbed lands restoration sites, areas that have sustained high-intensity fire, fire lines, fuel breaks, and trails are also

vulnerable to import and spread of nonnative plants. Soils are disturbed to restore natural topography, to build fire line, or by repeated foot traffic. Vehicles, equipment, clothing, and boots brought to a work site can harbor nonnative plant seeds from the previous work site. Materials that are imported to help mitigate soil erosion, such as straw, can contain nonnative plant seeds.

CONSTRUCTION, FACILITIES MAINTENANCE, AND DISTURBED LANDS RESTORATION

The following practices will be followed in construction, facilities maintenance and disturbed lands restoration activities:

1. Before any equipment is brought into the parks or moved to new areas within the parks after being used off pavement, it will be pressure or steam washed in order to remove seed-containing soil and plant parts. Examples of equipment are backhoes, tractors, loaders, excavators, dozers, bobcats, wheeled compressors, street sweepers, or trucks and trailers that have traveled off-road. Trained staff of the parks will inspect equipment to verify cleanliness before it enters the parks.
2. Topsoil will not be imported into the parks.
3. Before moving vehicles or equipment that have been used off paved surfaces to a new job site within the parks, visually inspect and clean the vehicles or equipment (including the undercarriage) thoroughly to remove all mud, dirt, and plant parts, particularly when moving from lower to higher elevations, from areas of known weed infestations, or into meadows, riparian areas, or other wetlands.
4. Do not use straw- or hay-based erosion control materials, even those certified as weed-free. Other fibrous materials, such as shaved aspen (excelsior) and coconut fiber (coir) are available at much lower risk. Because wood and coconut fibers are innately free of plant seeds, weed-free certification is not required for these products.
5. Use weed-free, locally-staged fill or on-site fill (mineral) materials when it can be extracted from the project site without causing adverse impacts to the native vegetation, soils, or hydrology.
6. Imported mineral materials will come from an approved source. Such materials include boulders, gravel, sand, road base, fill dirt, and all other earthen materials. Consult with the invasive plant ecologist at least a month in advance of project work. Quarries are rarely, if ever, free of invasive plants. Invasive plant staff will work with project managers to minimize the risk of importing invasive plants with mineral materials by inspecting proposed materials at the quarry or other source sites for presence of invasive plants. Mitigations to lower the risk may include washing coarse materials (boulders, rock, and coarse gravel), stripping the top 12 inches of material in a stockpile, requiring freshly-produced material stored less than one month, or other prescriptions specific to the situation. Some high-risk materials may be rejected. Material from quarries participating in the Sierra Nevada Region Weed Free Aggregate Program, managed by Yosemite National Park, may be used if the quarry receives a certification of “Full Compliance.” Material from quarries receiving a “Conditional” certification will need to be inspected by the parks’ invasive plant staff. Use of material from participating quarries is encouraged in order to provide incentive and recognition to quarry operators that implement good weed management practices. Consult with the invasive plant ecologist about participating quarries.
7. Do not move low-elevation (foothills) road materials to higher elevations.
8. Minimize the area of soil disturbance. Consider realigning trails or reducing the trail width to minimize disturbance. Scrape road shoulders only where steep, material-shedding slopes make this action necessary. When removing invasive plants, consider using herbicides rather than digging out roots, where appropriate.

9. Consider the location of soil disturbance. To avoid patches of invasive plants when aligning new trails, consult invasive plant staff when planning projects.
10. Minimize the frequency of soil disturbance. For example, disturbing an area once every five years creates less risk than disturbing it every year. If a site has to be cleared of vegetation yearly (such as road ditches) and the site is outside wilderness, consider paving as an alternative.
11. After completing construction or when otherwise stabilizing disturbed soils, revegetate the area or cover bare soil with local litter and duff mulch prior to fall rains in October-November. This mulch will provide a source of seeds to reestablish native vegetation and reduce the risk of nonnative seeds germinating. Ideally, the litter and duff should be collected from surrounding areas, but do not denude the collection area. Leave at least 50 percent of the material in place and do not disturb vegetation.
12. As a desired practice for planned construction sites, survey for and remove invasive plants at least one year before the start of construction. For sites where priority invasive plants are likely to be present, include funding for one year's pre-project survey when planning projects. Contact invasive plant staff to conduct surveys.
13. As a desired practice after construction and until sites are fully revegetated, schedule annual invasive plant surveys by qualified botanical technicians so that new introductions are detected early and prevented from becoming problems. For sites where there is substantial risk of introducing or spreading non-native plants through construction activities, include funding for one to three years of follow-up surveys when planning projects.
14. Consider the risk of nonnative plant invasion when locating perpetually disturbed facilities, such as campgrounds, corrals, and trails. For example, campsites adjacent to meadows and trails through meadows create a high risk for nonnative plants to become established in meadows. Future planning should consider closure of such high-risk campsites and rerouting of such trails.

FIRE MANAGEMENT

The following practices will be followed when disturbing soils in the fire management program:

1. Before any equipment is brought into the parks or moved to new areas within the parks after being used off pavement, it will be pressure or steam washed in order to remove seed-containing soil and plant parts. Examples of equipment are fire engines, crew buggies, dozers, water tenders, or trucks and trailers that have traveled off-road. This restriction will not apply to equipment responding to initial attack of wildland fire where fire spread is threatening life or property. For equipment responding to extended attack of wildland fire where fire spread is threatening life or property, the Fire Management Officer will request exceptions with the Chief of Resources Management and Science.
2. Minimize the area of soil disturbance. In frontcountry fire units, use hand line rather than dozer line where possible. Construct fire lines to minimum width required relative to fire behavior and terrain.
3. Consider the location of soil disturbance. Fire planners, resource advisors, and incident staff should consult the parks' invasive plant staff when locating hand line and dozer line in areas known to have populations of invasive plants. Dozer line and hand line should be located well away from invasive plant populations whenever possible.
4. When rehabilitating fire line, return windrowed soils to original position and cover bare soil with local litter and duff mulch prior to fall rains in October-November. This mulch will provide a source of seeds to reestablish native vegetation and reduce the risk of nonnative seeds

germinating. Ideally, the litter and duff should be collected from surrounding areas, but do not denude the collection area. Leave at least 50 percent of the material in place and do not disturb vegetation.

5. On fires, invasive plant staff should be consulted by the resource advisor, or when appropriate for large fires, assigned as an additional resource advisor to the incident management team whenever the spread of invasive plants is probable. Invasive plant staff should be consulted in the development of fire line and burned area rehabilitation plans.
6. As a desired practice in planned burn units at high risk for spreading known invasive plant populations, survey for and remove invasive plants at least one year before a planned ignition, if funding and staff are available.
7. As a desired practice in post-burn units, schedule annual invasive plant surveys by qualified botanical technicians so that new introductions are detected early and prevented from becoming problems. One to three years of follow-up surveys should be funded by projects. In recognition that current funding structures may not allow for dedicated surveys, post-fire invasive plant detection may need to rely on limited searches conducted by fire effects monitoring crews while traveling to and from plots.

IMPORT OF STOCK AND FEED

Hay, unprocessed feed, and straw may contain nonnative plant seeds. Invasive plants can be introduced into previously unoccupied areas during transport of feed materials, by laying out hay at pack stations or trail heads, and in manure deposited by stock throughout the parks. A portion of plant seeds remain live and viable as they pass through the digestive systems of horses and mules, and their manure can act as fertilizer. Use of straw as mulch is covered in the preceding section.

No stock feed is truly "weed free," but the types of stock feed vary in their risk of containing undesirable plants. California certified weed-free forage is produced from hay, feed, or straw products grown in a field that has received reasonable and prudent visual inspection and where no propagative parts or seeds of state- or federal-listed noxious weeds were detected. Unfortunately, many of the plants that cause problems in the parks' wilderness areas, such as reed canarygrass, orchard grass, timothy grass, and velvet grass, are not on the California or federal noxious weed lists, are desirable for hay production, and therefore may be present in certified weed-free forage. Even processed pellets can contain trace amounts of viable seed. However, the risk of importing viable seeds decreases with the level of processing: highly milled, heat-treated pellets have many fewer viable seeds than raw hay. More risk can be tolerated in frontcountry sites, where the probability of detection is higher and there are fewer barriers to effective treatment of established plants, than in wilderness sites, where probability of detection is low and there are more barriers to effective treatment of established plants.

The following practices will be followed when importing stock and feed into the park:

1. California, Nevada, or other state-certified weed free forage (baled or loose hay, hay cubes, or straw bedding) is required when hay products are used as supplemental forage or bedding in the parks' frontcountry zones. This requirement will be included in pack station concessions contracts and commercial use authorizations.
2. Feed carried into the wilderness will be commercially-processed pellets, rolled grains, or fermented hay (e.g., Chaffhaye™). These products have a high level of mechanical milling, heat treatment, and/or anaerobic fermentation that destroys seeds. Other feed products that have similar levels of processing that destroy nearly all seeds may be permitted. Baled or loose hay and

compressed hay cubes, which have little to no processing, will not be used in wilderness. This applies to all users: administrative, commercial, and private.

3. Stock users are encouraged to purge their animals for three days on pellets, rolled grains, fermented hay, or certified weed free forage prior to entering the park.
4. As a desired practice, stock should be inspected and cleaned by handlers prior to entering the parks, or prior to moving from frontcountry to wilderness within the parks. Inspect for and remove any plant parts, seeds, or soil that may have adhered to animals, tack, or equipment, and handle loads and tack in such a way as to avoid picking up plant parts, soil, or mud. This desired practice will be included in pack station concessions contracts and commercial use authorizations. Private stock users will be informed of this practice through outreach and education. Because this desired practice is difficult to achieve operationally, it will be a topic for ongoing discussion and improvement between invasive plant staff and animal handlers.
5. Manure that accumulates in corrals will be removed from the parks and not stockpiled or burned within the parks. This requirement will be included in pack station concessions contracts.
6. As a desired practice, NPS administrative corrals and concessioner pack stations will be kept free of invasive plants within a 50-foot buffer of the facility. This will be the responsibility of the NPS corrals and concessioner pack station staff. Invasive plant staff will monitor sites for invasive plants and consult on appropriate management strategies. Because there is limited time and funding to accomplish this practice, invasive plant staff will continue to work with corrals and concessioner staff to control invasive plants in the highest-risk facilities.

TRAVEL TO AND WITHIN WILDERNESS

The wilderness of Sequoia and Kings Canyon National Parks remains relatively uninvaded by nonnative plants. Even those species, such as cheatgrass and bull thistle, that have managed to colonize wilderness sites have left many wilderness drainages untouched. Protection of the wilderness, which is nearly 97% of the parks' acreage, from invasion by nonnative plants is among the highest priorities of the invasive plant management program.

The following practices will be followed to protect wilderness vegetation:

1. Frontcountry helibases and helispots are focal points for the movement of nonnative plant seeds from the frontcountry to the wilderness. As a desired practice, the Ash Mountain helibase and frontcountry helispots will be kept free of invasive plants within a 50-foot buffer of the facility to reduce the risk of contaminating clothing, shoes, gear, and external loads. Cargo nets will be inspected and cleaned after use, particularly after use outside the parks or in low elevations. This will be the responsibility of heliport staff. Invasive plant staff are available to consult.
2. Helicopter users will be responsible for inspecting and cleaning their gear, clothing, boots, and external load items for plant seeds, plant parts, and caked dirt and mud before loading. Helitack staff will inspect and clean helicopter skids.
3. Heliport staff will track helicopter landing sites and cargo net drops and provide locations to a designated contact annually. Invasive plant, heliport, and wilderness ranger staff will work together to survey for new introductions and control invasive plants in wilderness helispots.
4. Trailheads will be inspected for invasive plants and kept weed-free. Invasive plant staff will work with trailhead rangers and trail crews to inspect for and remove invasive plants.
5. When travelling from frontcountry to wilderness, from areas of known weed infestations (communicated in training), or from foothills to higher elevations, wilderness users will inspect,

remove, and properly dispose of plant seeds, plant parts, and caked dirt and mud found on clothing, boots, tools, and camping equipment. Disposal consists of removing the seed, plant parts, and dirt from clothing and equipment at the origin of the material, or bagging the seeds, plant parts, and dirt and disposing in bagged garbage. Public users will be informed of this practice through outreach efforts.

6. Wilderness rangers, trailhead rangers, and trail crews will be trained in invasive plant identification and will be key personnel in early detection of new invasions.
7. As a desired practice, invasive plant staff will train all parks personnel in invasive plant identification, early detection, and reporting. The parks' newsletters, pamphlets, reference books in the parks' libraries, herbaria, and invasive plant observation cards are available for this purpose.
8. The parks' visitors will be informed of the threat of nonnative plant species and how they can help prevent nonnative plants from entering the parks. See attachment 1 for details of the public participation and outreach components of this strategy.

EARLY DETECTION AND RAPID RESPONSE

BACKGROUND

Early detection and rapid response (EDRR) is a management approach that capitalizes on managers' ability to most effectively eradicate invasive plant populations when they are small. By detecting a new invasive plant introduction before it has a chance to spread or build a large seed bank, managers can respond early enough in the invasion process to fully eradicate the species from a given area. Through EDRR, well-informed surveillance can prevent costly long-term control efforts, for which success is not ensured. After prevention, EDRR is the most effective and cost-efficient set of actions that can be taken to protect the parks' resources from the impacts of invasive plants. EDRR is recurring and cyclic in nature, so is best provided by an operational program.

Fortunately, the invasion of nonnative plants into the parks' montane, subalpine and alpine habitats is still in its early stages. While there are some established wilderness populations requiring expensive and intensive control, such as velvetgrass in the Kern Canyon, the relatively uninvaded condition of the parks' mid to upper elevation wilderness points to the importance of EDRR as the primary strategy to be employed to protect these intact ecosystems. The threat to these mid and upper elevation ecosystems does exist: cheatgrass has been found as high as 9,819 feet elevation, several pasture species introduced to Rock Creek have reproduced at 10,600 feet elevation, and several highly-invasive perennial grasses, including reed canarygrass, have been detected in scattered mid-elevation wilderness meadows.

HISTORY

Past EDRR at the parks has been both active and passive. Active EDRR has been conducted in wilderness by the parks' meadow monitoring program since 1995, when the establishment of a professional plant ecologist in charge of the program coincided with heightened awareness and understanding of invasion biology, which led to increased focus on EDRR as a part of meadow monitoring. The USGS Sequoia-Kings Canyon and Yosemite field stations conducted a nonnative plant inventory throughout the parks from 1996 through 1998, including in wilderness. The parks' invasive plant management program was established in 2002, when project-focused survey and control efforts in wilderness also began. Program staff conducted widespread early detections surveys along wilderness trails and in wilderness meadows in 2012 and 2013. Active surveys are also conducted by the parks' disturbed lands restoration program during the course of restoring disturbed lands, and by the plant ecology program during the course of

surveying for and monitoring rare plants. Passive detections have been reported by other staff of the parks, partners, volunteers, and visitors while engaged in other work or recreational activities.

ACTIVE AND PASSIVE SURVEILLANCE

Early detection surveillance is either active (ongoing and systematic) or passive (occurring as other activities are being conducted). Because the area within Sequoia and Kings Canyon National Parks that is designated or managed as wilderness is vast—838,000 acres—and newly introduced nonnative plant populations are small, finding them can be analogous to finding a needle in a haystack. The addition of large numbers of passive surveyors— the parks' staff, volunteers, partners, and visitors—to the relatively few active surveyors has the potential to contribute significantly to the overall success of EDRR efforts in wilderness.

Active early detection is performed by staff and volunteers who have botanical expertise, who regularly work in wilderness, whose dedicated tasks include surveying for and mapping invasive plants, and who participate in a planned EDRR program that includes training, implementation of monitoring protocols, and detailed data collection and management. Active ED staff are expected to identify and detect a target list of nonnative plants, plus unknown plants that appear "out of place" and could potentially be nonnative. Active early detection is expected to have a significantly higher probability of detection per observer than passive early detection. Observation data recorded by active ED staff are more detailed than those recorded by passive observers. Currently, the invasive plant management program conducts active, dedicated nonnative plant survey and control actions with staff and volunteers when project funding is available for such surveys. Other parks programs such as the disturbed lands, plant ecology, and meadow monitoring programs also perform active EDRR annually as they carry out restoration, rare plant, meadow monitoring, and other tasks.

Passive early detection is performed by non-resource staff (interpreters, wilderness rangers, trail crews, etc.), partners, researchers, volunteers, and visitors who usually do not have botanical expertise, but through outreach and training, are asked to look for a short target list of invasive plants as they conduct other activities. Staff participating in passive early detection are asked **not** to remove plants, since many non-native plant species are difficult to distinguish from closely related natives, and observations must be confirmed by a qualified botanist prior to removal. Passive early detection is expected to have a significantly lower probability of detection per observer than active early detection, but the much greater number of passive observers increases the area of the parks that is searched annually. Observation data recorded by passive ED staff are less detailed than those collected by active observers. For passive ED to be effective, a substantial, sustained investment in developing training materials and conducting outreach by both invasive plant and interpretive program staff is necessary.

PRIORITY SPECIES, VECTORS, AND SITES

Early detection is especially challenging in the parks' wilderness because the area that needs to be surveyed is large, nonnative plant occurrences are scattered and infrequent, and resources for surveillance are limited. To focus EDRR efforts where they are most needed, nonnative species, vectors, and areas (locations) have been prioritized. Some species are more likely to invade and cause problems than others, some of the parks' management actions and recreational activities contribute more to invasion than others, and some areas are more likely to be invaded. Prioritization ensures that surveyors maximize resource protection by searching for the species that are most likely to damage the most important resources in the locations where those species are most likely to be found.

Priority Species: A shortlist has been developed for species that have been assessed as having high priority for prevention and EDRR in wilderness (table N-1) based on their likelihood of being present in wilderness and their potential ecological impacts. This is a short list of species used for training passive observers with limited expertise. A larger watch list is also maintained and is shared with ecologists in the USGS Sequoia-Kings Canyon Field Station, the Sierra Nevada Network Inventory & Monitoring Program, and the forestry, plant ecology, and disturbed lands restoration programs. When new populations of transformer species such as reed canarygrass and Himalayan blackberry are found, observers are asked to: 1) notify invasive plant management program staff immediately, and 2) provide detailed information about where the species was discovered, and additional information about patch size, abundance, habitat, and feasibility of control.

Table: N-1 List of Priority Nonnative Plants for Wilderness Early Detection and Rapid Response Activities

Grasses	Other Species
Cheatgrass (*Bromus tectorum*)	Italian thistle (*Carduus pycnocephalis*)
Smooth brome (*Bromus inermis*)	Yellow star thistle (*Centaurea solstitialis*)
Orchard grass (*Dactylis glomerata*)	Bull thistle (*Cirsium vulgare*)
Velvet grass (*Holcus lanatus*)	Prickly lettuce (*Lactuca serriola*)
Reed canarygrass (*Phalaris arundinacea*)	Oxeye daisy (*Leucanthemum vulgare)*
Kentucky bluegrass (*Poa pratensis*)	Himalayan blackberry (*Rubus armeniacus*)
	Dandelion (*Taraxacum officinale*)
	Woolly Mullein (*Verbascum thapsus*)

This is a dynamic list and will be modified through future planning.

Regular early detection monitoring is especially important for species that form monotypic stands or alter ecosystem processes, such as reed canarygrass, velvet grass, Himalayan blackberry, and yellow star thistle. The larger watch list includes species such as medusa head (*Taeniatherum caput-medusae*), spotted knapweed (*Centaurea maculosa*), Canada thistle (*Cirsium arvensis*) and rush skeletonweed (*Chondrilla juncaceae*), which aren't yet in the parks but are problems in similar wilderness habitats. Other species, such as bur buttercup (*Ranunculus testiculatus*), lambsquarters (*Chenopodium album*) and bulbous bluegrass (*Poa bulbosa*), are common in corrals, burns, and other disturbed frontcountry areas. However, as it is not certain whether these species will spread or become problems in wilderness, they were not included. Although wilderness extends into lower elevation foothill woodlands, nonnative grasses and forbs have displaced foothills native plants to such an extent that common foothill invasives were not included unless, like Italian thistle, they are thought have the potential to expand into undisturbed middle and higher elevation habitats. Kentucky bluegrass, which has naturalized in many of the parks' meadows, is difficult even for trained botanists to distinguish from native bluegrasses, but is included because more information is needed about its distribution and expansion in the parks. Similarly, although dandelion and cheatgrass also have established populations in some parts of the wilderness and thus may not always be subject to rapid response efforts, they remain a priority for detection and documentation.

Note that the absence of a species from the wilderness priority nonnative plant list does not mean that it is not of concern in wilderness, or that it will not be controlled if detected. In addition to searching for particular species, ED staff will search priority sites where a great variety of non-native plants are likely to be introduced. In these relatively confined areas within the larger intact ecosystem, such as wilderness stock hitching rails, the goal is to detect and eradicate all newly-introduced non-native plants, if feasible. Prioritization of vectors and sites is discussed further below.

Priority Vectors: Known vectors for the introduction and spread of nonnative species are prioritized for prevention and EDRR based on their likelihood of resulting in the introduction or spread of these species into wilderness (table N-2). Equipment, materials, and stock brought into the parks, park operations and maintenance activities that result in soil or vegetation disturbance, and visitor activities can all result in the introduction and spread of nonnative plants. See the Prevention section above for a more detailed description of the activities that act as vectors. Ongoing outreach and education is necessary to keep staff, partners, and visitors aware of the risk of introducing nonnative plants via these vectors. Regular early detection surveys are necessary where these vectors are active.

Table N-2: Vectors for the Introduction and Spread of Nonnative Plants, Prioritized for Prevention and ED&RR Activities*

Priority Materials and Equipment	Priority Actions or Uses
High Priority • Fire vehicles, equipment, clothing and shoes • Helicopter cargo and helitack staff clothing and shoes • Imported earth-moving equipment • Imported earthen materials (gravel, etc.) • Imported landscaping and nursery plants • Imported erosion-control materials (straw, etc.) • Imported stock and stock feed **Lower Priority** • Staff, outside crews, and visitor equipment, clothing and shoes	**High Priority** • Road and utility corridor construction and maintenance projects • Trail and wilderness facility construction and maintenance projects • Fire suppression and prescribed fire • Stock grazing, trail use and overnight stays **Lower Priority** • Routine park operations and maintenance activities • Wilderness hiking and camping

*This is a dynamic list and will be modified through future planning.

Priority Sites: Sites are prioritized for prevention and EDRR based on the likelihood of nonnative plant introduction, the presence of high-value resource or habitats, the difficulty of control, and other factors such as the existing distribution of nonnative plants. Both frontcountry and wilderness sites are discussed here. This is because activities that involve soil and vegetation disturbance, or the import of earthen or other materials into the parks, can result in the introduction or spread of invasive plants to frontcountry corrals, helispots, campgrounds, trailheads, and other areas that are known jumping-off points for the introduction of nonnative plants into wilderness. Priority sites also include threatened and endangered species habitats and sensitive habitats such as meadows and riparian areas. Riparian sites are also a priority because species introduced there can spread to areas downstream where they may not be detected before they become too large to control. Burned areas are considered high priority because some invasive plants such as cheatgrass are known to spread rapidly after fire. Note that because of the tremendous size of the parks, most of the parks' acreage will never be actively surveyed and will only rarely be passively surveyed.

Ideally, high priority sites would be actively surveyed annually, medium priority sites every 3 to 5 years, and low priority sites every 5 to 10 years. However, the parks may not have the capacity to implement this rotation schedule. With invasive plant staff putting sustained effort into outreach to passive surveyors, many sites can be passively surveyed annually. However, a significantly lower level of detection per passive surveyor vs. active surveyor would be expected. Active surveys would be conducted by the meadow monitoring program and invasive plant program when funds are available.

Table N-3: High, Medium, and Low Priority Sites for Early Detection and Rapid Response Actions[1]

High Priority Sites	Medium Priority Sites	Low Priority Sites
• Frontcountry corrals • Wilderness stock camps and hitch rails • Grazed meadows • Riparian wetlands crossed by stock • Frontcountry helibase and helispots • Wilderness helispots • Trailheads • Recently burned areas • Construction sites • Utility corridors • T&E[2] species habitats, if threatened by invasive plants	• Frontcountry campgrounds • Frontcountry visitor facilities • Maintenance facilities • High-use trails • Ungrazed meadows near invaded meadows • Riparian reaches downstream of trails and grazed meadows • Ranger stations • Trail crew camps • Trails entering wilderness from outside the parks • High-value, accessible giant sequoia groves • Other rare species habitats, if threatened by invasive plants	• Roads near trailheads • Ungrazed meadows • Frequently-used off-trail routes and camps • Roads approaching the parks • Frontcountry trails • Other maintained trails

[1]This is a dynamic list and will be modified through future planning.
[2]T&E=Threatened and Endangered

DATA COLLECTION AND MANAGEMENT

Systematic and repeated data collection and proper data management are essential for locating and tracking infestations over time, prioritizing threats, clarifying factors that contribute to the introduction and movement of invasive plants, and refining priorities and management actions. For most active surveys, spatial data are collected using Geographic Positioning System (GPS) units that contain a specialized data dictionary for collecting attributes. Data is maintained in the parks' ArcMap spatial geodatabase. Other staff and partners conducting passive surveys collect more limited data using paper Invasive Plant Observation Cards (attachment 2). A smart phone app, currently in development, will greatly expand the ability of non-resources staff, the parks' partners, volunteers and visitors to identify, map and assist in the control of nonnative plants.

Details of planned data collection and management are shown in attachment 3.

FIELD PROTOCOLS

The methods for conducting simple, rapid early detection are described in detail in attachment 4. Simple, repeated surveys are performed in likely locations to find the species most likely to invade. Surveys are guided by information about likely vectors for introduction. The goals are to work efficiently and safely, and to find and control the greatest number of invasive plant populations with relatively low effort and expense, before these populations can damage or displace native plants and other wilderness resources. When invasive plant populations are found, simple tools are used to describe and map these populations, and simple tools are used to control them. Data are collected and analyzed in order to learn more about where invasive plants are moving and why, to inform sound management, to improve EDRR over time, and to disseminate information and help other agencies and groups improve their own EDRR.

RAPID RESPONSE

The primary objectives of rapid response are to: (1) stop further seed production and dispersal to ensure that no further contributions are made to the seed bank, and (2) eradicate the infestation where possible, or contain the infestation so that no further resource damage is done while a long-term plan for control is developed.

In general, treatment of a non-native plant population is considered rapid response if treatment can be accomplished before the next reproductive cycle: at the time of detection, in the same growing season of detection, or in the first year after detection. Several years of follow-up treatment may be needed, but those efforts can generally be accomplished with existing staff and resources, and treatment is likely to lead to complete eradication. Control of larger, established populations that require additional project planning, funding, or compliance are not considered rapid response.

Immediate removal may be considered if:

- The work and treatment method is within the scope of an approved NEPA compliance document and an approved wilderness minimum requirements analysis.
- Staff are qualified to identify plants, are confident in the species identification, and a voucher specimen has been collected.
- Treatment can be accomplished safely with the staff present and within the time period available.
- The appropriate treatment tools are available.

Other factors influencing immediacy of removal include travel time to the location; the ecological threat, current distribution, and difficulty of control for the species; proximity to high-value habitats or sensitive species; the need to prevent imminent seed dispersal, and the priority of other work.

Thresholds and treatment methods for rapid response vs. longer-term planning and control will differ based on the species and situation. However, a typical rapid response effort will be by hand-pulling, cutting, or digging; by one to three people over one to three days; and will be scattered plants on less than one acre.

The types of control methods that would be considered in wilderness include the following:

- Manual (cutting, pulling, or digging out roots using hand tools),
- Flaming with propane torches,
- Tarping with black fabric for several years to deprive plants of light, or
- Application of herbicide with spray bottles or backpack sprayers. The herbicides clopyralid, glyphosate, and rimsulfuron have been approved by the superintendent to date.

Control methods will be chosen based on preservation of wilderness character and natural resources, expected effectiveness of the treatment, and operational efficiency and cost effectiveness. The specific choice of treatment method will depend on species characteristics (annual, biennial, rooting depth, presence of rhizomes, population density) and setting (proximity to water, visibility, avoiding damage to native plants and soils). If immediate control cannot be considered, is not desired, or is not feasible, staff will collect information needed for future assessments of long-term control need and feasibility.

MONITORING

Monitoring is the periodic repetition of systematic early detection surveys over time. Ideally, monitoring would occur following all management actions that could result in the introduction or spread of invasive plants. Data collected systematically over time will answer such questions as:

- Which species are being introduced, spreading and impacting resources in wilderness?
- What vectors contribute most to introduction and spread?
- Which habitats or species in wilderness are most threatened?
- Are ED&RR actions effective and sufficient for protecting the parks' resources from invasive nonnative species?

Ideally, repeated mapping and attribute data collection will result in a detailed picture of how managed and unmanaged invasive plant populations are changing in cover and spatial extent over time. Monitoring frequencies were described above for high, medium, and low priority areas. Suggested frequencies are based upon best professional judgment, as few models exist to inform monitoring frequency. Ongoing monitoring and other data collection will inform adaptive management so that monitoring frequency and the other methodologies described here can be improved over time.

ATTACHMENT 1:
PUBLIC PARTICIPATION AND OUTREACH

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Public participation in a prevention program is vital, for several reasons:

- Visitors need to be informed of appropriate practices to keep invaders from being introduced as a result of their actions;
- The power of an early detection program is increased immensely if even a fraction of the parks' 1.5 million annual visitors watch for and report suspected invasive plant locations; and
- Public understanding of the environmental challenges and costs posed by invasive species leads to support for and compliance with management efforts.

The following education and outreach efforts take place subject to adequate resources:

1. All staff, but particularly those in the division of interpretation, the wilderness office, and the Sequoia Natural History Association (SNHA), will share information about invasive plants and best practices to limit their spread with visitors heading into the wilderness.
2. Interpretive rangers offering walks, talks, slide shows, and informal programs and contacts may draw upon any of the following primary interpretive themes that could be used to expound on invasive species and provoke visitor responses to them:
    a. The natural resources of the southern Sierra Nevada have undergone a series of human uses and impacts as values for those resources have evolved.
    b. Because of the enormous topographic relief of the southern Sierra Nevada, the range creates a wide range of climates, shaping a diversity of interconnected habitats, each of which is occupied by carefully adapted, interdependent organisms.
    c. The Sierra Nevada environment, which plays a critical role in defining the region's climate, geography, and economy, is greatly affected by human activities within the region.
    d. Sequoia and Kings Canyon National Parks protect a large wilderness area where natural forces prevail and which provides significant social and scientific values to the world.
3. With the general public, staff will look for ways to share the following messages:
    a. Plant invasions are biological pollutants with long-lasting effects. Invasive plant populations can grow to unmanageable levels over short time periods.
    b. Prevention, followed by early detection and rapid response, is the first line of defense in protecting ecosystems from being degraded by nonnative plants.
    c. Check before you go: Check carefully for mud or seeds in tires, shoes, clothing, camping gear, and pets before entering or traveling within the park. Remove and dispose of mud and seeds in bagged garbage.
    d. Hikers, especially those traveling into wilderness, need to be vigilant about cleaning shoes, clothing, and equipment.
    e. Do not pick flowers or plants. Those that are not protected as native wildflowers may be invasive weeds, and you may spread their seeds inadvertently.
    f. At home, consider landscaping with plants that won't escape into wild surroundings. Contact your local extension office, county weed-control supervisor, land manager, garden club, and nature center to find out about attractive native or non-invasive alternatives.
    g. Handouts and websites are available to help you identify weeds. Keep an eye out for any invasives around campsites and as you walk trails. Inform a ranger if you find any; call or stop in at a visitor center, where Invasive Plant Observation Cards are available.

4. These messages are currently communicated in one or more of the following ways. Additional efforts are under development:

   a. **The parks' guide/newspaper**: Awareness and prevention message is included.

   b. **Handouts**: are available at visitor centers

   c. **Invasive Plant Observation Cards and Identification Cards**: available at visitor centers and campground kiosks, posted at trailhead permit offices

   d. **The parks' website**: Information includes "What Can I Do?" actions and describes twelve important invaders.

   e. **Interpretive wayside exhibits**: Emphasizes native plants and ecosystems.

   f. **Trailhead orientation panels**: Information on how to avoid transporting invasives is included on panels at most of the parks' trailheads

   g. **Indoor interpretive exhibits**: An exhibit for the greenhouse in the Giant Forest Museum is under development in 2014.

   h. **Film permits**: Information packets for filming projects that will be working in the parks include guidelines for invasive "invasive plant prevention hygiene"

   i. **Smart-phone app** to report invasive plant observations: Under development; to be added to the parks' website.

   j. **Boot brushes**: Available at 12 trailheads as of 2013.

   k. **In-person outreach**: This includes stock groups (e.g., Backcountry Horsemen) and other groups (e.g., presentations at sporting-goods stores).

   l. **Training** for internal staff groups (e.g., annual training for fire staff, wilderness and trailhead rangers, trail crew, and natural resources staff; and wilderness operations meetings for packstock handlers).

ATTACHMENT 2:
INVASIVE NONNATIVE PLANT OBSERVATION CARD

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2014 WILDERNESS WATCH LIST OF HIGHLY INVASIVE NON-NATIVE PLANTS

Scientific Name	Common Name	Type	Likely to be Found
Extremely Invasive, Report Immediately if Found Anywhere in Parks:			
Centaurea solstitialis	yellow star thistle	Herb A	Foothills & Montane
Holcus lanatus	velvet grass	Grass P	Montane, Meadows & Streams
Phalaris arundinacea	reed canary grass	Grass P	Montane, Meadows &Streams
Rubus discolor	Himalayan blackberry	Shrub P	Foothills & Montane, Moist Areas
Still Manageable, Report Soon:			
Bromus inermis	smooth brome	Grass P	Montane
Carduus pyncnocephalus	Italian thistle	Herb A	Up to Montane, Report above 6000'
Dactylis glomerata	orchard grass	Grass P	Montane, Moist Areas
Lactuca serriola	prickly lettuce	Herb A	Montane, Moist Areas
Poa bulbosa	bulbous bluegrass	Grass P	All, Report if found above 6000'
Verbascum thapsus	woolly mullein	Herb B	Report if found in wilderness
Widespread, Search in Natural Areas, Report at End of Season:			
Bromus tectorum	cheatgrass	Grass A	All, Report if found above 6000'
Cirsium vulgare	bull thistle	Herb B	Montane, Moist Areas
Poa pratensis	Kentucky bluegrass	Grass P	All, Report if found above 6000'
Taraxacum officinale	dandelion	Herb P	All, Report if found above 6000'

2014 WATCH LIST FOR HIGHLY INVASIVE PLANTS NOT YET IN PARKS

Scientific Name	Common Name	Type	Likely to be Found
Watch For in Frontcountry and Report Immediately:			
Aegilops triuncialis	barbed goat grass	Grass A	Foothills
Cardaria draba	whitetop	Herb P	Foothills & Montane
Carduus nutans	Musk thistle	Herb B	Foothills &Montane
Centaurea diffusa	diffuse knapweed	Herb A/P	Foothills & Montane
Centaurea maculosa	spotted knapweed	Herb B	Foothills & Montane
Cirsium vulgare	Canada thistle	Herb B	Montane, Moist Areas
Chondrilla juncaceae	rush skeletonweed	Herb A	Foothills & Montane
Genista monspessulana	French broom	Shrub P	Foothills
Lepidium latifolium	perennial pepperweed	Herb P	Montane
Sesbania punica	red sesbiana	Shrub P	Foothills, Riparian
Silybum marianum	milk thistle	Herb A/B	Foothills & Montane
Taeniatherum caput-medusae	medusa head	Grass A	Foothills

A = Annual B = Biennial P = Perennial

INVASIVE NON-NATIVE PLANT OBSERVATIONS
FOR SEQUOIA AND KINGS CANYON NATIONAL PARKS (SHORT FORM)

Sequoia and Kings Canyon National Parks need your help detecting non-native (exotic) plants that threaten native plant communities. Early detection of invasive plants allows the Parks to control them before they become difficult, expensive problems. The more people looking, the better chance we have to detect them early.

Here are some guidelines for completing this form:

1. DO NOT REMOVE PLANTS unless you are trained in plant identification and have made a positive ID! Many of these species closely resemble native species, and verification by Park staff is necessary before plants can be removed.
2. Please be specific about location. Include a landmark and explicit directions from that point (e.g. on eastern stream bank of Marble Fork, 100 ft. upstream of intersection with Generals Highway). If you have a 7.5 minute map available, mark the location and submit the map or a copy of the map (include map name if submitting a copy). Report location as Universal Transverse Mercator (UTM) coordinates if GPS unit is set to "NAD83" datum.
3. Please print clearly. If you are willing to gather more information on these species or would like to see a more comprehensive list, please ask for a "Long Form" card.
4. For photographs and descriptions to help identify these species, visit SEKI's web site at http://www.nps.gov/seki/snrm/nnp/nnp_index.htm, or CalIPC's website at http://www.cal-ipc.org/ip/management/plant_profiles/; or look at the books Weeds of the West, and Invasive Plants of California's Wildlands. Both are available in the Visitor Center libraries. Call (559) 565-4476 for more ID information.
5. If in doubt about plant identification, enclose a single specimen in a zip-lock bag when you return your observation card.

ABUNDANCE CODES
(The number of individuals within the patch you are reporting)

1.....1 to 10 plants
2.....11 to 100
3.....101 to 1,000
4.....1,001 to 10,000
5.....more than 10,000

COVER CODES
(The percent of ground surface covered by non-native plant foliage within the patch you are reporting)

T.....0 to 1%.....Trace, a few
L.....1% to 5%..... Low, scattered plants
M.....5% to 25%..... Moderate, patches of plants
H.....> 25%..... High, predominant plant

INVASIVE NON-NATIVE PLANT OBSERVATION REPORT

DATE (Yr-M-D)	SPECIES (Common or Latin)	LOCATION (detailed description of plant location, or attach 7.5 minute map with location marked)	SIZE OF PATCH (L X W, feet)	ABUNDANCE (see reverse)	COVER (see reverse)	OBSERVER (name)
02-7-15	*Foxglove*	*Lodgepole Campground: B-Loop, 100 feet upslope from Site 44 (Sample)*	*10 x 6*	*3*	*M*	*Muir, J.*

Please return to: Division of Natural Resources Office or any Visitor Center, Sequoia and Kings Canyon National Parks. Questions? Call 559-565-4476.

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ATTACHMENT 3:
DATA COLLECTION AND MANAGEMENT

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GPS data and Invasive Plant Observation Reports are turned into the parks' invasive plant management program data manager and uploaded to the geodatabase daily, or backed up daily (to field computer, memory card, etc.) and turned in as frequently as possible. Contact the invasive plant management program staff through the program website at: http://www.nps.gov/seki/naturescience/nnpmain.htm.

When sufficient data have been collected, these data will show which species are most likely to be introduced into and spread in wilderness; which features (grazed v. ungrazed meadows, riparian areas, heavily used trails, helispots, etc.), which locations (ranger stations, trailheads, etc.), and which vectors (stock use, construction, recreation, fire management, etc.) are the best predictors for invasive plant introduction and establishment; and which ecological systems (wetlands v. uplands, etc.) are most sensitive to damage or displacement. These data will also help resource managers decide what frequency and intensity of monitoring are sufficient to protect the parks' resources from damage or displacement.

Data collected include:

- Spatial data, including points (for infestations less than 10 meters in diameter, or when time does not allow for mapping polygons), lines (along streams, trails and roads), and polygons;
- Attribute data (name of data collector, infestation number, patch radius, estimated cover, disturbance, phenology, control methods, etc.);
- Negative data (absence of nonnatives along surveyed trails or in camps and meadows);
- Voucher specimens for new species are documented and collected in a plant press for preservation; unknown specimens are collected for later identification;
- Photographs and associated documentation.

A sample Wilderness Invasive Plant Observation Card is available in attachment 2.

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ATTACHMENT 4:
EARLY DETECTION FIELD PROTOCOLS

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EARLY DETECTION

Basic early detection protocols include:

- Ideally, baseline surveys would be conducted for all designated trails in the parks, and other priority areas in wilderness, where they have not already been completed. These surveys would be repeated, as necessary, based upon priority.
- High priority areas, and areas near or downstream of existing priority species populations, are searched with more frequency and intensity than low priority areas.
- Active survey routes, whether trails, off-trail routes, or roads in the frontcountry, are mapped on GPS units (preferred) or paper maps so that both invasive plant presence and absence data are captured.
- For species such as cheatgrass, which are widely distributed along roads and trails, more coarse monitoring than points, lines, and polygons may be warranted. For example, populations mapped as lines generally include all plants within 100 feet of each other. The starting of new lines may be warranted where there is a significant change in patch density or line width.
- Search areas are divided into areas with well-defined boundaries such as trails and streams. Watersheds, valleys and habitat types can provide good boundaries for larger scale searches.
- In meadows and other wetlands, the perimeter, two longest axes, trail and stream crossings, grazing disturbances, and camping areas are generally surveyed. The methodology has not been further refined as wetlands vary in size, and because water, terrain, and dense vegetation can restrict access.
- Surveys of ranger stations, the Bearpaw High Sierra Camp, and other stock, trail crew, administrative camps, and high-use sites should focus on areas of high use, disturbance, and grazing; social trails; and points of water access.
- Where surveys are conducted in areas that contain abandoned and historic trails (especially those that cross meadows or riparian areas) and also historic cabins and mines, these historic features should get at least a preliminary survey.

In wilderness, active EDRR surveys are conducted using Trimble Juno GPS units by trained individuals and small teams, during day trips or extended backpacking trips. Data may also be recorded on Invasive Plant Observation Reports or in field notebooks. Multi-day trips are sometimes necessary because of the remoteness of many survey locations, and to maximize the area surveyed. Training, safety, and wilderness communication procedures are detailed in other documents. For identifying native and nonnative plants in the field, crews use the Jepson Manual (Baldwin et al. 2012), Flora of the Yosemite Sierra (Taylor 2010), and similar texts. Electronic versions of some texts are available for use with portable electronic readers. Crews should also carry hand lenses, gloves and hand trowels, cardboard presses, plastic bags for collecting seeds.

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Appendix O

Analysis of Park Sensitive Plant Species

ON THE PREVIOUS PAGE
Waterfalls
NPS Photo

APPENDIX O:

ANALYSIS OF PARK SENSITIVE PLANT SPECIES

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ANALYSIS OF PARK SENSITIVE PLANT SPECIES

The table below provides a summary of the park sensitive vascular and nonvascular plant species considered for inclusion in the analysis of environmental effects. Those species with the potential to be measurably affected by the proposed actions are evaluated in the "Plants of Conservation Concern (Park Sensitive Plant Species)" section of chapter 4.

Scientific Name (after Baldwin 2012) [synonym]	Common Name	CNPS Rare Plant Rank	Global Rank	State Rank	Life Form	Elevation Range (meters)	Habitat	Potential Impacts	Result
Bryaceae - Pohlia Moss									
Pohlia tundrae	tundra thread moss	2B.3	G2G3	S2S3	Moss	2,700-3,000	Damp gravelly soils of alpine boulder and rock fields	Potentially present in meadows open to grazing	Evaluated
Meesiaceae – Meesia Moss									
Meesia triquetra	three-ranked hump moss	4.2	G5	S4	Moss	1,300-2,953	Saturated fens and meadows in subalpine coniferous forests	Potentially present in meadows open to grazing	Evaluated
Meesia uliginosa	broad-nerved hump moss	2B.2	G4	S2	Moss	1,300-2,804	Wet meadows and fens in upper montane and subalpine coniferous forests	Potentially present in meadows open to grazing	Evaluated
Mniaceae – Copper Moss									
Mielichhoferia elongata	elongate copper moss	2B.2	G4?	S2	Moss	500-1,300	Metamorphic substrate, cismontane woodland; usually with high levels of heavy metals	Rocky outcrops in foothills; very low likelihood of impact by cross-country travelers	Dismissed

Scientific Name (after Baldwin 2012) [synonym]	Common Name	CNPS Rare Plant Rank	Global Rank	State Rank	Life Form	Elevation Range (meters)	Habitat	Potential Impacts	Result
Bruchiaceae – Bruchia Moss									
Bruchia bolanderi	Bolander's bruchia	2B.2	G3	S2	Moss	1,700-2,800	Wet places in lower and upper montane conifer forests	Potentially present in meadows open to grazing	Evaluated
Ditrichaceae – **Trichodon Moss**									
Trichodon cylindricus	trichodon moss	2B.2	G4G5	S2	Moss	50-2,002	Sandy exposed soil, meadows and seeps; upper montane coniferous forest	Single documented collection (1982) from parks; very low likelihood of impact by cross-country travelers	Dismissed
Helodiaceae – **Helodium Moss**									
Helodium blandowii	Blandow's bog moss	2B.3	G5	S1	Moss	1,862-2,700	Meadows and seeps, Subalpine coniferous forest/damp soil	Present in meadows open to grazing	Evaluated
Pterigynandraceae – **Myurella Moss**									
Myurella julacea	small mousetail moss	2B.3	G5	S1S2	Moss	2,700-3,000	Damp soil, boulder and rock fields, fens; subalpine coniferous forest, alpine	Potentially present in meadows open to grazing	Evaluated
Ophioglossaceae – **Adder's-tongue Family**									
Botrychium minganense	Mingan moonwort	2B.2	G4	S1.2	Perennial Herb	1,500-3,100	Meadows, along streams or around seeps; lower montane coniferous forest	Potentially present in meadows open to grazing	Evaluated

Scientific Name (after Baldwin 2012) [synonym]	Common Name	CNPS Rare Plant Rank	Global Rank	State Rank	Life Form	Elevation Range (meters)	Habitat	Potential Impacts	Result
Aspleniaceae – Spleenwort Family									
Asplenium septentrionale	northern spleenwort	2B.3	G4G5	S2.3	Perennial Herb	2,500-3,350	Crevices in granitic rocks, montane and subalpine coniferous forest	Very low likelihood of impact by cross-country travelers	Dismissed
Juncaginaceae – Arrow-grass Family									
Triglochin palustris	marsh arrow-grass	2B.3	G5	S2.3	Perennial Herb	2,100-3,450	Wet meadows, flats, stream and lake margins; upper montane, subalpine	Present in meadows open to grazing	Evaluated
Cyperaceae – Sedge Family									
Carex congdonii	Congdon's sedge	4.3	G3	S3.3	Perennial Herb	2,600-3,900	Alpine talus fields	Common in high elevation talus; very low likelihood of impact by cross-country travelers	Dismissed
Carex incurviformis *[Carex incurviformis* var. *danaensis]*	Mount Dana sedge	4.3	G4G5T3	S3.3	Perennial Herb	3,700-4,000	Open dry gravelly or rocky slopes of the alpine	Very low likelihood of impact by cross-country travelers	Dismissed
Carex tahoensis	Tahoe sedge	4.3	G5	S3	Perennial Herb	3,200-3,700	Open rocky slopes of the alpine	Very low likelihood of impact by cross-country travelers	Dismissed
Carex praticola	meadow sedge	2B.2	G5	S2S3	Perennial Herb	(20)500-3,200	Moist to wet meadows, riparian edges, open forests	Potentially present in meadows open to grazing	Evaluated

Scientific Name (after Baldwin 2012) [synonym]	Common Name	CNPS Rare Plant Rank	Global Rank	State Rank	Life Form	Elevation Range (meters)	Habitat	Potential Impacts	Result
Poaceae – Grass Family									
Elymus scribneri	Scribner's wheatgrass	2B.3	G5	S2?	Perennial Herb	2,900-4,200	Alpine boulder and rock fields	Very low likelihood of impact by cross-country travelers	Dismissed
Poa lettermanii	Letterman's bluegrass	2B.3	G4	S2.3	Perennial Herb	> 3,500	Sandy soil around boulders; high alpine	Very low likelihood of impact by cross-country travelers	Dismissed
Agrostis humilis	mountain bent grass	2B.3	G4	S1.3	Perennial Herb	1,500-3,350	Moist meadows to dry slopes; subalpine, alpine	Present in meadows open to grazing	Evaluated
Cinna bolanderi	Bolander's woodreed	1B.2	G1	S1.2	Perennial Herb	1,850-2,400	Streambanks, wet meadows, moist sites; upper montane coniferous forest	Potentially present in meadows open to grazing	Evaluated
Juncaceae – Rush Family									
Juncus hemiendytus var. *abjectus*	Center Basin rush	4.3	G5T4	S3.3	Annual Herb	1,400-3,400	Wet sands and gravels; subalpine and alpine	Single location documented in parks; very low likelihood of impact by cross-country travelers	Dismissed
Iridaceae – Iris Family									
Iris munzii	Munz's iris	1B.3	G2	S2.3	Perennial Herb	540-800	Moist rocky areas under live oaks; foothills	No known locations in wilderness	Dismissed

Scientific Name (after Baldwin 2012) [synonym]	Common Name	CNPS Rare Plant Rank	Global Rank	State Rank	Life Form	Elevation Range (meters)	Habitat	Potential Impacts	Result
Liliaceae – Lily Family									
Allium abramsii	Abrams' allium	1B.2	G2G3	S2S3	Perennial Herb	1,400-2,000	Granitic sands of montane uplands	Very low likelihood of impact by cross-country travelers	Dismissed
Erythronium pusaterii	Kaweah Lakes fawn lily	1B.3	G2	S2.3	Perennial Herb	2,100-2,775	Rocky ledges and openings, on metamorphic or granitic substrates; coniferous forest	Very low likelihood of impact by cross-country travelers	Dismissed
Fritillaria pinetorum	pinewoods fritillary	4.3	G4	S3.3	Perennial Herb	1,800-3,200	Shaded granitic slopes; montane	Very low likelihood of impact by cross-country travelers	Dismissed
Asteraceae – Aster Family									
Carlquistia muirii	Muir's raillardella	1B.3	G2	S2.3	Perennial Herb	1,100-2,500	Dry, open sites on granitic soils in montane chaparral, lower and upper montane coniferous forest	Very low likelihood of impact by cross-country travelers; potential for trail impacts at HST and Copper Creek populations mitigated through project level compliance	Dismissed

Scientific Name (after Baldwin 2012) [synonym]	Common Name	CNPS Rare Plant Rank	Global Rank	State Rank	Life Form	Elevation Range (meters)	Habitat	Potential Impacts	Result
Erigeron aequifolius	Hall's daisy	1B.3	G2	S2.3	Perennial Herb	1,500-2,100	Granitic rock ledges and crevices, lower montane coniferous forest, pinyon/juniper woodlands	Very low likelihood of impact by cross-country travelers	Dismissed
Eriophyllum lanatum var. *obovatum*	woolly sunflower	4.3	G5T3	S3.3	Perennial Herb	1,300-2,500	Lower and upper montane coniferous forest	Very low likelihood of impact by cross-country travelers	Dismissed
Hulsea brevifolia	short-leaved hulsea	1B.2	G3	S3	Perennial Herb	1,500-2,700	Gravelly soils and outcrops; montane forest	Very low likelihood of impact by cross-country travelers	Dismissed
Tonestus peirsonii	Peirson's serpentweed	4.3	G3	S3.3	Perennial Herb	2,900-3,700	Rocky sites, crevices in granite; alpine	Very low likelihood of impact by cross-country travelers	Dismissed
Antennaria pulchella	beautiful pussy-toes	4.3	G3	S3.3	Perennial Herb	2,800-3,700	Meadows, streambanks, snow basins, ridges and boulder fields; alpine	Potentially present in dry meadows open to grazing	Evaluated

Scientific Name (after Baldwin 2012) [synonym]	Common Name	CNPS Rare Plant Rank	Global Rank	State Rank	Life Form	Elevation Range (meters)	Habitat	Potential Impacts	Result
Erigeron multiceps	Kern River daisy	1B.2	G2	S2.2	Perennial Herb	1,500-2,500	Well-drained alluvial woodlands and sandbars associated with riverine habitats; openings in coniferous forest, pine or aspen woodland	Potentially present near meadows open to grazing	Evaluated
Packera indecora *[Senecio indecorus]*	rayless mountain butterweed	2B.2	G5	S1.2	Perennial Herb	0-2,300	Damp areas along streams, meadows, woodland; subalpine, alpine	Potentially present in meadows open to grazing	Evaluated
Boraginaceae – Borage Family									
Hackelia sharsmithii	Sharsmith's stickseed	2B.3	G3	S2S3.3	Perennial Herb	3,150-3,700	Rocky areas in alpine boulder and rock fields; protected crevices in cliffs, talus slopes	Very low likelihood of impact by cross-country travelers; restricted to and sheltered by talus	Dismissed
Phacelia orogenes	mountain phacelia	4.3	G3	S3.3	Annual Herb	2,060-3,400	Gravelly slopes, meadow edges in conifer forests	Very low likelihood of impact by cross-country travelers	Dismissed

Scientific Name (after Baldwin 2012) [synonym]	Common Name	CNPS Rare Plant Rank	Global Rank	State Rank	Life Form	Elevation Range (meters)	Habitat	Potential Impacts	Result
Cryptantha glomeriflora	Truckee cryptantha	4.3	G3Q	S3.3	Annual Herb	1,800-3,750	Open slopes, dry meadows, creekbeds; montane, subalpine coniferous forest	Potentially present in dry meadows open to grazing	Evaluated
Lentibulariaceae – Bladderwort Family									
Utricularia intermedia	flat-leaved bladderwort	2B.2	G5	S2.2	Perennial Herb	1,200-2,700	Aquatic; shallow water in foothill woodland	Single documented location in parks, low elevation; very low likelihood of impact by cross-country travelers	Dismissed
Scrophulariaceae – Figwort Family									
Cordylanthus rigidus ssp. *brevibracteatus*	bird's beak	4.3	G5T3	S3.3	Annual Herb	850-2,560	Pine forest, chaparral, blue oak woodland; montane	Very low likelihood of impact by cross-country travelers	Dismissed
Mimulus inconspicuus	small-flowered monkeyflower	4.3	G3	S3.3	Annual Herb	160-2,000	Hillside streams or seeps, foothill oak woodlands	Very low likelihood of impact by cross-country travelers	Dismissed
Mimulus laciniatus	cut-leaved monkeyflower	4.3	G3	S3.3	Annual Herb	> 900	Seeps on granitic outcrops in chaparral, montane coniferous forest	Very low likelihood of impact by cross-country travelers	Dismissed

Scientific Name (after Baldwin 2012) [synonym]	Common Name	CNPS Rare Plant Rank	Global Rank	State Rank	Life Form	Elevation Range (meters)	Habitat	Potential Impacts	Result
Mimulus norrisii	Kaweah monkeyflower	1B.3	G2	S2.3	Annual Herb	600-1,300	Marble outcrops in chaparral, cismontane woodland	Very low likelihood of impact by cross-country travelers	Dismissed
Polemoniaceae – Phlox Family									
Eriastrum sparsiflorum	few-flowered eriastrum	4.3	G3G4	S3?	Annual Herb	1,075-1,710	Open areas of granitic sand, yellow pine forest; lower montane	No known locations in wilderness	Dismissed
Phlox dispersa	High Sierra phlox	4.3	G3	S3.3	Perennial Herb	gen 3,600-4,200	Alpine boulder and rock fields, dry flats of loose granite	Very low likelihood of impact by cross-country travelers	Dismissed
Leptosiphon oblanceolatus [Linanthus oblanceolatus]	Sierra Nevada linanthus	4.3	G3	S3.3	Annual Herb	2,800-3,700	Open flats near meadows; subalpine coniferous forest	Present in and near meadows open to grazing	Evaluated
Caryophyllaceae – Pink Family									
Silene aperta	Tulare campion	4.3	G3	S3.3	Perennial Herb	1,800-2,800	Open areas, conifer forest	Very low likelihood of impact by cross-country travelers	Dismissed
Minuartia stricta	bog stitchwort	2B.3	G5	S2	Perennial Herb	3,500-3,900	Moist granitic sands and gravels, meadows; alpine	Potentially present in meadows open to grazing	Evaluated

Scientific Name (after Baldwin 2012) [synonym]	Common Name	CNPS Rare Plant Rank	Global Rank	State Rank	Life Form	Elevation Range (meters)	Habitat	Potential Impacts	Result
Portulacaceae – Purslane Family									
Calyptridium pygmaeum	dwarf calyptridium	1B.2	G2	S2	Annual Herb	2,100-3,200	Sandy to gravelly soils; subalpine conifer forest, alpine	Very low likelihood of impact by cross-country travelers	Dismissed
Claytonia palustris	marsh claytonia	4.3	G3	S3.3	Perennial Herb	1,000-2,500	Mesic meadows, marshes, swamps, springs, streambanks; foothill and montane	Present in meadows open to grazing	Evaluated
Claytonia parviflora ssp. *grandiflora*	streambank springbeauty	4.2	G5T3	S3.2	Annual Herb	150-1,200	Vernally moist, often disturbed uplands of the foothills	Very low likelihood of impact by cross-country travelers	Dismissed
Polygonaceae – Buckwheat Family									
Eriogonum nudum var. *murinum*	mouse buckwheat	1B.2	G5T2	S2.2	Perennial Herb	400-700	Marble outcrops in chaparral, cismontane woodland	Very low likelihood of impact by cross-country travelers	Dismissed
Eriogonum polypodum	Tulare County buckwheat	4.3	G3	S3.3	Perennial Herb	(2,400) 2,800-3,500	Granitic sands and gravels, subalpine coniferous forest	Very low likelihood of impact by cross-country travelers	Dismissed

Scientific Name (after Baldwin 2012) [synonym]	Common Name	CNPS Rare Plant Rank	Global Rank	State Rank	Life Form	Elevation Range (meters)	Habitat	Potential Impacts	Result
Eriogonum prattenianum var. *avium*	kettle dome buckwheat	4.2	G4T3	S3.2	Perennial Herb	2,500-2,900	Granitic outcrops in the upper montane coniferous forest	Single known population in Kings Canyon; very low likelihood of impact by cross-country travelers or rock climbers.	Dismissed
Brassicaceae – Mustard Family									
Draba cruciata	Mineral King draba	1B.3	G2	S2.3	Perennial Herb	2,500-3,050	Gravelly slopes, subalpine	Very low likelihood of impact by cross-country travelers	Dismissed
Draba monoensis	White Mountains draba	1B.2	G1	S1.2	Perennial Herb	3,600-4,000	Moist gravels and rock crevices; alpine	Very low likelihood of impact by cross-country travelers	Dismissed
Draba praealta	tall draba	2B.3	G5	S2.3	Perennial Herb	2,500-4,100	Meadows, streambanks, alpine fell fields	Very low likelihood of impact by cross-country travelers	Dismissed
Streptanthus farnsworthianus	Farnsworth's jewelflower	4.3	G3	S3.3	Annual Herb	400-1,400	Rock outcrops and foothill, lower montane woodlands	Very low likelihood of impact by cross-country travelers	Dismissed
Streptanthus fenestratus	Tehipite Valley jewelflower	1B.3	G2	S2	Annual Herb	1,050-1,800	Granite ledges, carbonite limestone, upland sands; open mixed-conifer/oak woodland	Very low likelihood of impact by cross-country travelers	Dismissed

Scientific Name (after Baldwin 2012) [synonym]	Common Name	CNPS Rare Plant Rank	Global Rank	State Rank	Life Form	Elevation Range (meters)	Habitat	Potential Impacts	Result
Boechera pygmaea *[Arabis pygmaea]*	Tulare County rock cress	4.3	G3	S3	Perennial Herb	2,100-3,400	Meadow edges, sand and gravel flats; upper montane and subalpine coniferous forest	Present in and near meadows open to grazing	Evaluated
Draba sharsmithii	Mount Whitney draba	1B.3	G1	S1.3	Perennial Herb	3,300-3,800	Rocky slopes, boulder fields, moist uplands; alpine	Present in meadows open to grazing	Evaluated
Streptanthus gracilis	alpine jewelflower	1B.3	G3	S3.3	Annual Herb	2,600-3,600	Dry rocky uplands; montane and subalpine coniferous forest, alpine	Present in alpine areas and adjacent to meadows open to grazing	Evaluated
Ericaceae – Indian Pipe Family									
Pityopus californica	California pinefoot	4.2	G4G5	S3.2	Perennial Herb	<1,800	Deep litter and duff, understory of montane coniferous forest	Very low likelihood of impact by cross-country travelers	Dismissed
Fumariaceae – Fumitory Family									
Dicentra nevadensis	Tulare County bleeding heart	4.3	G3	S3.3	Perennial Herb	2,200-3,100	Moist gravels, meadows, boulder and rock fields; openings in subalpine coniferous forest, alpine	Present in meadows open to grazing	Evaluated

Scientific Name (after Baldwin 2012) [synonym]	Common Name	CNPS Rare Plant Rank	Global Rank	State Rank	Life Form	Elevation Range (meters)	Habitat	Potential Impacts	Result
Apiaceae – Carrot Family									
Angelica callii	Call's angelica	4.3	G3	S3.3?	Perennial Herb	1,000-2,000	Streambanks in mesic cismontane woodland, lower montane coniferous forest	Streamside species which may be subject to trampling by fishermen, but known populations show no impacts. Potential administrative impacts addressed through project-level compliance.	Dismissed
Eryngium spinosepalum	spiny-sepaled button-celery	1B.2	G2	S2.2	Biennial Herb	100-1,270	Vernal pools, swales; foothill woodland	Very low likelihood of impact by cross-country travelers	Dismissed
Oreonana purpurascens	purple mountain-parsley	1B.2	G3	S3.2	Perennial Herb	2,375-2,860	Metamorphic sands and gravels on ridges and slopes; upper montane broadleaf and coniferous forests	Present in meadows open to grazing	Evaluated

Scientific Name (after Baldwin 2012) [synonym]	Common Name	CNPS Rare Plant Rank	Global Rank	State Rank	Life Form	Elevation Range (meters)	Habitat	Potential Impacts	Result
Fabaceae – Pea Family									
Astragalus kentrophyta var. *danaus*	Sweetwater Mountains milkvetch	4.3	G5T3	S3	Perennial Herb	2,900-4,000	Alpine boulder and rock fields, subalpine coniferous forest on rocky substrate	Very low likelihood of impact by cross-country travelers	Dismissed
Oxytropis parryi	Parry's oxytrope	4.3	G5	S3.3	Perennial Herb	3,100-3,800	Dry knolls and rocky ridges, near timberline and above; alpine fell-fields	Single known observation from parks in 1981; locality too general to assign coordinates. Very low likelihood of impact by cross-country travelers	Dismissed
Astragalus ravenii	Raven's milkvetch	1B.3	G1Q	S1.2	Perennial Herb	3,400-3,450	Metamorphic gravels, boulder and rock fields; subalpine coniferous forest, alpine	Present in alpine areas open to grazing	Evaluated
Hosackia oblongifolia var. *cuprea* *[Lotus oblongifolius* var. *cupreus]*	copper-flowered bird's foot trefoil	1B.3	G5T2	S2.3	Perennial Herb	2,400-2,800	Obligate wetland plant of montane meadows within pine woodlands and coniferous forest	Potentially present in meadows open to grazing	Evaluated

Scientific Name (after Baldwin 2012) [synonym]	Common Name	CNPS Rare Plant Rank	Global Rank	State Rank	Life Form	Elevation Range (meters)	Habitat	Potential Impacts	Result
Lupinus lepidus var. *culbertsonii*	Hockett Meadows lupine	1B.3	G3?T1	S1.3	Perennial Herb	2,500-3,000	Mesic rocky slopes, meadows; subalpine forests, alpine	Present in meadows open to grazing and in areas open to off-trail stock use	Evaluated
Onagraceae – Evening Primrose Family									
Epilobium oreganum	Oregon fireweed	1B.2	G2	S2.2	Perennial Herb	550-1,800	Wet meadows, bogs, and small streams; montane	Potentially present in meadows open to grazing. Reported occurances of this NW CA species in the central & southern SN are likely erroneous determinations of *E. ciliatum*; although this may be a case of misidentifi-cation, the NPS will continue to survey for this plant in meadows used by pack stock	Evaluated

Scientific Name (after Baldwin 2012) [synonym]	Common Name	CNPS Rare Plant Rank	Global Rank	State Rank	Life Form	Elevation Range (meters)	Habitat	Potential Impacts	Result
Rhamnaceae – Buckthorn Family									
Ceanothus pinetorum	Kern ceanothus	4.3	G3	S3.3	Evergreen Shrub	1,050-2,750	Granitic outcrops, slopes, ridges and flats; lower montane to subalpine coniferous forest	Woody species; very low likelihood of impact by visitors or pack stock	Dismissed
Grossulariaceae – Currant Family									
Ribes menziesii var. *ixoderme*	canyon gooseberry	1B.2	G4T2	S2.2	Deciduous Shrub	900-1,100	Chaparral, foothill and lower montane woodlands	Woody species; very low likelihood of impact by visitors or pack stock	Dismissed
Ribes tularense	Sequoia gooseberry	1B.3	G2	S2.3	Deciduous Shrub	1,660-1,740	Lower and upper montane coniferous forest	Woody species; very low likelihood of impact by visitors or pack stock	Dismissed
Hydrangeaceae – Hydrangea Family									
Jamesia americana var. *rosea*	cliffbush	4.3	G5T3	S3.3	Deciduous Shrub	2,070-3,700	Rocky outcrops, boulders; subalpine coniferous forest, alpine	Woody species; very low likelihood of impact by visitors or pack stock	Dismissed
Rosaceae – Rose Family									
Rosa pinetorum [Sierra Nevada populations now treated as *R. bridgesii* which is common]	Sierran dwarf rose				Deciduous Shrub	700-2,500	Open forest, rocky areas	Woody species; very low likelihood of impact by visitors or pack stock	Dismissed

Scientific Name (after Baldwin 2012) [synonym]	Common Name	CNPS Rare Plant Rank	Global Rank	State Rank	Life Form	Elevation Range (meters)	Habitat	Potential Impacts	Result
Ivesia campestris	field ivesia	1B.2	G3	S3.2	Perennial Herb	2,200-3,100	Meadow edges; upper montane and subalpine coniferous forest	Present in meadows open to grazing	Evaluated
Petrophytum caespitosum ssp. *acuminatum*	marble rockmat	1B.3	G5T2	S2	Sub-shrub	900-2,350	Limestone/ marble and granite cliffs and rocky outcrops; montane conifer forest	Potential impacts from rock climbers in the Kings River Canyon	Evaluated

The following information explains the column headings.

CNPS Rare Plant and Threat Ranks. Plants with a California Rare Plant Rank of 1B are rare throughout their range with the majority of them endemic to California. All of the plants constituting California Rare Plant Rank 1B meet the definitions of sec. 1901, chapter 10 (Native Plant Protection Act) or secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and are eligible for state listing. Plants with a California Rare Plant Rank of 2B are considered rare, threatened, or endangered in California, but more common elsewhere. Plants with a Rare Plant Rank of 4 are those with limited distribution in California; this is considered a watch list for plants of concern throughout the state.

CNPS listing also includes Threat Ranks which are signified by a decimal number after the Rare Plant Rank. These Threat Ranks are to be considered guidelines in the assessment of threat level.

0.1 = Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
0.2 = Fairly threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
0.3 = Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

The California Department of Fish and Wildlife maintains the California Natural Diversity Database (CNDDB) using the same ranking methodology employed by all state Heritage programs. This methodology was originally developed by The Nature Conservancy and is now maintained by NatureServe. It includes a Global rank (G-rank), describing the rank for a given taxon over its entire distribution and a State rank (S-rank), describing the rank for the taxon over its state distribution. For subspecies and varieties, there is also a "T" rank describing the global rank for the subspecies. The global and state ranks for each of the species retained for analysis is also included in the table.

The *global rank* is a reflection of the overall status of a plant throughout its global range. Both Global and State ranks represent a letter + number score that reflects a combination of Rarity, Threat, and Trend factors, with weighting being heavier on Rarity than the other two.

G1 = Critically Imperiled — At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
G2 = Imperiled — At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
G3 = Vulnerable — At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors
G4 = Apparently Secure — Uncommon but not rare; some cause for long-term concern due to declines or other factors.
G5 = Secure — Common; widespread and abundant.

Subspecies receive a T-rank attached to the G-rank. With the subspecies, the G-rank reflects the condition of the entire species, whereas the T-rank reflects the global situation of just the subspecies or variety. For example: *Hosackia oblongifolia* var. *cuprea*. This plant is ranked G5T2. The G-rank refers to the whole species range i.e., *Hosackia oblongifolia*, while the T-rank refers only to the global condition of var. *cuprea*.

The *state rank* (S-rank) is assigned much the same way as the global rank, but state ranks refer to the imperilment status only within California's state boundaries.

S1 = Critically Imperiled—Critically imperiled in the state because of extreme rarity (often 5 or fewer populations) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state.
S2 = Imperiled—Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the state.
S3 = Vulnerable—Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the state.
S4 = Apparently Secure—Uncommon but not rare in the state; some cause for long-term concern due to declines or other factors.
S5 = Secure—Common, widespread, and abundant in the state.

Uncertainty about the rank of an element is expressed in two major ways:

By expressing the ranks as a range of values: e.g., S2S3 means the rank is somewhere between S2 and S3.

By adding a "?" to the rank: e.g., S2? represents more certainty than S2S3, but less certainty than S2.

A "Q" added to the rank indicates that the taxon is very rare, but there are taxonomic questions associated with it.



Appendix P

Permitted Research Program and Process

ON THE PREVIOUS PAGE
Moose Lake
Photo Courtesy of Rick Cain

APPENDIX P:

PERMITTED RESEARCH PROGRAM AND PROCESS

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PERMITTED RESEARCH PROGRAM AND PROCESS

Sequoia and Kings Canyon National Parks (the parks) has a rich history of scientific research that has contributed to the stewardship of the parks, the advancement of science, and the science education of broad audiences. Research in the parks includes studies, inventories, and monitoring conducted by National Park Service (NPS) staff as well as permitted research performed by external scientists from other federal agencies, state and local governments, universities, and non-profit organizations. Some of this permitted research is performed by cooperators working with and sponsored by the NPS through formal agreements. Others are collaborators working closely with NPS staff on scientific questions important to NPS stewardship but are not supported financially by NPS funds nor are part of a formal federal agreement. Additional researchers are independent, and while their studies may be of interest to the parks, they are not working directly with NPS staff nor are they financially supported by the NPS.

Over the past three years, 73% of the parks' permitted research included activities in wilderness. This research covers a wide range of disciplines (figure P-1). The most frequent topics for research in wilderness in the past three years were vascular plants/plant communities, herpetology (amphibians and reptiles), geology, cave/karst, invertebrates, and fire (behavior, ecology and effects).

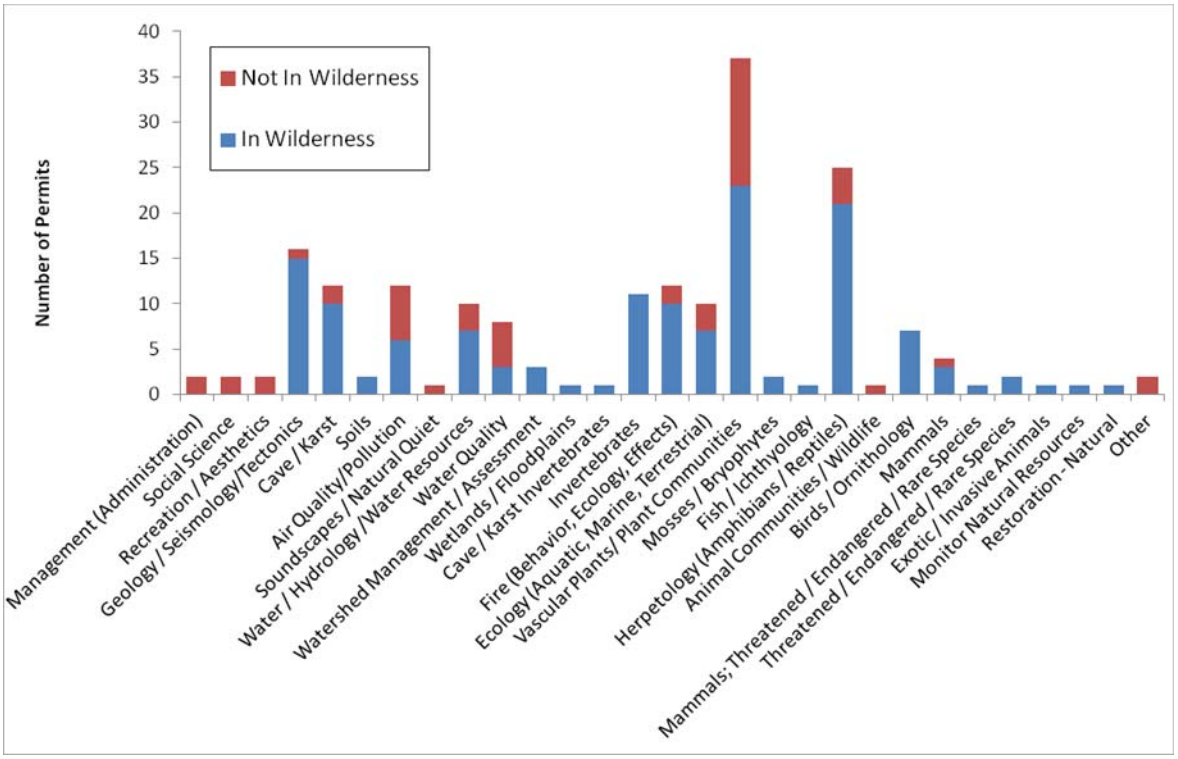


Figure P-1: Permitted Research in 2011-2013 (until 8/30/2013) Includes a Variety of Scientific Disciplines

Some of this research is specifically designed to improve the understanding of the natural quality of wilderness. For example, researchers documented the condition of mountain yellow legged frogs and Yosemite toad populations, which are in dramatic decline. A U.S. Geological Survey long-term study demonstrated that the mortality rate of conifers in wilderness and non-wilderness areas of the parks has increased significantly in recent decades. Additionally, several projects investigate water (hydrology),

water quality, air quality, and various ecological and wildlife topics. Researchers have studied the effects of atmospheric deposition of nutrients on a high elevation watershed for decades and more recently began using the long-term record to understand climatic changes.

APPLICABLE LAWS, EXECUTIVE ORDERS, MOUS, ETC. FOR PERMITTED RESEARCH

> "NPS welcomes proposals for scientific studies designed to increase understanding of the human and ecological processes and resources in parks and proposals that seek to use the unique values of parks to develop scientific understanding for public benefit" (NPS 2009).

THE ORGANIC ACT OF THE NATIONAL PARK SERVICE

The Organic Act directs us "to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." The 1978 Amendment (a.k.a. Redwoods Act) strengthened the protective functions of the NPS and influenced recent decisions regarding resource impairment. "…the protection, management, and administration of these areas shall be conducted in the light of the high public value and integrity of the NPS and shall not be exercised in derogation of the values and purposes for which these various areas have been established…"

While the Organic Act does not specifically direct the NPS to conduct, facilitate, or allow research in parks, it is now recognized that the mandate to maintain ecological integrity requires the NPS to apply current scientific understanding to stewardship. For example, a National Park Science Committee Report to the National Parks Advisory Board states, "The National Park Service has no choice: mastering the science required to maintain ecological integrity is central to its unimpairment mission" (National Parks Science Committee 2009). More recently, in 2012 the National Park System Advisory Board Science Committee stated, "The NPS needs a specific and explicit policy for park stewardship and decision making based on best available sound science, accurate fidelity to the law, and long-term public interest. Best available sound science is relevant to the issue, delivered at the appropriate time in the decision-making process, up-to-date and rigorous in method, mindful of limitations, peer-reviewed, and delivered in ways that allow managers to apply its findings…Existing policies and procedures must be improved to encourage participation of external scientists, scholars, and students in scientific and scholarly research conducted in national parks, and the expand the use of parks as national laboratories for science" (Knowles and Colwell 2012).

NATIONAL PARKS OMNIBUS MANAGEMENT ACT OF 1998

The National Parks Omnibus Management Act of 1998 directs the Secretary of the Interior "to assure that management of units of the National Park System is enhanced by the availability and utilization of a broad program of the highest quality science and information."It established the framework for fully integrating natural resource monitoring into the management process of the NPS. Section 5934 of the Act requires the Secretary of the Interior to develop a program of "inventory and monitoring of NPS resources to establish baseline information and to provide information on the long-term trends in the condition of the National Park System resources." The message of the Parks Omnibus Management Act of 1998 was reinforced by Congress in the FY 2000 Appropriations bill. In 2001, NPS began the Natural Resource Challenge with the following goals: (1) Increase inventory and monitoring capability; (2) Increase support to maintain and restore park natural resources; (3) Increase awareness of parks as "natural laboratories" for use by scientists; (4) Increase science education of visitors, local communities, and general public

about results of research in parks; and (5) Partner with universities, other agencies, and local organizations.

THE WILDERNESS ACT OF 1964

The Wilderness Act directs the Service to manage wilderness areas for the use and enjoyment of the American people in such a manner as will leave them unimpaired for future use and enjoyment as wilderness. Scientific activities are one of the public purposes of wilderness as described in the Act.

NPS *MANAGEMENT POLICIES 2006*

NPS *Management Policies 2006* includes many references to research and permitted research in particular. Some of these policies describe the need for current scientific understanding for stewardship that underlies the rationale for research in the parks, while other references describe the policy for reviewing proposals to conduct research in the parks and parks' wilderness. For example:

2.3.1.4 Science and Scholarship - Decisions documented in general management plans and other planning products, including environmental analyses and documentation, will be based on current scientific and scholarly understanding of park ecosystems and cultural contexts and socioeconomic environment both internal and external to the park. The collection and analysis of information about park resources will be a continuous process that will help ensure that decisions are consistent with park purposes.

4.2.1 NPS-conducted or Sponsored Inventory, Monitoring, and Research Studies – The Service will:

- identify, acquire, and interpret needed inventory, monitoring, and research, including applicable traditional knowledge, to obtain information and data that will help park managers accomplish park management objectives provided for in law and planning documents;
- define, assemble, and synthesize comprehensive baseline inventory data describing the natural resources under NPS stewardship, and identify processes that influence those resources;
- use qualitative and quantitative techniques to monitor key aspects of resources and processes at regular intervals;
- analyze the resulting information to detect or predict changes (including interrelationships with visitor carrying capacities) that may require management intervention and provide reference points for comparison with other environments and time frames; and
- use the resulting information to maintain – and where necessary restore – the integrity of natural systems.

6.3.6 Scientific Activities in Wilderness – The statutory purposes of wilderness include scientific activities, and these activities are encouraged and permitted when consistent with the service's responsibilities to preserve and manage wilderness.

8.10 Natural and Cultural Studies, Research and Collection Activities - Studies, research, and collection activities by non-NPS personnel involving natural and cultural resources will be encouraged and facilitated when they otherwise comport with NPS policies. Scientific activities that involve field work or specimen collection, or that have the potential to disturb resources, the visitor experience, or park operations require a permit issued by the superintendent that prescribes appropriate conditions for protecting park resources, visitors, and operations. Such studies may require additional permits from other jurisdictions.

PERMITTED RESEARCH REVIEW PROCESS

Sequoia and Kings Canyon National Parks' research permit review process is designed to comply with legal mandates, including the Organic Act of 1916 and the Wilderness Act of 1964. The review process incorporates recommendations in *White Paper Guidelines: Scientific Activities and Research in NPS Wilderness, Version 1, January 2011* and *Landres et al. 2010. A framework to evaluate proposals for scientific activities in Wilderness, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.* The following steps outline the process.

1. **Submit Permit Application Via Research Permit and Reporting System (RPRS):** Researchers submit applications via https://irma.nps.gov/rprs/ and are encouraged to do so at least 90 days prior to the start of proposed activities in the parks. Permits are issued on a calendar-year basis and must be renewed annually. The application should include a more detailed study proposal if one has not been submitted in a previous year. Additionally, if the researcher proposes to store specimens in a non-NPS repository, they are required to submit a signed appendix A of the application to provide information about the repository.
2. **NPS Review:** While the parks support research and monitoring activities for their benefit to stewardship and science, it is critical to be intellectually honest and rigorous in analyzing the impact of proposed activities. The parks' science coordination staff conduct an impact-benefit analysis that incorporates input from additional resource management or visitor experience subject matter experts. The current impact-benefit analysis scores the proposed research for 23 metrics to assess impact to wilderness character and for 12 metrics to assess benefit to stewardship and science (table P-1). The metrics may be altered as more is learned about the impacts of rapid and unprecedented climatic change and other stressors. Impact and benefit summary scores are used to determine: 1) if the potential impact is negligible or not and 2) if this impact is an acceptable tradeoff for the benefit of the research. All proposed studies, even those conducted outside wilderness, are assessed for impact and benefit.

Depending on the level of potential impact and if research is proposed within wilderness, wilderness and environmental compliance staff provide additional review, including a minimum requirement analysis (MRA). The review process may result in changes to the research method or location. For example, conditions of an approved permit may require researchers to reduce the number of samples, limit activities to a reduced or different geographical area, or use less impactful methods.

a. **Wilderness Minimum Requirement Analysis (MRA):** For research in designated or proposed wilderness, a MRA is required if the researcher proposes activities prohibited in Section 4(c) of the Wilderness Act (i.e., installations, use of motorized equipment, or use of mechanical or motorized transportation) or if the activity would have an effect on wilderness character (per Director's Order 41). The MRA and its accompanying instructions lead the researcher through a series of questions to first determine if the research is necessary in wilderness. If the research is determined to be necessary in wilderness, then step 2 determines the minimum activity required to accomplish the research. If NPS reviewers do not agree with the responses provided by the researcher, and/or there is not enough information to make a determination, the researcher is asked to revise the analysis. If the researcher has difficulty understanding the MRA process, they are directed to free online training and may be assisted by NPS staff if workload permits.

b. **Compliance with Other Federal and State Mandates:** Depending on the research proposed, other steps may be required, such as compliance with the Clean Water Act, Endangered Species Act, National Historic Preservation Act, or Animal Welfare Act. Compliance with all applicable laws could be a substantive step and if not accomplished in a timely manner may justify denial of the permit.

Table P-1: Current Metrics Used in the Impact Benefit Assessment

Impact Assessment		Benefit Assessment	
Wilderness Character	**Impact Metrics**	**Benefits**	**Benefit Metrics**
Untrammeled Quality	Manipulation	Stewardship	Would the results address an *urgent* stewardship issue?
	Disturbance		
Natural Quality	Type of collections		How would the results address an *important* stewardship issue?
	Quantity of collections		
	Scarring potential		Would the results be applicable *immediately* to stewardship?
	Sound character		
	Sound continuity		Would the results likely be applicable to *future* stewardship issues?
	Sound volume		
	Duration of project		Would the results allow *effective action* on a stewardship issue?
	Risk of unintended effects		
	Scope of manipulation		Would the results improve stewardship of this *local wilderness*?
	Trampling vulnerability		
	Threat of invasive species		What is the importance of contributions from this research?
Undeveloped Quality	Type of transportation		
	Volume of transportation	Science	How broad *geographically* will the results benefit science?
	Type of equipment		
	Amount of equipment		How far over *time* will the results benefit science?
	Footprint of equipment		
	Visibility of equipment		How many different *people* or types of people will benefit from the results?
	Duration of installation		
Solitude or Primitive and Unconfined Quality	Group size		How *important* is the activity to the scientific field of study
	Person days/season		
	Visitor surveys		What is the *breadth* of scientific inquiry?

3. **Permit Issued, Cancelled or Denied:** The superintendent has ultimate decision authority, which can be delegated, to approve or deny research and collecting permits. Research may be denied for a variety of reasons, such as: 1) the impact to resources or the visitor experience is too high, 2) the benefit does not justify the level of impact, 3) the research is not deemed necessary to occur in wilderness (and a site outside wilderness is not identified), 4) the researcher does not agree to the minimum activity required to accomplish the research, or 5) the research is considered too risky in terms of safety. Additionally, a research application may be cancelled if the applicant fails to provide adequate information to allow a thorough review.

   The NPS reviewer transmits the decision to the researcher via email. If the application is approved, a permit, including required conditions and supplementary materials will be attached to the email. If an application is cancelled or denied, a researcher may start the process over by submitting a new (revised) application to RPRS. It is recommended that researchers discuss required changes with the science coordinator before submitting a new application. A permit subsequently may be cancelled if a researcher fails to comply with safety requirements or any other permit conditions.

4. **Sign Permit and Return Copy:** If the research is approved, the researcher must sign and date the permit and return a copy to the parks' science coordinator.

5. **Conduct the Research:** Researchers must follow the conditions included with their permit. Some permits require that the researcher meet with one or more of the parks' staff prior to conducting the research. Researchers and their field teams must have a copy of the permit on hand while conducting research in the parks.

6. **Submit Spatial Data:** Researchers must submit spatial data for field locations before submitting a new application (even for a different study) or by March 31 of the following year, whichever is earlier. The parks will not approve a new or renewal permit without receiving spatial data.

7. **Submit Investigator Annual Report (IAR) Via the RPRS:** Researchers must submit their IAR before submitting a new application (even for a different study) or by March 31, whichever is earlier. The IAR is submitted directly via the RPRS website. Researchers receive an email from the RPRS coordinator with instructions, usually in January.

8. **Submit Final Report/Publications for Each Study:** The parks require researchers to provide final reports, manuscripts, and journal articles for all their permitted research. The parks encourage researchers to present their results to the parks' staff. In certain cases, the parks will request detailed information (i.e., raw and/or analyzed data).

REFERENCES

Knowles, T and R. Colwell

2012 *Revisiting Leopold: Resource Stewardship in the National Parks*. A Report of the National Park System Advisory Board Science Committee. August 25, 2012.

Landres, P., M. Fincher, L. Sharman, J. Alderson, C. Barns, T. Carlson, R. L. Anderson, S. Boudreau, D. J. Parsons, L. Boyers, and K. Hood

2010 *An interagency framework to evaluate proposals for scientific activities in wilderness*. General Technical Report RMRS-GTR-234WWW.

National Park Service

2011 *White Paper Guidelines: Scientific Activities and Research in NPS Wilderness, Version 1*. National Park Service, Wilderness Stewardship Division, Washington D.C., January 2011.

2013 *A natural resource condition assessment for Sequoia and Kings Canyon National Parks.* Natural Resource Report NPS/SEKI/NRR-2013/665. National Park Service, Fort Collins, Colorado. NPS 102/120974, June 2013.

National Parks Science Committee

2009 *National Park Service science in the 21st century*. Second edition. Report D-1589A. National Park Service, Lakewood, Colorado, USA.

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Appendix Q

Public Comment
Analysis Report

ON THE PREVIOUS PAGE
Emerald Lake Cirque
Photo Courtesy of Jeff Steele

APPENDIX Q:

PUBLIC COMMENT ANALYSIS REPORT

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NATIONAL PARK SERVICE

U.S. Department of the Interior

Sequoia and Kings Canyon National Parks

PUBLIC COMMENT ANALYSIS REPORT

SEQUOIA AND KINGS CANYON NATIONAL PARKS

WILDERNESS STEWARDSHIP PLAN AND DRAFT ENVIRONMENTAL IMPACT STATEMENT



ON THE PREVIOUS PAGE:
East Kennedy Lake in Autumn
Photo Courtesy of Leor Pantilat

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ACRONYMS AND ABBREVIATIONS

APE	Area of Potential Effect
BMP	Backcountry Management Plan
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CSD	Commercial Service Days
CUA	Commercial Use Authorization
DEIS	Draft Environmental Impact Statement
EIS	Environmental Impact Statement
END	Extent Necessary Determination
FEIS	Final Environmental Impact Statement
GMP	General Management Plan
HST	High Sierra Trail
JMT	John Muir Trail
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
NPS	National Park Service
NRHP	National Register of Historic Places
Parks	Sequoia and Kings Canyon National Parks
PCT	Pacific Crest National Scenic Trail
PEPC	Planning, Environment, and Public Comment
ROD	Record of Decision
SEKI	Sequoia and Kings Canyon National Parks
SHPO	State Historic Preservation Office(r)
SUMMP	Stock Use and Meadow Management Plan
USC	United States Code
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
VERP	Visitor Experience and Resource Protection
VSD	Visitor Service Days
VUD	Visitor-use Days
WSP	Wilderness Stewardship Plan
WVCM	Weighted Value per Campable Mile

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INTRODUCTION AND GUIDE

INTRODUCTION

The National Park Service (NPS), Sequoia and Kings Canyon National Parks (the parks) prepared a Wilderness Stewardship Plan and draft Environmental Impact Statement (WSP/DEIS) for the Sequoia-Kings Canyon and John Krebs Wildernesses, both located entirely within the parks. The WSP/DEIS established a framework for the management of wilderness within the parks in order to preserve wilderness character and provide opportunities for access and use in accordance with the Wilderness Act and other laws and policies. The WSP/DEIS focused on providing visitors with opportunities for solitude or primitive and unconfined recreation, managed the wilderness character impacts directly related to visitor use, and determined the administrative actions necessary to protect the parks' wilderness character.

As an implementation level plan, the WSP/DEIS provided detailed guidance on a variety of issues including, but not limited to: wilderness permitting; maintenance of trails, bridges, or other necessary infrastructure; use of campfires; wildlife and proper food storage; human waste management; party size for people and stock groups; camping and campsites; night limits for all campers; stock use – access and travel, and grazing; administrative support facilities; and other facilities such as frontcountry facilities to support wilderness use. Also analyzed and determined was the extent to which commercial services are necessary to fulfill the recreational and other purposes of the parks' congressionally designated wilderness areas. This "extent necessary" determination for commercial services was performed to ensure compliance with §4(d)(5) of the Wilderness Act.

This comment analysis report provides a summary of the public comments received during the public review of the WSP/DEIS and includes responses to the comments. Although the analysis process attempts to capture the full range of public concerns, this content analysis report should be used with caution. Comments from people who chose to respond do not necessarily represent the sentiments of the entire public, and may not accurately reflect existing conditions, directions, or situations. Furthermore, this was not a vote-counting process, and the emphasis was on content of the comment rather than the number of times a comment was received. This report is intended to be a summary of the comments received, rather than a statistical analysis.

PUBLIC COMMENT PROCESS SUMMARY

In June 2014 the parks released the WSP/DEIS to public, federal, state, and local agencies, tribes, and organizations for a 60-day public review period from June 27 to August 25, 2014.

The parks' staff presented elements of the WSP/DEIS at seven public meetings, including three informational meetings (in Oakland, Bishop, and Visalia), three meetings with focused discussions on the commercial service portion of the WSP/DEIS (Bishop and Visalia) and a webinar on the management preferred alternative. Total attendance at the public meetings was 79; 25 people viewed the webinar. The parks' staff also conducted meetings with Inyo and Sequoia national forest staff, and presented information at area tribal forum meetings. The public meeting schedule was as follows:

- July 8, 2014: Inyo National Forest headquarters, Bishop, CA
- July 9, 2014: Inyo National Forest headquarters, Bishop, CA
- July 15, 2014: Comfort Inn, Visalia, CA
- July 23, 2014: Richard Trudeau Training Center, Oakland, CA

- July 24, 2014: Eastern Sierra Tri-county Fairgrounds, Bishop, CA
- July 28, 2014: Visalia Marriott Hotel, Visalia, CA
- August 14, 2014: Webinar on Management Preferred Alternative

The public were able to submit their comments on the project using any of the following methods:

- Electronically through the NPS Planning, Environment, and Public Comment (PEPC) website
- In person at the public meetings
- By mailing comments to the NPS
- By emailing comments to the NPS

NATURE OF COMMENTS RECEIVED

During the scoping period, 275 pieces of correspondence from 20 states were received during the public scoping period. Approximately 78% of the 275 letters (representing 275 signatures) were submitted by individuals living in California. The topics that received the majority of comments were regarding commercial services, the Redwood Canyon cabin, stock use, and the "Hiker's Alternative" (generated by an "Action Alert" from High Sierra Hikers Association). All correspondences were entered into the PEPC system. Comments that were of a subject matter that did not pertain to the WSP/DEIS for the parks have been coded as outside of the scope of analysis of the WSP/DEIS.

All comments that were within the scope of the WSP/DEIS, regardless of their topic, were carefully read and analyzed and are presented in this report. Commenters will continue to be notified of the project's progress, and are encouraged to visit the NPS PEPC website at www.parkplanning.nps.gov/sekiwild to view information pertaining to this project.

THE COMMENT ANALYSIS PROCESS

Comment analysis is a process used to compile and combine similar public comments into a format that can be used by decision-makers including the WSP/EIS Team. Comment analysis assists the team in organizing, clarifying, and addressing technical information pursuant to National Environmental Policy Act (NEPA) regulations. It also aids in identifying the topics and issues to be evaluated and considered throughout the planning process.

The process includes five main components:

- Developing a coding structure
- Employing a comment database for comment management
- Reading and coding of public comments
- Interpreting and analyzing the comments to identify issues and themes
- Preparing a comment summary

A coding structure was developed to help sort comments into logical groups by topics and issues. The coding structure was derived from an analysis of the range of topics discussed during internal NPS alternatives scoping and the public scoping process, past planning documents, and the comments

themselves. The coding structure was designed to capture all comment content rather than to restrict or exclude any ideas.

The NPS PEPC database was used for management of the comments. The database stores the full text of all correspondence and allows each comment to be coded by topic and issue. Some outputs from the database include tallies of the total number of correspondence and comments received, sorting and reporting of comments by a particular topic or issue, and demographic information regarding the sources of the comments. Analysis of the public comments involved the assignment of codes to statements made by the public electronically on the PEPC website, in their letters, and email messages. All comments were read and those that arrived before the comment period ended were analyzed.

GUIDE TO THIS DOCUMENT

The first section of this report is the "Content Analysis Report" which is a basic report produced from PEPC that provides information on the numbers and types of comments received, provides a summary of the number of comments that were coded under each topic, and provides general demographic information, such as the states where commenters live, the number of letters received from different categories of organizations, etc.

The next section of this report is "Public Concerns and NPS Responses" which presents public concern statements organized by the WSP/DEIS chapters, along with "supporting quotes," which are verbatim excerpts from individual public comment letters and have not been edited; therefore spelling and grammar errors are not corrected. In addition, letters that had to be scanned for PEPC may contain spelling errors due to the scanning software. These supporting quotes are followed by information as to whether the comment author was an individual, organization (with a general description of the organization type), agency, or group, and the assigned letter number. For example, "(Individual, #2)" is a comment from an individual who is unaffiliated with any organization, agency, or group and who submitted the second letter received.

Concerns that were considered substantive include a response from the project team. NPS responses to concern statements in this report detail changes made to the FEIS in response to public comment and/or point to sections of the WSP/FEIS for further information or clarification. Additionally, some responses explain why comments were considered, but were ultimately dismissed from further analysis.

CONTENT ANALYSIS REPORT

Correspondence Signature Count by Correspondence Type

Type	Number of Correspondences
Web Form	167
Letter	64
Fax	20
E-mail	4
Total	**255**

Correspondence Signature Count by Organization Type

Organization Type	Number of Correspondences	Number of Signatures
Business	14	15
Conservation/Preservation	9	9
County Government	1	1
Federal Government	1	1
Non-governmental Organization	1	1
Recreation Group	14	14
State Government	2	2
Unaffiliated Individual	212	231
University/Professional Society	1	1
Total	**255**	275

Correspondence Distribution by Country

State	Percentage	Number of Correspondences
United States	100%	255

Correspondence Distribution by State

State	Percentage	Number of Correspondences
Arizona	0.8%	2
California	77.6%	198
Colorado	2.0%	5
Connecticut	0.4%	1
Delaware	0.4%	1
Georgia	0.4%	1
Indiana	0.8%	2
Kentucky	0.4%	1
Montana	1.2%	3
Nevada	2.0%	5
New Mexico	2.7%	7
New York	0.4%	1
Ohio	0.4%	1
Oregon	4.7%	12
Tennessee	0.8%	2
Texas	0.4%	1
Virginia	1.2%	3
Washington	2.0%	5
Washington, DC	0.4%	1
Unknown	1.2%	3

Correspondences Numbers and Organizations Represented in Public Comments

Corr. ID	Organization Type	Organization
1-5	Individuals	One page of comments for each commenter
6	Business	American Alpine Institute
7-16	Individuals	One page of comments for each commenter
17	Conservation/ Preservation	California Wildlife Foundation
18	State Government	California State Department of Transportation - Caltrans D6
19-52	Individuals	One page of comments for each commenter
53	Business	Southern Yosemite Mountain Guides (Commercial Outfitter)
54-59	Individuals	One page of comments for each commenter
60	Conservation/ Preservation	Sierra Club
61-89	Individuals	One page of comments for each commenter
90	Business	Southern Yosemite Mountain Guides
91-96	Individuals	One page of comments for each commenter
97-101	Individual	With four pages of comments from one commenter
102-111	Individuals	One page of comments for each commenter
112	Conservation/ Preservation	Tehipite Chapter of the Sierra Club
113-114	Individuals	One page of comments for each commenter
115	Non-Governmental Organization	Cave Research Foundation
116	Conservation/ Preservation	Sierra Nature Notes
117-122	Individuals	One page of comments for each commenter
123	Recreational Groups	High Sierra Hikers Association
124-130	Individuals	One page of comments for each commenter
131	Business	Brecon Estate Inc.
132-137	Individuals	One page of comments for each commenter
138	Recreational Groups	The Garden Law Firm representing Back Country Horsemen of California
139	Individual	One page of comments
140	Conservation/ Preservation	Western Cave Conservancy
141-145	Individuals	One page of comments for each commenter
146	State Government	State of California State Clearinghouse

Correspondences Numbers and Organizations Represented in Public Comments (continued)

Corr. ID	Organization Type	Organization
147-152	Individuals	One page of comments for each commenter
153	Recreational Groups	American Mountain Guides Association
154-159	Individuals	One page of comments for each commenter
160	Business	Delaware North Companies Parks & Resorts
161	Recreational Groups	Access Fund
162-164	Individuals	One page of comments for each commenter
165	Recreational Groups	American Whitewater
166	Conservation/ Preservation	Wilderness Watch
167-170	Individuals	One page of comments for each commenter
171	Recreational Groups	Back Country Horsemen of America
172-174	Individuals	One page of comments for each commenter
175	Conservation/ Preservation	Western Kentucky University
176-181	Individuals	One page of comments for each commenter
182	Business	Rainbow Pack Outfitters
183	Individual	One page of comments
184	Conservation/ Preservation	National Parks Conservation Association
185	Individual	One page of comments
186	Recreational Groups	Back Country Horsemen of America
187	Individual	One page of comments
188	Conservation/ Preservation	Cave Research Foundation, National Speleological Society
189-190	Individuals	One page of comments for each commenter
191	Conservation/ Preservation	National Speleological Society
192-195	Individuals	One page of comments for each commenter
196	Business	The Three-Corner-Round Pack Outfit, Inc.
197-199	Individual	One page of comments for each commenter
200	Business	Southern California Edison
201	Recreational Groups	National Forest Recreation Association
202-204	Individuals	One page of comments for each commenter
205	Business	Sierra Mountain Center
206-223	Individuals	One page of comments for each commenter
224	Business	High Sierra Pack Station

Correspondences Numbers and Organizations Represented in Public Comments (continued)

Corr. ID	Organization Type	Organization
225-229	Individual	One page of comments for each commenter
230	Recreational Groups	High Sierra Unit of the Backcountry Horsemen of California
231-234	Individuals	One page of comments for each commenter
235-236	Recreational Groups	Blue River Law representing High Sierra Hikers Association
237	County Government	Inyo County Planning Department
238-240	Business	Planeto Azul Hydrology
241	Recreational Groups	The Access Fund
242-250	Individuals	One page of comments for each commenter
251	Recreational Groups	The Garden Law Firm representing the National Forest Recreation Association
252	Federal Government	Environmental Protection Agency Region IX
253	Business	Southern California Edison
254	Recreational Groups	High Sierra Hikers Association
255	Individual	One page of comments

NOTE: For those individuals and groups that submitted multiple page comments, the correspondence ID number from the first PEPC entry (as above) is referenced below. For example, the commenter with correspondence ID #'s 97-101 will be referenced as #97.

PUBLIC CONCERNS AND NPS RESPONSES

CHAPTER 1: PURPOSE AND NEED

Proposed Modification to Purpose and Need

Concern 1: The WSP/EIS should define what it means by providing opportunities and encouraging public use.

> *The park does not really define what it means by providing opportunities and encouraging public use. Does this amount to more slide shows; less asphalt parking and even less trail permits issued? Does this mean more front country activities? What does unacceptable levels of impacts on wilderness character mean? To me, it means simply this, less access.*
> [Individual, #7]

> *I have noted a strong decrease on backcountry visitation over the last 25 years, I would like to see this turned around. . . If people do not know of or enjoy the wonders of the backcountry, interest in supporting the backcountry will erode. . .*
> [Individual, #33]

Response: This is discussed in detail in the "Purpose and Need" and "Desired Conditions" sections in "Chapter 1: Purpose and Need." Specific details about what types of opportunities are appropriate in wilderness are provided in the "Desired Conditions" section and include the following:

Outstanding opportunities for solitude or primitive and unconfined recreation would be provided to support visitor use and enjoyment of the parks' wilderness areas in balance with the protection of other wilderness character qualities.

- Visitors with diverse backgrounds and capabilities would have opportunities to use and be encouraged to enjoy wilderness.
- Visitors would have opportunities to experience solitude, a state of being alone or feeling remote from society, although these opportunities could vary by location and time.
- Visitors would have opportunities to participate in a variety of primitive recreation activities, characterized by non-motorized, non-mechanical travel and reliance on personal skill; primitive recreation activities would be managed to preserve other wilderness character qualities.
- Visitors would have opportunities to recreate in an unconfined, self-directed manner, subject only to those regulations that are necessary to preserve wilderness character.

In addition, the NPS encourages public use in a variety of ways which are described in "Appendix H: Wilderness Information and Education Strategy."

Concern 2: The WSP/EIS should clarify the difference between desired conditions and standards including what is "necessary," and define improvements to wilderness.

> *Is Desired Condition or Standard the higher category? Whichever it is, where may one find a list of Standards or Desired Conditions? Every vague, undefined word is defined by using other vague, undefined words. If Desired Condition and Standard are different, why and how are they different? Are your so-called Standards less desirable than Desired Conditions? Or are your Desired Conditions below your Standards? Does one of*

those, or some other word or phrase, describe a baseline against which everything else may be measured?
[Recreational Group, #254]

On page vi, toward the end of the paragraph beginning Desired conditions . . . is the amazing statement that 'NPS Management Policies 2006 also allows for improvements to wilderness character." Do you not understand that the wilderness is what it is? With what license or arrogance or hubris do you think that you should indulge in "improvements" to wilderness? What in the world do you mean? on page vi is: " The untrammeled quality of wilderness character would be preserved by limiting deliberate manipulation of ecological systems except as necessary to promote another quality of wilderness character. (Emphasis added.) Re the emphasized phrase, what is "necessary," who decides, what criteria would be employed? By this bullet point you have granted yourselves the right and the power to sacrifice aspect A of the so-called wilderness character today because it will enhance aspect B. And tomorrow, under the same aegis, you can sacrifice B because it will benefit A. And the next day you can sacrifice both A and B in order to sweeten C. Thus you have created a blanket privilege to yourselves to do anything at any time in any way, since no matter what you do it will be covered by this single bullet point.
[Recreational Group, #254]

Response: The definition of key terms, including *desired conditions* and *standards*, can be found in the "Purpose and Need for the Plan" section in "Chapter 1: Purpose and Need." See also the "Process to Address Visitor Capacity" section in "Appendix A: Visitor Capacity" for a more in-depth definition of standards and how they relate to indicators and measures.

A wilderness at its designation is in a distinct condition. The preservation of this condition at establishment is the mandate of the Wilderness Act. However, each wilderness, including those in these parks, may have elements or aspects that can be altered or eliminated to improve wilderness character. For example, this may include the removal of existing structures, improving the undeveloped quality, or allowing naturally occurring wildfires, which had previously been suppressed, to run their course uninterrupted, thus improving the natural and untrammeled qualities. The purpose of the statement is to illustrate that in some instances management actions can be taken to improve some of the compositional qualities of wilderness, thus improving the overall wilderness character.

The comment infers the difficulty of managing complex systems with multiple goals and objectives. When making management decisions about actions in wilderness, it is a balancing act. Actions are analyzed for effects on the various qualities of wilderness. As stated in the "Wilderness Character – Untrammeled" section of chapter 1, "Human actions that restrict, manipulate, or control the natural world within wilderness degrade the untrammeled quality. The untrammeled quality is distinct from the natural quality. The former is negatively impacted by purposeful human manipulation of natural processes, whereas the latter can be positively or negatively affected by human actions that are purposeful or accidental. In many cases in managed wildernesses, actions that are taken to improve the natural quality through some form of ecological restoration degrade the untrammeled quality by intervening in natural processes." This indicates that agencies make decisions that may degrade one quality of wilderness temporarily while seeking to improve another quality. This is most often the case between the untrammeled and natural qualities. An example is when a non-native fish is removed from water bodies to improve habitat for native frogs. This action would simultaneously impact the untrammeled quality (at least in the short-term), while improving the natural quality (for the long-term). These decisions are only made after analysis and discussion to incorporate as much pertinent and high quality information as is

available (see "Appendix I: Minimum Requirements Analysis," which shows the detailed and in-depth analysis process these parks go through before taking actions in wilderness.)

Concern 3: The WSP/EIS states that one of the objectives of the plan is that visitors would have opportunities to travel with stock without providing any analysis.

> *Another objective is: Stock use - Visitors would have opportunities to travel with stock, from day rides to multi-day trips, in a manner that ensures the protection of wilderness character. What "manner" is that? Do stock animals have a variety of "manners" that can be employed as one desires? Do horses and mules behave differently if you instruct them to tread lightly and bury their feces in mineral soil so that no one will be offended? Stock use is one of the issues that this WSP is supposed to be studying and analyzing, but you are stating that it is one of the desired objectives of the plan without providing any analysis whatsoever*
> [Recreational Group, #254]

Response: Travel in wilderness with stock is a proper activity. Reasonable and effective controls (e.g., party-size limits, grazing limits, and off-trail travel limits) will be put in place to ensure that impacts are acceptable and that wilderness character is preserved, while not unduly restricting the rights of the public to enjoy their wilderness through activities that are determined to be proper. This is a common use of the word "manner," meaning method, practice, or way of doing.

The 2007 General Management Plan (GMP) and associated Record of Decision (ROD) for Sequoia and Kings Canyon National Parks determined that stock use is proper in the wilderness of these parks. It is an objective of the WSP/EIS to provide opportunities for proper activities in wilderness provided that wilderness character is protected. Stock use has been determined to be one of these proper activities. The WSP/EIS subsequently looks at and analyzes stock use and its impacts extensively, throughout chapters 1 through 4 and in "Appendix D: Stock Use and Meadow Monitoring and Management Strategy." The WSP/EIS analyzes stock use and makes determinations on where stock use may occur, what controls will be placed on it to control impacts, and for the case of commercial stock, how much use will be allowed, among other considerations (see chapters 1 through 4 and appendix D for details of analysis and proposed actions). Among the alternatives that are analyzed, alternative 4 would greatly reduce overall stock use by reducing commercial support and eliminating grazing.

Concern 4: It should be clarified, in the visitor capacity and visitor use management section, how the number of stock in wilderness will be determined.

> *Visitor Capacity and Visitor-Use Management Page 13, bottom paragraph, which I quote in full: "The number of stock in wilderness is also considered to determine if a stock capacity level could be established in addition to an overall visitor capacity level. The number of stock is controlled by trailhead quotas, party-size limits on and off trail, visitor service-day limits placed on commercial services (appendix B), and grazing-capacity limits placed on individual meadows and forage areas. In addition, stock use is a component of the overall visitor-capacity framework." It seems to say that stock use numbers will be determined by how much stock use there will be. i.e., the number determines itself.*
> [Recreational Group, #254]

Response: The "Visitor Capacity and Visitor-use Management" sections of "Chapter 1: Purpose and Need" and "Appendix A: Visitor Capacity" have been revised.

One purpose of the WSP/EIS is to select visitor capacities and propose ways to monitor and manage impacts on park resources and visitor experiences. The Wilderness Act requires the NPS to administer designated wilderness areas "for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, [and] the preservation of their wilderness character." The Act does not have an express requirement to establish visitor capacities. However, NPS *Management Policies 2006* states: "The wilderness management plan will identify desired future conditions, as well as establish indicators [i.e., measures], standards, conditions, and thresholds beyond which management actions will be taken to reduce human impacts on wilderness resources" (6.3.4.2). NPS *Management Policies 2006* defines visitor capacity as "the type and level of visitor use that can be accommodated while sustaining the desired resource and visitor experience conditions in the park." Establishing visitor capacities is also an element of the comprehensive wilderness planning process defined by the NPS *Wilderness Stewardship Plan Handbook: Planning to Preserve Wilderness Character*.

Visitor capacity includes managing all aspects of visitor use (levels, types, behavior, timing, and distribution), with an understanding that all types of visitor use are associated with some level of impact. Appendix A includes a process for managing the types and amounts of visitor use that can be accommodated without unacceptable impact on wilderness character. The number of stock in wilderness is also regulated to protect wilderness character. Stock numbers are controlled by trailhead quotas, party-size limits on and off trail, visitor service-day limits placed on commercial services ("Appendix B: Extent Necessary Determination for Commercial Services"), and grazing-capacity limits placed on individual meadows and forage areas ("Appendix D: Stock Use and Meadow Monitoring and Management Strategy").

Guiding Laws

National Environmental Policy Act of 1969 (NEPA) and the National Forest Management Act (NFMA)

Concern 5: The WSP/EIS implements a new system of trail classification, and changes the classification of some trails without allowing the public to comment on the proposed changes. This is in violation of the National Forest Management Act and NEPA as it precludes public comment to the proposed changes.

> *The proposal for a trail classification system has not been adequately proposed to the public. This document is the first chance any users have had to review what will take place. There has not been a thorough analysis of the impacts and effects of the classification of the trails. There are no options provided for the classifications and the result is a net loss for trails open and maintained for stock use. There has not been a historical review of the closure or downgrading of trail maintenance nor has there been an overall look at the loss of future opportunities to maintain trails that may occur if there was a shift in Federal funding.*
> [Recreational Group, #201]

> *In the DEIS, NPS announced that it was partially implementing the relatively new Forest Service Trail Classification System. See Exh. 1 attached ("the National Park Service will partially adopt the U.S. Forest Service system of trail development class"). NPS the identified the total number of miles it was proposing to include under a particular trail, other than for Alternative 2 (Footnote 5- Apparently, NPS has a document that identifies which trails are assigned which classifications, but it has not made that public.) As a*

result, it is not possible for the public to submit substantive comments as to the pros/cons of the various alternatives with respect to the proposed trail classification.
[Recreational Group, #251]

For the same underlying reasons, NPS's failure to specify which trails will be assigned which particular trail classes precludes not only substantive public comment on these proposed classifications, but also makes it impossible to conduct an assessment of the environmental impact of these new classifications.
[Recreational Group, #251]

Pursuant to the legal challenge brought by the Backcountry Horsemen of America-Kern Sierra Unit, the Forest Service agreed that it needed to complete a Trail Transportation Plan pursuant to a public process. See attached Settlement Agreement at 11(A)(A¶4): see generally Back Country Horsemen of America v. Johanns, 424 F. Supp. 2d 89 (D.D.C. 2006) (Forest Service establishment of a trail classification system required public input pursuant to the National Forest Management Act. 16 USC § 1612). The failure to evaluate and seek public input on the environmental impacts of these changes violates NEPA. See attached Exh 2 (Settlement Agreement at II(A) (¶5)(the Forest Service agreed to prepare the appropriate NEPA analysis for the proposed changes to the tail classes)).
[Recreational Group, #251]

Establishment of a Trail Classification System through the Wilderness Stewardship Plan. We oppose the establishment of a trail classification system through the WSP. We do not recall any discussion focused on a new trail classification system during the scoping process for the WSP. Further, we feel that a trail classification system should be the subject of an entirely different plan that enables the trail users to be more specific about trail classifications and which trails would be kept and which would be abandoned. It is our position that a full NEPA process should be used to adopt a new trail classification system for SEKI and the wilderness areas of SEKI. We are completely opposed to the proposed Class 1 level of trail maintenance which would receive little or no trail maintenance. While a tree that blocks a trail can be climbed over by a hiker or backpacker, that same tree may prevent the use of that trail and that general area by stock users.
[Recreational Group, #230]

We were unable to access the USFS Trails Handbook in a timely manner. It is not immediately clear what the Trail Type, Trail Design Use, and Trail Development Class addresses. Not having access to this document makes it impossible to adequately comment, other than to say that insufficient information was presented. The Trail Plan appears to be a 'done deal' rather than having an acceptable NEPA scoping, analysis, and review for the public to comment.
[Recreational Group, #201]

New Park Trail Classification System Implementing a new system of trail classification, particularly one new to the agency, reflects a significant change in policy and should be contemplated with full public input and separate NEPA review after the WSP is adopted.
[Individual, #119]

The DEIS violates the NEPA and NFMA by imposing new trail classes without specifying the which trails will be assigned a specific trail class, thus precluding substantive public comment as to those proposed changes.
[Recreational Group, #251]

The proposal is essentially to adopt a truncated version, for Sequoia-Kings Canyon National Parks, of the U. S. Forest Service Trails Management Handbook (Forest Service Handbook 2309. 18 USFS Trails Handbook). The proposal reflects a potentially far-reaching shift in Park Service policy and administration of NPS Wilderness. Implementing a new system of trail classification should only be contemplated with the benefit of full public input and NEPA review after the WSP is adopted. As stated previously in this comment letter, NPS Management Policies set out a process whereby decisions regarding visitor carrying capacity are to be made in light of several pertinent criteria, none of which appear to have been satisfied in the development of the proposed Trail Classification System.
[Recreational Group, #186]

With respect to National Forest, trail classifications are part of the management plan for the Forests, and an only be changed pursuant to a public notice and comment process as required by the National Forest Management Act, 16 USC § 1604. The Forest Service admitted this fact pursuant to litigation which involved the same issue. Rock Creek v. Blackwell. Civ No. 03-330 (D.D.C. 2005)(Settlement Agreement Regarding Complaint of Backcountry Horsemen of America-Kern Sierra Unit dated Dec. 5, 2005)(attached). In that case, the Forest Service had included in its FEIS for its Wilderness Plan for the Ansel Adams, John Muir and Dinkey Lakes Wilderness a list of trails and corresponding trail classes. However, the Forest Service had never sought public input on the classes which it had assigned to the trails.
[Recreational Group, #251]

Response: First, the National Forest Management Act does not apply to NPS lands. Second, in regard to the need for compliance under NEPA, the WSP/EIS is a NEPA compliant document, and is the avenue for public review and comment on the proposed trail management and classification system.

The WSP/EIS describes the trail management and classification system in several places, most concisely in tables 47a-47e in "Chapter 2: Alternatives." In addition, maps are included within each alternative that provide visual information on the trails classification assignments per alternative. Attachment 1 in "Appendix K: Trail Management and Classification System for Sequoia and Kings Canyon National Parks" lists all trail segments by trail class and allowed use. Detailed maps were also provided on the NPS public website for the WSP/EIS.

The public had the opportunity to comment on the changes to the management of the trails during the review of the WSP/DEIS. During the comment process, the public requested greater clarity on how certain trails would be treated under different alternatives. In response to these requests, the WSP/EIS provides information on trail class and designed use in tabular form in addition to narrative and map form. A table has been added to Chapter 2 showing the development class and design use for each trail segment for each alternative.

Concern 6: By catering to visitors who require commercial services, the purpose of the preferred alternative does not match the goals of the Wilderness Act, nor does it match the stated need for the plan in the WSP/EIS. The stated purpose and need for the preferred alternative is also

not satisfied by the reasoning stated in the "Planning Framework" or "Relationship to Other Planning" sections of the WSP/EIS.

> *The WSP/DEIS is inadequate in the following areas: Purpose and need improperly caters to one kind of visitor High Sierra does not believe that NPS's WSP/DEIS is adequate to satisfy the requirements of NEPA. Under 40 CFR Sect. 1502.13, an EIS "shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action." Similar to the discussion High Sierra raised in its comments supra on the Wilderness Act, the proposed purpose of Preferred Alternative 2 does not match the goals of that Act, nor does it match the NPS's stated need. See also WSPIDEIS at 16. The stated purpose and need for the Preferred Alternative 2 is also not satisfied by the reasoning stated in the Planning Framework or Relationship With Other Planning Sections of the WSP/DEIS. See WSP/DEIS at 8-14, 19-22.*
> *The NPS does not deny that something must be done regarding commercial stock use in SEKI wilderness areas; however, the approach NPS has taken focuses too strongly on visitor use of the park, and caters to a certain kind of visitor that requires commercial services (WSP/DEIS at v), and not enough on preservation of wilderness and park natural characteristics. Some of the issues NPS plans to address through the WSP/DEIS will be contraindicated by commercial stock use, namely (WSP/DEIS at vi): Preserve ecological, geological, scientific, educational, scenic, and historical values of wilderness, including culturally significant resources and paleontological resources within wilderness, as important and prominent values, consistent with the Wilderness Act, California (stock can destroy river banks and meadows, bring in invasive or unwanted plant species through their manure, destroy pristine landscapes, and do not have historical value of the degree NPS believes); Wilderness Act, and applicable planning guidance from the GMP. Leave No Trace minimum impact practices (stock manure will remain on the trail, on meadows, enter water); Increasing commercial stock use may encourage people who are not self reliant to enter the backcountry without being personally fully equipped to support themselves in the case of emergencies or delayed returns to base. The NPS's purpose and need thus does not satisfy the "rule of reason" standard, and NPS must, in the FEIS, provide a thought-out reasoning to solidify its justifications for the proposed action.*
> [Recreational Group, #235]

> *The NPS's purpose and need thus does not satisfy the "rule of reason" standard, and NPS must, in the FEIS, provide a thought-out reasoning to solidify its justifications for the proposed action.*
> [Recreational Group, #235]

> *The WSP/DEIS Does Not Meet the Requirements Under the National Environmental Policy Act and the NPS Must Account For the Shortcomings In the FEIS.*
> [Recreational Group, #235]

Response: Individual alternatives do not have their own purpose and need. Rather, the alternatives presented for analysis in an EIS are designed to present a range of reasonable options for fulfilling the purpose and need of the plan. The purposes of the WSP are to develop a long range vision for preserving wilderness character and to enhance programs and actions for managing the parks' wilderness. The WSP is needed to provide updated goals and objectives for the management of wilderness and to meet the requirements of the Sequoia and Kings Canyon Backcountry Access Act that requires a completed WSP by June 2015.

All alternatives, including the preferred alternative, provide for the continued use and enjoyment of wilderness and preserve wilderness character consistent with the mandate of the Wilderness Act and the purpose and need of this WSP/EIS. "Chapter 4: Environmental Consequences" contains detailed analysis of the effects of each alternative on wilderness character and concludes that each alternative will preserve wilderness character, although the alternatives reach this goal in different ways. Under the preferred alternative, visitors who use commercial services to experience wilderness will be limited to 8,400 annual Visitor-use Days (VUDs, which equate to commercial service days, or CSDs). This is approximately 7.6% of the 110,000 total of all annual VUDs (table B-5 in "Appendix B: Extent Necessary Determination for Commercial Services"). Of these, visitors who use stock-based commercial services would be limited to 3,360 VUDs annually, or 3%.

Concern 7: The WSP/EIS does not meet the requirements under NEPA in regard to its analysis of stock and grazing impacts and proposed mitigation measures.

> *The WSP/DEIS's NEPA analysis is wholly lacking, will rubber-stamp existing practices, and allow for "business as usual" as it lacks the requisite analysis to reach any meaningful action.*
> [Recreational Group, #235]
>
> *The general problem with the WSP/DEIS is that it does not even recognize things are a problem in the first place, so it can't mitigate them. Mitigation measures must be discussed in sufficient detail to ensure that environmental consequences have been fairly evaluated.*
> [Recreational Group, #235]
>
> *The WSP/DEIS is inadequate in the following areas: Analysis of stock and grazing impacts Proposed mitigation measures High Sierra does not believe that NPS's WSP/DEIS is adequate to satisfy the requirements of NEPA.*
> [Recreational Group, #235]
>
> *Broad generalizations and vague references to mitigation measures do not constitute the detail as to mitigation measures that would be undertaken, and their effectiveness, that agency is required to provide. id.*
> [Recreational Group, #235]
>
> *Once adverse environmental impacts are identified, the agency must then describe what mitigating efforts it could pursue to off-set the damages that would result from the proposed action. id. Here, the WSP/DEIS falls short. For example, NPS must properly disclose that areas closed to grazing will undergo some recovery in soil compaction and disclose the area affected. There is no discussion of the consequences this mitigation will actually be expected to result in. Without such a discussion, the proposed mitigation is too vague and does not provide the detail as to the measure's effectiveness for dealing with the impacts of stock grazing in meadows.*
> [Recreational Group, #235]

Response: NEPA Council on Environmental Quality (CEQ) regulations acknowledge that mitigation measures can be integrated into EIS alternatives, stating, "Many Federal agencies and applicants include mitigation measures as integral components of a proposed project's design. Agencies also consider mitigation measures as alternatives when developing Environmental Assessments (EA) and Environmental Impact Statements (EIS)" 40 Code of Federal Regulations (CFR) § 1502.14(g), 1502.16(h). The Department of the Interior's NEPA regulations provide similar guidance (43 CFR § 46.130).

The analysis of grazing impacts on vegetation in "Chapter 4: Environmental Consequences" of the WSP/EIS takes into account many factors which influence the sensitivity of meadows to grazing impacts using methods described in the "Vegetation Methodology" section. These factors include broad elevation zones (upper montane and subalpine vs. lower montane / woodland), subalpine vegetation types (three vegetation types that span a moisture gradient from wet to dry), and the susceptibility of different vegetation types to different kinds of impacts (productivity, basal cover, and relative graminoid cover). This analysis of impacts also includes a detailed breakdown of how much area is subject to grazing impacts by three Cowardin wetland systems, five meadow moisture classes, as well as the amount of lakeshore meadow and peat-accumulating meadow subject to stock impacts. This detailed analysis provides an abundance of information about the expected impacts to wetlands and meadows of each of the alternatives in the WSP/EIS.

Recognizing that stock can impact the parks' resources, a range of mitigation measures and adaptive management tools informed the development of the alternatives and have been incorporated in the alternatives. Examples of stock-related mitigation measures in alternative 2 include: access restrictions (e.g., party-size limits and designating certain trails, camping areas, and meadows as closed to stock); implementation of an opening-date system for grazing; altering trails (e.g., rerouting trails away from moist areas); specific feed requirements to reduce the potential for nonnative-plant introductions; and minimum impact regulations for stock use. Under the preferred alternative, site-specific grazing limits would be adopted for those wilderness meadows open to grazing, as would an adaptive management system that integrates the results from a suite of complementary monitoring protocols into appropriate management action, and requires action if monitoring results show a downward trend in meadow condition. "Appendix D: Stock Use and Meadow Monitoring and Management Strategy" provides a detailed explanation of how these mitigation measures and adaptive management tools will be used to ensure that impacts from stock use remain within acceptable limits.

Concern 8: The NPS did not consider a "no-stock" alternative within the wilderness of the parks in the WSP/EIS, thus the range of alternatives is limited. A "no-stock" alternative is within the scope and purpose of the WSP/EIS, as the parks' Master Plan recognized the harmful impacts of stock use in 1971 and called for a complete phasing out of all recreational stock use in the parks' sensitive higher elevations. Because stock use is considered a "historical use" of the parks, the NPS improperly concluded that it did not need to consider a 'no stock" alternative in the WSP/EIS, in violation of NEPA.

> *40 CFR 1502. 14 Alternatives including the proposed action (a) "Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated." Comment: In the GMP there was a no-stock alternative (Alt. A.) Inasmuch as the WSP is tiering off the GMP, the reasons for eliminating the no-stock alternative should have been presented. I fail to find any such explanation. Lacking such an explanation, it is obvious that you had no intention of addressing the issue of whether there should be stock use in SEKI, but made the decision in the affirmative before you even began the process. 40CFR1502. 14 (c) "Include reasonable alternatives not within the jurisdiction of the lead agency." Comment: In our letters of August 31, 2011 and November 19, 2012 we clearly requested, and described in detail, one or more alternatives that we thought should be considered. Other than one alternative (#4) that specifies no grazing throughout SEKI, your extremely limited range of alternatives does not address any of our major concerns.*
> [Recreational Group, #254]

More than 40 years ago, the 1971 SEKI Master Plan called for phasing out all stock in SEKI's sensitive higher elevations. Despite High Sierra's efforts to pursue this alternative, in various reasonable forms, the NPS wholly ignores its prior planning decisions. This failure may also constitute Administrative Procedure Act violations.
[Recreational Group, #235]

The High Sierra decision from 2012 vacated portions of the GMP that relate to commercial stock use in SEKI's wilderness areas; the NPS can no longer rely on those portions of the GMP to justify its "historical use" claim. NPS recognizes this (WSP/DEIS at 32), but its further attempts to provide a rationale for its "historical" argument fail. NPS's specialized finding (WSP/DEIS Appx. B, the Extent Necessary Determination) attempts to shoehorn historic use with the concept of historic under the Wilderness Act by claiming that scientific and educational trips require stock use. WSP/DEIS App. B-15. This "historical use" argument fails under NEPA and under the Wilderness Act.
[Recreational Group, #235]

Additionally, a "no-stock" alternative is not only within the scope and purpose of the DEIS, but has been a serious consideration since the SEKI's Master Plan recognized the harmful impacts of stock use in 1971.
[Recreational Group, #235]

The Master Plan called for a complete phasing out of all recreational stock use in SEKI's sensitive higher elevations, and the WSP/DEIS itself includes an alternative that includes no stock above certain elevations. The acknowledgement that a "no-stock" alternative in high elevations is necessary and the currently documented impacts of stock use throughout the SEKI show that a "no-stock" alternative covering the entire SEKI wilderness is not only a reasonable alternative, but one that was illogically and unlawfully excluded from consideration. Failure to consider a "no-stock" alternative here implies that NPS already made the decision, without any analysis, that stock use is acceptable in SEKI wilderness. Such a rationale for excluding an alternative is impermissible under NEPA.
[Recreational Group, #235]

Response: The NPS considered five alternatives during the planning process for the GMP, one of which was a “no stock” alternative. The NPS did not select the “no-stock” alternative in the ROD for the GMP because the NPS determined that stock use was an appropriate way for visitors to access wilderness and for the NPS to conduct administrative activities in wilderness.

With regard to the 1971 Master Plan, the GMP explained (volume 1, pages 6 and 36) that it replaced the direction from Master Plan on the issue of stock use in the parks. The NPS recognizes that the litigation challenging the GMP invalidated the portions of the GMP that relate to commercial stock use in wilderness and to facilities used to support commercial stock use. However, the portions of the GMP that relate to private and administrative stock use in wilderness remain valid. Because the WSP/EIS is tiered to the valid portions of the GMP, the NPS need not revisit a “no-stock” alternative in the WSP/EIS.

Concern 9: The identification and assessment of the five alternatives is lacking and violates NEPA because there is little variation across alternatives and the alternatives do not avoid or minimize impacts as required by 40 CFR Section 1502.1. Instead, the alternatives propose different ways for the NPS to get what it wants — increased stock use in wilderness.

> *Despite the opportunity to have five different ways to analyze the issue, NPS's identification and assessment of the five alternatives is lacking and violates NEPA. 40 CFR Sect. 1500. 2(e).*
> [Recreational Group, #235]

> *NPS attempts to justify this by saying that because of the "high standard for natural resource preservation" there is "little variation across the alternatives." WSP/DEIS at ix. NPS identifies the "differences" between the alternatives as lying in the "key elements of wilderness management -use levels, access and trails, stock use and grazing, and infrastructure, both recreational and administrative." id. The focus of the alternatives is thus not to avoid or minimize impacts as is required. See 40 CFR Sect. 1502. 1 (EIS "shall provide full and fair discussion of significant environmental impacts and shall inform decision- makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment. . .”). Instead it is to propose different ways for NPS to get what it wants, such as increased stock use in wilderness areas.*
> [Recreational Group, #235]

Response: With public input, the NPS developed a range of five alternatives that provide different ways of achieving the purpose and objectives of the WSP/EIS. There are a range of actions proposed under each alternative, which differ substantially for several of the key topics. For example, alternative 3 provides for increased recreational opportunities in wilderness by increasing some trailhead quotas by 10%, whereas alternative 5 would reduce trailhead quotas by 30% to increase opportunities for solitude. Alternatives 2 and 3 would close approximately 30 miles of trail to stock users, whereas alternative 4 would close 109 miles of trail to stock users. Grazing would be discontinued under alternative 4 but would be allowed, with variations, under other alternatives. Similarly, alternative 4 would result in the removal of most of the recreational developments and facilities in wilderness but additional development to protect resources would be added under alternative 3. All of the alternatives fulfill the mandate of the Wilderness Act and the NPS Organic Act to preserve resources unimpaired for future generations.

The WSP/EIS provides a comprehensive discussion of the impacts from the five alternatives to allow the decision makers and the public to understand the effects of each alternative on natural and cultural resources and visitor experience. The WSP/EIS discloses the impacts associated with the five alternatives. The environmental analysis in the WSP/EIS demonstrates that none of the alternatives would result in unacceptable impacts. Additional stock access and restrictions and mitigation measures, such as meadow opening dates and trail improvements, would work to minimize impacts on the parks’ resources.

Of note, only one alternative (alternative 3) would provide for increased visitation and potentially increased stock use.

Concern 10: Reductions in stock use will eliminate diversity and individual choice by making the areas accessible only to those who are physically capable to hike at high elevations, whereas NEPA mandates to "maintain . . . an environment that supports diversity and variety of individual choice.”

> *The second mandate of Section 101(b)4 is to "maintain . . . an environment that supports diversity and variety of individual choice.”*
> [Recreational Group, #201]

> *Reductions in stock use will eliminate the diversity and individual choice by making the areas accessible only to those who are physically capable to hike at high elevations.*
> [Recreational Group, #201]

Response: NEPA Section 101(b) sets forth criteria that are considered by agencies when undertaking actions subject to NEPA. These criteria assist agencies in evaluating whether agency actions meet the national environmental policy set forth in NEPA. Section 101(b) criteria covers a broad range of issues, one of which is "preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice."

This and the other factors in NEPA Section 101(b) were considered in the context of selecting a preferred alternative. The NPS concluded that alternative 2 would provide for diversity and a variety of primitive and unconfined recreational opportunities, even though there would be some increased restrictions on stock use.

Concern 11: Drift fences were removed by NPS without involving the public in the NEPA process and without following the required public input process. The re-establishment of the Lower Junction Meadow drift fence and the Vidette drift fence on the John Muir Trail (JMT) was requested since these drift fences provide resource protection and prevents stock from moving up the canyon to closed meadows.

> *Within the past year the HSU has on several occasions conferred with SEKI about the removal of several drift fences in the Bubbs Creek drainage. We learned that these drift fences were removed by SEKI without involving the public in a National Environmental Policy Act (NEPA) process and without following the required public input process in the BMP. We notified you about these illegally removed drift fences once we learned about them and we even met with you about re-establishing these drift fences. However, you suggested that we deal with the issue in the WSP process. It is hard to accept the fact that SEKI can act in an illegal and unauthorized fashion to remove drift fences and then tell the stock using public to deal with the subject in the WSP. We specifically request the re-establishment of the Lower Junction Meadow Drift Fence and the Vidette Drift Fence on the John Muir Trail. These drift fences provide resource protection. The Lower Junction Meadow Drift Fence also prevents pack and saddle stock from returning to our horse trailers. The Vidette Drift Fence prevents stock from moving up the canyon to a closed meadow.*
> [Recreational Group, #230]

Response: The WSP/EIS has inventoried and analyzed existing and potential drift fences and gates with differing amounts proposed for each alternative. Structures in the wilderness diminish wilderness character (undeveloped and opportunities for primitive and unconfined recreation). Table 51a in "Chapter 2: Alternatives" provides details on the location and the proposed action for each alternative. Each of these structures were evaluated for their value in protecting resources and in their value to facilitate stock use under the guiding tenet that structures are generally prohibited in wilderness. The referred-to actions of the parks occurred over the past several decades and contributed to current conditions. See the "Stock-use Structures" subsection for alternative 1 in chapter 2 for additional details.

Concern 12: The parks should reexamine the policy of banning boating on the Wild and Scenic South Fork Kings River from its confluence with Bubbs Creek to the parks' boundary.

> *American Whitewaters 2011 and 2012 comments also encouraged the Parks to reexamine the policy of banning boating on the Wild and Scenic South Fork Kings River*

from its confluence with Bubbs Creek to the Park boundary. This reach of the South Fork Kings River is approximately eight miles long, with approximately two miles located within the Sequoia-Kings Wilderness Area. Our August 30, 2011 comments in particular outline the reasons why banning boating is inconsistent with the Wilderness Act, Wild and Scenic Rivers Act, and National Park Policy. These statements are still relevant today Contrary to meeting the needs of all park users, banning one activity outright denies the needs of certain park users. Neither the compendium nor the GMP describe how banning boating on the South Fork of the Kings River helps to meet the needs of all park users, or conversely, how allowing boating on other rivers in the Parks intrudes on the needs of other Park users. American Whitewater does not believe that the reasons for eliminating a detailed study of lifting the boating ban on the South Fork Kings River is adequate. Further, the WPS/DEIS does not argue that studying this option is impractical or unfeasible from a technical or economic standpoint. Banning boating within Wilderness Areas, on Wild and Scenic Rivers, and within National Parks is a rare practice. Allowing human-powered boating within a Wilderness Area and on a Wild and Scenic River is an acceptable activity through the lens of common sense, as described in our previous comment letters, and incorporated by reference.
[Recreational Group, #165]

Response: In the 2007 GMP, the parks analyzed the aspect of allowing floatation devices (i.e., non-motorized boating) on the lower reach of the South Fork Kings River (from the Bubbs Creek confluence with South Fork downstream to the parks' boundary) and made the decision to not allow this activity. The parks need not re-evaluate this portion of the plan of record in subsequently tiered plans. NEPA does not require that decisions contained in valid management plans and ROD be revisited in tiered NEPA documents. The preferred alternative of the GMP affirmed that the activity of boating on the South Fork Kings lower reach was not consistent with desired conditions of the GMP. The NPS need not revisit the question of whether boating should be allowed on this section of river in the WSP/EIS.

Guiding Policies, Regulations, and Laws for Wilderness

Concern 13: Creating new stock campsites and new structures/facilities that support stock use violates the Wilderness Act. These structures should only be allowed for ranger patrols in the parks.

(cont'd) DEIS Alternative 2 Element 10 - In addition to opposing the Atwell Mill changes for stock, the entire concept of creating new stock campgrounds and ANY new structures/facilities that support stock use is contrary to the Wilderness Act. Essentially, the stock community is asking the NPS to install facilities in the wilderness to ensure their commercial viability. Although this is done in the name of allegedly minimizing impact, that is not truly the case. Every drift fence, post, gate, and stock campground is a means of enabling a commercial end that could not otherwise exist at current levels or even the levels proposed in DEIS Alternative 2. Without all of the stock supporting facilities in the wilderness allowed by DEIS Alternative 2 and paid for by the rest of us, stock use would have to be reduced to levels that might not be commercially viable but that would FINALLY approach the minimum impact/leave no trace standard that the NPS demands of HUMAN visitors.
[Individual, #46]

Remove all fences, gates, and wire from the SEKI Wilderness. These structures are the kind of structures and installations prohibited by the Wilderness Act (section 4[c]). They are also evidence of human trammeling of the Wilderness, and so violate the Wilderness

> *Act in that way as well. The only places where these structures could be allowed are essential pastures needed for ranger patrols.*
> [Conservation/Preservation, #166]

Response: The establishment of facilities in frontcountry locations is not directly under the mandate of the Wilderness Act, as they are not in wilderness. Use in wilderness that may be supported by these facilities has been analyzed for its effects on wilderness character throughout "Chapter 4: Environmental Consequences." Facilities in wilderness such as drift fences and food-storage boxes for public and administrative use have been evaluated in accordance with the minimum requirement analysis process of Section 4(c) of the Wilderness Act to ensure they are the minimum required to meet the purposes of the Act (see "Appendix M: Programmatic Minimum Requirements Analysis"). Finally, any changes to frontcountry facilities proposed by this WSP/EIS will also be subject to additional site-specific NEPA analysis and compliance.

Concern 14: Allowing unlimited permitted stock use under the preferred alternative is not consistent with the Wilderness Act. The "limit" is set at a much higher number than the average use of recent years, and is even higher than the highest figure in the no-action alternative during those years.

> *The Preferred Alternative makes it appear that, for the first time, there will be a numeric limit to stock use. But the "limit" is set at a much higher figure than the average use of recent years, and is even higher than the highest figure in the "No Action Alternative" during those years. In effect, stock use will continue to be unlimited, since the reasonable expectation is that the new "limit" will never be reached. Should the FEIS still contain this manipulation of numbers, there can be no qualitative and comparative analysis as required under the Act to show that commercial services are required, or for what amounts. For all practical purposes, stock would be permitted to an unlimited extent under the Preferred Alternative. This cannot be consistent with the Wilderness Act.*
> [Recreational Group, #235]

Response: The action alternatives in the WSP/EIS would impose numerous limitations on stock use. Examples include daily trailhead quotas; an annual capacity (i.e., limit) on Visitor Service Days (VSDs, commercial service providers only); a secondary and more restrictive capacity (limit) on VSDs in the Mount Whitney Management Area (commercial service providers only); CUA requirement (commercial service providers only); carried feed requirements; camping night limits; campfire limits; party-size limits; food storage restrictions; and access and camping limitations and restrictions that are more restrictive than for those who only hike.

The annual limit on VSDs proposed in the preferred alternative (5,040 for non-stock supported services and 3,360 for stock supported services) is higher than the average from the four-year period of VSD data collected (2010-2013). However, these four years were among the lowest stock use years of the past three decades. Any change from the 2010-2013 period annual average of 2,487 stock supported VSDs, to the proposed limit of 3,360 stock supported VSDs, can easily be accommodated without impacting wilderness character and will allow for wilderness visitors to participate in activities that are proper for realizing wilderness purposes. More importantly, the stock supported service day allocation of 3,360 VSDs represents a reduction from the 25 year average of 3,870 annual stock use nights (note that data assessment has shown that 1 stock use night by a commercial service provider is equivalent to one VUD/VSD). The statistical reality of establishing a "limit" or cap at a previous average would necessarily lower the future average.

Concern 15: The WSP/FEIS must take into account the issue of administrative stock since the WSP/DEIS did not satisfy the core policy of the Wilderness Act. The commenters state that much of the administrative stock use in the parks is unnecessary and harmful to wilderness areas, and goes well beyond what is needed to support a project.

> *In the FEIS, NPS must take into account that the issue of administrative stock as discussed in the WSP/DEIS does not satisfy the core policy of the Wilderness Act. 16 USC Sect. 1131(a) (wilderness areas "shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character . . ."). Much of the administrative stock use in SEKI is unnecessary and harmful to SEKI and the wilderness areas, and goes well beyond what is needed to support a project. There are two primary examples of this unnecessary and harmful use: (1) packtrains that re-supply trail crews, and (2) "holiday" trips for NPS staff.*
> [Recreational Group, #235]

Response: Prior to each work season, the parks' managers review park operations through a wilderness minimum requirement analysis to determine how to administer the wilderness in a manner that protects wilderness character. This analysis weighs the options for the transport and resupply of equipment for trail crews, rangers, and resource staff. The decision on which method to utilize is based on a site-specific analysis, including the location in wilderness, available meadows for forage, and the type and weight of the supplies. In most cases, administrative stock drops off supplies for crews and then returns to the frontcountry immediately or within a day or two. However, in some circumstances, the results of a minimum requirements analysis indicates that it is less of an impact to hold and feed, or graze on site, particularly in remote locations, than to conduct multiple trips back and forth from the trailhead.

Management staff trips into wilderness, which are occasionally conducted, have been proven to be extremely valuable for the parks' management to learn first-hand about wilderness conditions and issues, thus improving knowledge of decision makers. It is obviously of value for individuals who are involved in decision-making to have first-hand knowledge of conditions and operations. When conducted, these trips adhere to the same, or frequently stricter, restrictions than those required of the general public, including; party-size limits, grazing limits, and campfire restrictions.

Concern 16: The WSP/EIS does not uphold the "preservation" requirements of the Wilderness Act including the unfettered resource extraction caused by stock use. Preservation of wilderness requires the NPS to address and limit stock use to levels appropriate to ensure such preservation.

> *Another major problem with the proposed alternatives vis-a-vis the "preservation" goal of the Wilderness Act is the unfettered resource extraction caused by stock use. Resource extraction activities are strictly limited and must be performed in manners compatible with the preservation of the wilderness environments. 16 USC Sect. 1133(d)(2), (3).*
> [Recreational Group, #235]

> *The FEIS must provide analysis and alternatives that actually preserve wilderness values as mandated by the Act, not continue to place undue reliance on monitoring schemes that allow for continued grazing and stock use despite the documented impacts. The NPS has the responsibility under the Wilderness Act to "preserve wilderness for the American people in such a manner as will leave them unimpaired for future use and enjoyment." 16 USC Sect. 1131(2)(a). Preservation of wilderness requires the NPS to address and limit*

stock use to levels appropriate to ensure such preservation, not require management action only when degradation has already occurred.
[Recreational Group, #235]

The SEKI WSP/DEIS continues to use "opening dates" as an attempt to curb stock trampling impacts, but the method has been ineffective at preventing significant, adverse impacts to meadows, streambanks, lakeshores, and wetlands.
[Recreational Group, #235]

Response: NPS *Management Policies 2006* Section 8.6.8.1 states that grazing incidental to recreational stock use is allowed in parks in a manner consistent with the policy direction articulated in Section 8.2.2.8 of these management policies. Section 8.2.2.8 explains that recreational stock use is authorized provided it is managed to avoid unacceptable impacts and that plans for recreational stock use should address social, biological, and physical carrying capacity considerations.

The NPS recognizes that grazing has the potential to impact vegetation, water quality, and soils, which are components of the natural quality of wilderness. These impacts are described and evaluated in "Chapter 3: Affected Environment" and "Chapter 4: Environmental Consequences" of the WSP/EIS. Each of the alternatives that allow for grazing to continue, including the preferred alternative, mitigates these impacts to acceptable levels through the continued monitoring and adaptive management of stock use and grazing. Grazing levels have been and would continue to be refined in the future through the adaptive management approach adopted in the parks' proposed strategy for monitoring and managing grazing in wilderness. This flexibility allows the parks to incorporate future monitoring results as well as any new information about meadow characteristics and the relationship between grazing levels and impacts into the management of grazing. Together with the monitoring protocols and adaptive management described in "Appendix D: Stock Use and Meadow Monitoring and Management Strategy," the proposed grazing levels are designed to ensure that meadows are protected from the potential adverse effects of grazing, and that impacts are kept within limits that ensure the resiliency of meadow ecosystems and thus preserve wilderness character as called for by the Wilderness Act. Grazing management is addressed in detail in appendix D. Chapter 4 of the WSP/EIS analyzes the impacts of each alternative on wilderness character. The WSP/EIS concludes that grazing by recreational stock can be conducted in a manner that maintains desired natural, social, and cultural resource conditions.

Concern 17: The Extent Necessary Determination (END) does not apply and does not evaluate the correct criteria for determining whether an activity is proper under the Wilderness Act. Its evaluation of commercial stock activities needs to be reconsidered.

The NPS must apply meaningful criteria in the FEIS to meet the Act's narrow exception for commercial services. Criteria that should be met regarding necessity have been outlined in our past comments and are detailed once again here. To be meaningful, the criteria must refer to the physical needs of persons wishing to explore wilderness, not to provide a means for those who are circumventing trailhead quotas, who use stock to haul unnecessary items into the backcountry, or who are seeking convenience and ease. These uses of commercial stock do not constitute necessity. The criteria should include: 1) the potential commercial client must be physically incapable of hiking and/or carrying a backpack of his or her own; 2) the potential client must need stock support to facilitate wilderness dependent activity, not simply desire convenience or comfort; 3) the potential client must be willing to travel with the minimum necessary gear - that normally carried by a backpacker.
[Recreational Group, #235]

Since the criteria used in the END do not fit within the mandates of the Wilderness Act, the FEIS/WSP should examine the factors in the NPS Management Policies, as well as additional factors, to determine whether stock use is proper within wilderness areas, such as those proposed by High Sierra supra.
[Recreational Group, #235]

The END's conclusions do not flow from the criteria utilized to arrive at them, and the FEIS must be rectified in order to comply with the requirements of the Act.
[Recreational Group, #235]

The Wilderness Act requires the preservation of wilderness, prohibiting commercial activities with only narrow exception. The NPS has not met its obligations under the Act in the Extent Necessary Determination issued in the WSP/DEIS. The NPS failed to apply meaningful criteria to determine the necessity of commercial stock services in SEKI. Further, the NPS did not truly weigh the impact of all relevant factors and potential consequences of permitting commercial stock services in SEKI. Lastly, the NPS did not apply and evaluate the correct criteria for determining whether stock use is a proper recreational activity under the Act. The NPS will continue to be in violation of the Act until it seriously accounts for the deficiencies outlined above.
[Recreational Group, #235]

The Extent Necessary Determination ("END") issued by the NPS in the WSP/DEIS falls short of the explicit statutory requirements, and of the Ninth Circuit's interpretations of the Act. The END claims that commercial services are "necessary" to facilitate stock use in wilderness areas for multiple reasons. WSP/DEIS Appx. B-18.
[Recreational Group, #235]

My concerns with SEKI management relate to excessive commercial use and in particular commercial pack stock use. The Wilderness Act allows commercial use only to the extent necessary. I believe that current commercial use in SEKI wilderness is significantly beyond the prescription in the Act.
[Individual, #51]

In Vol. 2, Appendix B, you have made a mockery of the Wilderness Act. The statement on page 4 of the Act reads: "Except as specifically provided for in this Act, and subject to existing private rights, there shall be no commercial enterprise . . . . "(a clear statement). You have assumed that the "extent necessary' (a vague phrase) two pages later means unlimited commercial use by anyone for any reason, thus negating the first statement. You also assume, without providing any proof, rationale, or logic, that "extent necessary" refers to stock animals. How do you know that? The words "horses," "mules," and "stock animals" do not appear in the Wilderness Act.
[Recreational Group, #254]

Response: These concerns express the view that the parks did not consider the proper criteria when deciding whether to allow commercial services in wilderness. Some commenters refer to the NPS *Management Policies 2006* and suggest that the NPS did not evaluate commercial services in accordance with guidance contained in these management policies. Section 6.4.4 of the management policies states: "Wilderness oriented commercial services . . . *may be authorized . . . if they are consistent with the wilderness management objectives contained in the park's wilderness management plan*, including the application of the minimum requirement concept. Activities such as guide services for outfitted horseback, hiking, mountain climbing, or river trips and similar activities *may be appropriate and may be*

authorized if conducted under the terms and conditions outlined in the park's wilderness management plan and/or in legislation authorizing these types of commercial uses." (*emphasis added*). The findings of the END are wholly compliant and consistent with the management objectives of the WSP/EIS. The WSP/EIS has followed this agency guidance by completing a Programmatic Minimum Requirements Analysis (MRA) (appendix M). The criteria set forth in the NPS *Management Policies 2006* were considered in the Programmatic MRA.

Other commenters suggested that the parks consider the following criteria (generally based on physical disability): whether visitors have the physical ability to hike and carry a pack; whether a visitor has an absolute need to use commercial services; and whether the visitor will carry the minimum essential gear. Neither the Wilderness Act nor NPS policy identify these as criteria to be considered when determining the amount of commercial services that can be authorized in wilderness. Implementation of the suggested criteria would lead to excessively intrusive inquiry into the personal health status of visitors and their personal preferences for travel items, commit the NPS to an impractical commercial service monitoring program, impose a narrow vision of how the public may use its wilderness, and fail to provide meaningful criteria for services other than stock services. With respect to the suggested criteria that only those who strictly need commercial support should be allowed to use it, the END explains that NPS does not interpret the word "necessary" as used in Section 4(d)(5) in an absolutist sense.

The proposed criteria used by NPS in the END are consistent with the mandate of the Wilderness Act and NPS policies and can be usefully applied to commercial services of diverse types, including backpacking/hiking, mountaineering/climbing, fishing, photography, or stock use. The NPS believes that it considered appropriate criteria in the END process. The END sets specific numeric limits on commercially supported visitor service days.

Concern 18: The END improperly uses historical pack use as a prime factor for the determination that stock use is a proper activity in wilderness. Nowhere in the Act, the regulations, or in the Management Policies are "historical" or "traditional" uses provided as factors that are to be given the substantial weight accorded to them in the END.

> *The END improperly uses historical pack use as a prime factor for the determination that stock use is a proper activity in wilderness. Nowhere in the Act, the regulations, or in the Management Policies are "historical" or "traditional" uses provided as factors that are to be given the substantial weight accorded to them in the END.*
> [Recreational Group, #235]

Response: The Wilderness Act in Section 4(b) states: "wilderness areas shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, *and historical use*" (*emphasis added*). Horseback riding has occurred in these parks for more than 150 years and actually predates the establishment of the parks. Through the GMP process, the NPS determined stock use to be a proper use in wilderness. The END sets forth the criteria that NPS used to determine which activities would be appropriately supported by commercial services. These factors included whether the allowance of stock use would enable the wilderness to maintain its primeval character, preserve natural conditions, provide outstanding opportunities for solitude, and preserve wilderness in an unimpaired condition. The END notes that stock use is a traditional activity in the parks, but the fact that it is a long-standing use was not the "prime factor" that guided the NPS's decision-making.

Concern 19: The END's economic equity argument is arbitrary and capricious and inconsistent with the Wilderness Act, because visitors of all ages, incomes, and abilities can access and camp in the wilderness in a noncommercial manner. There is no requirement under the Wilderness Act that the wilderness be equally accessible to persons of all ages, incomes, and abilities, nor could such a

requirement be practically imposed without completely undercutting the entire concept of wilderness.

> *(cont'd) The END's economic equity argument is arbitrary and capricious and inconsistent with the Wilderness Act, because visitors of all ages, incomes, and abilities can access and camp in the wilderness in a noncommercial manner, as demonstrated by DEIS Alternative 2's own proposal for a universal access campground. Further, in any case, there is no requirement under the Wilderness Act that the wilderness be equally accessible to persons of all ages, incomes, and abilities, nor could such a requirement be practically imposed without completely undercutting the entire concept of wilderness. Most people, on the historic trails west, walked, and some were left behind. That is just how it goes, and there is no room under the law for the NPS to falsely style itself as an equitable guardian when it is truly being asked to front for a commercial enterprise.* [Individual, #46]

Response: In determining which proper activities could be supported through commercial services, the NPS considered a number of factors including whether the activity required specialized skills, knowledge, and equipment and whether there were special safety or resource concerns associated with the activity. These factors were applied to stock use in table B-2 of the END ("Appendix B: Extent Necessary Determination for Commercial Services"). While the cost of horse ownership was taken into account, it was not the primary factor in deciding whether to allow commercial stock services in wilderness.

The NPS is also charged with allowing proper use and protecting public lands for all people as stated in NPS *Management Policies 2006*, Section 8.2: "Enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks. The Service is committed to providing appropriate high-quality opportunities for visitors to enjoy the parks, and the Service will maintain within the parks an atmosphere that is open, inviting, and accessible to every segment of American society." Commercial stock services are consistent with the mandate of the Wilderness Act and this specific objective of NPS policies, and as determined through the END process, is a proper, appropriate, and suitable way to experience wilderness.

Concern 20: The Wilderness Act cannot be cited as a basis to preclude in any way horseback riding in the John Krebs Wilderness Area or the Sequoia-Kings Canyon Wilderness Addition.

> *The Wilderness Act cannot be cited as a basis to preclude in any way horseback riding in the John Krebs Wilderness Area or the Sequoia-Kings Canyon Wilderness Addition. In fact, horseback riding is the only public use which is explicitly authorized in these Wilderness Areas. Moreover, because this protection was an explicit condition for the areas being designated as Wilderness Areas, any violation of this explicit condition would not only be a violation of law, it would be reneging on a promise made to horseback riders in order to obtain their agreement to the establishment of the Johns Krebs Wilderness and the Sequoia-Kings Canyon Wilderness Addition.* [Recreational Group, #138]

Response: The WSP/EIS does not preclude horseback riding in either of these wilderness areas.

Concern 21: Regulating stock access and closing meadows based on social and scenic values violate the Wilderness Act and the parks' enabling legislation.

> *As part of SEKI's WSP you are proposing through alternatives 2,3,4, & 5, to 1) more severly regulate stock access and longterm use within SEKI, 2) enact trail closures &*

institute a new trail classification system with which to aid in the reduction of stock access, and 3) institute new meadow closures based on 'social' & 'scenic' values which would also more severely limit stock access. These three "management" tools violate the letter and the spirit of both the Park's enabling legislation, and the Wilderness act of 1964. Alternatives 2, 3, 4, & 5, violate existing statutes and are not valid for legal consideration as alternatives for the SEKI-WSP. Therefore, the only alternative valid for consideration is the "status quo"/no change alternative.
[Recreational Group, #138]

Response: Management action, such as regulating stock use, to preserve wilderness character is within the authority of the NPS and is compliant with the Wilderness Act, the National Park Service Organic Act, the parks' enabling legislation, and other laws and policies. This WSP/EIS uses a variety of controls and restrictions to ensure that the qualities of wilderness character — natural, untrammeled, undeveloped, and providing outstanding opportunities for solitude or a primitive and unconfined type of recreation — are preserved, and that the public purposes of wilderness — recreational, scenic, scientific, educational, conservation, and historical use — are fulfilled. Prohibiting grazing in some specific meadows in order to provide ungrazed meadows for the public to experience is consistent with the mandates of the Wilderness Act, in that it supports the natural quality; is a place that "generally appears to have been affected primarily by the forces of nature" (Section 2(c)(1)); and supports scenic as one of the act's stated public purposes (Section 4(b)). See appendix D, Network of Meadows Closed to Grazing section for additional information.

Concern 22: The wording used in the WSP/EIS regarding the use of fixed anchors is incorrect and contradicts Director's Order #41. It should be re-worded to avoid negative consequences on the safety of climbing groups.

The statement, the use of fixed anchors is rarely appropriate in wilderness, does not conform to the guidelines in DO#41 or climbing best practices. The actual language used in DO#41 is, fixed anchors& should be rare in wilderness. Given that the AMGA believes fixed anchors, particularly bolts, are a last resort in wilderness, through judicious placement their use should always be considered appropriate. Similarly, the phrase fixed anchors will not be placed merely for convenience or to make an otherwise un-climbable route climbable, also needs to be modified. The only point to placing a fixed anchor is to make an un-climbed route climbable with a reasonable degree of safety, in many ways the essence of unconfined recreation. If such a safety concern were not present, or placing removable gear was an option, then there would not be a need for the fixed anchor. However, we do agree that fixed anchors should not be placed for convenience, or to establish bolt-intensive routes that would increase levels of use and impact. The discussion of new fixed anchors should relate primarily to bolts, but any authorization required to replace or remove existing fixed anchors should be conducted programmatically. In addition to maintaining opportunities for unconfined recreation in a manner recognized by DO #41 as an appropriate use in wilderness, programmatic authorizations reduce the administrative burden that would be generated by requiring a climbing team to obtain a permit to replace a simple item, such as a sun-damaged rappel sling on a well-established route.
[Recreational Group, #153]

NPS Director's Order #41 (DO #41) is fatally flawed with its current wording and could easily result in deaths with SEKI wilderness. By defining slings as fixed anchors any caving, climbing, or canyoneering group is put in the awkward position of using old slings or violating DO #41 during non-emergency activities. Is it really the intent of this

order that a $20 permit be filed for each potential activity that many need to replace a sling? Given that a permit is being required will SEKI identify the locations of each fixed anchor- -including slings. Will there be regular monitoring of the condition of authorized anchors? Will the information be publicly accessible so individuals will know whether they need to file for a permit to replace a sling?
[Individual, #114]

The statement, [t]he use of fixed anchors is rarely appropriate in wilderness needs to be modified in order to subscribe to DO41 guidelines and wilderness climbing best practices. Directors Order #41 states, [f]ixed anchors or fixed equipment should be rare in wilderness, not that the use of fixed anchors is rarely appropriate. This distinction is important because, through judicious placement of fixed anchors, every fixed anchor, and the use thereof, should be appropriate.
[Recreational Group, #161]

The statement, [f]ixed anchors will not be placed merely for convenience or to make an otherwise un-climbable route climbable also needs to be edited to reflect the fundamental purpose of fixed anchors in wilderness. Directors Order #41 acknowledges that the occasional placement of a fixed anchor for belay, rappel, or protection purposed does not necessarily impair the future enjoyment of wilderness of violate the Wilderness Act. We recommend changing [f]ixed anchors will not be placed merely for convenience or to make an otherwise un-climbable route climbable to fixed anchors will not be placed merely for convenience or to establish bolt-intensive face climbs that attract high levels of use and impact.
[Recreational Group, #161]

Response: "Appendix J: Climbing Management Strategy" has been modified to more clearly define fixed anchors as consisting of two types; permanent and removable. See the "Background" and "Public Use of Fixed Anchors" sections of appendix J. Only those fixed anchors which are permanent (e.g., bolts) will require prior approval for placement or replacement (see the "Public Use of Fixed Anchors" section of appendix J).

Concern 23: The NPS should clarify if legislative statements in the document apply in Mineral King Valley. There is a concern that the parks are not recognizing the intent and law regarding 16 United States Code (USC) 45f Mineral King Valley addition.

Page 179. Element 11: Commercial Services in Wilderness Planning Objective: "Commercial services would be allowed to the extent necessary"- - -"To meet the objectives of this alternative, commercial service" - - - - - and commercial services would be limited in the high use-areas (table 37 on the next page). . See also appendix B." Comment: Is this statement regarding to any of the 45f Mineral King area? As Commercial is not allowed at (3).
[Individual, #28]

Page B-1 Appendix B. "Extent Necessary Determination For Commercial Services In The Wilderness Of Sequoia And Kings Canyon National Parks" Page B-12. "Over-snow travel (ski and snow shoe touring." paragraph three." Day -use skiing and snowshoeing in wilderness is a proper activity. Day skiing and snowshoeing may be supported by commercial service providers solely for skiing and snowshoeing," Page B-27 "ALT 3: Allow for Increased Uses, and ALT : 2, 4, 5, Comment's are these ALT. statement

regarding any of the 45 f Mineral King area. Calling out commercial, and Wilderness areas? as commercial is not allowed at 45 f. at (3) .
[Individual, #28]

Pages 347. - 348. CONCESSIONS AND COMMERCIAL USE. "CUAs, which are not considered concession contracts, may be issued pursuant to section 418 of the National Park Service Concessions Management Improvement Act of 1998 (16 USC 5966)." Comment: Dose the park concede that Congressional Law, 16-section45f&num=0&edition=prelim 16 USC 45f: Mineral King Valley addition authorized Congressionally enacted in 1987/2009 is the governing law, - - - - -over Park's CUA,s. Of the "Mineral King call out Area," ?
[Individual, #28]

Response: Public Law (PL) 95-625 [16 USC 45f.], titled *Addition of Mineral King Valley to Sequoia National Park* was enacted in 1978. Section 314(c)(3) of this Act applies to the private permitted cabins in the Mineral King Valley area. The provisions of the WSP/EIS do not apply to these private permitted cabins that are located on federally owned land in the Mineral King Valley area of Sequoia National Park. The WSP/EIS proposes no changes to the use and occupancy of these permitted cabins.

Concern 24: The pack station at Mineral King should either be made economically viable or should be closed. There is no need to provide facilities to support commercial stock use since such additional facilities are a subsidy to commercial enterprise in wilderness which is contrary to the intent of the Wilderness Act.

(cont'd) DEIS Alternative 2 Element 10 - Further, I do not see any basis for allowing commercial stock use or travel from ANY trailheads that lack a pack station. Cedar Grove pack station can access north and south including Roads' End. Wolverton pack station, if it is in fact commercially viable, could access the cutoff and Sevenmile Hill to the HST, and go from there. Mineral King pack station can either become economically viable or close. Pack stations outside of the parks can handle the rest from where they are located. There is no need to provide for ANY facilities to support commercial stock use at ANY other trailhead, such as parking, paving, extra large clearings, gates, posts, fences, etc. Such additional facilities are a pure subsidy to commercial enterprise in wilderness that is contrary to the intent of the Wilderness Act. The DEIS Alternative 2 fails to account for how new frontcountry stock supporting activities at the Middle Fork Kaweah and South Fork in particular would "harden" the landscape at these locations and completely change their character, mix of uses, and day-to-day impacts on the trailhead environment and the trails themselves.
[Individual, #46]

Response: The preferred alternative proposes to prohibit contracted concession operations at the Mineral King Pack Station. Existing facilities at the Mineral King administrative corrals, used for the parks' administrative purposes, could be retained on the existing site or re-established at an alternate location. Existing facilities (both the former pack station and the administrative corral) could be modified to allow for short-term public camping or staging and/or short-term camping by CUA holders (see the "Element 10" section for alternative 2 in "Chapter 2: Alternatives"). The development and use of frontcountry facilities is not directly addressed by the terms of the Wilderness Act. However, "Chapter 4: Environmental Consequences" of the WSP/EIS analyzes the impacts of use supported by frontcountry facilities on wilderness character. In addition, any changes to frontcountry facilities that are approved through the WSP/EIS process will be subject to additional site-specific NEPA analysis and compliance.

Other frontcountry facilities have a variety of actions proposed, varying by alternative (see table 52 in chapter 2).

NPS Management Policies 2006

Concern 25: Alternatives 2 through 5 violate NPS policy since there appears to be no reasonable basis to support the restrictions proposed in the alternatives relative to which trails remain available for private recreational stock use.

> *Alternatives 2 through 5 Appear to Violate NPS Policy as They Represent De Facto Closures to Recreational Stock Use As described previously, there appears to be no reasonable basis to support the restrictions proposed in alternatives 2 through 5 relative to which trails remain available for private recreational stock use. To structure WSP alternatives that include reductions/restrictions to hiking or stock use appears to us to represent a de facto closure that is neither warranted nor supportable.*
> [Recreational Group, #171]

> *Clearly the WSP has yet to follow the course recommended by NPS policies and, at present, there is no reasonable basis for placing limitations on private recreational stock use in park Wilderness in the absence of compelling data on unacceptable impacts on park resources and visitor experiences resulting from such use. We recommend that action alternatives in the WSP that restrict hiking and private stock use be amended to eliminate the de facto closures currently included in the alternatives.*
> [Recreational Group, #171]

> *The draft WSP/EIS appears to violate applicable law and NPS policy as proposed regulations on stock use have not been shown either to be necessary to preserve wilderness character nor has documentation been cited that demonstrates recreational stock use currently is resulting in either unacceptable impacts or to unreasonably interfere with other (park) uses.*
> [Recreational Group, #186]

Response: The Wilderness Act and NPS policy do not expressly require that stock have access to wilderness. Rather, the Wilderness Act (which allows "a primitive type of recreation") and the NPS Organic Act mandate the preservation of wilderness character while allowing visitors to access wilderness in a compatible manner. While stock use is not directly limited by the Wilderness Act, if the impacts of stock use or any other kind of use threaten wilderness character, then the NPS must take action to address these impacts. In the course of evaluating current conditions in the parks' wilderness, the NPS identified resource impacts specific to stock use; in response WSP/EIS propose a number of methods to address these impacts that are compliant with the mandate of the Wilderness Act.

Concern 26: The Trail Management and Classification System should be separate from the WSP/EIS process.

> *We recommend that the Park Service develop a trails management plan separate from the WSP process.*
> [Recreational Group, #171]

Response: Incorporating the Trail Management and Classification System in the WSP/EIS is consistent with law and directly follows NPS policy (NPS *Management Policies 2006*, Section 6.3.10.2).

Concern 27: The parks should consider options to mitigate conflicts associated with recreational stock use in wilderness prior to implementing trail closures since not doing so would appear inconsistent with NPS policy.

> *Irrespective of any perceived level of conflict (either within-group or between groups with differing modes of primitive Wilderness travel) we encourage park personnel to consider options to mitigating any conflicts associated with recreational stock use in Wilderness prior to implementing outright trail closures. Not doing so would appear inconsistent with NPS policy, as described below.*
> [Recreational Group, #171]

Response: The Trail Management and Classification System is consistent with law and directly follows NPS policy (NPS *Management Policies 2006*, Section 6.3.10.2), including regulating the types of use of selected trails.

National Parks Omnibus Management Act of 1998

Concern 28: The WSP/EIS is incomplete and biased in the analysis of alternatives 2 to 5 since it ignored the Omnibus Act of 1998. There is a huge discrepancy between the requirements of the Omnibus Act and the proposed (almost identical) alternatives 2 to 5 especially in the lack of the mention of other cabins in the wilderness besides Redwood Canyon Cabin.

> *Alternative 2 to Alternative 5 are ignoring the Omnibus Act of 1998. This is a critical and missing entity, and results in the proposed alternatives being rather and completely biased. The lack of even mentioning the Omnibus Act of 1998 makes the Plan incomplete. Thus there is a huge discrepancy between the requirements of the Omnibus Act and the proposed (almost identical) alternatives of 2 to 5 in the Plan. The Plan is missing (and thus incomplete, misleading, and biased) any mention of all of the other cabins in the wilderness part of the park. This results in many readers even knowing about other similar situations where rangers live in the cabin over a long time period.*
> [Individual, #185]

> *(cont'd from 392890) 2) SEKI management, possibly in concert with CRF and wilderness-advocacy groups, should make a detailed study of the extent to which Federal laws and regulations may encourage scientific research in NPS-administered Wilderness Areas. Like item 1, I suggest this in hopes of benefiting not only researchers like myself and CRF, but the Park Service as well. As I understand NPS's job, it is to follow all relevant Federal laws and regulations regarding the lands under its stewardship. At the risk of stating the obvious, the many laws in question can provide seemingly contradictory directives regarding things like scientific research. The best example of this can be found by comparing the language of the Wilderness Act with the National Parks Omnibus Management Act of 1998. The section of the Wilderness Act quoted above prohibits structures and installations. This would seem to provide a very straightforward reason to abate the Redwood Canyon cabin. However, as noted in section 202 of the National Parks Omnibus Management Act of 1998, The Secretary is authorized and directed to assure that management of units of the National Park System is enhanced by the availability and utilization of a broad program of the highest quality science and information. If the language from the 1998 Omnibus Act were the only relevant language, then the research program and cabin in Redwood Canyon would probably be seen as a straightforward way to meet this directive, at essentially no cost to the Park Service. The 37-year-long research program in Redwood Canyon, with the logistical support of the*

cabin, may in fact be a broad program of the highest quality science and information possible under the circumstances, and thus may also be necessary to meet minimum requirements for the administration of the area for the purposes of [the Wilderness Act]. (cont'd in 392892)
[Business, #118]

(cont'd from 392891) I suggest that specific consideration be given to the balance between these two directives. In essence, the presence of the double wilderness in Redwood Canyon might conceivably tip the balance toward the prescriptions of the 1998 Omnibus Act. The current Wilderness Stewardship plan under consideration is a draft; perhaps the final version could outline a plan for further study of Redwood Canyon, with an eye towards assessing the resource there, and eventually formulating a plan for how to balance the several factors that affect wilderness management in (and under) the canyon. In the end, it is conceivable that the presence of the Redwood Canyon cabin and CRF research project may be more of an aid to wilderness management than a hindrance or legal liability. In my opinion, the following question suggests itself: Would a plan to make a special study of this area - taking into account all that has been learned by CRF and other research groups - really be a liability if it were part of the final Wilderness Stewardship plan? 3) I suggest that SEKI management give consideration to a meeting of the various stakeholders that might be concerned with the presence or absence of a cabin in Redwood Canyon. As I understand the legal situation facing SEKI during the last several years, it has been the target of lawsuits in which wilderness-advocacy groups have alleged that it has not managed wilderness according to the Wilderness Act, especially as regards backcountry ranger stations and usage of NPS wilderness by pack stock. A simple question suggests itself: Have these lawsuits actually concerned the Redwood Canyon cabin? Answering this question might go a long way toward developing a plan for Redwood Canyon. Perhaps it is worth trying to organize one or more meetings between NPS SEKI personnel, the advocacy groups involved in the lawsuits, and the cave researchers.
[Business, #118]

Response: The National Parks Omnibus Management Act of 1998 establishes the importance of science and research in the National Park System. The established criteria of research/scientific study is consistent with applicable laws and NPS management policies and will be conducted in a manner as to pose no threat to the parks' resources or public enjoyment derived from those resources. When evaluating the presence of a research cabin to determine if either of these criteria is met, the NPS must also look at other related laws and policies. Since this area is within designated wilderness, the cabin must meet the minimum requirements as mandated by the Wilderness Act. Under the Wilderness Act, there shall be no structure or installation within a wilderness area except as necessary to meet minimum requirements for the administration of the area for the purpose of the Act (Section 4(c)). Thus, only those developments necessary for the administration of wilderness are authorized. Relevant components of the Omnibus Management Act have been added to the WSP under the section "Legal Requirements" in "Chapter 1: Purpose and Need."

The cabins mentioned in the comment above refer to the ranger stations that, through the minimum requirement analysis process ("Appendix M: Programmatic Minimum Requirements Analysis"), have been determined to be necessary for the administration of wilderness.

National Parks and Recreation Act of 1978

Concern 29: The WSP/EIS should identify whether the measures and standards accomplish the intent of the carrying capacity purposes envisioned by the 1978 National Parks and Recreation Act as described in the 1997 NPS Visitor Experience and Resource Protection framework handbook for planners and managers.

> *In addition to identifying whether these three visitor capacity measures and standards are being established to retain existing conditions, ensure that areas remain within their applied standard, and ensure the preservation of wilderness character, the WSP should identify whether these measures and standards also accomplish the intent of the carrying capacity purposes envisioned by the 1978 National Parks and Recreation Act as described in the 1997 NPS Visitor Experience and Resource Protection framework handbook for planners and managers.*
> [Individual, #97]

> *This direction for a future tiered implementation plan to implement carrying capacity in the three GMP backcountry management zones is entirely separate than using indicators and standards to manage visitor capacity for the purposes of the Wilderness Act of 1964. While the GMP took the Wilderness Act into consideration, the carrying capacity provisions of the 1978 National Parks and Recreation Act applies to the entire park. This is reflected in the GMPs approach to carrying capacity and to management zoning.*
> [Conservation/Preservation, #184]

Response: Under the 1978 National Parks and Recreation Act (P. L. 95-625), the NPS is required to address the issue of carrying capacity in its GMPs. While NPS did choose to address visitor capacity in the WSP, the National Parks and Recreation Act neither imposes such a requirement on WSPs, nor dictates any particular method for addressing visitor capacity in GMPs.

The 1997 NPS Visitor Experience and Resource Protection (VERP) handbook provides one method for addressing visitor use (carrying capacity) issues in parks. It provides a methodology for visitor use planning and management. The VERP Handbook (page 2 of the handbook) is a general guide to the elements that make up the VERP framework. It was not intended to be a step-by-step guide that applies to each park unit in exactly the same way.

In 2014, the NPS Wilderness Stewardship Plan Handbook was finalized and provides guidance for integrating wilderness character into visitor capacity systems such as VERP and Limits of Acceptable Change (see page 31 of the Wilderness Stewardship Plan Handbook and the "Planning Framework" section of "Chapter 1: Purpose and Need" of the WSP/EIS for a description of the process). This wilderness stewardship planning framework was followed as the visitor capacity sections of the WSP/EIS were developed.

Concern 30: The WSP/EIS should describe that the GMP envisioned that the wilderness plan would be the tiered implementation plan for implementing the carrying capacity provisions of the 1978 National Parks and Recreation Act in the three GMP backcountry management zones and clearly state that is part of the purpose of the WSP/EIS.

> *The GMP envisioned that the wilderness plan would be the tiered implementation plan for implementing the carrying capacity provisions of the 1978 National Parks and Recreation Act in the three GMP backcountry management zones. The WSP should describe what that direction was and clearly state that is part of the purpose of the WSP.*
> [Conservation/Preservation, #184]

Implementing the carrying capacity provisions of the 1978 National Parks and Recreation Act at SEKI requires the preparation of one or more implementation plans after the GMP. The GMP said that: As discussed in the management prescriptions, visitor carrying capacity is the type and level of visitor use that can be accommodated while sustaining the quality of parks resources and visitor opportunities consistent with the purposes of the parks
[Conservation/Preservation, #184]

Response: At the time the GMP was prepared, there was no integration of wilderness character into planning for visitor capacity. This was not formally included in the visitor capacity framework until January 2014 with the finalization of the NPS Wilderness Stewardship Plan Handbook. Therefore, though the NPS used the GMP to help guide the establishment of overall desired conditions and resource objectives and guidance on potential management actions (see pages 64-67 of the GMP), the NPS used this as a starting point and went beyond this in the development of the Visitor Capacity Framework for this WSP/EIS (see the "Relationship to Other Planning" section of "Chapter 1: Purpose and Need" of the WSP/EIS and "Appendix A: Visitor Capacity"). However, the requirement of the 1978 Parks and Recreation Act was fulfilled by the GMP Management Prescriptions for carrying capacity (see GMP page 52).

Sequoia and Kings Canyon National Parks Enabling Legislation

Concern 31: The creation of hiking-only trails would contradict the parks' enabling legislation, which prohibits exclusive use. The alternatives in the WSP/EIS provide for the exclusive use of certain trails by hikers/backpackers, which is not in accordance with law, as otherwise required by the Administrative Procedure Act.

NPS's actions in selecting an alternative from the DEIS must also be consistent with the Administrative Procedure Act, 5 USC Sect. 706(2)(A), which permits a court to set aside an agency action when it is "arbitrary, capricious, an abuse of discretion or otherwise not in accordance with law." Furthermore, when the statutory language is clear, no deference is given to the agency's decision in implementing that statutory language. High Sierra Hikers Ass'n v. US. Forest Service, 436 F. Supp. 2d 1117, 1129 (E. D. Cal. 2006)("If the statute is clear and unambiguous, no deference is required and the plain meaning of Congress will be enforced"). Thus, the statutory language which says "no exclusive use" means just that, no exclusive use. Under this clear statutory language, if an area is closed for one user group, it must be closed for all user groups. NPS has no deference to impose exclusive use, regardless of its reasoning. However, as discussed herein, that is exactly what NPS has done by setting aside areas for the exclusive use of hikers by banning equestrians.
[Recreational Group, #138]

The DEIS then openly admits that it sets up areas for the exclusive use of hikers, stating that "Visitors traveling with stock would continue to have access to most trails in the parks, with some trails reserved for hiker use only." DEIS (Executive Summary at xix)(emphasis added).
[Recreational Group, #138]

However, these restrictions on stock use are contrary to the legal authority set out above. In addition, many if not all of these restrictions appear to be based on NPS's decision to favor the opinions of a minority of hikers/backpackers who have stated a preference not

to see either pack or saddle stock, and use those preferences as a basis to set up areas for the exclusive use of hikers. This methodology is not only contrary to the legal authority set out above, it is inherently ripe for abuse by any user group, which might have as an objective the goal of eliminating another user group from the area.
[Recreational Group, #138]

As NFRA discussed in its comments, the alternatives in the DEIS designated certain meadows for exclusive use of hikers and backpackers by prohibiting pack and saddle stock users in those meadows. For example, page 100 of the DEIS explicitly acknowledges that some trails "would be designated hiker-only where there are threats to sensitive resources or visitor safety issues." See id. At 115 (listing 42 miles of trails that are hiker only). In addition, in a summary of impact of the alternatives on stock access to the wilderness areas. NPS stated that the alternatives would establish between 32. 1-109. 7 miles of trails for the exclusive use of hikers. See Att. 1. However, as discussed above, establishing areas for the exclusive use of certain user groups violates the law which applies to these areas. While NPS apparently has assumed that it can allow exclusive use as long as it has some basis for doing so, the applicable law is very straightforward. The unequivocal prohibition on exclusive use means that, if one group is excluded, all groups must be excluded. Therefore, it does not matter what the reason for it may be, no exceptions can be made to allow exclusive use. Because of these requirement, the alternatives set out in the DEIS which NPS admits provide for the exclusive use of certain trails by hikers/backpackers are not in accordance with law, as otherwise required by the Administrative: Procedure Act. 5 USC § 706(2)(A)("A"), and should never have been considered as legal options. NFRA has previously raised this point in prior comments, but it appears to have fallen on deaf ears at the agency level (Footnote 3-We have been unable to locate any references to this applicable federal law in the DEIS.)
[Recreational Group, #251]

Because there is no rational basis for NPS to give exclusive use of areas to hikers/backpackers based on a very few self-serving assertions that seeing a stock user reduces their wilderness experience, the DEIS violates the APA.
[Recreational Group, #251]

Trails Proposed Closed to Stock I oppose proposals to create hiker-only trails based on criteria that include perceived conflicts. Legislation establishing Sequoia Nat'l Park (1926) prohibits the creation of exclusive use: "No exclusive privilege shall be granted within said park, or on or over the roads and trails therein, except upon ground leased for the erection of buildings or camps thereon." 16 USC § 45d. Consequently, if stock use were prohibited from any trail or area, backpackers would effectively have an "exclusive privilege" on that trail or in that area.
[Individual, #119]

"Social Value" as a Basis for Closing Meadows to Grazing. Alternative 2, which is the preferred alternative, describes itself as emphasizing site-specific actions to protect wilderness. In support of closing seven additional meadows along the John Muir Trail (JMT) and the High Sierra Trail (HST), these seven meadows would be closed to grazing in order to expand the network of meadows closed to grazing for scientific and social value (emphasis added). We understand that certain hiker groups are urging SEKI to close meadows to grazing in order to provide them with an opportunity to view ungrazed meadows. We believe this is the basis for the "social value" component of the recommendation in the PA to close an additional seven meadows along the JMT and the

HST. However, 16 USC Section 45d is very clear that this exclusive privilege arrangement is not allowed. Section 45d provides that no exclusive privilege shall be granted within said park, or on or over the roads and trails therein, except upon ground leased for the erection of buildings or camps thereon.
[Recreational Group, #230]

It is further questionable whether or not the Park Service has authority to designate exclusive use trails or areas, at least with respect to Sequoia National Park. If stock use were to be prohibited from any trail or area, as currently proposed in WSP alternatives 2 through 5, hikers and backpackers would effectively have an exclusive privilege on that trail or in that area. The legislation states that No exclusive privilege shall be granted within said park, or on or over the roads and trails therein, except upon ground leased for the erection of buildings or camps thereon(16 USC §45d).
[Recreational Group, #171]

*The numerous trails set out in the DEIS for the exclusive use of hikers/backpackers violate the plain language of applicable laws which prohibit setting aside areas for the exclusive use of any group. The areas covered by the DEIS are the Sequoia-Kings Canyon Wilderness and John Krebs Wilderness. With regard to pack and saddle stock activities in these two wilderness areas, Congress stated that these areas were to be managed in a manner "consistent with the statutory authority under which the Sequoia and Kings Canyon National Parks were created" as well as the Wilderness Act. House Report No. 110-694 (*4). Thus, to determine whether the proposed management of these areas is consistent with federal statutes, it is critical to analyze the statutory authority which created these Parks.*
[Recreational Group, #251]

While horseback riding and pack and saddle stock are authorized uses within the Sequoia and Kings Canyon National Parks, the Secretary has the authority to manage such uses in accordance with laws applicable to the park, and consistent with park planning documents. The use of pack and saddle stock is an appropriate and historically accepted recreational activity, as documented in the 2006 General Management Plan for the parks. The Secretary may authorize horseback riding in, or the entry of recreational or commercial saddle or pack stock into, an area designated as wilderness by this Act. The Committee intends that any decision made to authorize these activities shall be consistent with the statutory authority under which Sequoia and Kings Canyon National Parks were created, and the Wilderness Act, including section 4(d)(5) related to commercial services. Any authorization of these activities shall be subject to conditions and restrictions deemed necessary to protect park resources and wilderness values. (Emphasis added). As set out above, the statutory authority under which the Sequoia National Park was created included a prohibition on exclusive privileges. Therefore, it is clear that NPS's regulation of pack and saddle stock users cannot result in NPS providing exclusive privileges to hikers/backpackers in this area. Any such outcome is contrary to the explicit federal law which applies to these areas.
[Recreational Group, #251]

Response: The provision of the parks' enabling legislation referenced in the comment is 16 USC § 45d. This section states that, "No exclusive privilege shall be granted within said park, or on or over the roads and trails therein, except upon ground leased for the erection of buildings or camps thereon." This statute was an early precursor to today's concession laws, which allow NPS to enter into contracts with private entities for the provision of visitor services such as lodging and food service establishments. The type of

exclusive use that is prohibited by Section 45(d) is one that excludes the general public from an area. Restricting trails to certain uses does not confer exclusive privilege because the trail remains open to the general public. The WSP/EIS recognizes that stock use is a traditional use of the parks' wilderness, and allows the continued use of stock in the wilderness, subject to appropriate restrictions to preserve wilderness character.

Sequoia and Kings Canyon National Parks General Management Plan

Concern 32: The reference to the GMP statement "The use of stock for administrative and recreational purposes is still recognized as a traditional, historically and culturally significant, and legitimate activity that will continue in the wilderness of Sequoia and Kings Canyon National Parks" and the substitution of the word "recreational" for "commercial and private" needs to be retracted from the WSP/EIS.

> *Under INTRODUCTION in Vol. 2, p. D-5, is this startling statement-the last sentence of the first paragraph: "The use of stock for administrative and recreational purposes is still recognized as a traditional, historically and culturally significant, and legitimate activity that will continue in the wilderness of Sequoia and Kings Canyon National Parks (NPS GMP 2007)." Comment: SEKI, ourselves, and everyone else has consistently referred to the three categories of stock use-administrative, commercial, and private. Do you think that you have evaded the court's order and pulled the wool over everyone's eyes by substituting the word "recreational" for commercial and private? Your own statistics show that some 80% of recreational stock use is commercial. This is a deceitful and dishonest statement, a deliberate reference to the GMP that was forbidden by the court. It needs to be retracted*
> [Recreational Group, #254]

Response: The decision of the GMP ROD that recreational stock use at some level would occur was not vacated by the court. Because the court vacated references to commercial stock use, the WSP/EIS examines alternatives that include differences in terms of commercially supported stock use, including alternative 4, which would greatly reduce commercial support of all kinds. It is not necessary for the WSP/EIS to reexamine the GMP decision to allow recreational stock use at some level within the parks' wilderness.

Concern 33: The document should not take the same approach as the GMP took on carrying capacity. The WSP/EIS is currently written as to allow the parks several ways to avoid taking action.

> *It may well be unintentional, but the document is so written as to allow the parks several ways to avoid taking action. It implies that the parks are drawing a line in the sand, but it really provides the parks multiple opportunities to move that line. It is the equivalent of designing a beautiful set of goalposts. But then allowing those goalposts to be relocated to a more convenient location after the plan is completed. That is the approach the GMP took on carrying capacity; it kicked the can down the road for some implementation plan to handle the messy details. The WSP is that implementation plan for the parks' wilderness areas. It is time to clearly draw that line in the sand; not kick the can down the road again.*
> [Individual, #97]

Response: The purpose of selecting visitor capacity standards is to provide managers with a rational means of determining when management action should be taken to correct or improve an undesirable

condition that has resulted from visitor use. While the WSP/EIS does provide these types of visitor capacity standards, it does not dictate particular management actions that must be taken when a standard is exceeded. The WSP/EIS provides the flexibility to respond with site-specific management actions that are consistent with the particular instance in which the standard is exceeded.

Concern 34: The WSP/EIS should provide the full background of what the GMP said that the wilderness plan should do, it should explain fully how the WSP/EIS is linked to the GMP, and it should recognize the direction that is provided in the GMP.

> *The WSP appears to be the implementation plan for the parks backcountry areas that the GMP was proposing. The WSP acknowledges that the 2007 GMP called for the development of a wilderness plan as a tiered implementation plan. The WSP should provide the full background of what the GMP said that the wilderness plan should do. It should explain fully how the WSP is linked to the GMP. The WSP should recognize the direction that is provided in the GMP. Some of that direction is provided by management prescriptions. Some of it is provided by carrying capacity text in other parts of the GMP.*
> [Conservation/Preservation, #184]

> *Since the WSP is a tiered implementation plan off the GMP, it should do at least three things: 1. Clearly identify how the spatial area being planned for in the WSP (the parks wilderness areas) relates to the spatial area that the GMP included in the three GMP backcountry management zones. 2. Explain what direction the GMP provided for management of the three GMP backcountry management zones. 3. Explain what direction the GMP provided for the proposed wilderness plan.*
> [Conservation/Preservation, #184]

> *The GMP envisioned that the wilderness plan would be the tiered implementation plan for implementing the carrying capacity provisions of the 1978 National Parks and Recreation Act in the three GMP backcountry management zones. The WSP should describe what that direction was and clearly state that is part of the purpose of the WSP.*
> [Conservation/Preservation, #184]

Response: Information on how the WSP/EIS is linked to the GMP is adequately covered in the WSP/EIS, located in the following sections of "Chapter 1: Purpose and Need": "Goals and Objectives," "Relationship to Other Planning," "Purpose and Significance of the Parks," "Key Elements Considered in the Alternatives," "Issue and Impact Topics," and "Elements and Topics Outside the Scope of the Plan." In addition, information on the portions of the GMP vacated through a court order (High Sierra Hikers Association v. U. S. Department of the Interior, 848 F. Supp. 2d 1036 [N. D. Cal. 2012]) and how that affects the decisions made in the GMP is included in the "Purpose and Need of the Plan," "Background," and "Key Elements Considered in the Alternatives – Stock Use" sections of chapter 1.

Concern 35: The WSP/EIS appears to diverge from the GMP without justification because it did not review alternative sites for a potential commercial pack station.

> *Lastly, the GMP states that alternative sites would be reviewed for a potential commercial horse station. The WSP appears to diverge from the GMP without justification.*
> [Conservation/Preservation, #184]

Response: As explained in the "Purpose and Need" section of "Chapter 1: Purpose and Need" in an order dated May 29, 2012, the U. S. District Court for the Northern District California issued an opinion in a

lawsuit that challenged the parks' GMP (High Sierra Hikers Association v. U. S. Department of the Interior). The Court's order "vacate[d] all portions of the GMP and ROD, which provide programmatic guidance regarding the type or level of stock services necessary in the Sequoia and Kings Canyon National Parks wilderness or direction as to need, appropriateness, or size of developments, structures, or facilities used completely or partially for commercial stock services." Where the GMP is referred to in this document, only those sections not vacated by the court order apply. Therefore, all decisions made related to the commercial pack station at Wolverton through the GMP no longer apply.

Concern 36: Alternatives 4 and 5 appear inconsistent with several aspects of the parks' GMP and NPS policy. Alternative 4 fails to meet the stated objective to provide visitors with a greater range of wilderness experiences and alternative 5 would prohibit any off-trail travel by horse and stock users.

> *Draft WSP/EIS Does Not Represent a Reasonable Range of Alternatives For example, Alternatives 4 and 5 appear inconsistent with several aspects of the parks General Management Plan (GMP) and NPS policy. Alternative 4 fails to meet the stated objective to provide visitors with a greater range of wilderness experiences should the proposal to prohibit open meadow grazing by recreation pack stock be implemented (our rationale follows in subsequent pages of this comment letter). In addition, Alternative 5 would prohibit any off-trail travel by horse and stock users.*
> [Recreational Group, #171]

Response: Each alternative meets the stated objectives to a different degree and reflects public input received during the scoping process. The alternatives carried forward for analysis must meet project objectives to a large degree, although not necessarily completely.

CEQ has defined reasonable alternatives as those that are economically and technically feasible, and that show evidence of common sense (CEQ 1981). Alternatives that could not be implemented if they were chosen, or that do not resolve the need for action and do not fulfill the stated purpose in taking action to a large degree, should be eliminated as unreasonable before impact analysis begins. Unreasonable alternatives may be those that are unreasonably expensive; that cannot be implemented for technical or logistic reasons; that do not meet the parks' mandates; that are inconsistent with the parks' statements of purpose and significance or management objectives; or that have severe environmental impacts — although none of these factors automatically renders an alternative unreasonable.

Concern 37: The NPS fails to explain why the WSP/EIS ignores a "no-stock" option that was previously presented to the public in the GMP.

> *A "no-stock" alternative was present in the General Management Plan; yet NPS fails to explain why the WSP/DEIS, which tiers off the GMP, ignores an option previously presented to the public. The NPS's exclusion of the no-stock alternative was improper because it is a viable, yet unexamined alternative and the NPS failed to provide any adequate justification for its exclusion. The courts excused the NPS from examining a "no-stock" alternative in the EIS for the GMP because the purpose of that document was not to provide a detailed assessment of stock management options. High Sierra Hikers Ass'n, 848 F. Supp. 2d at 1052. The court determined that the detailed assessment would be part of the "future WSPs." id . A "no-stock" alternative is well within the scope and purpose of the WSP/DEIS as articulated by the NPS, and without such an alternative the agency cannot make "most intelligent, optimally beneficial decision" that NEPA's "reasonable alternative" requirement is designed to ensure. See id.*
> [Recreational Group, #235]

Response: In the 2007 GMP, the parks previously analyzed the alternative of eliminating stock use in the parks' wilderness areas and did not select this alternative (alternative A, see GMP page 123). Instead, the parks selected an alternative that, according to the GMP ROD, would allow for continued stock use, stating, "Use of stock continues, both as a means of access to wilderness by visitors, and for the administration of wilderness and protection of wilderness values. A formal system of resource monitoring is used to adaptively adjust stock use through regulation and local closures." The parks need not re-evaluate this portion of the plan of record in subsequently tiered plans. The WSP/EIS, as a tiered document, has analyzed alternatives that are entirely consistent with the intent of the GMP ROD.

Administrative Procedure Act

Concern 38: Grazing by recreational stock is a form of resource extraction that is impermissible under NEPA and the Wilderness Act.

> *The NPS's WSP/DEIS allows for unpermitted resource extraction from wilderness areas, and is impermissible under NEPA, the Wilderness Act, and may be an abuse of discretion under the APA.*
> [Recreational Group, #235]

Response: NEPA requires the NPS to evaluate the environmental impacts of a proposed action and to consider alternative courses of action. NEPA does not require a substantive outcome and has no provisions specific to wilderness management or grazing. In the WSP/EIS, the NPS has considered alternatives with varying levels of stock use and has evaluated the environmental impacts of the alternatives, as required by NEPA.

The Wilderness Act does not prohibit grazing. Grazing is allowed in wilderness areas where it was established prior to wilderness designation. Grazing of recreational and administrative stock has been an established practice in these parks for decades, well before the parks' wilderness was designated in 1984.

In addition, NPS regulations distinguish the use of pack animals from herding, pasturing, and grazing of livestock for agricultural purposes, which is prohibited in most national parks including these parks. The regulations allow superintendents to designate areas and conditions for the use of recreational pack and saddle stock, which is what the alternatives in the WSP/EIS do.

NPS *Management Policies 2006* Section 8.6.8.1 states that grazing incidental to recreational stock use is allowed in parks in a manner consistent with the policy direction articulated in Section 8.2.2.8 of these management policies. Section 8.2.2.8 explains that recreational stock use is authorized provided it is managed to avoid unacceptable impacts and that plans for recreational stock use should address social, biological and physical carrying capacity considerations. In the WSP/EIS, the NPS considered alternatives with varying levels of recreational stock use and evaluated the environmental impacts of each alternative. The environmental analysis in the WSP/EIS demonstrates that none of the alternatives would result in unacceptable impacts. The decision to include grazing by pack and saddle stock in the alternatives under consideration in the WSP/EIS is therefore consistent with applicable law and NPS policy.

National Historic Preservation Act

Concern 39: The document violates the National Historic Preservation Act (NHPA), the Wilderness Act, and NPS *Management Policies 2006* because the alternatives have an improper and detrimental impact on the historic and protected aspects of stock use.

The DEIS violated the NHPA because the alternatives in the DEIS have an improper and detrimental impact on the historic and protected aspects of stock use in the area.
[Recreational Group, #251]

NPS agrees that the use of pack and saddle stock is still recognized as a traditional, historically and culturally significant, and legitimate activity that will continues in the backcountry of Sequoia and Kings Canyon National Parks. Therefore, the historic stock activity in the backcountry of Sequoia and Kings Canyon National Parks is protected by the Wilderness Act, the specific statutes establishing both the John Krebs Wilderness and the Sequoia-Kings Canyon Wilderness areas and the NHPA as well. Because of this determination by Congress, NPS's consideration of alternative in the DEIS that ban the use of stock in these areas is improper.
[Recreational Group, #251]

Furthermore, pack stations on the eastern and western portions of the Sierra Nevada Range are eligible for listing on the National Register. These stations and trails they use for their historic operations comprise a historic district/landscape. In addition to the pack stations, portions of these areas that include the trails used by packers are eligible for being an historic district/landscape and are within the area covered by the DEIS. As such, the entirety of these areas will be impacted by the decisions made in the DEIS.
[Recreational Group, #251]

However, the DEIS failed to comply with the law by failing to recognize this status. Pursuant to the Section 106 of NHPA and NEPA, NPS must first identify historic properties within the relevant areas which can be adversely affected by the agency decision. NPS failed to do that with respect to these areas which are eligible for listing on the National Register.
[Recreational Group, #251]

Request Management Policy 6. 3. 8 Cultural Resources be observed. Request the activity of packing and stock use as cultural use vs a recreational use.
[Business, #182]

Response: The Wilderness Act does not require that stock has access to wilderness. Rather, the Wilderness Act mandates the preservation of wilderness character while allowing visitors to access wilderness in a compatible manner.

The National Historic Preservation Act recognizes five property types: districts, sites, buildings, structures, and objects (PL 89-665; 16 USC 470 et seq. as amended; Section 101 (a)(1)(A)). These categories are used in the National Register of Historic Places. Thus the NHPA does not apply to "historic uses." Even though historic uses are not considered under the NHPA, the NPS does identify resource categories to help focus attention on management requirements within identified NHPA property types (NPS-28). One of those categories is ethnographic resources. Ethnographic resources are concerned with peoples associated with parks, with their cultural systems or ways of life, and with sites, structures, and natural resources (NPS-28). The NPS recognizes in the WSP/EIS that stock use is a historically and culturally significant traditional use that is an appropriate means for fulfilling the recreational purpose of wilderness (see the "Key Elements Considered in the Alternatives — Stock Use" section of "Chapter 1: Purpose and Need," which says, "Private and recreational stock use is a historically and culturally significant traditional use that is an appropriate means for fulfilling the recreational purpose of wilderness"). While there has been no formal evaluation of stock use as an ethnographic resource in the

Sierra Nevada, the WSP/EIS does not preclude the continued use of stock for recreational and administrative purposes in park wilderness.

NPS *Management Policies 2006* Section 6.3.8 does not specifically address the historic use of wilderness. It states that "the laws pertaining to historic preservation also remain applicable within wilderness but must generally be administered to preserve the area's wilderness character." Cultural resources that have been included within wilderness will be protected and maintained according to the pertinent laws and policies governing cultural resources using management methods that are consistent with the preservation of wilderness character and values. The laws related to cultural-resource protection, per 6.3.8, include the Antiquities Act and the Historic Sites, Buildings and Antiquities Act, as well as subsequent historic preservation legislation, including the National Historic Preservation Act, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act. The WSP/EIS is consistent with these laws and with NPS *Management Policies 2006.*

Concern 40: Historic pack stations have been denied the Section 106 historic evaluation process of NHPA. Because the WSP/EIS has not completed a Section 106 review of the planning area, including trails, meadows, sites, and structures, the document is unable to accurately assess for adverse effects.

> *We do not feel the parks have applied the Section 106 process of the National Historic Preservation Act, a part of the NEPA process, in the DEIS. The constraints placed on the historic facilities; pack stations located outside of the planning area is considered outside of the scope of the parks planning process, but directly limits, constrains their access, ability to perform their public service for which they were originally designed. Identified in the DEIS as commercial stock, no recognition/identification has been given as to where the commercial stock originates from. According to the NEPA/NHPA law, it is the responsibility of the federal agency in their planning efforts, to first identify historic properties which can potentially suffer an adverse effect from said federal project. Because the DEIS has not completed a complete Section 106 review of the planning area, including trails, meadows, sites, structures etc. , it is unable to accurately assess for adverse effects. The Inyo National Forest completed a 2005 John Muir and Ansel Adams Wilderness ROD, and later a 2007 Commercial Pack Station, Outfitter Guide Permit Issuance ROD, and now we have the NPS WSP. Please consider that by addressing federal planning projects separately; first addressing wilderness, then non-wilderness, USFS planning and now National Park Service planning, this disjointed mode of federal planning (instigated by litigation) separates a large land mass, between USFS and NPS managed lands, between front and backcountry areas, which then effectively disconnects the historic pack stations from each planning area on a map, but not outside of limiting controls and regulations. Because of this disjointed planning process presented by the involved federal agencies, the historic pack stations have been denied the Section 106 historic evaluation process of the National Historic Preservation Act (NHPA).*
> [Business, #182]

Response: During the planning process, the parks' cultural-resource staff reviewed the alternatives and determined the area of potential effect and the impacts on listed historic properties, or those that are potentially eligible for listing on the National Register of Historic Places (NRHP). This information is included in "Chapter 3: Affected Environment" and in "Chapter 4: Environmental Consequences" and was provided to the California State Historic Preservation Officer (SHPO). Only one potentially eligible property would be affected by the proposed action: the Bearpaw Meadow High Sierra Camp, specifically the ranger station with the camp area. The SHPO concurred with the determination of effect ("Appendix S: Consultation with the California State Historic Preservation Office").

However, because the entire wilderness area has not been surveyed, there are cultural resources that have not yet been formally assessed per section 110 of the NHPA. The parks have historically and will continue to work to ensure compliance with Section 110 of the NHPA by locating, inventorying, and nominating cultural resources that may be eligible for listing on the NRHP. If, however, there are features that have not yet been formally assessed, the parks have a responsibility to do so as directed in Section 110 and will work to achieve this goal. Prior to implementation of any action that may have an adverse effect on cultural resources, including potential cultural landscapes and potential historic structures (such as drift fences and hitch rails), a separate 106 process would be initiated for that action. If adverse effects cannot be avoided, the parks will coordinate with the California SHPO and the Advisory Council on Historic Preservation to develop measures to mitigate the potential adverse effects in compliance with section 106 of NHPA.

Concern 41: Drift fences and hitch rails should be evaluated via the Section 106 process of NHPA since they are features associated with the historic pack stations, which are a larger part of the cultural landscape. None of these features should be removed until this evaluation has been completed and further development of the cultural/traditional landscape has been considered.

> *Drift fences and hitch rails should be evaluated via the Section 106 process of NHPA as associated features of the historic pack stations, a part of a larger cultural landscape extending beyond park boundaries. We appreciate the discussion on drift fences, their importance, and how to manage. Request none removed until evaluation completed and further development of cultural/traditional landscape considered.*
> [Business, #182]

Response: The NPS must weigh the effects that all proposed alternatives may have on resources, both cultural and natural. In some cases, impacts that benefit natural resources and features could have an adverse effect on cultural resources. Prior to implementation of any action that may have an adverse effect to cultural resources, including potential cultural landscapes and potential historic structures (such as drift fences and hitch rails), a separate 106 process would be initiated for that action. If adverse effects cannot be avoided, the parks will coordinate with the California SHPO and the Advisory Council on Historic Preservation to develop measures to mitigate the proposed adverse effects in compliance with section 106 of NHPA.

Concern 42: The JMT and all other trails should be evaluated for historic significance, per the NHPA and the National Trails System Act of 1968. The parks should consider the volume and types of visitor traffic and the need for continued commercial services in the planning process. Because the formal trail system in the parks predates wilderness designation, historical use should be considered.

> *Request evaluation of the JMT and all other trails for historic significance, per the NHPA and the National Trails System Act of 1968. Also, we request the parks consider the volume and types of visitor traffic, and need for continued commercial services in the planning process. Because the formal trail system in the parks predates wilderness designation, historical use should be considered. Trails should preserve the diversity of users, giving a generous nod to stock users.*
> [Business, #182]

Response: "Appendix K: Trail Management and Classification System for Sequoia and Kings Canyon National Parks," attachment 4 outlines the trails considered historic, the priority for evaluating these trails, and the strategy for maintaining these trails to preserve their historic features. This information was

provided to the California SHPO for their review and the parks will continue to work with the California SHPO to evaluate and protect these historic resources.

Code of Federal Regulations

Concern 43: Commenters stated that the 60-day comment period was unfair due to the time needed to review the amount of material presented in the WSP/EIS. There was concern that the WSP/EIS is dense, repetitive, and sometimes incomprehensible, or alternatively, that the WSP/EIS is lacking in analysis and self-serving. Commenters suggested that the document did not reasonably inform the public of how the document can be utilized by the NPS to "plan actions and make decisions" and fulfill the NEPA requirements 40 CFR 1502.9(a) for the wilderness environment.

> *VIOLATIONS OF NEPA REQUIREMENTS 40 CFR 1500. 2 "Environmental impact statements shall be concise, clear, and to the point, and shall be supported by evidence that agencies have made the necessary environmental analyses." Comment: The DEIS/WSP is none of those things. It is dense, repetitive, and sometimes incomprehensible. As to analysis there isn't any. The document is replete with assertions, statements, claims, and conclusions masquerading as analysis. But there is no analysis. 40 CFR 1502. 8 Writing "Environmental impact statements shall be written in plain language . . . so that decisionmakers and the public can readily understand them. Agencies should employ writers of clear prose or editors to write, review, or edit statements, . . . " Comment: Much of the prose is vague and ambiguous, and is subject to multiple interpretations. Many sentences and paragraphs that purport to be statements of fact are unsubstantiated. Some are contradictory. Many statements consist of bureaucratic boilerplate language that serves no purpose other than to substitute for documented facts and reasoned analysis. 40 CFR 1502. 2 (a) "Environmental impact statements shall be analytic rather than encyclopedic." Comment: The creators of this DEIS have loaded it with every iota of useless prose and redundant information in their arsenal. At two volumes and 1,234 pages it is truly encyclopedic, and organized in such a manner as to provide obfuscation rather than clarity.*
> [Recreational Group, #254]

> *This DEIS is concerned with only one thing: doing business as usual. It is entirely lacking in analysis, entirely self-serving, entirely intended to ratify existing policy, and entirely functions as a barrier to public involvement.*
> [Recreational Group, #254]

> *As a preliminary matter, High Sierra reminds the NPS that the CEQ regulations encourage agencies to limit the length of their NEPA documents. 40 CFR Sect. 1502. 7; 43 CFR Sect. 46. 405. At 1,234 pages, this WSP/DEIS is extraordinarily and unnecessarily long and not within the "normal" page limits of 300 pages. The length of this WSP/DEIS is not explained away by clear reasoning, plain language, or arguments or in-depth analysis. High Sierra believes that the WSP/DEIS contravenes the CEQ regulations on this point. See 40 CFR Sect. 1500. 2, 1502.8, 1502.2(a).*
> [Recreational Group, #235]

> *Thus how the WSP/DEIS can be utilized by the NPS to "plan actions and make decisions" (40 CFR Sect. 1501.1) and fulfill the NEPA requirements (see 40 CFR Sect. 1502.9(a) (regarding draft statements)) is difficult to comprehend. The WSP/DEIS does not reasonably inform the public of what that means for the wilderness environment*
> [Recreational Group, #235]

> *Time Allowed to Comment. We understand that the Sequoia and Kings Canyon National Parks Backcountry Access Act of 2012 placed a stringent time limitation on SEKI to adopt its WSP. This is particularly unfortunate for BCHA, BCHC, and HSU and the commercial packers who are directly impacted by the WSP. We are being given approximately 60 days to comment on two volumes of materials that are approximately four inches thick. The matters dealt with in these two volumes are matters that numerous SEKI employees and even independent contractors have been working on for several years. The members of the HSU who are participating in this comment process are individuals who are employed and can only study and prepare comments in their spare time. It is inherently unfair to give us only a 60 day period to submit our comments in writing. Government should do better for its citizens.*
> [Recreational Group, #230]

Response: The NPS has made extensive efforts to involve the public throughout the planning process. Public scoping, which occurred from April 11 to August 31, 2011 and included several public meetings, resulted in more than 900 comments that helped shape the plan. In addition, preliminary draft alternatives were presented to the public for a 48-day public review and comment period, which allowed the public to review alternatives and options for how the key topics would be addressed in the plan. This extra step during the public scoping period allowed the parks' staff to meet with the public and receive input and make updates to the alternatives prior to the draft plan being distributed for public review. More than 200 comments were received on the preliminary draft alternatives. During the 60-day public review of the WSP/DEIS, the parks' staff held six public meetings, including one webinar, to reach out to the public and answer questions about the plan and its alternatives. Also, supplemental information and fact sheets were prepared to allow the public to review summary materials on the plan, so they could focus on those topics of most interest to them. The parks received more than 250 comments during the public review period for the WSP/DEIS, and no formal requests were made for an extension of the public review period.

The WSP/EIS will provide site-specific management direction to the more than 97% of the parks' acreage that is wilderness for the next 15-20 years. As a key management document for the future of the parks' wilderness, it is important that the WSP/EIS include adequate information to allow the public to understand the management options presented and evaluate the effects of the alternatives. Public input during the scoping process shaped the content and number of alternatives presented in the WSP/DEIS. The public identified many important issues that should be addressed in the WSP/EIS, including stock use, commercial services, and the use of campfires. During scoping, the NPS held workshops to gather feedback from the public on six preliminary alternatives. Based on public review, the NPS determined that five alternatives were adequate to fulfill NEPA's mandate that a WSP/EIS present a reasonable range of alternatives. The alternatives are presented in "Chapter 2: Alternatives" with accompanying graphics. The environmental effects of each alternative are presented in "Chapter 4: Environmental Consequences." Where appropriate, supporting data has been included in appendices.

In addition, when determining the content of the WSP/EIS, the NPS followed the NPS Wilderness Stewardship Planning Handbook (NPS 2014a), which provides direction for wilderness stewardship plans. Among other things, NPS policy requires that wilderness stewardship plans include a minimum requirements analysis and a determination on the amount of commercial services that will be authorized in wilderness. The Programmatic Minimum Requirements Analysis is found in appendix M and an Extent Necessary Determination for commercial services is found in appendix B.

Concern 44: The **WSP/EIS** does not include consultation letters with the U.S. Fish and Wildlife Service (USFWS) and other California agencies on the potential impacts on Yosemite toads and mountain yellow-legged frogs. The NPS is required to prepare and include a biological assessment in its environmental review.

The NPS has failed to meet the requirements of the Endangered Species Act, ("ESA") 16 USC
[Recreational Group, #235]

Sect. 1531 et seq., and the California Endangered Species Act, Cal. Fish and Game Code Sect. 2050 et seq., in its evaluation of the impacts on both the Yellow Legged Mountain Frog and the Yosemite Toad. NPS identified YT as threatened under the ESA and the MYLF as endangered under the Federal ESA in April 2014, effective June 30, 2014. See 79 Fed. Reg. 82,24256 (April 29, 2014). The MYLF was listed as endangered under the California Endangered Species Act in 2012. California Fish and Game Commission: notice of findings. Southern mountain yellow-legged frog (Rana muscosa), Sierra Nevada mountain yellow legged-frog (Rana sierrae). (February 2012). High Sierra has stressed the impact stock use, particularly grazing in SEKI meadows, has on these species and is disappointed that no coherent biological assessment is present in the WSP/DEIS despite the status of these species at the time the WSP/DEIS was issued.
[Recreational Group, #235]

NPS is required to prepare a biological assessment for the SEKI WSP/DEIS to "evaluate the potential effects of the action on listed and proposed species and designated and proposed critical habitat and determine whether any such species or habitat are likely to be adversely affected by the action and to determine whether formal consultation or a conference is necessary." 50 CFR Sect. 402. 12(a). The requirement is present for Federal actions that are "major construction activities." 50 CFR Sect. 402. 12(b). A "major construction activity" includes an undertaking "which is a major Federal action significantly effecting the human environment as referred to in the National Environmental Policy Act." 50 CFR Sect. 402. 2. The WSP/DEIS is obviously a major Federal action under NEPA and as such the NPS is required to include a biological assessment in its environmental review.
[Recreational Group, #235]

Though the contents of the biological assessment are at the agency's discretion, the NPS did not provide sufficient information to meet the purpose of the ESA and did not make a clear determination regarding the effects of the WSP/DEIS on the MYLF and the YT.
[Recreational Group, #235]

The NPS has data and impacts regarding the species strewn throughout the WSP/DEIS, but does not make a coherent and definitive determination regarding the overall effect of the proposed action.
[Recreational Group, #235]

The ESA establishes an interagency consultation process to assist federal agencies to comply with this duty. Under the ESA, "agency action" includes "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies." 50 CFR Sect. 402. 02.
[Recreational Group, #235]

The NPS has failed in its obligation to consult with the Fish and Wildlife Service and California agencies regarding the effect of the WSP/DEIS on the MYLF and the YT.
[Recreational Group, #235]

The WSP/DEIS states that NPS did consult (WSP/DEIS at 551-552), but Appendix G to the WSP/DEIS does not provide any materials demonstrating a response from FWS or California agencies regarding the MYLF and the YT in connection with the WSP/DEIS. [Recreational Group, #235]

Moreover, the WSP/DEIS states in the Summary of Impacts table that most alternatives would have a "beneficial effect" on the YT and MYLF. WSP/DEIS at 260 - 261. As stated above, any effect, even that which may be beneficial, triggers the formal consultation requirement. 51 Fed. Reg. 19,926, 19,949 (June 3, 1986). All alternatives, other than Alternative 4, would allow visitor use to continue at current or increased levels, leading to increased encounters. Id . The NPS's statement that stock access and grazing restrictions would decrease these impacts and thus provide beneficial impacts does not relieve the NPS from its obligation to consult. It appears that the NPS has determined that the WSP/DEIS will have an effect on both the YT and the MYLF. Therefore, it is required to consult regarding the impacts of the WSP/DEIS under the ESA. [Recreational Group, #235]

Response: As stated in "Chapter 5: Consultation and Coordination," informal and formal consultation with the USFWS under the Endangered Species Act is ongoing. A thorough analysis of the effects of all alternatives was included in "Chapter 4: Environmental Consequences" of the WSP/EIS, including a determination of effects for listed species, which fulfills the requirement of a biological assessment (per Director's Order 12 6.2.g and f). This information was provided to the USFWS who, at the time of this writing, is preparing a biological opinion which will be included in the WSP/FEIS.

CHAPTER 2: ALTERNATIVES

Elements Common to All

Concern 45: Helicopter use and military overflights are disruptive to visitors' wilderness experience. Administrative helicopter use should be reduced, and military overflights should be reduced during the peak summer months. Additionally, pilots should be required to fly at a predetermined speed and height over the parks to minimize impacts from noise. Commercial air tours should not be permitted.

Considering permitting commercial air overflights, would needlessly re-open the military overflight issue. Base commanders are not prohibited from flying over SEKI wilderness. They have agreed to conduct their training elsewhere in the interest of preserving our nation's wilderness. Commercial air tours are not compatible with preserving these two parks' wilderness, nor with natural quiet and I urge that this activity not be considered. [Individual, #141]

Reduce administrative helicopter use. The NPS at SEKI uses an extraordinary amount of unnecessary helicopter use in the SEKI Wilderness for administrative purposes, rather than using wilderness-compatible means of transportation. In fact, SEKI has a national reputation as one of the worst offenders of administrative helicopter use anywhere in the National Wilderness Preservation System. The use of helicopters should be limited to emergencies involving the health and safety of visitors and administrative personnel. NPS wilderness rangers and trail crews are perfectly capable of accessing wilderness on foot or with stock and should be setting the example for other wilderness visitors. [Conservation/Preservation, #166]

I strongly encourage the NPS to request that the military suspend their overflights during the summer months of June, July and August, leaving the remaining nine months to conduct their exercises.
[N/A, #195]

The vast majority of the disruptive noise is from jets that abruptly accelerate or climb or dive. If the Parks Service and Navy could identify the elevation and speed that creates the least disruptive noise, and the Navy required its pilots to fly at that elevation without varying speed or elevation, at least the noise would be far more uniform, constant "background" noise, much less disruptive to the wilderness tranquility than jets abruptly accelerating, climbing, diving, etc.
[Conservation/Preservation, #163]

Response: The parks perform minimum requirement analyses for all helicopter flights that are not conducted on an emergency basis to comply with the Wilderness Act (Section 4(c)), and have specific criteria that are reviewed prior to approving flights/landings (see "Appendix I: Minimum Requirements Analysis"). It is a stated management preference that wilderness administrative operations seek non-motorized means to accomplish tasks before resorting to helicopters. Helicopter use is one measure that will be monitored as an aspect of wilderness character (see table C-2 in "Appendix C: Wilderness Character Monitoring Strategy"). The parks do not support the implementation of commercial air tours over these parks wilderness and have addressed this in the "Elements Common to All Alternatives, Aviation" section of "Chapter 1: Purpose and Need.." Military overflights are also addressed in this section of the WSP/EIS, which discusses the parks' lack of authority over the airspace but that the parks work cooperatively with the military to control and mitigate impacts.

Concern 46: Drones should be banned from NPS units and especially in wilderness.

We strongly support the decision to prohibit the use of privately owned drones at SEKI, as well as other national parks, especially inside of wilderness. We understand the National Park Service is in the process of establishing rules for drones nationwide. The Sierra Club would like to participate in that process and help establish rules for the use of drones in National Parks and Wilderness.
[Conservation/Preservation, #60]

Response: The NPS has a temporary ban on all drones except those approved for management uses in all national parks. It is anticipated that this will become a permanent ban. Chapter 36, Code of Federal Regulations, Section 2.17 also prohibits delivering or retrieving objects or persons by airborne means, except in emergencies or as approved by the Superintendent through a permit, on all park-managed lands. These parks believe that drones are incompatible with the wilderness experience and degrade wilderness character.

Concern 47: The WSP/EIS should include opportunities for education, including backpacking and fire safety.

Education of fire safety and regulations and permits prior to backpacking would be appropriate as good stewards of this park land.
[N/A, #65]

Frontcountry facilities: The education of backpackers when they receive their permit is very important for the protection of our wilderness.
[N/A, #195]

Response: Every alternative in this WSP/EIS strongly supports education as a critical element of wilderness character preservation and experience ("Management Actions Applicable to All Alternatives," pages viii and 33). See "Appendix H: Wilderness Information and Education Strategy" for details on educational goals and methods.

Suggests New Element for Common to All

Concern 48: All of the alternatives should have areas with trails and those without trails.

> *All alternatives should have the same two-tier management system: areas with trails and areas without trails. In trail corridors, the trail itself should be the only permanent human fixture, other than a few essential signs (only at trail junctions) and structures (e.g., existing bridges) that are critical for visitor safety.*
> [Individual, #180]

Response: There are trailed and trail-less areas included in all alternatives, and each alternative proposes different levels of allowable development. The preferred alternative seeks to balance reducing development from existing levels while providing those facilities that properly support the use and enjoyment, and public purposes (recreational, scenic, scientific, educational, conservation, and historical use) of wilderness.

Concern 49: There should not be permanent structures in wilderness other than the trails.

> *There should be no toilets, no bear boxes, no drift fences for stock, or any of the other intrusions that the Park Service has allowed to proliferate in the wilderness in recent decades. In trail-less areas, a person should be able to experience wilderness with no signs, no human structures, no bear boxes, no fire rings, and no livestock.*
> [Individual, #180]

Response: The Wilderness Act provides general prohibitions on structures (and other features and actions) in wilderness in Section 4(c). This is a general, not an absolute, prohibition. It is informed by language that is meant to ensure that only those structures that can be demonstrated to be the "minimum required" to administer the area as wilderness will be allowed.

Concern 50: The WSP/EIS should include a strategy to prepare for climate change.

> *Adoption of a policy that recognizes and prepares for the effects of rapid climate change in the region of Sequoia and Kings canyon NP.*
> [Individual, #176]

Response: To develop a full management response to climate change is outside the scope of the WSP/EIS planning effort. Text has been added to the WSP/FEIS ("Chapter 3: Affected Environment," "Chapter 4: Environmental Consequences," and "Appendix H: Wilderness Information and Education Strategy") discussing climate change and its effects on wilderness character, and how the parks would adaptively manage visitor use in response to changing climatic conditions. The parks are currently working on a Resource Stewardship Strategy that will integrate adaptive-management strategies for natural and cultural resource management in order to respond to climate change.

General Comments on Key Topics

Concern 51: Based on data in the WSP/EIS, stock users comprise a small percentage of the parks' users. The continuation of stock use in the parks will continue to impact the parks' resources, including wilderness. The NPS should protect the resources for the majority of the visitors, not make accommodations for a small user group.

> *In Vol. 1, page 327, is Table 67, which shows the number of clients served by category during a four-year period, 2009 through 2012. The number of clients served annually by pack and saddle stock during those years ranged from 469 to 819, an average of 643.5. For this tiny number of people, the NPS at SEKI willingly and willfully sacrifices "wilderness character," promotes wilderness exploitation and degradation, and negatively impacts the experiences of all those who travel on foot-that is, for 93% of the total visitors to SEKI wilderness. Why is this your policy?*
> [Recreational Group, #254]

Response: The parks are public lands managed to provide for the use and enjoyment of the whole public, whether their preferred method of recreation puts them in a minority or a majority. The NPS disagrees that the current levels and types of stock use "sacrifices wilderness character," and the NPS will not support actions or policy that lead to the elimination of an appropriate wilderness use just because it is conducted by a small amount of the public. There are significant and adequate controls and restrictions in place to ensure that wilderness character is preserved. There is no supporting information that even suggests that "all those who travel on foot," or even a majority, are negatively impacted by visitors who choose to use stock to recreate on their public lands.

Concern 52: The WSP/EIS appears to be biased towards those visitors who do not want commercial stock use to continue in the parks. However, commercial stock outfitters provide services to parks' visitors, and without commercial services, these people would likely not visit the parks.

> *The Wilderness Stewardship Plan has an anti-commercial packing bias. There is an apparent disconnect with the fact that the commercial pack stations are there to serve the public. The majority of trail closures, camping closures, grazing closures, and party size restrictions are geared towards commercial stock groups, with private stock users also being affected. This will have a net effect of fewer trips, with fewer people visiting the Parks.*
> [Recreational Group, #201]

Response: The WSP/EIS does contain significant controls and restrictions on all commercial services (not just those related to stock) provided to the public. This is a direct reflection of the expressed mandate of the Wilderness Act. In the Act, Section 4(d)(5), which established that commercial services provided in wilderness are discretionary ("may be performed"), must support proper activities to realize wilderness public purposes, and will be allowed to the "extent necessary." These parks know and understand that in many situations commercial services support public need to properly experience wilderness and have developed the Extent Necessary Determination (appendix B) to document and guide the provision of these services.

Concern 53: The WSP/EIS should address ways stock users should be responsible for animal waste using the Leave No Trace© principles. Manure bags should be required by all stock users to mitigate the impacts from stock use.

For all alternatives, manure in corrals is to be removed from parks (WSP/DEIS at 219) however, the WSP/DEIS does not provide any information on this point. Namely, the estimated pounds of manure generated each year in corrals by stock, whether the corrals are constructed to avoid runoff or seepage into groundwater or wetland or riparian areas or surface waters, how the corrals are cleaned of manure (e.g., whether they are scraped down), how manure is transported out of the park and the impacts of different methods, the effects of a concentrated manure source on wildlife near the corral areas, the effect of excess nutrients on nearby soils, and potential germination of seeds in stock manure. In fact, NPS dismissed the idea of manure bags (WSP/DEIS at 221) but did not address other ways stock users should be responsible for animal waste. This approach is totally contrary to the "leave no trace" principles and a violation of the pristine character of the wilderness.
[Recreational Group, #235]

I also support actions that don't appear in any of your alternatives, such as requiring "manure catchers" on stock animals see (www. bunbag. com)
[Individual, #117]

Reduce the impacts of packstock manure by requiring "manure catchers" on all stock animals or scattering of animal manure to keep it off trails and out of surface waters. All stock users should be required to attach manure catchers to their animals, or at a minimum, dump the manure at least 25 feet away from trails and campsites, and even farther away from surface waters. It is particularly important to keep packstock manure out of and away from surface waters.
[Conservation/Preservation, #166]

You have stated in Vol. 1, page 221, that you will not consider manure bags for stock animals. So what are you going to do about stock-animal waste? You have stated that total stock use in 2013 was more than 6,000 days, which means that those animals have dumped more than 300,000 pounds of raw animal sewage on SEKI's trails and campsites and in water sources in the few months of the season.
[Recreational Group, #254]

Response: Manure bags are known to chafe the skin of stock, and the parks do not consider them a feasible alternative for use on stock traveling long distances and for long periods on trails in wilderness. This information has been added to the "Alternative Elements Considered but Dismissed from Detailed Analysis" section of "Chapter 2: Alternatives." Manure handling mitigations have been added to the plan to guide stock users in properly treating stock manure. The parks will communicate these practices to wilderness stock users. Manure handling protocols are discussed in the "Measures to Protect Wilderness Character and Visitor Experience" section of chapter 2.

Suggests New Key Topic to Address

Concern 54: Drought conditions that California has experienced for the past three years should be addressed in the WSP/EIS.

DROUGHT- This topic is not one of the elements of the draft plan, but think it needs to be a major consideration in planning for wilderness stewardship. The current severity of 3 years of drought has impacted the entire Sierra range. I ask that all planning, especially for stock use, include consideration of the impacts of the drought on meadows and waterways.
[Individual, #145]

Response: Information has been added to the final WSP/FEIS discussing how changing climatic conditions (e.g., prolonged drought, warming temperatures, and more severe storms and flooding) will affect wilderness management and key resource topics. This is also part of the adaptive management approach as discussed in detail in "Chapter 2: Alternatives," "Appendix A: Visitor Capacity," and "Appendix D: Stock Use and Meadow Monitoring and Management Strategy."

Concern 55: The WSP should discuss climate change and the interaction of climate change impacts on the consequences of the alternatives.

> *The DEIS (p. 37) wrongly dismissed assessing the interaction of the effects of the alternatives with those of climate change, by speciously asserting that " . . . available information is not adequate to quantify the interaction of climate-change impacts on the consequences of the alternatives." This statement is in conflict with available scientific information, which includes many quantitative estimates of climate change effects (e.g., decreased low flows in streams, changes in snowmelt timing) published in scientific journals. However, it also misleads, because the general trend and type of climate change impacts that interact with the many of the consequences of the alternatives are generally agreed upon and have been increasingly documented (Beschta et al. , 2013) (e.g., low flows in streams, changes in snowmelt timing (Stewart et al. , 2005), increased air temperatures, etc.). This information is adequate to assess general interactions of climate change effects and many of the consequences of the alternatives' allowed stock activities (Beschta et al., Table l, 2013). The DEIS must be revised accordingly.*
> [Business, #238]

Response: Text has been added to "Chapter 1: Purpose and Need" "Chapter 3: Affected Environment" and "Chapter 4: Environmental Consequences" of the WSP/EIS to assess the interaction of the effects of the alternatives with those of climate change.

Concern 56: Alternative 5 should include the removal of danger trees, as utility companies are required by state and federal law to remove hazard trees in or adjacent to utility rights-of-way.

> *The draft Wilderness Stewardship Plan/DEIS identifies Alternative 5 "Emphasize Opportunities for Solitude" as the National Park Service's environmentally preferred alternative. In this alternative, the Plan states on page 385 that hazard tree removal would be halted. California Public Resources Code Section 4293 requires owners of power lines to maintain vegetation at a certain distance away from power lines and requires a utility to fell, trim, or cut hazard trees to remove the threat that the tree may fall on a power line, unless the utility does not have the legal right to perform the work. Consequently, SCE has a practice of removing hazard trees that could fall on power lines and could cause a wildfire, resulting in potentially significant damage to Park resources and the public. Additionally, the National Electric Reliability Council's Vegetation Management Standard FAC -003-2 requires utilities to manage vegetation so that it does not adversely impact the reliability of the transmission grid. More recently, in response to the severe drought conditions in California, the CPUC adopted resolution ESRB-4 directing the state's investor-owned utilities to take appropriate actions to prevent fires associated with or threatening their facilities; actions include vegetation management and removal of hazard trees in or adjacent to utility right-of-ways. If Alternative 5 is selected, the Wilderness Stewardship Plan should be amended to address the conflict with national and state directives regarding hazard trees.*
> [Business, #200]

Response: With the elimination of designated campsites in wilderness under alternative 5, the requirement to remove hazard trees from the areas around designated sites would also be eliminated. Maintenance of structures and mitigation of threats to structures in utility corridors would continue to be permitted under the conditions established in the special use permit granted for the utility corridor.

Suggests Change in Alternative(s) for Element 1: Visitor Use Levels

Concern 57: The use of trailhead quotas was generally supported by most commenters. Some commenters proposed increases to quotas, while others proposed decreases. Some commenters stated that all wilderness visitors, including those supported by commercial services, should compete equally for limited trailhead quota space.

The impacts of people and pack animals should be monitored, and then limited by quotas, if the environment is too heavily trod or grazed.
[Individual, #56]

Commercial pack animals should be subject to a limited trailhead quota system because of the highly negative impact they have on the park back country, because the trails are already crowded, and because backpackers have a quota system.
[Individual, #130]

I support the continued use of trail head quotas, which should be based on resource impacts and adjusted as necessary. I urge the Park Service to continue monitoring and the use of adaptive management to minimize impacts on wilderness resources. Additional areas where these techniques may be appropriate are: Bearpaw Meadow, Dusy Basin, and Monarch Lakes.
[Individual, #145]

By further limiting outdoor recreation opportunities as proposed in the preferred alternative 2 we are going to limit access to our wilderness areas to an ever shrinking elite. I would urge you to increase the number of permits by at least 10% epecially on the most heavily used trails.
[Individual, #83]

Trailhead Quotas: I prefer Alternative 3, Trailhead quotas would be increased by 10% in some areas. There are obviously areas where the characteristics of the entrance trailhead(s) and the dispersed geography that can be reached in one or two days of hiking would permit an increase in the quota. At the same time, there may be other trailheads where the quota should be decreased. Trailhead quotas should also be based on ones trip destination, not simply the trailhead one enters the wilderness.
[Individual, #88]

17. Maintain a single trailhead quota system for all wilderness visitors (i.e., no separate quotas for commercial visitors). All visitors are required to obtain permits through the same quota system, then visitors who have a wilderness permit and truly need commercial services may employ the services of an outfitter/guide.
[Recreational Group, #123]

All visitors to the SEKI should utilize the same wilderness permit application system for their visits. After obtaining a permit, they can make their logistical decisions like the rest of us.
[Individual, #162]

Response: The preferred alternative would initially retain the existing trailhead quotas established by the 1986 Backcountry Management Plan (BMP), and apply new quotas to a few trails that did not have them (see the "Alternative 2, Element 1" section of "Chapter 2: Alternatives"). Since 1986, use levels have not been shown to lead to unacceptable impacts in most wilderness locations. Where undesirable impacts are occurring, the preferred alternative would initially address these impacts through means other than reducing trailhead quotas (table 23). However, the preferred alternative also allows for changes to trailhead quotas in the future if undesirable impacts are detected through monitoring of specific areas (see the "Alternative 2, Element 1" section of chapter 2). Expanding and reducing trailhead quotas in overall ways were analyzed in alternative 3 (expanded) and alternative 5 (reduced). The trailhead quota system proposed in all action alternatives would apply to all wilderness visitors, and would not give preference to any user groups, whether private or commercially supported (see the "Alternative 2, Element 1" section of chapter 2).

Concern 58: Existing destination quotas should continue to be applied. However, there is no need for destination quotas in some areas, such as Dusy Basin. Other areas, such as White Chief, Eagle Lake, and the Mosquito Lakes, should have an individual destination quota instead of one general trailhead quota.

> *Destination Quotas: I agree with Alternative 2: Existing destination quotas would continue to be applied. However, I wonder about the intent of Additional destination quotas may be added for specific areas (e.g., Bearpaw, Dusy Basin, Guitar Lake, Hamilton Lake, Monarch Lakes, Rae Lakes, and other areas). In Dusy Basin, for example, most of the basin is off-trail, not near the Bishop Pass Trail corridor. There is no need for a destination quota in the off-trail portions of Dusy Basin.*
> [Individual, #88]

> *I support destination quotas for places that need them instead of trail quotas. Trail quotas do not adequately ensure that the number of overnight campers at one destination will not be too high. For example, there should be a separate quota for White Chief, Eagle Lake, and the Mosquito Lakes instead of one for the trailhead.*
> [N/A, #195]

Response: The preferred alternative continues to apply destination quotas in the few areas where they are now in place. No new destination quotas would be added at this time, though many areas would be monitored to detect undesirable impacts from visitor use, including the Mineral King lakes (see the "Alternative 2, Element 1" section of "Chapter 2: Alternatives"). In these locations, the application of destination quotas would be one of several potential management responses to resolve problems associated with visitor use.

Concern 59: Commenters requested that the NPS not adopt trailhead quotas of adjacent land management agencies, and that NPS should indicate that working with other agencies is difficult.

> *19. The NPS shall not rely on trailhead quotas set by surrounding US Forest Service (USFS) units, but shall make its own determination of the adequacy of entry quotas. Where USFS entry quotas are too high to preserve all attributes of SEKIs wilderness character, the NPS shall use its own authority to limit commercial services (as under item #1, above) and enforce NPS entry limits with or without cooperation from surrounding units.*
> [Recreational Group, #123]

Although somewhat unclear, the Draft WSP seems to suggest that the parks are proposing the following actions for those two popular areas: Mount Whitney (Crabtree-3): The document proposes Consulting with USFS regarding area use levels. The term consulting is a euphemism bordering on obfuscation. The parks know that what needs to be done is to lower the number of hikers who use this very popular trail. Evolution Basin and Valley (McClure-1): The document proposes Consulting and coordinating with USFS and Yosemite on quota reductions for PCT/JMT. Quotas may be reduced at certain trailheads. Impose overnight stay limit. Consulting and coordinating with other agencies and park units to reduce quotas on popular trails is a significant undertaking. Success in such a venture is far from certain. That should be disclosed in the Description of the Alternative and in the Environmental Consequences sections of the document. The document should disclose what the parks fallback plan is if those efforts fail to work.
[Individual, #97]

Proposed improvements to the Lamark Col trail make sense assuming the improvements are done with great sensitivity. An option might be to have the Inyo National Forest further reduce the entry permits per day from the current number, which I believe is 8/day, to a smaller number.
[Individual, #141]

Response: These parks have generally not seen unacceptable impacts attributable to high trailhead entry quotas, whether the trailhead is managed by the NPS or adjacent agencies (e.g., U.S. Forest Service [USFS]). Relative to the levels of visitor use associated with the preferred alternative, the current USFS quotas on the east-side of these parks are viewed as appropriate. Also, USFS trailhead quotas have been derived through a separate planning process that was subjected to court review. These parks recognize that changing trailhead quotas is a significant action and may require interagency coordination, but such coordination is entirely possible. There has been, and will continue to be, regular consultation and coordination between these parks and appropriate land management agencies on wilderness issues, including visitor capacities and ways to mitigate undesirable impacts.

Concern 60: Day-use quotas should not be required, but the parks need to be aware that use could change and new restrictions may be needed to manage day-use. The WSP/EIS does not appear to follow the GMP guidance on day-use.

Based on my experience, I don't think these parks require day use quotas in any area at this time.
[Individual, #27]

I do not support the idea of having day use quotas for hikers except for exceptionally high use areas like Mt. Whitney.
[N/A, #195]

What is the plan for managing use on trails in day use areas of the wilderness close to the frontcountry? In several places (e.g., page M-4) the document says that SEKI wilderness can be broadly understood as three different types of locations: 1. day use areas close to the frontcountry . . . It is not clear how the parks intend to manage visitor capacity in day use areas of the wilderness close to the frontcountry.
[Individual, #97]

The GMP forecasts that visitor use, especially day use, could grow appreciably during the life of that plan. The GMP said While visitation at Sequoia and Kings Canyon

National Parks has generally remained flat, it could grow appreciably during the life of this plan. Depending on the vision selected, growth of up to 30% could be accommodated, primarily in frontcountry areas. This would necessarily result in a shift toward increased day use, particularly as regional populations are expected to double over the next two decades. The WSP should recognize that this increased visitor use could reasonably occur in those day use areas close to the frontcountry. It needs to propose a reasonable approach for detecting and managing that visitation increase, should it occur.
[Conservation/Preservation, #184]

Response: The preferred alternative does not propose to implement any day-use quotas or permits initially, but day-use would be monitored and quotas and permits would remain an option if unacceptable impacts were detected in the future (see "Appendix A: Visitor Capacity"). The day-use permit system managed by the Inyo National Forest for the east-side approach to Mount Whitney would be unchanged by this plan.

The GMP did not specifically forecast a potential increase in day-use areas of the wilderness but did project an increase in visitor use in low-use frontcountry (nonwilderness) areas. Overall, visitor use in Sequoia and Kings Canyon National Parks has been stable since 2007 when the GMP was completed. There has not been a substantial increase in visitation; visitation peaked in 2010-2012 but has since decreased to levels below the 2007 level. However, trails suitable and frequently used for day-use were considered in the visitor capacity framework, which states: Day-use levels would not receive any new controls such as permits or quotas. Day-use would be required to comply with off-trail party-size limits. Day-use would continue to be monitored and may be the subject of people at one time or other monitoring methodologies to ensure that biophysical resources and wilderness experiences are not adversely impacted. If monitoring were to indicate degradation of wilderness character, management actions would be taken. These could consist of increased education, controls on parking, or other actions to deal with site-specific problems (see appendix A).

Concern 61: Visitor-use levels should vary across the parks and allow for high levels of use in some areas.

There will be times where high visitor use needs to be permitted, with finding ways to deal with that (such as increased "clean-up patrols," perhaps by volunteers, and continuing to provide privies) other than reducing that use will be preferable. It is not okay to remove all of the desirable high sierra locations from all but the super athletes. I think the Pear/Emerald vicinity, in particular, needs to be accepted as a place with high visitor use.
[Individual, #4]

My recommendation would be to allow continued intensive use of certain popular destinations - with strict enforcement of existing (and some new) regulations and use restrictions - while allowing modest flexibility in restrictions for responsible visitors, especially in more remote, less frequently visited areas.
[Individual, #178]

Mount Whitney Management Area In this area we would hybridize the Alternative 2 proposal with Alternative 3 principles - in particular, permitting added use in the area as described in Alternative 3 allows for use to be better managed and gives the public more opportunities to use this area.
[Business, #196]

Response: For all action alternatives, the visitor capacity framework ("Appendix A: Visitor Capacity") provides for varying use levels across the parks. The preferred alternative provides for relatively high use to be allowed in some very popular areas (e.g., around Mount Whitney, out of Roads End, and somewhat less around Emerald and Pear lakes) (see appendix A). Other areas would be managed for lower levels of use.

Concern 62: The NPS should use trail counter devices instead of visitor surveys to determine the level of use, especially in higher use areas, before implementing any further restrictions on trail quotas or building new trails.

> *Element 1: Visitor Use Levels I think using actual trail counter devices in areas of concern (versus just random surveys) should be used before making any final decisions on trail quotas or trail buildings. Special attention should be paid to Whitney exit quotas and PCT /JMT numbers.*
> [Individual, #158]

Response: Automated trail counters are one of many ways to collect monitoring data. The parks have chosen a standard method of collecting trail encounter data through direct observation, following established collection protocols as it provides more detailed information (e.g., mode of travel and direction of travel is recorded) for analysis (see table A-6 in "Appendix A: Visitor Capacity"). Trail counters could be used to augment direct observations in the future.

Concern 63: The "moderate" visitor use standard is too high except for several places where day-use and overnight use overlap. Moderate use would result in the meeting of more than 100 persons in a day of hiking. The visitor use levels should be reviewed and modified occasionally based on visitor input.

> *Element 1: Visitor-Use Levels The numbers contained within Table 13, however, give me pause. What you term "moderate" use would result in the meeting of more than 100 persons in a day of hiking. This level is too high for all except a handful of places where day-use and overnight use overlap.*
> [Individual, #129]

> *Trail encounters is a social issue, not an issue of impact on the wilderness resource. The standards used in Alternative 2 are reasonable but we prefer those in alternative 4 for encounters with other wilderness users. However this standard should be reviewed periodically based on input from wilderness visitors.*
> [Conservation/Preservation, #60]

Response: The establishment of trail encounter standards ensures that visitor encounter frequency will not rise above a set standard, thus protecting the solitude quality of wilderness character. The standards proposed in this WSP/EIS are consistent with the desired conditions that this plan seeks to achieve. Standards do not dictate what a particular wilderness user would experience, but rather place a maximum limit on visitor encounters that could be experienced at the highest use periods. Data collected over the years of 2012-2014 do not suggest that every hiker would experience the maximum encounter frequency that the standard would allow. It is reasonable to anticipate that actual encounter frequencies will be below the standard on most days of the quota season, even if the conditions at times of peak use approach the encounter standard. Visitor encounter standards can be reviewed in response to new information obtained from monitoring, staff observation, or visitor input.

Concern 64: The WSP/EIS should define the visitor capacity measures more clearly. As they are written, readers could interpret the measures differently. There should be a better description and more detail for each measure.

> *Definition of measures. The three visitor capacity measures (Weighted Value per Campsite, Grazing capacities, and number of encounters) are not described clearly. As such, they could be subject to different interpretations about how they should be measured. This is particularly true for the trail encounter measure. Measurements are only useful if they can be replicated; if two people can take the same measurement and get similar results. The visitor encounter measure is not described in a precise and meaningful way, and thus the stated measure and standard could be interpreted to describe very different conditions. Many of the most critical details in the carrying capacity framework appear to be put off to future monitoring plans. But these are not just technical details; these details can have a significant effect on the problem analysis. And that in turn has an effect on whether management action is triggered to bring conditions back within standard. These details are critical to protecting the visitor experience.*
> [Conservation/Preservation, #184]
>
> *The WSP should clearly define the three visitor capacity measures so that there is a common understanding of how to interpret and measure them. Critical details that affect the meaning (the value) of those measures should be defined in the WSP, not put off to some future monitoring plans to work out. The WSP should be the document that defines the measure and standard, not the monitoring plans.*
> [Conservation/Preservation, #184]
>
> *In general, the visitor capacity framework section contains the right categories to guide future management. Yet several of these categories appear to be lack the details that would help the public gain confidence that implementation of the WSP will indeed protect wilderness resources.*
> [Conservation/Preservation, #184]

Response: Each of the visitor capacity measures are clearly defined in "Appendix A: Visitor Capacity." The methods to determine the status of these measures are conventional in the field of visitor capacity and have been regularly utilized, in these parks and elsewhere. Future monitoring protocols and plans will further detail methodologies for monitoring, data collection, and analysis. The WSP/EIS has defined the applicable measures and set the standards from which future management actions may be taken. Additional details on monitoring are included in "Appendix C: Wilderness Character Monitoring," and "Appendix D: Stock Use and Meadow Monitoring and Management Strategy."

Concern 65: The proposed changes to the Evolution Basin and Valley portion of the Pacific Crest Trail (PCT)/JMT would impose an overnight stay limit under the preferred alternative. This change and impacts of the change are not presented in the WSP/EIS and should be further detailed.

> *One of the proposed actions for the Evolution Basin and Valley portion of the PCT/JMT is to impose an overnight stay limit in Alternative 2. That would certainly reduce the encounter rate because through-hikers would not have as many encounters with people who are camping in the basin. But this idea is not clearly communicated in the document. The proposed action will make a significant change to how people use Evolution Basin and Valley. The parks are proposing to convert this area of the parks to more of a through-hiking experience and reduce the opportunity for camping, a wilderness experience that many people now enjoy. That change in use pattern is not clearly*

> *described in the Description of the Alternative, nor is it adequately assessed in the Environmental Consequences section. This is true for the actions being contemplated for the other popular trails. The proposed change in visitor use patterns should be clearly described in the Description of the Alternative, and the impact on the visitor experience should be assessed in the Environmental Consequences section.*
> [Individual, #97]

Response: The establishment of a night stay limit in either Evolution Valley and or Evolution Basin is an option open to future implementation for the preferred alternative. As with other new or changed restrictions on visitor use, it has been evaluated and additional narrative has been added to "Chapter 2: Alternatives" and "Chapter 4: Environmental Consequences" to reflect this option. Visitor use restrictions are discussed throughout the document (e.g., table 23).

Concern 66: The WSP/EIS should discuss visitor capacity in terms of all users, not separating them and therefore creating tension among the user groups. As trends change, visitor use will as well. The visitor capacity standards should be written with more flexibility so they can change as the parks' visitation changes.

> *Visitor Capacity discussion, separates commercial from non-commercial uses, and stock vs non-stock uses, and pits user types against one another. Does not address historical use. Request the parks avoid hard fast annual visitor capacity numbers, as access dates, economics, social values (fads) will vary, as well as on the ground evaluations and findings. We request the parks create a mechanism for flexibility that is more able to complement wilderness purposes, and maintains/addresses the 5th value of wilderness character.*
> [Business, #182]

Response: The visitor capacity framework looks at combined visitation for most factors, including encounter frequency, overall visitor-use days, and campsite impacts. There is some segmentation by mode of travel, primarily in assessing and applying limits to use supported by commercial services (i.e., stock-based and hiking-based). This is not meant to create user conflict but to serve as a method for the parks to measure different uses, which in turn can aid in making informed management decisions. Capacities are established pursuant to both law and policy (NPS *Management Policies 2006,* Section 8.2.1, and various court decisions). The separation of commercially supported visitation and private user visitation is a direct outcome of court decisions on the "extent necessary" clause of the Wilderness Act, which mandates that commercial services are discretionary in wilderness (see "Appendix B: Extent Necessary Determination for Commercial Services"). Limits established on visitation supported by commercial service providers are in response to these legal determinations. The total annual visitor use levels, as described in "Chapter 2: Alternatives" and "Appendix A: Visitor Capacity," are flexible and would not individually trigger management action to reduce use, unless specific on-the-ground conditions were determined to be out of standard.

Suggests Change in Alternative(s) for Element 2: Trails

Concern 67: Lack of funding is an inadequate rationale for implementing a trail classification system. If there are insufficient funds for trail maintenance, the response should be to increase participation (by qualified volunteers, if possible) or increase resources allocated to trail maintenance. "Downgrading" trails to lesser maintenance means visitors (especially stock users) lose access.

> *It appears that the Trail Classification System, and specifically TC1, is promoted as one means by which to lighten the maintenance workload of park trail crews and direct increasingly scant resources to high-use trails or other park program. However, we would argue that the general availability or lack of budget resources should not be a determinant for establishing a trail classification system.*
> [Recreational Group, #186]

Response: The trail management and classification system is not being adopted primarily to save trail maintenance costs. As described in the WSP/EIS, the trail classification system is primarily a means to ensure appropriate levels of development and the desired range of visitor recreational opportunities ("Appendix K: Trail Management and Classification System for Sequoia and Kings Canyon National Parks").

Concern 68: A trail receiving limited stock use is not a reason to close it; these trails should be kept open to preserve opportunities for future stock users who want more solitude.

> *The rationale for many of the trails being closed to stock use is that there is little to no use currently occurring. Then there is really no need to formally close those trails, and they should instead remain open for future visitors who may want to travel to lesser used areas of the wilderness.*
> [Recreational Group, #186]

Response: Trails are closed to stock because of the potential for resource impacts and use conflicts. As trails were being considered for closure for the above reasons, an analysis of each trail segment was conducted to determine the current stock use and to see if the closure would have a significant effect on current stock recreational use. After that, a case-by-case analysis determined whether the route or trail would be closed to stock. For example, in Upper Goddard Canyon, there are sensitive wetlands and amphibian populations. In order to accommodate current use levels, the WSP/EIS proposes to change the designated unmaintained route to a maintained Class 1 trail open to stock. In McGee Canyon, also with sensitive wetlands, recent use is essentially nonexistent. At this location, the WSP/EIS proposes to abandon the designated unmaintained route and thereby close the area to stock travel.

Concern 69: The trail classification system must take into account the suitability of a given trail for stock travel. The proposed system does not take this into account, and trails may suffer erosion damage as a result.

> *I cannot fully agree with your division of the maintained trail system into two wilderness categories (classes 2 and 3). The reality is far more complex. The key point here, which is not expressed in your plan, is that trail use and trail condition must be considered together. Specifically, trails that cannot sustain use by pack stock without suffering erosion damage should not be open to such use. You do not address this important connection and I urge you to do so.*
> [Individual, #29]

Response: The trail management and classification system has tools besides trail classification to address the suitability of a trail for stock travel. Trail classification speaks to the amount of development a trail or trail segment has. Trail routing, surrounding terrain, and the presence or absence of particularly sensitive resources are at least equally important in terms of a trail's susceptibility to erosion damage from use. For this reason, under the WSP/EIS, trails are considered as open or closed to stock travel independently of their trail class.

Concern 70: The trail classification should be clearly described so that all visitors know the conditions they may encounter.

> *The new trail designation is good, so hikers and stock users can select what is best for them. Class 2 trails should be clearly described for commercial stock, as I've had unfortunate incidents occur in that regard.*
> [Individual, #8]

Response: Trails classification is described in detail in "Appendix K: Trail Management and Classification System for Sequoia and Kings Canyon National Parks." In addition, upon implementation, information on wilderness trails classifications will be provided to the public on the parks' website and in maps and guides.

Concern 71: The trail classification system appears to limit trails to those that exist already in the parks with the potential for new Class 1 trails if needed for the protection of resources. The NPS should reestablish and maintain existing trails that are not currently up to standard in wilderness.

> *There are a limited number of main trails in Kings Canyon like the Bubbs Creek, Woods Creek, John Muir Trails. However, there are use trails (60 Lakes Basin), unmaintained trails, (Taboose Pass and Sawmill Pass) and abandoned trails (JMT into Lake Basin and Center Basin). Why not spend the money to reestablish and maintain these trails. It would provide incentives to backpackers who are timid or lack navigational skills to access some of these less visited areas. This would also reduce the amount of backpackers/hikers per trail mile. Those who backpack in SEKI not only benefit from the experience, they are the strongest and most vocal advocates for the parks. I would not mind one bit even being charged a trail maintenance fee IF those were dedicated funds only used for trail construction and maintenance.*
> [Individual, #7]

> *My main concern is with "Element 2: Trails" (at least as described in the Summary), where Alternative 2 appears to allow new trails only (1) in Class 1 and (2) if needed to protect resources. I hope you are not entirely blocking the possibility of any new Class 2 trails, such as to the Suwanee Grove or above the Wuksachi Lodge, or even Class 1 trails if they could be for reasons of providing access to minimally used areas suitable for those who are not super athletes.*
> [Individual, #4]

> *Trails: As many trails as possible should be kept in good shape, so that safety is enhanced and the trails are useable by pack animals. For example, I don't think the trail over Sawtooth Pass is useable by stock anymore.*
> [Individual, #128]

Response: The preferred alternative currently limits the construction of new trails. If the NPS were to construct a new trail, further NEPA evaluation (i.e., an environmental assessment) would be required. If a new trail is established by visitor use, and resource damage is occurring, it would be reasonable to determine what class of trail would be most appropriate on a case-by-case basis based on site conditions and levels of use. Therefore, the preferred alternative has been modified to allow the construction of new trails under criteria provided in the trails management system ("Appendix K: Trail Management and Classification System for Sequoia and Kings Canyon National Parks").

Concern 72: New trails should not be constructed in the Mount Langley area. The substrate is mostly sand; therefore, using the current cairn system would be sufficient.

> *Alternative 2 Element 2 Trails: I am opposed to placing the proposed trails in the Mt. Langley area in this category. They would be more appropriately placed in Alternative #3. I believe this area is a stronghold for raising the lambs of the Mt Langley heard. Although some repots state that humans don't interfere with the sheep, I am unaware of any reports that address lambing areas.*
> [Individual, #158]

> *Furthermore, having a trails crew, using explosives to build trails, and increasing visitor use through ease of access could also be detrimental. "Building" a trail in the upper Soldier Lake/Mt Langley summit area would be a waste of resources as well as this mountain is primarily sand. I think the current "cairn" project is low impact & appropriate, but it will take several years to catch on. But, visitors will just cut switchbacks & ski the sand if a trail is "built."*
> [Individual, #158]

Response: The preferred alternative includes designating a trail to Mount Langley as a Class 1 trail. This trail would not be formally "constructed" but would use a cairn system to designate a route to the top of Mount Langley.

Concern 73: Bridges in the wilderness area should continue to be maintained under the WSP/EIS. An additional bridge should be added on the Franklin Lakes Trail over the lower Franklin Creek.

> *I support continuing to repair and maintain all bridges in the wilderness area. In addition, a bridge is needed on the lower Franklin Creek crossing on the Franklin Lakes trail. This crossing can be very challenging throughout the summer in a normal snow year, especially with a backpack. A small, removable bridge similar to the one on the Eagle Lake trail would be adequate.*
> [N/A, #195]

Response: Franklin Creek is not suitable for a bridge. In the spring, the flow is too high to install a removable bridge safely, and when the spring runoff subsides, the water in the creek is very low so a bridge is not needed.

Suggests Change in Alternative(s) for Element 3: Campfires

Concern 74: Commenters expressed differing opinions about what the appropriate campfire elevations should be in the WSP/FEIS. In addition, campfires are valuable to visitors because they provide warmth and cooking.

> *In regards to Element #3 concerning campfires, I feel that the current elevation limits are quit adequate, especially in the wilderness areas.*
> [Business, #224]

> *Campfires: I strongly recommend Alternative 4, followed by Alternative 3.*
> [Individual, #27]

We support the elevation limit of 9,000 feet in Alternative 3 for campfires. A simple elevation limit would be unambiguous, easy to understand and to enforce.
[Conservation/Preservation, #60]

I support the elevation limit of 9,000 feet in Alternative 3 for campfires. Designating different elevation limits for campfires depending on local conditions can be confusing for wilderness visitors.
[Individual, #145]

Elevation should not be the sole determining factor for campfires. There are wooded areas above 10,000 ft. that have the down wood resources that could be used for social and warmth campfires in higher elevations. In order to manage the wood resources that the Park has, we recommend that the Park compile an inventory of the resources. The compilation, similar to what was done in the preparation of the meadow management plan, would then permit site specific campfire management. Campfire management could feasible permit fires in an area for several years and then have the area rested, rotating to allow regrowth of the resources above 10,000 ft. This could be particularly helpful in areas where avalanches have fallen and the public could utilize some of the fallen wood.
[Business, #196]

The Wilderness Stewardship Plan prohibiting fires about 10,000 feet elevation would greatly impact the ability of folks to enjoy the back country by making it difficult to cook and stay warm when the temperature drops. The park lands to be enjoyed would then be discouraged for the purpose it was created. Additionally, I believe it would cause a greater risk of runaway fire because of the excess dead timber on the forest floor should there be a lightening strike there. We have seen great fires recently because of the cut backs on clearing the forest floor.
[N/A, #65]

Response: Campfire restrictions serve twin purposes of protecting fossil wood resources and protecting down wood resources in less productive environments. Short-term prohibitions on campfires are used to prevent human-caused fires. As explained in the "High-elevation Long-lived Tree Species" section of "Chapter 3: Affected Environment," higher-elevation environments in the Sequoia and Kings Canyon Wilderness have limited wood production and are more likely to have fossil wood resources.

Using elevation as a trigger point to restrict campfires provides an objective location that can be easily determined by wilderness users. Setting the elevation limit on campfires to 10,000 feet in Kings Canyon National Park and the Kern drainage, and 9,000 feet in the Kaweah and Tule drainages protects downed wood resources in less productive areas and protects fossil wood where it is likely to be present.

Depletion of downed wood resources and consumption of fossil wood resources is more likely in higher elevations where campfires are permitted and may lead to damage to living trees, standing dead trees and destruction of fossil wood. As described in the "Preferred Alternative, Element 3" section of "Chapter 2: Alternatives," in areas where available wood could be burned without unduly depleting ground fuels or consuming fossil wood resources, variances could be established to permit campfires at higher elevations. In addition, in specific areas at lower elevation, where downed wood resources are at risk of being depleted, regulations prohibiting campfires could be implemented.

Setting these elevation limits on campfires also protects opportunities for unconfined recreation by allowing campfires on nearly half of the parks' land while continuing to protect the natural environment. Lowering the elevation to 9,000 feet wilderness wide would prohibit campfires in 65% of the parks' land,

which would have significant impacts on opportunities for unconfined recreation. Eliminating campfires in wilderness was evaluated under alternative 4; however, prohibiting campfires entirely would have significant impacts on opportunities for unconfined recreation.

While many wilderness users use campfires to supplement cooking, the majority have access to and uses portable stoves for cooking purposes.

Suggests Change in Alternative(s) for Element 4: Food Storage

Concern 75: Comments on food-storage boxes were varied, including removal of all food-storage boxes, removal of some food-storage boxes, retention of all existing food-storage boxes, and addition of more food-storage boxes.

> *Leave all food storage boxes and privies.*
> [Individual, #8]
>
> *I would also urge that the use of bear boxes be continued. Canisters just aren't practical for a party of any size over several days.*
> [Individual, #87]
>
> *Bear boxes: Remove all bear boxes not in certain heavily used areas: the JMT/PCT (maintain the boxes for PCT through hikers), Paradise Valley, Kearsarge Lakes and require bear-proof canisters for all backcountry travel regardless of where one is going. Even if someone is going to a remote, off-trail area, he or she will have to pass through and probably camp in areas with what you term a history of bear issues.*
> [Individual, #88]
>
> *Removing food storage lockers is a mistake, they are one of NPS successes, even though Lower Tent Meadow or Frypan are low use, they are bear habitat areas that could become problem areas.*
> [Individual, #127]
>
> *Remove all food lockers from the SEKI Wilderness. With the availability of lightweight bear-proof food canisters, SEKI should remove all food lockers from the SEKI Wilderness.*
> [Conservation/Preservation, #166]

Response: Food-storage boxes are one of several techniques that can prevent wildlife from obtaining human food. The boxes can negatively affect basic wilderness character, including the qualities of being undeveloped, of solitude, and of aspects of primitive recreation involving self-reliance. They can also improve certain aspects of wilderness character, including naturalness, by reducing human impacts on wildlife behavior. The alternatives in the WSP/EIS consider a wide range of possible approaches to balancing the effects of food-storage boxes in the parks' wilderness, from removing all such boxes (alternatives 4 and 5) to adding up to 35 more (alternative 3).

One of the goals and objectives of the WSP/EIS is "removal of installations that are unnecessary for the protection of other wilderness character qualities" (see the "Desired Conditions" section of "Chapter 1: Purpose and Need"). The preferred alternative (alternative 2) seeks to meet this goal through location-specific actions, maintaining a minimal number of food-storage boxes "in areas where the risk of affecting native wildlife [with human foods] is high" ("Alternative 2, Element 4" section of "Chapter 2:

Alternatives"). Boxes whose presence do not maximize preservation of wilderness qualities overall would be removed.

Every food-storage box was considered for removal or retention (table 15 in chapter 2) in consultation with wilderness rangers, the parks' wildlife biologist, and the WSP Interdisciplinary Team. Those boxes proposed for retention meet the minimum-tool requirement in those locations where a combination of factors makes the positive impacts of their presence greater than their negative impacts — even in some container-required areas. These locations demonstrate two or more of the following characteristics: ongoing, significant bear issues;

- first night or close-in locations where visitors are likely to have more food than they can carry within one container per person;
- no suitable opportunities for counterbalancing food; and/or
- containers alone have not succeeded in successfully controlling bears' access to unnatural foods.

Where the results of removing a box are in question, the preferred alternative calls for testing the effect of removing it before expending funds to do so.

Despite the fact that the parks' wilderness includes large areas of bear habitat, many areas have not had significant problems with bears accessing human foods. Given the parks' intention to continue education about the importance of food storage ("Elements Common to all Action Alternatives" section of chapter 2 and "Appendix H: Wilderness Information and Education Strategy"), and the availability of trees in some areas for counterbalancing, problems are not expected to develop in these locations. If human activity and bear problems change over time, the preferred alternative allows the parks to adapt management in specific locations that have improved or worsened, using the minimum requirements analysis process.

The park website will continue to advise that people not rely completely on finding food-storage boxes in specific locations, as the boxes can break and become nonfunctional, or become unavailable due to misuse by other travelers (NPS 2014b). Educational efforts on food-storage options and techniques, including suggestions on how to maximize use of containers during long trips will continue and be enhanced. In the preferred alternative, commercial services would also remain an option for long-distance travelers to get resupplies rather than carrying more food than can be stored.

Concern 76: All food-storage boxes should be removed from the parks' wilderness as they are not the minimum tool necessary for the administration of wilderness.

> *The minimum tool for food storage is the canister for hikers and the bear-resistant pannier for stock parties. Your plan should rely on these minimum-tool solutions.* [Individual, #129]

Response: As found through a minimum analysis process, food-storage boxes are necessary in some locations to protect native wildlife and provide a diversity of opportunities for primitive recreation. However, one of the goals and objectives of the WSP/EIS is "removal of installations that are unnecessary for the protection of other wilderness character qualities" (see the "Desired Conditions" section of "Chapter 1: Purpose and Need"). The preferred alternative seeks to meet this goal through location-specific actions, maintaining a minimal number of food-storage boxes only "in areas where the risk of affecting native wildlife [with human foods] is high" ("Alternative 2, Element 4" section of "Chapter 2: Alternatives"). Boxes whose presence do not maximize preservation of wilderness qualities overall would be removed.

Concern 77: The WSP/EIS should address why food-storage boxes are necessary in wilderness when other surrounding wilderness lands do not use these boxes.

> *Your proposal to continue the use of food storage boxes in wilderness in not supportable under the Wilderness Act. Quite simply, food storage boxes are not the "minimum tool" that the act requires. This is clearly reflected by the point that the wilderness areas that surround the SEKI wilderness do not use these boxes.*
> [Individual, #129]

Response: Levels and types of usage in the parks may differ from that in some surrounding wilderness areas. The different types of use in the adjacent forest lands, including hunting, impact wildlife behaviors in a different manner than in parks where there is no hunting. In addition, the level of success in protecting wildlife from accessing human foods in surrounding areas may not meet the level desired by the parks. The minimum requirements analysis process has confirmed that food-storage boxes may meet the minimum tool requirement in some areas.

Concern 78: Education should be the focus for preventing wildlife from obtaining human food, not the use of food-storage boxes.

> *We suggest an ultimate goal of removing all of the food storage boxes. As suggested in other alternatives portable containers may be required as the ultimate solution. In the near future we urge you to move in that direction accompanied by education of wilderness users to help them realize that adequate food storage is good not only to protect their own provisions but also for the wilderness resource and the bears.*
> [Conservation/Preservation, #60]

Response: No matter which alternative is selected, the parks will continue to stress wilderness education topics including food storage ("Management Actions Applicable to all Alternatives" section of "Chapter 1: Purpose and Need"), and to cooperate with managers of surrounding areas to achieve benefits to the wilderness ("Planning Efforts of Adjacent Lands" section of chapter 1).

Concern 79: Regarding portable food-storage containers (or canisters), comments included a range of suggestions: a call to use them everywhere; the opinion that they are not practical for longer trips; the belief that backpackers are unlikely to be completely compliant with the use of food-storage containers; and that requiring containers in certain places and allowing counter-balancing in other areas is confusing to visitors.

> *Food Storage: I think it's simpler to require canisters everywhere than a complex pattern of where canisters are required and where properly counter-balanced hanging is allowed.*
> [Individual, #27]

> *I would also urge that the use of bear boxes be continued. Canisters just aren't practical for a party of any size over several days.*
> [Individual, #87]

> *Your proposal to continue the use of food storage boxes in wilderness in not supportable under the Wilderness Act. Quite simply, food storage boxes are not the "minimum tool" that the act requires. This is clearly reflected by the point that the wilderness areas that surround the SEKI wilderness do not use these boxes. The minimum tool for food storage*

> *is the canister for hikers and the bear-resistant pannier for stock parties. Your plan should rely on these minimum-tool solutions.*
> [Individual, #129]

Response: Portable food-storage containers have proven very successful in many areas of the parks. Where bear- and human-activity levels combine to make portable containers insufficient, the preferred alternative proposes that a minimum number of boxes remain — even in some container-required areas. Where the results of removing a box are in question, the preferred alternative calls for testing the effect of removing it before expending funds to do so.

If human activity and bear problems change over time, the preferred alternative allows the parks to adapt management in specific locations that have improved or worsened, using the minimum requirements analysis process.

Many visitors are very familiar with the parks' wilderness and know what food-storage options are best used in which locations. Other visitors have learned it readily or use existing references, such as the parks' website, handouts, and Wilderness Office staff, to ensure that there is no confusion. One of the goals of wilderness education, which is critical to implementation of every alternative ("Management Actions Applicable to All Alternatives" section of "Chapter 1: Purpose and Need"), is to help visitors understand various regulations and where they apply before their trip into wilderness. The parks will continue to enhance educational efforts on food-storage options and techniques, including suggestions on how to maximize use of containers during long trips.

Concern 80: The WSP/EIS should include options for through-hikers on the PCT to rent canisters before they enter the parks with a drop point for canisters available when they exit the parks.

> *Remove all food lockers from the SEKI Wilderness. With the availability of lightweight bear-proof food canisters, SEKI should remove all food lockers from the SEKI Wilderness. If the concern is for through-hikers on the Pacific Crest Trail (PCT) who don't want to have to carry canisters all the way to Canada, those hikers could pay for a canister rental before the start of their hike. The canisters could then be picked up at the Cottonwood Pass trailhead just south of SEKI. The PCT hikers could then drop off the canister after they exit SEKI the next time they leave Wilderness for a food re-supply.*
> [Conservation/Preservation, #166]

> *While I understand that the NPS is encouraging the use of portable storage containers, I feel that it is unwise to assume that all backpackers will carry containers and will carry enough of them to hold all of the food, toiletries and garbage that they have, especially if they are on an extended trip.*
> [N/A, #195]

Response: Administering the canister program is an operational and implementation issue, not a planning decision. However, canisters are available for rent in a variety of locations within and outside of the parks and the NPS would consider expanding this program as funds allow.

Concern 81: The parks' funds should not be used for removal of the food-storage boxes.

> *Leave all food storage boxes and privies. Funds should not be spent to remove structures conducive to wilderness protection.*
> [Individual, #8]

Response: Under the preferred alternative, some funds would be spent to remove those food-storage boxes that do not meet one of the goals and objectives of the WSP/EIS: "removal of installations that are unnecessary for the protection of other wilderness character qualities" ("Management Actions Applicable to All Alternatives" section of "Chapter 1: Purpose and Need"). The preferred alternative seeks to meet this goal through location-specific actions, maintaining a minimal number of food-storage boxes only "in areas where the risk of affecting native wildlife [with human foods] is high" ("Alternative 2, Element 4" section of "Chapter 2: Alternatives"). Some long-term savings of funds would result in that funds would no longer be required for maintenance and repair of those food-storage boxes that get removed (there would be fewer boxes to maintain). The same is true for efforts to revegetate trampled areas that tend to surround food-storage boxes.

Concern 82: Commenters suggested specific changes to the locations and number of food-storage boxes in Tyndall Frog Ponds, Laurel Creek/Lower Funston, Crabtree, Kern Hot Springs, and Franklin Lake.

> *Table 15 shows two bear boxes at Frog Ponds. There is only one but I think/concur that is should be removed as there is one near the Shepherds Pass trail junction on the north side of the JMT/Tyndall creek crossing, a much more popular campsite.*
> *Table 15 also snows three boxes at Laurel Creek. Perhaps these are the ones locate in Lower Funston Meadow?? If so, only one is needed at Lower Funston Meadow. Perhaps, a new one could be bumped to upper Funston as those are old boxes that are/will be non-functional soon.*
>
> *Lastly, Crabtree is a very popular area where I have heard from reliable sources that at least one bear is seen once annually. This has been in the Lower Crabtree Meadow. This is also where hordes of PCT hikes. base camp before ascending Whitney, a day or two after resupplying at Horseshoe Meadow. I would definitely leave this bear box over the upper one, however. The ranger station area is usually pretty congested, enough to scare any bear away. But, I see no point in removing either bear box as they are so close to the ranger station and easily maintained.*
> [Individual, #158]
>
> *Under Alternative 2, the Kern Hot Springs is a high use area. Both bear boxes should remain there. Franklin Lake is also a high use area. I have seen people camping below the dam on numerous occasions, using the bear box there. I strongly support leaving both bear boxes at Franklin Lake.*
> [N/A, #195]

Response: In the course of preparing the WSP/EIS, every food-storage box for which the WSP Interdisciplinary Team could find evidence was considered for removal or retention (table 15 in "Chapter 2: Alternatives"). This was done in consultation with wilderness rangers, the parks' wildlife biologist, and various field staff. Because a single, simultaneous parks-wide inventory of functioning food-storage boxes does not exist, and because boxes are sometimes moved by visitors or their removal was not recorded, the exact number in the wilderness when the WSP/EIS was written is a very close approximate.

A correction to the number of food-storage boxes submitted in one comment resulted in a change specified throughout the WSP/EIS from "87" to "approximately 86." Two amendments have also been made in table 15 ("Alternative 2, Element 4" section of chapter 2):

- The table indicates two boxes at Tyndall Frog Ponds. There is only one.

- The table also lists three boxes at Laurel Creek. This area is far more commonly referred to as Lower Funston Meadow.

In the preferred alternative (alternative 2), boxes would remain only where food-storages boxes meet the minimum-tool requirement. These locations demonstrate two or more of the following characteristics:

- ongoing, significant bear issues,
- first night or close in locations where visitors may have more food than they can carry within one container per person,
- no good opportunities for counterbalancing food, and/or
- containers alone have not succeeded in successfully controlling bears' access to unnatural foods.

If human activity and bear problems change over time, the preferred alternative allows the parks to use the minimum-tool requirement process to adapt its management in specific locations that have improved or worsened.

Regarding Crabtree Meadow, it is the parks' experience that the majority of hikers arriving in the Crabtree area are carrying portable food-storage containers and that, by the time they reach Crabtree, they are not in need of food-storage boxes. In addition, the large-capacity box at the Crabtree Ranger Station almost always has space available. The occasional sighting of a bear in the Lower Crabtree area has not been associated with access to human food for many years.

Suggests Change in Alternative(s) for Element 5: Human-waste Management

Concern 83: All privies should be retained in wilderness, especially in heavily used areas. Some new privies should be installed, and commenters suggested locations where new privies would and would not be appropriate. In addition, the parks' funds should not be used for removal of the privies.

> *Leave all food storage boxes and privies. Funds should not be spent to remove structures conducive to wilderness protection.*
> [Individual, #8]

> *Element #5 Human Waste. Human waste is considered hazardous waste and a health hazard. Human waste in high use areas should have access to a confined outhouse. This would help eliminate so many "cat-holes." Packing out human waste should be up to the users own basis.*
> [Business, #224]

> *I support the approach to privies and restroom described under Alternative 3. Privies should be repaired and maintained in high use areas, such as Monarch, Franklin, Eagle, and Mosquito Lakes and not be removed and additional ones added in other high use areas, such as Guitar Lake.*
> [N/A, #195]

> *As for privies in the wilderness, I would favor more rather than fewer as I believe they would diminish the likelihood of human excrement contaminating the local water supply, although that would depend on their construction, and studies should be done to test that hypothesis before their widespread deployment.*
> [Conservation/Preservation, #170]

Privies should be installed at Guitar, Eagle, Franklin and Monarch lakes and maintained. Pack out waste kits are not likely to be used.
[Individual, #8]

You should RE INSTALL the toilet at Heather Lake which you closed down although you put 3 of them nearer to Emerald Lake. You should allow a toilet at Hockett Meadows as there is already one for the ranger & researchers that go there.
[Individual, #16]

Because of the number of overnight visitors to Eagle and Mosquito Lakes, the privies should remain there as protection to the environment. Human waste packs are less likely to be used.
[Individual, #69]

Response: Structures, such as privies, in wilderness are generally inconsistent with the preservation of wilderness character. In the preferred alternative, each existing privy has been evaluated for removal or retention based on specific criteria (see the "Alternative 2, Element 5" section of "Chapter 2: Alternatives"). As a result of this evaluation, the NPS is proposing to remove seven privies and add one privy. Some additional privies/restrooms may be removed if testing of pack-out human-waste kits proves successful in several specific areas (see table 16 in chapter 2). Wilderness is also to be a place of self-reliance and this self-reliance is supported by users taking responsibility for their actions, rather than relying on developments in wilderness. Some long-term savings of funds would result in that funds would no longer be required for maintenance and repair of removed privies or for revegetation of trampled areas that tend to surround privies to be removed.

Concern 84: Commenters suggested the use of new types of waste removal systems, including military style toilets that use enzymes to break down waste and solar dehydrating toilets.

WHY not use a MILITARY STYLE WASTE REMOVAL SYSTEM that is/was used in IRAQ and is NOT that expensive. The enzymes eat up the defecation and the water was recycled to drink. They work up at 10,000 ft!
[Individual, #16]

It would be easy to increase the capacity of the few heavily used trails by widening the trails and by installing bathrooms. Solar dehydrating toilets have been proven to work well in the Rocky Mountain National Park.
[Individual, #83]

Response: These parks and other local land management agencies have had limited success with composting toilets, and in many cases, have actually removed them due to their ineffectiveness and high level of maintenance. In addition, adding any new structures (developments) to wilderness is counter to the preservation of wilderness character. One of the desired conditions of this WSP/EIS is to reduce development in wilderness, thus improving wilderness character ("Desired Conditions" section of "Chapter 1: Purpose and Need"). These parks will continue to assess new waste management systems and technologies and will be open to adopting them as they prove reliable and effective in the wilderness environment.

Concern 85: Pack-out waste kits should be required in higher use areas such as the Mount Whitney Management Area. Waste disposal cans could be placed at all trailheads in higher use areas.

I believe commercial users with stock support should be required to use wagbags &/or pack out human waste in the Whitney zone.
[Individual, #158]

Human Waste. I am in favor of measures to mitigate the pollution problem, specifically at Guitar Lake. We at SYMG have been packing out our wag-bags for many years now (Over Cottonwood Pass since we can't exit via Trailcrest). This is a good solution and measures should be put in place to require all users to use wag bags. SEKI/INYO should place wag bag disposal cans at all trailheads associated with the Whitney Region.
[Business, #90]

Response: The preferred alternative continues the strongly recommended use of pack-out waste kits in the Mount Whitney Management Area (table 23 in "Chapter 2: Alternatives"). Requiring commercial service providers to remove human waste in the Mount Whitney Management Area and elsewhere is an operational determination and not an aspect of this WSP/EIS, but will be considered as a condition of assigned Commercial Use Authorizations. Used pack-out waste kits are considered normal household waste (provided they are the commercially produced type, e.g., WAG BAG® and Restop 2®) and can be deposited in existing waste receptacles at trailheads.

Suggests Change in Alternative(s) for Element 6: Party Size

Concern 86: Party sizes should be reduced for day, overnight, and off-trail uses for hiking as well as for stock parties. Large group sizes cause the most damage to resources and affect other visitors' wilderness experience.

I think that stock group sizes of twenty are too large (and twenty persons) and have far too great an impact on the wilderness. Such groups tend to be noisy, loud and disruptive of the wilderness tranquility. I would suggest a maximum size of 8 stock and 8 people.
[Individual, #147]

The Park Service should substantially lower maximum party size limits from 15 people and 20 head of stock to a maximum of 15 heartbeats in the preferred alternative. Large group sizes seriously detract from the experience of wilderness visitors (as work conducted in SEKI and surrounding national forest lands clearly demonstrated way back in the 1990s).
[Individual, #180]

Hikers: I strongly feel that all the on-trail day use party sizes are too large for those of us who hike solo or in groups of less than 5 to have enjoyable and quality day hikes. 25 or even 20 people can't really hike together anyway. I prefer having overnight use limits like those in Alternatives 5 and 4. However, the preferred Alternative 2 would be acceptable for enjoyable wilderness experience if the day use party size were reduced. Parties of 20 for day use have too much potential for noise and disruption.
[Individual, #127]

Reduce group size limits. The group size limits in the Preferred Alternative are far too excessive, and will degrade the SEKI Wilderness's wilderness conditions and character. Alternative 5's limits are far lower and better, but even some of the limits in alternative 5 (on-trail day-use party size limit of 20) are too high.
[Conservation/Preservation, #166]

Response: The commenters suggest using a "beating hearts" method for setting party-size limits. In deciding on party-size limits, the NPS rejected both the "people and stock sum" and the "beating hearts" methods of setting stock party-size limits: the former because it fails to take into account the effects of adding people and stock together, and the latter because it unnecessarily restricts the choices of stock parties (affecting the unconfined quality of recreation). Party sizes for hiking and stock groups on- and off-trail were set in the WSP/EIS after a careful analysis of wilderness character impacts, and after consideration of things like consistency, simplicity, anticipated perceived fairness, and the availability of other means of controlling impacts. The various reasons set forth by the commenters were taken into account in this analysis of party size.

Concern 87: The number of pack animals per person should be limited, such as one pack animal per three visitors.

> *10. Group size limits (maximum), except for essential NPS administrative uses: Persons per group (on trails): 12 Persons per group (off trails): 6 Stock animals per group (on trails): 10 Stock animals per group (off trails): 0 Max heartbeats for commercial stock parties where clients ride (animals packer/s riders, on trails): 14 Max heartbeats for commercial stock parties where all clients walk (animals packer/s, on trails): 7 11. For all commercial stock groups, whether the clients walk or ride, there shall be a limit of no more than one pack animal per three persons. Employees of commercial outfits (including, but not limited to, packers, cooks, attendants for disabled persons, etc.) ALL count as persons in the calculation. For example, a group of four clients with one packer and one assistant (i. e. , six persons total) may use no more than two pack animals.*
> [Recreational Group, #123]

Response: The commenters suggest setting limits on the number of stock allowed to limit how much gear stock parties can carry per person. In setting party-size limits, the NPS rejected any ratio system for setting the number of stock per party to limit their gear as unnecessarily restrictive of recreational choices (Remedy Order, High Sierra Hikers Association vs U.S. Department of the Interior C-09-04621 RS, page 9: "It is not appropriate for one group of the parks' users to impose its vision of wilderness etiquette over others.").

Concern 88: The NPS should gradually reduce the sizes of stock parties, eventually eliminating them.

> *Initiate phased reductions of pack animal traffic on the trails of the High Sierra, with the goal of their eventual elimination. . . gradually reduce the number of permits. . . reduce the size of pack trains allowed. . . Parks personnel spoke of planned reductions in pack animal traffic. Somehow these have never been accomplished*
> [N/A, #48]

Response: Riding and packing stock are legitimate primitive recreational uses of wilderness and are allowed per the GMP. The WSP/EIS is not revisiting the question of allowing recreational use of stock in the parks' wilderness. Focusing on a person's physical inability to hike distracts from the issue that choosing to hike or ride or climb or boat is a question of personal recreational preference.

Concern 89: There should be no reduction in hiking party size. Party sizes can be large for various reasons, including for a variety of experience levels and for youth groups. In the case of affected resources, the number of permits should be limited, but the hiking party sizes should remain the same.

I do not understand the need to reduce party size as a way to reduce overall impact o There can be good reasons for larger groups; just to pick three examples: - A multi-generational family of hikers who are carrying on and passing the tradition of loving the wilderness on to the next generation - Chaperoned groups of youth being introduced to the wilderness experience - Less experienced hikers being guided by more experienced hikers, whether or not under the auspices of a not-for-profit organized hiking group or commercial outfitter o If the concern is with overly impacting a particular area, rather than reducing group size, the focus should be on reducing the total number of permits allowed in the affected area o So, in general, I am against the idea of reducing the allowed groups sizes for hikers - I do not understand the need to reduce group size and/or total number of hikers off-trail o Unless there is a particular area that is clearly being over-used - i. e. which is showing physical signs of over-use, why limit this activity more than on-trail activity? o In its nature, off-trail travel is not as common as on-trail travel, since those who travel off-trail tend to be a smaller number of individuals, since they need to be able to do so, both physically and mentally (i. e. by relying on navigation skills) - I wish to reiterate again, that this does not apply to stock animal travel o So I am against the idea of reducing group size or number of hikers off-trail (without clear physical damage of an area being an issue)
[Individual, #39]

Response: Hiking party size on-trail in the preferred alternative has not changed from the no-action alternative. Off-trail party size is reduced from 15 people to 12. Trailhead quotas (the "number of permits") limit the total number of visitors using an area, and therefore provide some protection from impacts associated with the total number of people. These include things like litter, feces, firewood use, and some trampling impacts. However, some impacts depend on the size of a party more than on the overall total number of people in an area. These include things like expansion of trampling impacts in campsites, and effects on opportunities for solitude for other visitors (both traveling and in camps), and formation of informal trails. The party-size limits are therefore needed in addition to total use limits in order to preserve wilderness character. It is appropriate for there to be lower off-trail party-size limits because off-trail travel more quickly creates informal trail impacts than on-trail travel.

Concern 90: The WSP/EIS does not adequately justify the reasoning for reducing stock party sizes. The number of stock users has decreased in the parks; therefore, the party-size limits are unnecessary. The party sizes are inconsistent with those of adjacent forests. Additionally, the results of the visitor survey do not support a reduction in stock party sizes.

Proposals to Limit Maximum Stock Party Size Not Supported it appears that the maximum party sizes indicated for alternatives 2 through 5 make little sense (and thus are not reasonable) by their proposals to decrease maximum on-trail party size to less than what we understand to be consistent with adjacent forests (i.e., 15 people/25 head, total maximum party size of 40). We request that the WSP/EIS better clarify both the objective(s) in determining maximum party size (both on-trail and off-trail) and how the NPS selected alternative compares with maximum party size limits on adjacent national forests.
[Recreational Group, #186]

Results of the parks 2011 Wilderness Visitor Survey, for example, do not support a reduction in the maximum party size for stock users. Of the nearly 600 hikers/backpackers who answered the question, 86.6% of respondents reported they had either no or a Small Problem seeing Groups With Too Many Horses. Only 5.7% ranked it as a Big Problem (Report, p. 77, Table 34h). Based on these numbers alone, the WSP/EIS

fails to document public demand as supporting a decrease in maximum stock party size. If there were other rationale, we would hope this would be made clear in the WSP/EIS.
[Recreational Group, #186]

For Recreational Stock Users, WSP/DEIS at xiii, Alternative 2's proposed party size actually decreases from Alternative 1's No Action I Status Quo option, but the number of stock allowed is still too high for what the recreational stock visitor numbers support. WSP/DEIS at xiv. If there is a decreasing number of recreational stock users, it does not make sense for NPS to permanently adopt party size numbers for certain areas.
[Recreational Group, #235]

Response: The objectives in setting party sizes for all groups were to preserve wilderness character, including preserving the most unconfined primitive recreation consistent with other qualities of wilderness character. In terms of stock party size, the maximum number of people allowed is the same as for hikers; the maximum number of stock allowed on-trail is the same as in the no-action alternative. The combined total number of stock and people in a party on-trail is restricted to protect against the potential for large campsite impacts and to preserve opportunities for solitude for other groups. The off-trail party size is limited to less than on-trail to protect against the likelihood of informal trail impacts, as well as to ensure that off-trail areas present opportunities for greater solitude than on-trail. Although the total amount of stock use in the parks has decreased, not all impacts of stock travel are closely tied to the total amount of stock. Instead, some impacts (e.g., campsite impacts, impacts to solitude, and establishment of informal trails) are more directly related to the size of a party. To protect against those impacts, party-size restrictions are needed. The Inyo, Sierra, and Sequoia USFS lands currently have limits of 15 people and 25 head of stock, with some of Inyo and Sierra NFs having additional limits of 1.33 head of stock per person. These party-size limits are not consistent with Sequoia and Kings Canyon National Parks' party-size limits under the preferred alternative but were considered under alternative 3 (although consistency was not complete in that case either, as alternative 3 did not include the 1.33 head per person limit). Although the visitor survey provided information useful to the analysis, it was not primary in driving or determining the party-size limits in the preferred alternative.

Concern 91: One commenter stated that the WSP/EIS is unclear on whether the number of stock users proposed is cumulative or total.

It is unclear whether the number of stock users proposed is cumulative or total
[Recreational Group, #235]

Response: It is unclear what the commenter means by "cumulative or total." Table 18 in "Chapter 2: Alternatives" provides the maximum party size for people, the maximum party size for stock, and the maximum combined party size for people and stock. The new combined size limit reduces the total potential party size for stock. In the past, a stock party with 15 people could travel with 20 head of stock for a combined party size of 35. Under the NPS preferred alternative, a stock party with 15 people could take only 13 head. Assuming a more common ratio of about 2 riders for 3 head, the preferred alternative would allow for a stock party comprising 11 riders and 17 head.

Concern 92: The WSP/EIS should set party-size limits for day-use trails.

I would like to see party-size limits for day use on certain trails, such as certain areas of Giant Forest, Mist Falls, and the Lakes Trail (Pear Lakes).
[Individual, #88]

Response: The preferred alternative does set a day-use party size of no more than 25 people per group, but does not impose additional party-size limits on specific trails where day-use occurs. However, additional party-size limits may be imposed if visitor use monitoring indicates that is necessary to preserve wilderness character, as is stated in the "Alternative 2, Element 6" section of "Chapter 2: Alternatives."

Suggests Change in Alternative(s) for Element 7: Camping/Campsites, and Night Limits

Concern 93: Campsites for stock should be designated and stock parties should be required to use them. Designated stock campsites would limit the overlap with backpackers.

> *All stock parties should be required to stay at designated stock camping sites located no more than ï¿½ mile from designated stock trails. Designated stock sites would allow hikers to avoid the severe impacts and intrusion on the wilderness experience that comes with stock use.*
> [Individual, #180]

> *Overnight camping sites for stock are also needed. Alternative 2 proposes setting aside some sites in the Atwell Mill Campground, which would work well since many stock parties use the Atwell/Hockett Trail. Camping sites and a staging area also could be added at the Tar Gap Parking Area and/or at the site of the former commercial pack station. In high use areas, stock groups should have their own stock camps and be required to use them to limit the overlap with backpackers.*
> [N/A, #195]

> *Overnight camping by commercial stock parties at designated stock camps only (as in other western national parks, such as Yellowstone and others).*
> [Recreational Group, #123]

Response: As described in the preferred alternative in the "Alternative 2, Element 7" section of "Chapter 2: Alternatives," the locations of established stock camps would be identified and the NPS would recommend their use." In specific popular areas, stock users may be required to camp in designated stock camps. These areas may include Woods Creek Crossing, Rock Creek Crossing, and Big Pete Meadow. If an area is designated as a required stock camping site/area, backpacker camping would be prohibited. Criteria used for establishing stock-only campsites would include the areas' historic visitation by both backpackers and stock users."

Concern 94: The use of stock campsites may need to be rotated to minimize impacts.

> *Generally speaking, it may be appropriate to designate sites in some areas, but with stock camps in particular, use will need to be rotated if the stie becomes too impacted.*
> [Individual, #158]

Response: The practice of rotating stock campsites is an operational issue but may be warranted if stock camps are designated.

Concern 95: Close-in campsites should require a reservation.

> *Under "Element 7: Close-in Camping" for Alternative 2, ! like the idea of more close-in camping spots, but I wonder if some of these should be designated sites by reservation*

> *only. Could this close-in camping include such things as (a) an extension of the Muir Grove trail to a campsite at Hidden Spring (I previously said Big Spring by mistake) or (b) campsites above Wuksachi on Clover Creek (sufficiently far above any water intake for the lodge) or near the Suwanee grove?*
> [Individual, #120]

Response: Requiring reservations for the use of particular campsites decreases opportunities for unconfined recreation and is generally unnecessary to protect resources. The proposed new close-in camps are generally in areas that previously have had no camping and are expected to have low use. The capacity of the new camping areas would be managed through the use of trailhead quotas, which would be established on the associated trailheads. If determined necessary in the future, a reservation system could be implemented as an operational measure.

Concern 96: Night limits may unnecessarily restrict commercial outfitters. In areas such as the Mount Whitney Management Area, certain closures might make it necessary to spend more time in one area.

> *Night Limits. I am not in favor of night limits. Related specifically to commercial use, night limits are especially problematic since we are not allowed to exit via trailcrest. That means we are essentially obligated to spend additional nights in the Whitney Zone following any reasonable itinerary. If night limits were implemented, I would request that serious consideration be given to allowing commercial services to exit via Trailcrest.*
> [Business, #90]

Response: Night limit restrictions apply equally to all user groups. As described in table 9 in "Chapter 2: Alternatives," "Night limits exist to protect popular areas from crowding and campsite proliferation." Popular areas require more regulation in order to prevent impacts to resources, to maintain access for all users, and to maintain opportunities for solitude.

Concern 97: Visitors who obtain permits and follow site-specific night limits should not have to follow a yearly night limit.

> *Camping Night Limits: I do not agree with any of the alternatives. A total nights per year limit is ridiculous. I know people who exceed the limit stated in all the alternatives who are some of the most responsible adherents to Leave No Trace principles. For retirees or the unemployed, if they obtain a wilderness permit and do not exceed the per night limits in specified locations, there should be no limit on the total number of days spent per year in the wilderness.*
> [Individual, #88]

Response: Annual night limits provide a mechanism to prevent individuals from residing in wilderness. Individuals residing in the wilderness diminish opportunities for solitude and unconfined primitive recreation and increase the potential for developments in wilderness**.**

Concern 98: The 7-night limit as described under alternative 3 is appropriate for a single location.

> *Regarding "Element 7: Night Limits," I mostly support Alternative 3 for night limits. I do not see any reason to allow stays in a single location beyond seven nights (other than for trail crews and the like). I'd rather have slightly more visitors while maintaining, or*

> *lowering, the amount staying each night by reducing the number of nights allowed in most locations.*
> [Individual, #4]

Response: There is no evidence that wilderness users are impacting natural resources or opportunities for solitude by staying at one site for extended periods of time except in some particular popular high-use areas. As described in the "Wilderness Character, Campsite Condition" section of "Chapter 3: Affected Environment," at current use levels, campsite condition in wilderness has improved markedly. Campsite condition was evaluated in the late 1970s and repeated in the mid-2000s. The surveys showed an increase in the percentage of Class 1, (minimally impacted) campsites from 37% to 60%. Under alternative 3, the potential increase in wilderness user numbers would necessitate more stringent regulation of how long users could stay in one location to prevent undesired resource and social impacts; at current use levels, the regulations are unneeded.

Concern 99: The greater limitations for campsites presented in alternative 4 would provide better protection to minimize impacts from campsites.

> *Standards are needed to assess campsite impacts. We prefer the standards for campsite impacts in Alternative 4 rather than those in alternative 2. Techniques like prohibition of campfires, minimum distance from streams and lakes, limits on the length of stay, etc. will be needed in many areas. In some highly used areas designated campsites may be appropriate-even though such designation could be looked at as a trammeling activity.*
> [Conservation/Preservation, #60]

> *I support the standards for campsite impacts in Alternative 4 rather than those in Alternative 2. I would suggest that an increase In trail head education be appropriate, in the form of trail head signage which includes clear diagrams, as well as visitor education during the permitting process.*
> [Individual, #145]

Response: As described in the "Alternative 2, Element 7" section of "Chapter 2: Alternatives," standards for campsite condition are established using the value of Weighted Value per Campable Mile (WVCM). This measure is evaluated on a larger scale than a specific campsite, taking into account conditions in the entire subzone.

Campsite condition in the wilderness has improved markedly in the last 30 years, as described in the "Wilderness Character, Campsite Condition" section of "Chapter 3: Affected Environment." Campsite condition was evaluated in the late 1970s and repeated in the mid-2000s. The surveys showed an increase in the percentage of Class 1 campsites from 37% to 60%. This improvement is believed to be the product of better education for wilderness users and decreased numbers of users. To attain higher campsite condition standards than those in alternative 2, more stringent regulations would need to be put in place and use levels would need to be decreased. More stringent regulations or reduced user levels would unnecessarily and negatively affect opportunities for unconfined recreation and would not substantially reduce other impacts.

Concern 100: The campsite use presented for alternative 5 is preferable, especially the differing distances to first allowable campsites based on conditions and eliminating designated campsites; however, the 10-night stay should be reduced.

> *I strongly support most of the recommendations outlined in alternative five for campsite use. First allowable campsite distance is very important and I would support differing*

distances depending upon the area. One concern I do have is the length of time visitors would be allowed to occupy one campsite, which seems a little excessive at 10 days. Eliminating designated camping fits nicely within this alternative though consideration of co camping zones in some areas would be supported by most users.
[Individual, #35]

Response: The first allowable campsite location is the same across all alternatives, see table 19 in "Chapter 2: Alternatives." There is no evidence that wilderness users are impacting natural resources or opportunities for solitude by staying at one site for extended periods of time except in some particular popular high-use areas where shorter stay limits have been instituted.

Concern 101: Commenters suggested specific changes to camping restrictions that were outlined for the preferred alternative, including night limits and designated campsites.

I do not agree with the 1-night limit at Hamilton Lake and 1-night limit per lake at Rae Lakes. The limit should be changed to 2 nights. A limit is necessary, but only one night prevents people at Hamilton from a layover day to hike to Precipice Lake and Kaweah Gap. That hike is one of the most spectacular hikes on our planet. A few dayhikers every day will not destroy the experience for those going beyond those destinations. At Rae Lakes, a 2 night limit would allow people to use a layover day to go to Sixty Lakes Basin or simply further explore the area. I also completely disagree with a stay limit in Dusy Basin: A basin-wide limit is not needed. The first lake immediately off the trail is overused; the rest of the basin is not.
[Individual, #88]

Designated Camping at Guitar Lake and possibly Lower and Upper Crabtree Meadows. I am not in favor of this if it means pre-planning for specific dates/camps on the part of wilderness users. Especially on these long-distance trails, it is very common for itineraries to change. That could be because hikers are slower or faster than expected, or just because they choose to spend time in places that they find special, only known to them when they actually get to that place, and impossible to plan for pre-trip. With wilderness permitting entry date on the front end of a trip, and designated camping spots/dates in the Whitney Zone on the back end, these regulations would inherently work against users being able to take advantage of those special places or moments.
[Business, #90]

There is definitely a need for backpackers' campsites in Mineral King. Some of the sites in Cold Springs Campground could be set aside for one-night stays for backpackers. Camping sites for backpackers also could be added at the Tar Gap Parking Area, which already has a pit toilet.
[N/A, #195]

Response: As described in table 9 in "Chapter 2: Alternatives," "Night limits exist to protect popular areas from crowding and campsite proliferation." Popular areas require more regulation in order to prevent impacts to resources, to maintain access for all users, and to maintain opportunities for solitude. In the areas where there are 1- or 2-night camping limits, there are other nearby locations that users can camp to comply with the night limit.

Suggests Change in Alternative(s) for Element 8: Stock Use

Concern 102: The parks should implement a hiking-only trail system that includes some relatively easy trails, in addition to the trails that allow stock. If stock could not be completely restricted from these trails, they should minimally be used by stock. These restricted trails would allow backpackers to enjoy the parks without the evidence of stock use.

> *Under "Element 8: Stock Use," I wish there would be some relatively easy trails that are not open to stock use, or at least open only to minimal (low #) use. I don't know how this translates into miles.*
> [Individual, #11]

> *If the decision is to allow some pack animals into the park there needs to be a trail system for backpackers only so they can enjoy the wilderness without all the flies, manure, and deep dust on the trails.*
> [Individual, #130]

> *For those hikers who prefer to not have to put up with fouling and trampling caused by pack stock, the Preferred Alternative should implement the creation of single use trails (foot traffic only). I would suggest that approximately 20% o the trail system be reserved for foot traffic only (no stock).*
> [Individual, #147]

> *I'm OK with commercial stock in the park, they certainly provide a service. But I do think there need to be more restrictions than there currently are. There should be no off-trail use allowed (and some kind of very, very stiff penalties for any offenses like Milestone basin, like banning the offending organization from the park for 5 years), smaller group sizes to help limit impact, and a network of hiker only trails, where hikers can be assured their potential campsites won't be full of horse manure and they won't be walking all day on a trail dotted with horse manure, both old and fresh.*
> [Individual, #198]

> *8. Restrict stock use on a portion of SEKIs trails to establish a modest network of trails that provide a hiking experience free of pollution by manure, dust, and flies. Specifically, restrict stock use as in Alternative 4 (DEIS Vol. 1, pp. 174-176), PLUS no stock travel of any kind (except for essential NPS administrative uses) on Taboose Pass (from John Muir Trail junction to park boundary at Taboose Pass).*
> [Recreational Group, #123]

Response: A network of hiking only trails is considered in alternative 4. Even in alternative 4, though, "relatively easy" trails for hiking only are not realized. A problem with this idea is that the "relatively easy" trails that exist are the parks' most popular Class 3 trails such as the Rae Lakes Loop or the High Sierra Trail. Designating "relatively easy" hiking only trails in practice would prohibit stock use on the most popular trails in the parks. This would be in conflict with the goals and objectives for outstanding opportunities for solitude or primitive and unconfined recreation (see the "Goals and Objectives" section of "Chapter 1: Purpose and Need").

In the preferred alternative, there are some trails designated "hiking only" that are relatively easy. These include the Monarch Lakes, Admiration Point, Little Baldy, Marble Falls, Tokopah Falls, Paradise Creek, and Dorst/Lost Grove trails (table K-1 in "Appendix K: Trail Management and Classification System for Sequoia and Kings Canyon National Parks"). Of these, the Monarch Lakes Trail is open for backpacking

use. Although these trails were designated "hiking only" primarily for reasons of crowding and safety, the fact of their status as "hiking only" provides some access to trails with no stock use. In addition, although most trails in the parks are open to stock, there are numerous trails where stock use is very light where hikers could seek relatively low-stock experiences.

Concern 103: All trails should be open to all users and maintained as such, except those that are currently designated as hiking only trails. By restricting stock from certain trails, the NPS is restricting stock users from experiencing certain portions of the parks; this includes visitors who may not be able to hike to these areas without the aid of stock.

> *Trails should not be exclusively reserved for one type of wilderness user, with the exception of the Mt Whitney Trail from Whitney Portal to the Summit, where stock use is currently not allowed. There should not be any 'hiker only' trails. Such a system penalizes and restricts users who prefer to travel with stock from seeing and enjoying areas in the wilderness on an equal basis with bikers. Hiker only trails also preclude users who need to travel by pack and saddle stock due to disabilities from having the same experience as able bodied visitors. This creates a sense of discrimination. Granting exclusive privileges to certain user groups is not an acceptable Park Service practice.*
> [Recreational Group, #201]

> *We oppose proposals to create hiker-only trails based on criteria that include perceived conflicts. For example, the Monarch Lake Trail a wonderful trail and important to recreational stock users. Its closure would diminish opportunities for unconfined recreation in park Wilderness. This is but one example of the 42 miles of trail proposed closed to stock use in WSP Alternative 2, the Preferred Alternative (DEIS, p. 115)*
> [Recreational Group, #171]

> *We are also concerned with the continuation of the off-trail restriction of eight "individuals" in the Brewer Stringers I Sphinx. Based on our experience in the area, the Brewer stringers should be treated the same as any other off-trail use area. Brewer Stringer is an area that TCR uses on a regular basis during heavy snow years to access the backcountry on a reasonable date. Since 2006 we account for 100% of the stock use at 70-1. 2 and now we will be perpetually kept out of the area. If there are specific concerns about the area a conversation can help manage the issue rather than eliminating access permanently to the only stock user in the meadow in the past decade.*
> [Business, #196]

Response: There are currently very few trails closed to stock use, and these are closed to stock use for reasons of resource protection and visitor safety on high-use, exposed trails. The preferred alternative adds a few trails to the "hiking only" category based on these same criteria. Although alternative 4 considers the effects of having a relatively large set of hiking only trails, the preferred alternative maintains the maximum extent of stock use on trails while protecting sensitive resources and providing for visitor safety on crowded trails.

Concern 104: The visitor survey used in the WSP/EIS as support for creating hiking only trails actually shows a low percentage of users that report conflict among user groups.

> *Designation of Hiker-Only Trails Not Supported by Wilderness Visitor Survey Available data collected by the Park Service, including the parks 2011 Wilderness Visitor Survey, does not support the need for designation of hiker-only trails in park Wilderness. In fact, the survey revealed a remarkably low level of reported hiker-horse conflict. The*

questionnaire used with hikers and backpackers in the field included a question that goes straight to the heart of potential on-trail conflict. Question 31 asked: Did the actions or behavior of any other group or individual interfere with your enjoyment of the wilderness on this trip? (Report, p. 69). Among 622 respondents to this question, nearly 80% (8. 5%) ided No. That overwhelming response should immediately signal to the Park Service that the vast majority of hikers/backpackers in SEKI Wilderness do not view recreational stock use as a conflict. Yet the DEIS fails to disclose and discuss this particular piece of compelling data.
[Recreational Group, #171]

Importantly, of the 134 people who reported conflict (21. 5% o the overall sample), only 54 (or 8. 5% o overall sample) said the conflict was a result of Groups with pack animals. (Report, p. 70, Question 32). Yet the Park Service is proposing to designate hiker-only trails, which would be closed to recreational stock use, based in part on the appearance of conflict as reported by less than 10 percent of hikers and backpackers? This apparent favoritism does not comport with existing law and NPS policy, as described in further detail below.
[Recreational Group, #171]

Response: Alternative 4 in the WSP/EIS considered the effects of having a significant network of trails designated as "hiking only." The reasons for considering this were not based so much on the visitor use survey as they were based on public comment during scoping. The preferred alternative considers closing trails to stock use for reasons of resource protection and visitor safety on high-use or exposed trails and maintains the maximum extent of stock access on trails consistent with those goals.

Concern 105: The WSP/EIS does not properly validate the need to close certain trails to hiking, commercial or private stock use, or both.

At present, stock use by private parties currently comprises only two percent (2%) ll overnight use in park Wilderness. For the period between 2002 and 2012, Wilderness stock-use permits averaged about 2% o total permits issued each year by the NPS and adjacent national forests combined (draft WSP/EIS, p. 334). Moreover, recreational stock use in the parks by private individuals, like Back Country Horsemen, today is less than half (58%) he levels documented by the NPS in the 1980s, when the 1984 California Wilderness Act was enacted (Source: NPS, Summary of Stock Use Nights in Sequoia & Kings Canyon National Parks - 1960-2009). Given statistics that point to the drastic curtailment of private stock use, the draft WSP/EIS fails to justify the need for the Park Service to impose further restrictions on private stock users. If localized conflicts are thought to indeed exist, we implore the Park Service to seek first to implement targeted visitor outreach, education, and/or other means of separating incompatible recreational uses (a concept at SEKI to which we do not subscribe) instead of targeting private stock users who represent only two percent of all overnight Wilderness use.
[Recreational Group, #171]

Alternatives 2 through 5 Appear to Violate NPS Policy as They Represent De Facto Closures to Recreational Stock Use As described previously, there appears to be no reasonable basis to support the restrictions proposed in alternatives 2 through 5 relative to which trails remain available for private recreational stock use. To structure WSP alternatives that include reductions/restrictions to hiking or stock use appears to us to represent a de facto closure that is neither warranted nor supportable.
[Recreational Group, #171]

Response: The Wilderness Act does not require that stock has access to wilderness. Rather, the Wilderness Act mandates the preservation of wilderness character while allowing visitors to access wilderness in a compatible manner. While stock use is not directly limited by the Wilderness Act, if the impacts of stock use or any other kind of use threaten wilderness character, then the NPS must take action to address these impacts. In the course of evaluating current conditions in the parks' wilderness, the NPS identified resource impacts specific to stock use; in response, the WSP/DEIS and WSP/FEIS propose a number of methods to address these impacts that are compliant with the direction of the Wilderness Act.

Concern 106: The WSP/EIS does not separate private stock users from commercial and administrative stock users. Therefore, trail closures and reduction in stock use is not properly justified.

> *Lastly, no attempt was made to distinguish in the draft EIS/WSP between potential resource impacts associated with private stock use (and its corresponding 2% o all overnight park Wilderness visitation) versus potential impacts associated with the remaining 98% o overnight use associated with either backpacking, commercial outfitters (including stock-assisted trip) or the parks administrative use of pack stock. Thus, proposed reductions in trail miles available to private stock users in WSP alternatives 2 through 5 are wholly unwarranted, unjustifiable and have not been documented as being necessary to preserve wilderness character.*
> [Recreational Group, #171]

Response: The commenter notes that stock restrictions are not generally shown as separating the private stock user from commercial service providers or administrative stock users, reasoning that since such a small fraction of total stock use is from private stock users that additional restrictions on them are unwarranted. It is true that in creating alternatives for the WSP/EIS, a conscious decision was made not to separate private from other stock users in terms of deciding where stock use (travel, camping, grazing) would be allowed. This decision was made specifically to avoid restricting private stock users unnecessarily, while allowing the greatest possible extent of stock access consistent with protecting wilderness character. The NPS imposed additional restrictions on commercial service providers and administrative stock use where warranted. In areas where commercial service providers or administrative stock use has the potential to displace or limit private stock use, steps were taken to protect private stock users (e.g., reserving Lower Whitney Creek Meadow for private grazing only in the Whitney area).

Concern 107: Regulating stock use to a level that would prevent impacts to the parks' resources would be too burdensome on the parks' finances and staff.

> *Horses and mules should not be allowed in national Parks. Although regulations, if adhered to, could prevent some of the damage, they could not prevent all of it and would likely be unenforceable as a practical matter. Such enforcement would likely be at public expense besides. The environmental impact of horses & mules is adverse to the quality of Sequoia & Kings Canyon National Parks and their presence should be banned in all alteratives preferred by the National Park Service.*
> [Individual, #139]

Response: The effects of regulating stock use are considered in the analysis (see the "Park Operations" section of "Chapter 4: Environmental Consequences").

Concern 108: The NPS should not create any new stock-supporting facilities at campgrounds and trailheads, including campsites, drift fences, gates, and parking. Adding facilities such as these could encourage more personal and commercial stock use.

(cont'd) DEIS Alternative 2 Element 10 - In addition to opposing the Atwell Mill changes for stock, the entire concept of creating new stock campgrounds and ANY new structures/facilities that support stock use is contrary to the Wilderness Act. Essentially, the stock community is asking the NPS to install facilities in the wilderness to ensure their commercial viability. Although this is done in the name of allegedly minimizing impact, that is not truly the case. Every drift fence, post, gate, and stock campground is a means of enabling a commercial end that could not otherwise exist at current levels or even the levels proposed in DEIS Alternative 2. Without all of the stock supporting facilities in the wilderness allowed by DEIS Alternative 2 and paid for by the rest of us, stock use would have to be reduced to levels that might not be commercially viable but that would FINALLY approach the minimum impact/leave no trace standard that the NPS demands of HUMAN visitors.
[Individual, #46]

(cont'd) DEIS Alternative 2 Element 10 - Further, I do not see any basis for allowing commercial stock use or travel from ANY trailheads that lack a pack station. Cedar Grove pack station can access north and south including Roads' End. Wolverton pack station, if it is in fact commercially viable, could access the cutoff and Sevenmile Hill to the HST, and go from there. Mineral King pack station can either become economically viable or close. Pack stations outside of the parks can handle the rest from where they are located. There is no need to provide for ANY facilities to support commercial stock use at ANY other trailhead, such as parking, paving, extra large clearings, gates, posts, fences, etc. Such additional facilities are a pure subsidy to commercial enterprise in wilderness that is contrary to the intent of the Wilderness Act. The DEIS Alternative 2 fails to account for how new frontcountry stock supporting activities at the Middle Fork Kaweah and South Fork in particular would "harden" the landscape at these locations and completely change their character, mix of uses, and day-to-day impacts on the trailhead environment and the trails themselves.
[Individual, #46]

Please arrange to keep stock out of fragile areas (such as the Dusy Basin). I request that the NPS set aside trails free of stock, so that walkers can enjoy the parks and the landscape will be relatively less harmed. I strongly agree that NO NEW facilities should ever encourage more stock use or commercial use. I understand the history of the commercial packers, but I feel strongly that the numbers must be carefully controlled and incrementally reduced. The sizes of the trains and the parties must be adapted to the present foot traffic in these parks, and the packers must use bear contrainers just like everyone else.
[Individual, #164]

Response: The establishment of facilities in frontcountry locations is not directly under the mandate of the Wilderness Act, as they are not in wilderness. Use into wilderness that may be supported by these facilities has been analyzed for its effects on wilderness character throughout “Chapter 4: Environmental Consequences.” Facilities in wilderness (e.g., drift fences and food-storage boxes) for public and administrative use, have been evaluated and subjected to a minimum requirement analysis to ensure they are the minimum required to meet the purposes of the Wilderness Act (see “Appendix M: Programmatic Minimum Requirements Analysis”), as required by Section 4(c) of the Wilderness Act. Note that any changes to frontcountry facilities proposed by this WSP/EIS will also be subject to additional site-specific NEPA analysis and compliance.

Concern 109: Stock use should be limited to the trails; all cross country travel by stock should be banned since off-trail use by stock is damaging.

> *All cross country use by stock should be prohibited- - -no exceptions! Even light off-trail use by stock is extremely damaging, as it only takes a few large animals to establish trails of use. Prohibition of cross-country stock use is decades overdue.*
> [Individual, #180]

> *Stock should not be allowed to go off trail, except within 0. 5 miles of the trail to find a camping spot.*
> [N/A, #195]

> *Establish a network of trails and meadows closed to stock use. We are not suggesting building new trails, but dedicating a network of existing trails for hikers. Restrict stock animals that travel off maintained trails. Scientists have long recommended that stock animals be required to stay on designated, maintained trails. The NPS should limit off-trail stock groups to a much smaller size limit than for on-trail groups. (A maximum group size of 6 seems to be a limit supported by research.) Off-trail use by such groups should be closely monitored and regulated so the impacts of their travel are "no-trace," in other words, not persisting from year to year.*
> [Conservation/Preservation, #166]

Response: Limiting all stock travel to formal trails is considered in alternative 5. The potential for informal trail impacts was analyzed in the "Soils" section of "Chapter 4: Environmental Consequences." The potential for nonnative plant introductions was analyzed in the in "Nonnative Plant Species" section of "Chapter 4: Environmental Consequences."

Concern 110: The NPS should limit the areas where stock are allowed. In areas where camping with stock is not permitted, stock should be limited to 0.25-mile from the trails.

> *Off-trail stock: In other areas open to camping with stock, travel would be allowed up to 0. 5 mile from trails and routes in areas where they are allowed to camp and up to 100 yards from day-use trails. For other areas, the 0. 5 miles should be changed to 0. 25 miles.*
> [Individual, #88]

Response: All alternatives call for restricting access in no-stock camping areas to 100 yards from trails.

Concern 111: All stock use should be banned from high elevation areas where the resources are more sensitive; however, stock should be allowed in off-trail areas below the treeline. Signage would help guide stock users in determining what areas are accessible.

> *Off trail use, by both hikers and those using stock for overnight camping is an issue that needs careful consideration. High elevation alpine areas and other particularly sensitive areas should be monitored carefully with steps taken to minimize excessive impacts in those areas. There are certain areas near trails in sub-alpine zones below the tree line where off trail camping by stock may be acceptable but these areas should always be specifically designated and carefully monitored.*
> [Conservation/Preservation, #60]

It is time to restrict horses to sub-sub-alpine regions of the park: a reasonable plan would be that signs saying no campfires above 9000' or 9600' or 10000' have an additional sign attached to those posts saying no horses above those elevations, either. It is simple, workable, and would protect the alpine and sub-alpine wilderness environments from large, heavy, shod pack stock and large parties traveling as a group in those fragile environments.
[N/A, #154]

Prohibit stock use in fragile high-elevation lake basins. These include Center Basin, Dusty Basin, Lake Basin, Milestone Basin, Miter Basin, Wallace Lakes Basin, and Wright Lakes Basin. Even relatively small numbers of stock cause significant harm in these fragile areas. In order to avoid the impacts, NPS would have to limit the numbers so severely that it would make administration very difficult. Stock users desiring to visit these fragile areas should incorporate enough time in their schedules to hike into these basins if they wish to visit them.
[Conservation/Preservation, #166]

Response: "Stock use" includes three different activities: travel, camping, and grazing. Stock travel at higher elevations is almost exclusively on trails. Restricting stock travel from trails designed and constructed for stock use would not assist in the preservation of high elevation areas. In terms of camping and grazing with stock, existing information indicates the preferred alternative would have no unacceptable impacts. Campsite resource conditions have improved at all elevations in the parks since designation (Cole and Parsons 2013). For grazing, the WSP/EIS imposes site-specific (rather than broad or general) restrictions to ensure the widest possible recreational access consistent with preserving wilderness character and the parks' resources (see the "Topics Dismissed from Detailed Analysis" section of "Chapter 1: Purpose and Need").

Concern 112: Stock use should be limited to administrative uses and those visitors who are physically unable to hike.

The use of stock should be limited to trail and facility maintenance and groups that carry people with disabilities.
[Individual, #83]

I strongly urge you to eliminate all livestock from these parks, except perhaps for the special administrative uses when no other options are viable. Even where and when stock are used, they should be prohibited from high elevation basins and lake drainages like Dusy Basin, Darwin Canyon, Evolution Valley, etc. When stock are used by the NPS manure catchers should be required.
[Individual, #94]

The impact of pack animals needs to be reduced by greater limitations on the permits for their use, perhaps restricting the transport of excessive supplies and amenities (tiki torches, inflatable rafts and furniture?) and even able-bodied visitors
[Individual, #229]

1. Allow commercial horseback riding and packstock services in SEKIs wildernesses only to the extent that is truly necessary and proper under the Wilderness Act. Commercial stock are allowed for recreational purposes ONLY for clients/parties who: i) are physically incapable of hiking and/or carrying a backpack of his or her own; ii) need stock support to facilitate a wilderness-dependent activity (not simply desire convenience,

> *comfort, or a horseback ride); iii) are willing to travel with the minimum necessary gear (i. e. , lightweight gear/food normally carried by a backpacker); and iv) do not displace non-commercial visitors (i. e. , commercial stock services NOT allowed for entry points and times of year for which trailhead quotas normally are filled).*
> [Recreational Group, #123]

Response: The Wilderness Act, including Section 4(d)(5), makes no mention of visitors' physical needs or provides any restriction on items brought into wilderness other than those identified in "Prohibition of Certain Uses" in Section 4(c). Individual visitor's physical status is therefore not used as criteria for the necessity of stock support.

Riding and packing stock are legitimate primitive recreational uses of wilderness, and are allowed per the GMP. The WSP/EIS is not revisiting the question of allowing recreational use of stock in the parks' wilderness. Focusing on a person's physical inability to hike distracts from the issue that choosing to hike or ride or climb or boat is a question of personal recreational preference.

Concern 113: The NPS should reduce the level of stock used for administrative purposes to the extent necessary only. Administrative stock use should be reduced at the same magnitude as private and commercial stock use.

> *the Park Service should dramatically curtail administrative use of stock. All WSP alternatives should specify that use of administrative stock will be limited to the absolute minimum extent necessary to perform essential functions. Those essential functions should be clearly defined. If administrative stock are not being used for such functions, they should be removed from the wilderness and pastured in the frontcountry.*
> [Individual, #180]

> *According to SEKI data administrative stock use in 2012 constituted over 40% of total use and was greater than commercial use. (P348) Users do not distinguish between a commercial mule and an administrative pack animal. They all leave manure on the trail. If guided and non-guided stock are limited, so too should the Park stock.*
> [Business, #205]

Response: Administrative activities that provide for the preservation of wilderness character are allowed under the Wilderness Act (Sect. 2(a)). Administrative stock use is subject to the same minimum impact guidance as visitors. During implementation of the plan, the extent of administrative stock use will be analyzed under the minimum requirements process. For grazing purposes, the preferred alternative states, "Administrative grazing would be managed to limit impacts on public grazing (Note: with rare exceptions, visitors are given preference for limited grazing resources)" (see "Alternative 2, Element 8" section of "Chapter 2: Alternatives").

Concern 114: Stock should not wear bells, as it disrupts the natural soundscape.

> *5. No bells on stock animals in wilderness (to preserve the natural quiet).*
> [Recreational Group, #123]

Response: If free-grazing stock use is allowed, then visitors need some means to track and recover their stock. Current means available are bells or electronic tracking collars. Bells disturb the wilderness soundscape for some visitors, while electronic tracking collars disturb other visitors who object to modern technology in wilderness. Conversely, some visitors enjoy hearing the bells on stock, and others have no objection to modern electronics. These are impacts on the opportunities for solitude and undeveloped

qualities of wilderness character. Given no clear advantage of either method in terms of preservation of wilderness character, the WSP/EIS does not prescribe or proscribe either one.

Concern 115: Stock use at the South Fork Trailhead should not be increased, as proposed under alternative 2. This area currently allows use of the foothill trails without stock presence and it should remain that way. Modifying the trailhead for stock use would likely damage some of the trees that are part of the attraction of the area.

> *I would like to be clear that I am adamantly opposed to developing the South Fork trailhead to increased use of stock proposed in Alternative 2 for the following reasons: 1. The only trails closed to stock in the foothills, which means the only accessible winter trails in the Park, are the chaparral Marble Falls trail and the Paradise Creek trail. The majority of foothill trails are used by foot hikers so with Ladybug a foot only trail, there would still be only 3 actually closed to stock. One of the most unique characteristics of Sequoia Park is the fact that it extends down into the foothill region and has this incredible trail system in the foothills with winter access. 2. The Ladybug trail is easy, short and beautiful with all those ladybugs usually hibernating right in the middle of the trail, an ideal trail for children to see the ladybugs. So many who could not achieve a harder hike, may still learn to appreciate the solitude and beauty of nature on Ladybug trail. I hate to think of what stock would do to that trail and to the ladybugs. The trail itself is unsuitable for stock, being too narrow in places and would require extensive improvement 3. I cannot imagine a way to improve the trailhead for turnaround for stock vehicles without removing or damaging some of the beautiful old oaks in the parking area and destroying parts of this wonderful small shady vale of South Fork Campground which is habitat for Hutton's Vireo through late November and Varied Thrush in the winter. Even development below the road's end will destroy beautiful habitat. I have never seen stock on the Garfield Grove trail and use is minimal on the Ladybug trail, so it is not a great loss for stock users. I believe there should be some alternatives available for families without the extra resources to support stock travel. They should be able to enjoy a trail free of manure, flies and churned dust produced by stock. 4. There is plenty of room at the North Fork and Middle Fork trailheads for improvements and both the N Fork trail and Colony Mill Rd are wide and can easily accommodate stock, since they were actual roads.*
> [Individual, #206]

Response: Stock use is currently allowed at the South Fork trailhead. The NPS is proposing to modify the existing parking area and/or campground to allow for stock trailer turnaround and/or a stock trailer parking area. Site specific planning and compliance would occur prior to modifications, and methods to minimize impacts on the area would be considered.

Concern 116: The WSP/DEIS fails to identify unacceptable impacts on natural and cultural resources of the parks from the use of stock; therefore, the changes in stock management are unwarranted.

> *Park management direction-both stated and implied-in the GMP indicate there are few documented resource concerns or user conflicts associated with the existing park Wilderness trail system. Yet Alternatives 3 through 5 include reductions in the amount of trail miles available for recreational stock use. The draft WSP/EIS is deficient as it is not clear on what basis formed the rationale for these proposed reductions. As stated previously, pack stock use by private parties has decreased substantially over the past several decades. It would follow that adverse or unacceptable impacts resulting from*

> *stock use on Wilderness trails would therefore be substantially fewer at present than the WSP baseline datum of 1984 (or 2009 for the John Krebs Wilderness). Lastly, the draft WSP/EIS fails to document unacceptable impacts-be it to water quality, cultural or natural resources-that can be attributed to use of private horse and pack stock in park Wilderness.*
> [Recreational Group, #171]

Response: Management actions to preserve wilderness character, such as regulating stock use, are within the authority of the NPS and are compliant with the Wilderness Act, the National Park Service Organic Act, the parks' enabling legislation, and other laws and policies. In accordance with the Wilderness Act, if the impacts of stock use or any other kind of use threaten wilderness character, then the NPS must take action to address these impacts. NPS *Management Policies 2006* Section 8.2.2.8 explains that recreational stock use is authorized in national parks provided it is managed to avoid unacceptable impacts and that plans for recreational stock use should address social, biological, and physical carrying capacity considerations.

In the course of evaluating current conditions in the parks' wilderness, the NPS identified resource impacts specific to stock use; in response, the WSP/EIS proposes a number of methods that are compliant with the mandate of the Wilderness Act to address these impacts. In the WSP/EIS, the NPS considered alternatives with varying levels of recreational stock use and evaluated the environmental impacts of each alternative. The environmental analysis in the WSP/EIS demonstrates that none of the alternatives would result in unacceptable impacts.

The number of stock and where stock can travel and graze in wilderness are regulated to protect wilderness character. Stock numbers are controlled by trailhead quotas, party-size limits on and off trail, visitor service-day limits placed on commercial services ("Appendix B: Extent Necessary Determination for Commercial Services"), and grazing-capacity limits placed on individual meadows and forage areas ("Appendix D: Stock Use and Meadow Monitoring and Management Strategy"). Additional stock access restrictions and mitigation measures, such as meadow opening dates and trail improvements, would work to minimize impacts on the parks' resources.

Suggests Change in Alternative(s) for Element 8: Stock Use - Grazing

Concern 117: The NPS should reduce or eliminate all stock grazing in wilderness, including administrative stock grazing, as grazing causes undue stress on the parks' resources.

> *I suggest that the NPS eliminate ALL grazing of any kind in the parks. Given the susceptibility of the park regions to global climate change, additional stresses on the park areas (from grazing, for example) must be avoided. While monitoring (of grazing impacts) can help, this is not a panacea for reducing damage. It is essential that park areas are adequately protected for future generations.*
> [Individual, #147]

Response: The NPS recognizes that grazing has the potential to impact vegetation, water quality, and soils. These impacts are described and evaluated in "Chapter 3: Affected Environment" and "Chapter 4: Environmental Consequences" of the WSP/EIS. The elimination of grazing by stock in wilderness is considered under alternative 4 of the WSP/EIS. Each of the alternatives that allow for grazing to continue, including the preferred alternative, mitigates these impacts to acceptable levels through the continued monitoring and adaptive management of stock use and grazing. Grazing management is addressed in detail in "Appendix D: Stock Use and Meadow Monitoring and Management Strategy."

Concern 118: Stock users should be required to pack in weed-free feed for their stock and the stock should be fed this feed prior to entering the parks. In addition, stock should be physically inspected for seeds as this would help prevent the spread of invasive plants into sensitive habitats.

> *The WSP should prohibit grazing park-wide. All stock users should be required to pack in weed-free feed for their animals, so that SEKI's beautiful meadows are no longer mowed down by grazing stock. Many other national parks have adopted this requirement. Limit "administrative" grazing by NPS stock. Currently, SEKI owns numerous stock animals that are allowed to graze and trample the park's fragile meadows all summer long. NPS packers periodically haul fresh food to trail crews, but then leave the animals to graze in the wilderness until time to exit the mountains to fetch another load of supplies. It should be the opposite: NPS stock should leave the mountains between re-supply trips, not graze the park's fragile meadows all summer long.*
> [Conservation/Preservation, #166]
>
> *Just a caution on grazing - it needs to be strictly controlled to stop trampling of meadows and the plants and animals in them - stock should be for the most part required to bring their own feed to lessen the impact on meadows and streams.*
> [Individual, #67]
>
> *stock users should be required to carry pelleted feed that is certified as weed free. They should be fed a weed free diet for several days before entering the wilderness, and all stock animals should be inspected before they are allowed into the backcountry to ensure that they are not transporting seeds of invasive plants.*
> [Individual, #180]
>
> *The DEIS also fails to reasonably assess the effectiveness of proposed measures related to stock management effects (App. D) and nonnative vegetation strategy (App. N) with respect to limiting the spread of nonnative vegetation. This is a serious deficiency in the DEIS, because the approaches in App. N and App. Dare unlikely to be effective in stemming ongoing nonnative vegetation invasions due to the lack of required effective measures to reduce the spread of nonnative vegetation. Instead of applying more effective measures to limit nonnative vegetation spread and establishment, such as those previously discussed, App. N and App. D primarily rely on detection of infestations and post-detection treatments. It has long been recognized that post-detection treatments are generally ineffective at stemming nonnative vegetation invasions and are far more ineffective than preventing nonnative vegetation establishment. These limitations of the nonnative vegetation strategies in App. D and N must be adequately assessed and disclosed in the FEIS.*
> [Business, #238]

Response: The role of stock as a dispersal vector for nonnative plants is recognized and evaluated in the WSP/EIS. Under all of the action alternatives, the threat of introducing nonnative plants is minimized by requiring that all stock feed brought into wilderness be limited to commercially processed pellets, rolled grains, or fermented hay. These products are less likely to contain nonnative plant propagules than is certified weed-free feed, which may still contain invasive plant propagules that cause problems in wildlands. Therefore, this measure is considered more protective than allowing “weed-free” hay products in wilderness. In the frontcountry areas, where early detection and control is more feasible than in wilderness, state-certified weed free forage would be required when hay products are used as feed or bedding.

Stock users are encouraged to purge their animals for at least three days on pellets, rolled grains, fermented hay, or certified weed-free forage prior to entering the parks. They are also encouraged to inspect and clean stock and equipment for any plant parts, seeds or soil that may have adhered to animals, tack, or equipment, and to handle loads and tack in such a way as to avoid picking up plant parts or soil. Pack station concessions contracts, commercial use authorizations, and outreach and educational materials will continue to include these guidelines. These are identified as desired practices rather than requirements due to the impracticality of enforcement.

The NPS strategy for preventing the introduction and spread of nonnative invasive plants is presented in detail in "Appendix N: Strategy for Reducing Nonnative Plants in Wilderness."

Concern 119: Some commenters expressed the view that drift fences and other structures should be removed to enhance wilderness experience, while other commenters believe that removal of these structures would negatively affect the wilderness experience of some visitors.

> *Removal of Drift Fences and Hitch Rails These "structures" protect resources and often serve to project the packer's wilderness experience (lest stock drift beyond meadow and return to trailhead, creating a safety hazard to all on the trail). As such, they serve as a valuable management tool.*
> [Individual, #119]

> *The Park Service should remove all fences, gates, and wire associated with stock use. Drift fences are a significant intrusion on wilderness character and would be rendered unnecessary if stock users carried their own feed and were not turned loose to graze.*
> [Individual, #180]

> *(cont'd from 392881) Next, the WSP badly needs to review how it evaluates fences and, above all, not build any new ones. These are yet another unacceptable intrusion on wilderness character brought on by allowing stock. Although the table for stock fences justifies most as protecting meadows, this is untrue in almost all cases. Almost every fence is there for the convenience of stock packers to prevent their stock from returning to their base or crossing a drainage. For instance, the fences at the 2ND San Joaquin bridge, Lower Evolution meadow, Big Pete (maybe has some slight justification), Ladder, Stillwater, above the Swinging Bridge at Woods and, as noted, most others, do not protect meadows and should be removed. If packers want to find their stock, they should use modern electronic tracking devices with alarms when they go beyond a certain distance. It is no longer acceptable for them to have the NPS build and maintain such major physical intrusions on wilderness character.*
> [Conservation/Preservation, #116]

> *The elimination of drift fences and hitch rails is totally unwarranted and will lead to greater difficulties in managing stock use properly. The current system of drift fences and hitch rails actually help to protect the natural resources and should remain. Conflicts between stock users and park rangers will likely occur if stock wander into areas where grazing is prohibited if the drift fences are removed. Hitch rails serve as an alternative to having to tie stock to trees. It is irrational to remove them and sets stock users up for failure.*
> [Recreational Group, #201]

> *In multiple management documents SEKI proclaims that stock use is a historic and traditional use that will be continued while being subject to management provisions to*

> *minimize potential damages caused by stock grazing. But the proposed removal of 12 drift fences and gates and the removal of 23 hitching rails in the PA is counter to the preservation of stock use as is the closing of an additional 17 meadows to grazing in the PA. If stock use is concentrated in fewer and fewer meadows, there is a greater potential for damage to the remaining meadows which will result in demands for more closures and more restrictions. The removal of drift fences and gates and hitching rails has a very significant negative effect on the wilderness experience of stock users.*
> [Recreational Group, #230]

> *In general, BCHA and HSU BCH California are opposed to all hitch rail removals on the grounds that their primary benefit is resource protection (protection of trees and soil). High lines are generally used for overnight restraint, not short-term restraint while traveling, and are therefore not suitable for short-term use. In areas where more than one hitch rail is provided, we are not opposed to the excess rails being removed.*
> [Recreational Group, #186]

Response: Recreational stock use is allowed under the action alternatives because it furthers wilderness purposes such as recreation. NPS use of stock is allowed in wilderness for the purposes of administering and patrolling wilderness. Drift fences and hitch rails prevent recreational and administrative stock from leaving designated grazing areas and entering areas where grazing is prohibited. The value of all stock-related structures and facilities (e.g., drift fences and hitch rails) for meeting the planning objectives for each alternative has been evaluated and a range of options for their management is provided. Tables 51a and 51b in "Chapter 2: Alternatives" of the WSP/EIS articulate the reason for retaining or removing each such structure under alternatives 2, 3 and 5. Those that are retained have been determined to be the minimum necessary for administering the wilderness in accordance with the Wilderness Act and the wilderness management goals of each alternative (see "Appendix M: Minimum Requirement Analysis"). Under alternative 4, which prohibits all grazing, the removal of all such structures in order to emphasize the undeveloped quality of wilderness is considered and evaluated. The preferred alternative reduces the number of these installations in wilderness but retains those that that are determined to be the minimum requirement for recreational and other wilderness purposes and for administrative operations. Other methods, including the use of high lines and other temporary means of restraining animals, are allowed, and encouraged through outreach and education.

Concern 120: Commenters suggested changes to trail meadow closures and stock facility removal including increasing stock use nights in certain meadows, opening certain meadows to grazing, maintaining certain meadows for private stock grazing only, retaining certain drift fences, and restricting stock from high-elevation basins and trails.

> *Tom Sears Meadow should be open for commercial stock use grazing. Sandy Meadow should have 400 stock use nights. There are numerous stringers in the area where the stock disperse to, and there is much more capacity that the current regulations allow. Strawberry Meadow was cut off to commercial grazing in 2013 with no notice and no analysis. It was closed to private stock grazing in 2014. It should be re-opened. Lower Crabtree was only 39 for the season. It should be 100 for a normal year. Upper Crabtree had only 79 for the season, where it should be at 150. There are many tributaries and stringers that are not being utilized. McClure needs to be open to be grazed. Some visitors want to go there to camp, and and the packers should be able to stay there as well with the stock.*
> [Recreational Group, #201]

Meadow Closures 1) Meadows south of Bighorn Plateau and west of the JMT and north of Wright Creek This meadow is an important stopping place along the JMT with no close alternative grazing opportunities. The next closest grazing opportunities are at Crabtree or Sandy Meadow, which is 6 miles distant to the south. Kindle Creek meadow is 5 miles to the north, so would be a 11-mile stretch of no open meadow. 2) Chagoopa Plateau #3 Meadow This meadow is an important stopping place along the HST from Kaweah Gap with no close alternative grazing opportunities. The next closest grazing opportunities are at the Kern River. . Big Arroyo 3 miles away, but that trail is proposed closed under Alt. 2; south and east is Upper Funston, which is 8 miles distant. 3) Grouse Meadow This meadow is an important stopping place along the JMT with no close alternative grazing opportunities. Closest alternative grazing opportunities along JMT is Little Pete, some 4 miles distant. 4) Lower Crabtree Meadow This meadow is a well-liked and important stopping place along the JMT with no close alternative grazing opportunities. Upper Crabtree is about 1 mile to north, often wet (would need drift fence to keep stock out of lake; but Alt. 2 proposes to close it too to grazing?); Sandy is 5 miles distant, Strawberry 1 mile but only 3 acres = 1party at a time; so no viable alternatives. 5) Woods Lake Basin Meadows This meadow is a major stopping point along the Rae Lakes Loop that serves multiple passes and routes. It is the first stopping place when you enter the region from the south. The region is open to stock travel, but any grazing would be prohibited. We find this restriction unacceptable, particularly since there are no close alternate meadows. 6) Taboose Pass Area Closest alternative grazing opportunities are 5 miles distant.
[Recreational Group, #186]

Drift Fence Removal 1) Stillwater Meadow No other drift fences are available to restrict stock access to sensitive meadows or to drift down canyon from Deer Meadow. 2) Shortys Meadow (upper) Important drift fence to keep stock from going over Granite Pass. 3) West Side Roaring River (lower) Important drift fence for private party stock use and sensitive resource protection. Adjacent pastures are NPS use only; need to maintain separation. 4) Grasshopper Important for maintaining stock in the meadow(s) and traveling up canyon. 5) Cold Springs This is the only drift fence in the Upper Kern Canyon in a region with lots of good feed that is well liked by private parties, particularly since no longer used by NPS stock teams. 6) Lower Funston Protects sensitive meadows and keeps stock from going down the Kern Canyon. Has been there 50-60 years and is used frequently. 7) Rattlesnake Canyon #2 & 3 Protects sensitive meadows and keeps stock from going down the Kern Canyon.
[Recreational Group, #186]

Element 8: Stock use Lower Soldier Lake meadow, I believe, should only be open to private grazing otherwise commercial use might increase along with Whitney supported trips. I think there should be at least one meadow open to private grazing in the Mt. Whitney area, perhaps "Rainbow camp?"
[Individual, #158]

Response: Individual suggestions for changes to the preferred alternative related to meadow closures and stock facilities were considered in the context of the planning objectives and the following revisions have been made in the WSP/FEIS:

Meadow Number	Comment	Revision
85-6	Lower Soldier Lake Meadow should be open to private grazing only.	The preferred alternative has been modified to reflect that Lower Soldier Lake Meadow would be open to private grazing only.
80-1	Meadows south of Bighorn Plateau and west of the JMT and north of Wright Creek should be open for grazing.	No change. The description of the area this closure applies to has been revised for clarity.
57-1	Woods Lake Basin Meadow should be open for grazing.	The preferred alternative has been modified to reflect that Woods Lake Basin Meadows would be open to grazing by burros and llamas.
80-5.1, 80-5.2, 80-6	Lake South America Loop and Kern Headwaters should remain open to grazing.	The preferred alternative has been modified to reflect that Lake South America Loop and Kern Headwaters Meadows would be open to grazing by burros and llamas.
67-2	Ouzel Meadow should not have a grazing night restriction.	The preferred alternative has been modified to reflect that the night limit at Ouzel Meadow would be removed.
72-11	Tom Sears Meadow should be open for commercial stock grazing.	No change. Under the preferred alternative, Tom Sears Meadow is open for grazing by commercial outfitters.
83-8	Sandy Meadow grazing nights should increase to 400 nights.	No change. The proposed stock use and meadow monitoring and management strategy includes a process by which grazing level could be modified based on monitoring results.
39-2	Big Pete Meadow should have temporary closures instead of complete closure.	No change. Under the preferred alternative, a portion of Big Pete Meadow would remain open to grazing.
83-4	Upper Crabtree Meadow should have a grazing capacity of 150 nights.	No change. The proposed stock use and meadow monitoring and management strategy includes a process by which grazing level could be modified based on monitoring results.

Concern 121: When deciding on distances between grazing meadows and stock camps and on the number of grazing days, the NPS should take into account long-distance travelers. On longer trips, stock groups can travel up to 10 miles per day; however, under the preferred alternative, there are sections of trails with no grazing for over 20 miles. The long distance between sites could also be detrimental to stock parties with younger or older visitors that cannot sustain longer distances between breaks. In addition, high-use trails have few meadows for grazing opportunities.

> *I request that SEKI takes a holistic approach to stock-use quotas and meadow closures. A good example is for the John Muir Trail, where I understand there will be more site-specific measures being implemented as a result of this new stewardship plan, including closing some meadows for the sole purpose of just having some undisturbed meadows for all wilderness users and researchers to enjoy. I ask that considerations are made for groups traveling on longer trips, such as the JMT, where there needs to be a practical way to travel and still find appropriate camping/grazing. For reference, 8-10 miles of traveling per day is typical and there should be stock-appropriate camping/grazing sites at intervals appropriate to through-travel.*
> [Business, #90]

Change grazing restrictions on all trail systems to facilitate shorter travel distances. The maximum distance between allowable camping and grazing areas should be no greater than 3 miles, with camping limits of no less than 2 nights per area. This provides opportunities for visitors to travel with both young and old members of their group and aids in the Parks' mission to facilitate and enhance visitor experiences.
[Recreational Group, #201]

The proposed changes in the Preferred Alternative creates two sections of trail greater than 20 miles - between Upper Bubbs to the Twin Lakes area and then again from Little Pete Meadow to the northern end of the Park - where there would be no grazing with stock for more than two nights. This would essentially close swaths of the backcountry to stock users who want to camp and explore the area.
[Business, #196]

Upon close inspection of the draft WSP/EIS and associated tables and maps, we found that few alternate meadows exist in proximity to those proposed closed to stock grazing along high-use trails (PCT, JMT, HST), despite statements by the NPS to the contrary. For example, one such proposed closure (Bighorn Plateau Lake) would result in an 11-mile stretch of the PCT/JMT along which there would be no meadows open for horse/stock grazing. This would make PCT-related travel logistics untenable, particularly if severe weather (e.g., late afternoon thunderstorms) forced a stock-assisted party to quickly set up camp in order to wait out the storm.
[Recreational Group, #186]

Response: For visitors traveling along the JMT/PCT within the parks, the average distance between meadows that are proposed to remain open to grazing is less than 3 miles under the preferred alternative. In two places along this route, visitors traveling with horses and/or mules would have to travel over ten miles between meadows available for grazing — 13.7 miles between the Darwin Pocket meadows in Evolution Valley and Big Pete Meadow in LeConte Canyon (when crossing Muir Pass) and 10.3 miles between Upper Bubbs Creek and Sheep Camp (when crossing Forester Pass). For parties traveling with burros and llamas through the Evolution Basin, the maximum required distance would be 7.3 miles. The remaining distances between meadows open to grazing range from 0.5 mile to 8.6 miles. The NPS recognizes that certain meadows along the most popular travel corridors have high logistical value for visitors traveling with stock. Where resource concerns other than vegetation removal do not limit grazing capacity, logistical value would be used as one factor to set allowable utilization rates, and thus the total amount of grazing allowed. A list of the criteria used to evaluate logistical value and a list of the 55 meadows which meet the criteria are presented in "Appendix D: Stock Use and Meadow Monitoring and Management Strategy."

Under current conditions, 63 of the 83 named meadows along the JMT, PCT, and High Sierra Trail (HST) are open to grazing. Under the preferred alternative, 57 of the named meadows would remain open to grazing.

Concern 122: Closing meadows for scientific, experiential, and social values would be unfavorable for certain visitor groups. Many trails in the parks have historically been used for stock travel and the meadows used for grazing. Closing the meadows would affect the wilderness experience for stock users.

Closing Meadows for 'social' value shows a clear bias towards one user group over another. Setting aside meadows, especially along the Pacific Crest Trail (a nationally designated trail for hikers and horses) so that a select group of users will not see any

stock is establishing a very dangerous precedent. The public would then come to expect the Park Service to cater to other personal preferences the visitors may have. When it is done for one group- others will expect the same.
[Recreational Group, #201]

The John Muir and High Sierra Trails are also historic trails and popular with stock users. They should not have meadows closed for "social value. ' This management action completely ignores the desires of other users who enjoy looking out and seeing the pleasant view of horses and mules grazing peacefully in the meadow at sunset and the early morning. For stock users, watching your animals graze freely around a meadow is one of the highlights and a meaningful aspect of going into the wilderness with horses, mules and burros.
[Recreational Group, #201]

Closure of open meadow grazing for social and scenic value presupposes a fundamental question of whether most hikers and backpackers would have the knowledge and/or experience to identify the cause of a meadow they witnessed as being trampled. For example, deer and bighorn sheep can leave evidence of patchy grazing in park meadows. Also, deer are known to flatten vegetation when bedding down in meadows or other high grasses.
[Recreational Group, #186]

We believe the Park Service has not thought this issue through and, consequently, believe that the proposal to restrict meadow grazing based in part on the desire to protect social or scenic values is unfounded and arbitrary. For example, the Parks stated objective of providing at least one ungrazed meadow per drainage is arbitrary and not supported by the available date. The WSP/EIS alternatives that support this line of thought are flawed, if not outright biased against horse/stock use because they appear overtly preferential to the perceived concerns that might-or might not-be expressed by a vocal minority of hikers/backpackers.
[Recreational Group, #186]

Response: In the years following implementation of the 1986 Stock Use and Meadow Management Plan (SUMMP), visitor use — including by both stock users and hikers — has become increasingly concentrated along the primary trail corridors such as the JMT, PCT, and HST. Although many users appreciate and value the opportunity to encounter and view pack animals in wilderness, others have expressed concern over the effect of grazing impacts (e.g., manure, flies, and appearance of grazed vegetation) on their wilderness experience. Although approximately half of the wilderness meadows were closed to grazing under the 1986 SUMMP, very few of them are along the primary trail corridors. On the approximately 102-mile length of the JMT from the Piute Creek entrance into Kings Canyon National Park to its terminus at the summit of Mount Whitney, three meadow areas (Rae Lakes, Vidette, and Crabtree Ranger Station Meadows) are closed to all grazing. An additional two meadows adjacent to the PCT south of the Mount Whitney area (Guyot Creek and Rock Creek Ranger Station) are closed to grazing. Along the length of the HST between Crescent Meadow and its junction with the JMT, two small meadows (adjacent to Hamilton Lakes and at the Kern Hot Springs) are closed to grazing. As wilderness travel has become more focused on these pathways, the opportunity to experience naturally functioning meadows has become less accessible to a majority of visitors. In order to balance the desire for the availability of grazing resources with this opportunity, the NPS has carefully selected a small number of additional meadows (six) to be closed to grazing along the primary trail corridors. Closure of these meadows to grazing would not preclude visitors traveling with stock from camping there as long as their animals were held and fed.

Concern 123: Reducing the number of meadows where stock are permitted to graze will create more pressure on the grazed meadows, therefore increasing impacts to these meadows. This could lead to further closures for resource protection. Closing meadows to grazing is not justified, as recreational stock use has declined by approximately half since the parks' wilderness was established in 1984.

> *Channeling all of the grazing into fewer meadows will ultimately result in impacts that the Park Service will deem unacceptable, which will lead to more closures. In most of the historic grazing reports, it clearly showed that the best method of managing the meadows was to disperse the grazing. This resulted in better biomass residual, little barren ground, and less vegetative change.*
> [Recreational Group, #201]

> *Please consider how shocked we were when we learned from SEKI staff that the PA proposes to close a total of 28 meadows to grazing, including the original 11 meadows closed in the SUMMP. This is rather incredible increase. While the PA proposes a decrease of "only" 10% of the meadow acreage open to grazing over Alternative 1 (the current status), we consider any decrease to be a threat to our status because when fewer and fewer meadows are open for grazing there is greater potential for impacts on those meadows which can lead to more closures due to those impacts. While SEKI claims that there remain 225 named meadows open to grazing in the PA, a high percentage of those meadows are "off the beaten path" and located in areas where stock users do not routinely go.*
> [Recreational Group, #230]

> *Designation of Meadows Closed to Grazing Near High-Use Trails for Scientific Value Not Supported As documented earlier in this comment letter and in the draft WSP/EIS, the level of current recreational stock use is less than half of what is was when park Wilderness first designated in 1984-the date that forms a baseline by which the Park Service is to measure improvement in wilderness character. In addition, approximately half of all meadows in park Wilderness are either are currently closed or inaccessible to recreational stock. So there appears to be no sound rationale to further restrict meadow grazing in light of these statistics.*
> [Recreational Group, #186]

Response: In the past decade, as shifting use patterns have led to increased visitation along primary trail corridors and concentrated use in popular areas such as around Mount Whitney, temporary grazing closures have been put in place to ensure that meadows are not grazed beyond their capacity and to allow for periods of recovery when conditions warrant. Recognizing that the changes in grazing management proposed under the preferred alternative have the potential to shift use and lead to increased pressure on adjacent meadows, estimated capacities have been developed for each of the open meadows and will be used to guide decisions on the total amount of grazing allowed at a given site. These capacities have been developed to ensure that meadows are protected from the potential adverse effects of grazing and that impacts are kept within limits that ensure the resiliency of meadow ecosystems. The NPS recognizes that certain meadows along the most popular travel corridors have high logistical value for visitors traveling with stock. Where resource concerns other than vegetation removal do not limit grazing capacity, logistical value would be used as one factor to set allowable utilization rates, and thus the total amount of grazing allowed. Although this system would likely lead to mid-season closures in meadows as their capacity to sustain grazing is reached, by planning ahead and working with the parks' staff to identify available grazing resources it would remain possible for stock users to continue to enjoy wilderness travel. In the most popular areas, this may mean that stock users would need to carry feed. To help ensure

that limited grazing resources are available for visitors, in almost all areas administrative grazing would be managed in such a way as to give priority to private and commercial users; exceptions to this include the four pastures associated with ranger stations and reserved exclusively for administrative use and meadows that are critical for supporting trail maintenance activities that rely on stock support. Grazing management is addressed in detail in "Appendix D: Stock Use and Meadow Monitoring and Management Strategy."

Concern 124: The NPS should post grazing information online. That way, stock users could have up-to-date information on the condition of the meadows prior to entering the parks' wilderness, allowing them to plan an appropriate route based on open meadows.

> *Stock parties should be notified before entering wilderness about locations where forage has already been seriously impacted and asked to find alternative campsites where the forage is adequate. It would be helpful to stock parties if current forage conditions in all areas open to grazing including the one half mile zone along trails used by stock, could be posted on line. That information could be used to alter plans, if necessary, for a wilderness visit by stock parties ahead of their entry to SEKI Wilderness.*
> [Conservation/Preservation, #60]

> *Both private and commercial stock parties should be notified before entering wilderness about locations where forage is vulnerable or already seriously impacted and asked to find alternative campsites where the forage is not vulnerable. Late season grazing may be limited due to prior stock visits with some areas closed when adequate forage in not available. If private/commercial stock users must use an area that is compromised, they should be required to tie stock to posts, and use packed-in feed supplies. I support the requirement that all stock be fed weed-free supplemental feed a minimum of 2 days before a trip, and during the trip. It would be helpful to stock parties if current forage conditions in all areas open to grazing, including the one-half mile zone along trails used by stock, could be posted online.*
> [Individual, #145]

Response: Notification of temporary restrictions on wilderness travel for the upcoming year is provided via bulletin and posted online each year in early March. Grazing regulations and trip-planning information, including detailed maps and descriptions of forage areas, is posted online each year at the beginning of the season, sent via mail to all commercial users, and provided to private users on request. Opening date bulletins, which include anticipated opening dates for grazing, are sent out and posted following the early April and May snow surveys. Information regarding meadow status throughout the season — changes to opening dates at the beginning of the season and closures as grazing capacities are reached — is posted online, communicated via phone to commercial operators, and provided to all users who contact the wilderness office or a permitting station by phone or in person, as it becomes available from the field. All users must recognize, however, that such information may not always be available and incorporate flexibility in their trip planning accordingly. Wilderness travel by its nature involves a degree of uncertainty and this is reflected and celebrated in the lack of designated campsites or allocated grazing nights in the wilderness areas managed by the parks.

Concern 125: The SUMMP should continue to be the standard for stock management in the parks. The SUMMP could be modified to include a rotation schedule for which meadows would be open to grazing.

> *The Park Service should continue with the current program of meadow management under the Stock Use and Meadow Management Plan. The Plan should be amended to establish a rotation schedule so that there is never a net loss of meadows to graze.*
> [Recreational Group, #201]

> *Meadows and grazing should be managed using the Stock Use and Meadow Management Plan with minor adjustments. Closures would not exceed 1 year and a rest - rotation schedule should replace the closure system that is currently in effect. The stock use nights need to be flexible if meadows are not being fully utilized.*
> [Recreational Group, #201]

Response: In the nearly 30 years that have passed since the 1886 SUMMP and BMP were adopted, not only have visitor use patterns changed, but much has been learned about meadow systems, potential grazing impacts, and their management. This WSP/EIS seeks to revise these documents according to contemporary wilderness management and planning guidance and to incorporate new information. The purpose and need for this plan, planning objectives, framework, and the relationship of this plan to the 1986 SUMMP and BMP are discussed in detail in "Chapter 1: Purpose and Need" of the WSP/EIS. Under the preferred alternative, many of the decisions made regarding wilderness meadows and stock use in the 1986 SUMMP and BMP are proposed for continued adoption. Under each of the action alternatives which would allow for grazing to continue, management of stock use in the wilderness of the parks would continue to use the grazing management tools described in the 1986 SUMMP.

In their review of stock monitoring and management in wilderness, McClaran and Cole (1993) recognized the strengths of the program established by the 1986 SUMMP. However, they also called attention to two weaknesses: the application of a single uniform grazing standard to all the parks' meadows and the absence of defoliation standards. The management and monitoring systems described in "Appendix D: Stock Use and Meadow Monitoring and Management Strategy" of the WSP/EIS attempt to correct those deficiencies, through: 1) the development of site specific grazing capacities that can be modified to take into account different management objectives at the meadow scale and 2) the continued implementation of residual biomass monitoring in frequently grazed meadows. Rotation schedules would continue to be one tool available to managers when making decisions regarding grazing; however, recognizing the considerable natural variability inherent in meadow systems as well as in visitor use patterns, no formal rotation schedule is proposed for adoption through this WSP/EIS.

Concern 126: The term "logistical value" should be defined in the WSP/EIS and the meadows that meet the definition of "high logistical value" should be identified.

> *The term logistical value appears to be used as a relative means by which to rate the biological value of meadows in the draft WSP/EIS. Yet a definition is not provided in the glossary nor is the term defined anywhere in Chapter 2 or Appendix D. Table D-14 located within Appendix D lists Forage Areas of High Logistical Value (a total of 55 such meadows); however, none of the meadows proposed to be closed to pack stock grazing in alternative 2, 3 and 5 are listed. The Final WSP/EIS must identify what is meant by the term High Logistical Value meadows and which meadows, if any, proposed for closure in the Park Services Selected Alternative meet that definition.*
> [Recreational Group, #186]

Response: The term "logistical value" is defined in "Appendix D: Stock Use and Meadow Monitoring and Management Strategy," as follows:

"Some forage areas have high logistical value to groups traveling with stock. The characteristics used to designate forage areas as having high value are:

- resource concerns other than defoliation do not limit grazing capacity
- closest forage area to a high pass
- first forage area beyond round-trip distance from trailhead
- fires allowed at forage area but not in nearby forage areas
- lack of other forage areas open to grazing nearby
- traditional stock camp
- strategic location for administrative use"

A list of the named forage areas which meet these criteria for high logistical value is provided in appendix D. Logistical value was taken into consideration when identifying meadows which would be closed to grazing under alternatives 2, 3, and 5, and none of the meadows proposed for closure under those alternatives meet this definition.

Concern 127: Grazing limitations should be altered for different stock types. Burros eat less and prefer different plant species; therefore, the grazing nights should be doubled and the meadow acreage should be altered for burros, as these limitations were based on horse and mule eating habits.

> *When discussing grazing reductions we recommend taking into consideration SEKI's own conclusions regarding the differences in consumption between stock types. The methodology of the park concludes that a burro eats 40% of what a horse eats. Based upon that alone night restrictions that are in place for meadow capacity issues, allowable grazing nights should be double for burros. In addition to the quantity of feed that burros eat the types and range of feed that burros eat are different. The meadow acreage is based upon preferences for horses and mules and not that of the burro, which is by nature a desert animal wanting more dry grasses than moist grass. These factors should be taken into consideration, particularly in areas where burros and TCR are the significant user.*
> [Business, #196]

Response: In calculating grazing levels, "Appendix D: Stock Use and Meadow Monitoring and Management Strategy" recognizes and defines the different consumption rates attributable to different animal types in the "Grazing Levels" section. For this reason, annual summaries of reported grazing levels are calculated both as stock nights — an overnight stay by one grazing animal — and as animal unit nights, which reflect the differences between horses and mules, burros, and llamas. Because over 95% of stock use in any given year is attributable to horses and mules, the NPS uses the simpler term, stock night, to communicate regulations and report use statistics to users. Decisions regarding grazing levels, however, take into account the difference between animal types, and thus, capacities given in stock nights are increased should the primary use be by either burros or llamas.

Concern 128: The WSP/EIS describes an alternative where there would be no stock grazing in the wilderness (alternative 4). That alternative should have been "considered but eliminated from further study" as being completely unfeasible for stock trips into and through the wilderness areas in the parks. It would require far more stock per trip to pack adequate feed, and the stock limits were not increased to take that into account.

The Plan goes so far as to describe an alternative where there would be absolutely no stock grazing in the wilderness at all (Alternative 4). That alternative should have 'been considered but eliminated from further study' as being completely unfeasible for stock trips into and through the wilderness areas in Sequoia-Kings. It would require far more stock per trip to pack adequate feed, and of course the stock limits were not increased to take that into account. This is totally unacceptable and should have been treated the same as the proposal for manure bags.
[Recreational Group, #201]

Response: Alternative 4 was added to the WSP/EIS based on public comments, an action which is consistent with NEPA. This alternative was valuable to consider as a wilderness management option.

Suggests Change in Alternative(s) for Element 9: Administrative Structures

Concern 129: The WSP/EIS does not properly characterize the Redwood Canyon Cabin and its historic role in cave research at the parks. The cabin should be identified as a ranger station, a research station, and an ethnographic resource.

The cabin has historic and cultural value. Though not chronologically "historic," the cabin has been the center of ongoing exploration into newly discovered wilderness. Such "new" wilderness is unique to the Park, and very rare in our modern world
[Individual, #113]

In Alternative 2 (The NPS preferred alternative), Element 9 Other Administrative Facilities, the suggested action of terminating the use of and removing the "Redwood Canyon Cabin" is unacceptable and unwarranted. Despite the existence of numerous other structures in wilderness areas it is the only one slated for abatement, with little justification given for it being singled out. The WSP/Draft DEIS is deficient in explaining the history of this cabin, and the historic role it has played in informing management decisions in regards to the cave in particular and Redwood Canyon in general. The body of the WSP/Draft EIS also does not do justice to the need for research to better understand the local environment and inform management decisions.
[Conservation/Preservation, #190]

(cont'd from 329893) The cabin should be identified as a ranger station and research station, having the same functions as other remote ranger cabins throughout SEKI. The cabin is a cultural and historic resource of the Park. Lilburn Cave is identified by the WSP as the longest cave in California. The cabin has played a primary role in the mapping and exploration of the cave. The cavers and researchers who restored the cabin were and are the first explorers of a significant resource within SEKI. The NPS has identified structures used by first explorers within designated wilderness as having historic and cultural significance. If the current direction of the WSP had been applied to Shorty Lovelace's structures by a management plan early in the last century, would Shorty's cabins still exist? In the discussions of removing the cabin, was there discussion of what historians would want to retain, to identify the discovery and exploration of Lilburn Cave? The cabin is an ethnographic resource not identified by the WSP. The cabin, since its first use in the exploration of Liburn Cave, has created a gathering point for researchers and cavers to co-mingle-and the occasional hiker who ventures that far down Redwood Canyon. Songs have been written and stories told of exploration and risks. Individuals have risked their lives in furthering research and exploration of SEKI caves-ballads have been written. There are fantastic stories that park interpreters could

use in describing this group of individuals and the challenges of exploring a unique part of SEKI wilderness. The cabin can be used as part of the story, in addition to providing the other functions mentioned above. If, after reevaluating the cabin with the above points, the NPS still does not believe that the cabin can be retained under existing legislation, the cabin should be allowed to remain long enough for researchers to finish the ongoing research projects. The cabin should remain long enough for its supporters to work with legislators to make a small amendment to the Omnibus Public Land Management Act of 2009, to allow the cabin to remain.
[Conservation/Preservation, #112]

Response: The NPS recognizes the importance of cave research in these parks. Redwood Canyon Cabin is used by cave researchers who focus on research and mapping of Lilburn Cave. A brief history of the cabin and research is discussed in the "Other Facilities and Developments" section in "Chapter 3: Affected Environment." The cabin has not been used as a ranger station. The cabin is not considered an ethnographic resource.

Concern 130: The Redwood Cabin should be retained as it is the minimum tool necessary to allow for research at Lilburn Cave. Research of this type has a high level of risk unique to a cave environment. Without the ability to store equipment and safety gear, researchers would not be able to safely study this important resource of the parks.

SEKI Redwood Canyon unit . . . The storage of gear, cooking and eating equipment, and emergency supplies at the cabin allows Principal Investigators and their support staff to save backpack weight and save their energy for the strenuous caving required in Lilburn. . . loss of use of the cabin through abatement or failure to maintain will result in a lower proportion of their time being devoted to research activities and also loss. . . solar-generated electricity at the Redwood Canyon facility since 1992. This powers a data logger, the Park radio, cabin lighting, and cave telephone. In addition, there are outlets for recharging caving headlamps and powering researchers laptops. . . The alternative to the tubing and filter is boiling and cooling large volumes of creek water for drinking, which consumes the full-time efforts of one individual during an expedition. This limits the personnel-hours donated to project needs without reducing the visitor impact on the area. . . multi-conductor cable was installed in Lilburn Cave in 1976 for carrying water level data to a logging recorder in the cabin. Extra conductors in the cable allowed installation of a simple phone system by which cave parties could contact the cabin. . . an element of safety protocol in Lilburn Cave. . . Simultaneous monitoring of water levels at widely-separated points forms the basis of the long-term study of the ebb-and-flow behavior of Big Spring. . . Loss of the wire would terminate the hydrographic study, cancel an air flow study currently in planning. . .
[Conservation/Preservation, #38]

I am concerned with the proposal to eliminate the research cabin in Redwood Canyon. Storage of this equipment on site reduces disruption to the area (ie, number of trips) and aids in the goals of the wilderness designation. In the event of a rescue at Lilburn Cave, the presence of rescue supplies on site saves many hours in response time and perhaps a life. More importantly, it mitigates the need for helicopter insertion of equipment, in keeping with the requirements of the wilderness designation. Without an adequate safety plan, research in the area would be disrupted especially for volunteers who already donate their time and assume substantial risks out of love for the wilderness. Without a base of operations, efforts to monitor the resources of SEKI would be difficult as trips to collect data become more involved. If all supplies must be carried in, more people must

pitch in. Impacts would be increased on the wilderness in order to maintain current levels of research - in a time in which watershed research is become more vital for the preservation of California's wilderness. Without data, the wilderness cannot be adequately managed. I strongly feel that keeping the cabin in Redwood Cabin is the best way to achieve the management goals of the wilderness in Sequoia-Kings Canyon National Park. Its use by a number of agencies protects the resources for future generations and decreases impact of research on the area.
[Individual, #20]

Only retaining the cabin will meet the "Planning Objective: Administrative structures and developments would be the minimum necessary for the administration of wilderness, similar to current conditions." . . . the cabin itself part of the minimum necessary facilities to support the health and safety of visitors to the cave. . . While there is no current research proposal to study these air motions, the Redwood Canyon Cabin is likely to be part of the minimum necessary facilities for such a study. While drafting the park's cave management plan is at best in its very earliest stages, park management should consider how they will manage Lilburn cave without the support of the cabin. They should pay particular attention to visitor safety and encouraging the research needed to properly manage the Redwood Canyon wilderness. They should do this planning before they decide to remove the cabin.
[Conservation/Preservation, #106]

The presence of the cabin at Lilburn Cave supports significant research and monitoring of that hydrology system through cave exploration and cave diving operations. Therefore the maintenance of the cabin within the wilderness is a crucial part of the minimum requirements to manage this unique aspect of the wilderness of Redwood Canyon.
[Individual, #89]

The WSP only effectively presents two alternatives for the Redwood Canyon cabin and as such does a great disservice to the collaboration that this research and management facility represents and fails to acknowledge or value how the cabin came to be rebuilt by volunteer labor and materials with the direct and close cooperation between the National Park Service and the Cave Research Foundation with the specific intent and successfully attained goal of fostering research, understanding, and management of the unique wilderness resource of Lilburn Cave. As written the Parks preferred alternative fails to acknowledge how the Redwood Canyon cabin is such a minimum requirement and should be amended in consultation with the Park Cave Research office, Cave Research Foundation, and the greater public to direct how the cabin should be preserved and managed to administer the wilderness that Redwood Canyon and Lilburn Cave represent.
[Individual, #187]

Response: The NPS recognizes the importance of cave research in these parks and acknowledges that the Redwood Canyon Cabin is utilized for cave-related research ("Other Facilities and Developments" section of "Chapter 3: Affected Environment"). The need for the cabin to allow for research has been evaluated through the minimum requirement analysis process. This analysis determined that the preferred alternative would be modified to allow for the continued existence and use of the Redwood Canyon Cabin.

Concern 131: The Redwood Canyon Cabin could be moved closer to Lilburn Cave, which would remove the structure from wilderness and provide better access, as the cabin would be close to the road.

> *Moving the Cabin to the closest NP boundary to Lilburn cave would bring the cabin close enough to the cave to still be the minimal amount required to support rescue and research. Takes it out of the wilderness area and closer to road access. We suspect this would be fully supported by the caving/research community.*
> [Business, #131]

Response: Through the wilderness minimum requirement analysis, the NPS explored options for relocating the cabin outside of wilderness. Those options were dismissed because they would create other unacceptable impacts.

Concern 132: The Redwood Canyon Cabin is similar to administrative structures that also occur in wilderness; however, these structures are not considered for removal.

> *I understand that the Park Service proposes removing this cabin, indicating that it is not compliant with their management policies. I also understand that there are several other cabins of the same ilk that are not slated for any discussion about removal. I don't understand why the cabin at Redwood Canyon is being targeted, as it is currently, and has been, an established base of operations for many research activities.*
> [Conservation/Preservation, #26]

Response: The WSP/EIS explored options for all administrative structures located in wilderness (see "Chapter 2: Alternatives"), including the removal of ranger stations.

Concern 133: The Redwood Canyon Cabin should be deemed as a ranger station, as it holds the same importance as the ranger stations that will not be removed under the WSP/EIS.

> *The cabin should be identified as a ranger station and research station, having the same functions as other remote ranger cabins throughout SEKI.*
> [Conservation/Preservation, #112]

Response: The Redwood Canyon Cabin was determined to be not necessary for use as a wilderness ranger station because 1) it is located relatively close to a trailhead; 2) the area can easily be patrolled by day hiking; and, 3) there is minimal visitor activity, other than research, in lower Redwood Canyon. Therefore, long-term occupancy by rangers is not necessary in order to protect the area's wilderness character.

Concern 134: The presence of researchers at the Redwood Canyon Cabin helps to prevent vandalism.

> *The most effective deterrent to vandalism is the presence of responsible people. . . their mere presence has demonstrated itself as an effective deterrent over the past 30 years that the CRF has been working in Lilburn Cave. . . the presence of cavers at the Redwood Canyon research hut has clearly demonstrated that caver presence is an effective deterrent to vandalism. Removal of the cabin and associated infrastructure will result in far fewer cavers frequenting the area for several reasons. . . Removal of the cabin will also discourage caver presence in the area because it will send the wrong message. If the Park Service rewards the volunteers by taking away the infrastructure that they use (and diligently maintain for the Park Service), it sends a very clear and undesirable message to the caving community at large and to the cave research community in particular: volunteer efforts are not appreciated. . . Because of this, I support Alternative 1.*
> [N/A, #36]

Response: There is no evidence that the sporadic use of the Redwood Canyon Cabin by researchers prevents vandalism in the area.

Concern 135: The NPS should consult with the Park Cave Research Office regarding the Redwood Canyon Cabin to determine how the cabin should be managed in the WSP/EIS.

> *The WSP only effectively presents two alternatives for the Redwood Canyon cabin and as such does a great disservice to the collaboration that this research and management facility represents and fails to acknowledge or value how the cabin came to be rebuilt by volunteer labor and materials with the direct and close cooperation between the National Park Service and the Cave Research Foundation with the specific intent and successfully attained goal of fostering research, understanding, and management of the unique wilderness resource of Lilburn Cave. As written the Parks preferred alternative fails to acknowledge how the Redwood Canyon cabin is such a minimum requirement and should be amended in consultation with the Park Cave Research office, Cave Research Foundation, and the greater public to direct how the cabin should be preserved and managed to administer the wilderness that Redwood Canyon and Lilburn Cave represent.*
> [Individual, #187]

Response: The parks' cave management staff has been involved in the WSP/EIS process and provided information to help the planning team formulate alternatives related to the Redwood Canyon Cabin.

Concern 136: Party sizes should be adjusted to ensure safe caving group sizes, especially for research originating at the Redwood Canyon Cabin.

> *I therefore strongly request that Alternative 2 be altered to allow the continued use of the existing cabin and infrastructure. This may also involve adjusting the related limits on party size for consistency with long established guidelines on caving safety. If Alternative 2 cannot be modified, I would have to recommend Alternative 1, as the only one which preserves this vitally needed structure.*
> [Conservation/Preservation, #190]

Response: Safety is not paramount in wilderness; parties are expected to be self-reliant in terms of matching their experience and abilities to the difficulty of their trip. This applies in recreational caving as it does in winter travel or high-water boating. Researchers can request a party-size variance as part of the research permit process if that is needed to safely pursue appropriate research.

Concern 137: Removing Redwood Canyon Cabin would cause the end of many wilderness research projects including climate research.

> *The Tehipite Chapter of the Sierra Club Executive Committee, the following resolution was unanimously passed. The Tehipite Chapter of the Sierra Club supports maintaining the Research Cabin in Redwood Canyon to the greatest extent possible." The cabin plays a critical role in the management and preservation of caves, as well as the safety of cavers within Sequoia and Kings Canyon National Parks (SEKI). The Wilderness Stewardship Plan (WSP) fails to analyze the importance and varied uses of the cabin, then jumps to the flawed conclusion that the WSP will have no impact on cave resources. If it is the decision of the NPS to remove the cabin, the WSP needs to identify alternatives which would provide the same level of cave resource protection that the cabin now provides. The WSP states that "Direction is being informed by this WSP. Actions proposed under the WSP alternatives would have indirect and no, or negligible, impact*

on cave resources. Therefore, caves will not be analyzed in this WSP/DEIS." This statement is patently false. The WSP gives no direction as to how the significant functions provided by the cabin will be replaced. The future cave management plan will be left without one of the primary tools to manage caves within SEKI. The cabin should be evaluated for all of its existing and potential future uses. The WSP identifies the cabin primarily as a research facility contracted out for Lilburn Cave. The WSP fails to identify the other wilderness critical uses the cabin provides. Some research projects, such as climate research, have worldwide significance. Without the cabin, researchers have stated that they will not be able to continue their projects. The WSP does not identify the significant loss of wilderness research as one of the consequences of the Preferred Alternative. (cont'd in 329894)
[Conservation/Preservation, #112]

Response: The NPS has evaluated the necessity for the Redwood Canyon Cabin for research through a minimum requirement analysis in accordance with the Wilderness Act and NPS policies. It was determined that a small facility is necessary to support research in Lilburn Cave and alternative 2, the preferred alternative, has been updated to reflect this change.

Concern 138: The backcountry ranger stations should be retained, as they provide safety assistance for backcountry travelers.

Though I've never gotten injured while backpacking, I know that accidents do happen. So it's important to have rangers pre-positioned so they can get to the scene quickly. I strongly oppose the removal any backcountry ranger stations. If anything, I would add a few more and put them in the more isolated area of the Park.
[N/A, #5]

Ranger Stations: I agree with Alternative 2 though Bench Lake tent platform could be moved to a more suitable location for patrol functions needs to be more specific. The Bench Lake station is crucial due to its being the only ranger station between LeConte Canyon and Rae Lakes on the JMT as well as being near the junction of the Taboose Pass trail. For both search and rescue support and day-to-day maintenance of the backcountry, this location is crucial.
[Individual, #88]

Response: Under the preferred alternative, all of the existing wilderness ranger stations would be retained. However, specific structures could be moved or modified to better serve the visitor and to reduce impacts on wilderness character.

Concern 139: The cabins located in wilderness should be retained and could be rented to visitors as is currently done with the cabins near Pear Lake.

Please note my vote for #3 EXCEPT I would KEEP ALL THE CABINS that exist and use them by renting them out as you do the Ranger cabin in Sequoia Nat. Park near Pear Lake. You could charge $100 a night easily for the summer when the ranger is gone. If you are going to leave the cabins in Mineral King, WHY would you take out any cabins in Sequoia? You could have a lottery and sell an overnight in Giant Forest. You know that people would pay more than $100 per night to have that opportunity.
[Individual, #16]

Response: The wilderness ranger stations are used for the purposes of administering the area as wilderness. Each station has a working function important for managing visitor use and protecting wilderness character. In addition, the NPS does not have the legal authority to rent out the wilderness ranger stations as this would establish commercial enterprises in wilderness which is counter to the mandate of the Wilderness Act (which prohibits commercial enterprises). The Pear Lake Ski Hut is within a specifically allowed Designated Potential Wilderness Addition, per the California Wilderness Act (1984) and its accompanying House of Representatives Committee Report 98-40 (1983) and is operated in the winter through an agreement with a non-profit cooperating association.

Suggests Change in Alternative(s) for Element 10: Frontcountry Facilities to Support Wilderness Access and Use

Concern 140: The declining facilities at Mineral King should be removed and the area should be restored to natural conditions.

> *14. Remove all structures at the former (long defunct) commercial pack station at Mineral King and restore the site to natural conditions.*
> [Recreational Group, #123]

Response: The preferred alternative proposes to remove the concessions operations at the Mineral King Pack Station and use existing facilities at the Mineral King administrative corrals for the parks' administrative purposes at the existing location or establish similar facilities at a new location. Existing facilities could be modified to allow for short-term public camping or staging and/or short-term camping by commercial use authorization holders (see the "Alternative 2, Element 10" section of "Chapter 2: Alternatives"). Note that any changes to frontcountry facilities proposed by this WSP/EIS will be subject to additional site-specific NEPA analysis and compliance.

Concern 141: The pack station at Mineral King should be restored.

> *Pack Stations: Enjoyment of the back country is a shared responsibility where use by hikers and stock riders can and should be balanced. Pack Stations are a key element in this use and Mineral King has lacked one for years. If at all possible, a Pack Station at Mineral King should be restored. Certainly, this possibility should not be eliminated from the discussion or the Plan.*
> [Individual, #128]

Response: The Mineral King Pack Station, a concession-operated facility, has not operated since 2002. In 2004, a franchise fee/feasibility analysis was conducted on the pack stations within Sequoia and Kings Canyon National Parks. The report found that the operation of a commercial pack station at Mineral King would not be economically feasible (NPS 2004). Even though the preferred alternative does not include the reestablishment of a pack station at Mineral King, the NPS recognizes that stock use at Mineral King is an important activity and that facilities are needed to support this use. Therefore, the preferred alternative allows for the modification or relocation of the existing pack station to allow for short-term public camping or staging by stock users, and/or short-term camping/staging by commercial use authorization holders (see the "Alternative 2, Element 10" section of "Chapter 2: Alternatives"). Again, any changes to frontcountry facilities proposed by this WSP/FEIS will be subject to additional site-specific NEPA analysis and compliance.

Concern 142: The commercial pack station at Wolverton should not be reopened, as it would have an effect on safety, visitor experience, and the parks' resources. Additionally, it was not financially successful when it was open. The Wolverton Pack Station is located in an area that is close to

vehicle traffic, which would cause safety issues, especially for novice riders. The station is located near the Giant Forest Restoration area, and increased stock use in this area would create disturbance to the resources and other visitors.

Element 10: Frontcountry Facilities I support the continuation of a commercial pack station at Cedar Grove. This facility has a proven purpose. You should not, on the other hand, take any actions that would increase the current very low level of stock use in and around the Wolverton area. I do not support any effort that would be lead to the reestablishment of a commercial pack station at Wolverton nor do I support the installation of campsites that would lead to more private day-use riding in this area. These trails should be managed to support and encourage the very heavy level of hiking use that they see each summer.
[Individual, #129]

Of particular concern are frontcountry day rides, which could roll back the years and decades worth of effort to protect and restore the Giant Forest. NPS has worked for decades to remove and eradicate non-native species from the Giant Forest, spending significant resources. We believe the visitor experience has been enhanced by these efforts, which include NPS allowing the Commercial Use Authorization at Wolverton to expire on its own terms.
[Conservation/Preservation, #184]

The issue with which I most disagree is the proposal to re-open the question of the Wolverton Pack Station for commercial use. Having the preferred alternative suggest an economic study be performed to assess the financial viability of the pack station is a very slippery slope. It is difficult to understand how the possibility of re-opening the pack station could be included in an alternative that is "the environmentally preferred option." This controversial management closure decision has already been made, in the face of significant opposition, and I urge you not to re-open the controversy. The Wolverton site is not appropriate for commercial pack station use because: 1. First and foremost, safety. The pack station is located where novice riders on horseback conflict with vehicle traffic at the busy access points to the General Sherman Tree. 2. The GMP specifies (pages 136 & 146) that an examination be performed on four other sites to determine if there is a suitable site for the pack station. There is not consideration of re-opening the Wolverton station. 3. The pack station is surrounded on three Sides by busy roads heavily used by park visitors. 4. Bridge and tunnel alternatives to address road safety are prohibitively expensive and would impact resources. 5. The previous pack operation at Wolverton was not economically feasible. This was well demonstrated by the final operator. 6. The park pack operation is performed by highly skilled professionals with extensive expertise, therefore comparing the park operation to a commercial operator with novice riders, is not realistic. 8. The environmental impact of a commercial pack operation in the area of the Giant Forest Restoration is of great concern. To introduce a commercial stock operation in this area would not only inappropriate, would be obviously environmentally damaging. 9. The NPS paid the previous operator a significant sum to settle quite marginal claims during the closure of the pack station. Re-opening the issue will nullify this settlement and result in wasted NPS and taxpayer monies. 10. There is no analysis of this proposal within the environmental impacts portion of the document. The GMP states that alternative sites will be subject to public environmental review. There are several other reasons. . . These include the decrepit nature of the buildings, the questionable waste water facilities, the inadequate parking and the Impacts of manure/urine runoff.
[Individual, #141]

Response: The preferred alternative has been updated to reflect that the commercial pack station would not be reestablished to provide wilderness stock trips at the Wolverton site. The corrals could be used for short-term staging by commercial service providers and private parties. Commercial use for frontcountry day rides at this site would be considered in the future under a separate planning process.

Concern 143: The commercial pack station at Wolverton should be reestablished, which would provide services for a variety of visitors. Not considering reopening the Wolverton Pack Station would be inconsistent with previous management documents such as the Sequoia and Kings Canyon Giant Forest/Lodgepole Development Concept Plan.

> *Reestablish commercial pack station operations at Wolverton and Mineral King with facilities that can provide services for day rides and overnight trips. Include facilities and services for persons with disabilities; Provide overnight corrals and facilities for private stock users; include camping sites for stock users for both short term (2 nights) and longer term (14 nights) at Wolverton, Mineral King, Cedar Grove, Atwell Mill, North Fork Kaweah Trailhead, and South Fork Kaweah Campground and Trailhead.*
> [Recreational Group, #201]

> *We are disappointed that the PA does not propose to re-establish the commercial pack station at Wolverton. When SEKI discussed the status of the Wolverton Pack Station (WPS) in earlier management documents, these documents indicated a clear intent to relocate the WPS and yet there is no mention of doing so in the PA. One of these documents was the Sequoia and Kings Canyon Giant Forest/Lodgepole Development Concept Plan dated February 1980.*
> [Recreational Group, #230]

Response: The GMP, approved in 2007, supersedes the 1979 Giant Forest/Lodgepole Development Concept Plan. However, as explained in the "Purpose and Need for the Plan" section of "Chapter 1: Purpose and Need," in an order dated May 29, 2012, the U.S. District Court for the Northern District California issued an opinion in a lawsuit that challenged the parks' GMP (High Sierra Hikers Association v. U.S. Department of the Interior). The Court's order "vacate[d] all portions of the GMP and ROD, which provide programmatic guidance regarding the type or level of stock services necessary in the Sequoia and Kings Canyon National Parks wilderness or direction as to need, appropriateness, or size of developments, structures, or facilities used completely or partially for commercial stock services." Where the GMP is referred to in this document, only those sections not vacated by the court order apply. Therefore, all decisions made related to the commercial pack station at Wolverton through the GMP no longer apply.

Concern 144: Some commenters support modifying the Atwell Mill Campground to provide stock camps, as well as several backpacking sites, while other commenters stated that allowing stock presence at Atwell Mill Campground would produce more impacts on the resources in the area and affect visitor use.

> *Atwell's Mill Campground should provide a few overnight backpacking sites and sites for stock camps. This would prevent backpackers sleeping overnight in their cars and allow private stock owners a place for stock and camping. A pack station should be reintroduced in Mineral King to allow more visitors to access wilderness.*
> [Individual, #8]

> *The Atwell Mill campground should not be modified to accommodate stock. it is going to degrade and "dustrialize" what is currently a small, relatively quiet car campground*

> *used primarily by local families accessing the East Fork and visitors who want an alternative to the busy Mineral King area. Now, the NPS proposes to degrade the existing uses at Atwell Mill (which were doing just fine) with rigs, trailers, heavy equipment, manure, dust, flies and odors, while maintaining those same impacts at the administrative corral in Mineral King*
> [Individual, #46]

Response: Including backpacking and stock camps at Atwell Mill Campground is considered in the preferred alternative.

Concern 145: Atwell Mill Campground should not be modified to allow stock access. Instead, stock access should be limited to the Mineral King area.

> *DEIS Alternative 2 Element 10 - The Atwell Mill campground should not be modified to accommodate stock, unless the administrative corral is relocated out of Mineral King to there as well. There is no sense in spreading the stock impact to degrade another area. The only thing that stinks worse than the Atwell Mill campground is going to, is the attempt to misrepresent the changes to Atwell Mill as a "done deal" in the DEIS. It is obvious the NPS is intervening at Atwell Mill to attempt to assure the commercial viability of a service that is no longer viable. If it was not viable at Mineral King it is not going to be viable at Atwell Mill.*
> [Individual, #46]

Response: Stock access is currently allowed at Atwell Mill and the preferred alternative considers developing one to three sites at the Atwell Mill campground to provide opportunities for stock users to camp prior to departing into the wilderness. The preferred alternative allows for the modification of the existing pack station at Mineral King to allow for short-term public camping or staging by stock users, and/or short-term camping/staging by commercial use authorization holders (see the "Alternative 2, Element 10" section of "Chapter 2: Alternatives"). Any changes to frontcountry facilities proposed by this WSP/EIS will be subject to additional site-specific NEPA analysis and compliance.

Concern 146: The pack station at Mineral King could be run by a non-profit organization, which would collect donations for services related to stock use, cross-country skiing, or snowshoeing.

> *Regarding Mineral King area private pack usage, this could be set up as non profit's, collecting donations for services rendered in a limited manner, as put forward in your writings, and also for winter cross country skiing and snow shooing.*
> [Individual, #28]

Response: Existing facilities at the Mineral King administrative corrals are used for the parks' administrative purposes. Existing facilities (both the former pack station and the administrative corral) could be modified to allow for short-term public camping or staging and/or short-term camping by CUA holders (see the "Alternative 2, Element 10" section in "Chapter 2: Alternatives"). The use and management of frontcountry facilities is not directly addressed by the terms of the Wilderness Act; however, "Chapter 4: Environmental Consequences" of the WSP/EIS analyzes the impacts of use supported by frontcountry facilities on wilderness character. Any changes to frontcountry facilities that are approved through the WSP/EIS process will be subject to additional site-specific NEPA analysis and compliance.

Suggests Change in Alternative(s) for Element 11: Commercial Services

Concern 147: Commercial services should not be reduced by a blanket 20%, as this could affect the livelihoods of commercial outfitters. If the intent is to reduce use in wilderness, the reduction should be applied to all users, not just commercial services.

> *It is our understanding that the goal of the preferred alternative is to reduce the use in the Whitney Management Area. This includes a cut to commercial non-stock use by 20%. a cut would be drastic and significant and would have a further detrimental impact on the livelihoods of our local guides and on our business. We believe that commercial use in the Whitney Zone should be expanded.*
> [Business, #6]

> *So, if you really are going to cut the use, perhaps go over the traditional use reports for the Outfitters, give them a 20-30% increase on their highest years to have room for growth. I could limiting new outfitters in Whitney Zone if you wanted to cut down use, however I think NPS should look at existing OG's in good standing as a resource for bringing people to the area versus cutting their use down because is "not enough solitude" for someone else's tastes.*
> [Business, #53]

> *Why do all of the alternatives impose a limit upon guided use, generally 20% across the board and proportional to the alternative in the WMA? Nowhere in the document is there any study that indicates that guided use is more damaging that non-guided and therefore needs to be reduced. The assumption in both the Visitor Capacity and Extent Necessary for Commercial Use seem to believe that current use is appropriate use but is still too much. What study has been done to determine what level is appropriate? If SEKI intends to follow through on the proposed reduction in guided services then a study and it's conclusions needs to be undertaken. Without this there is no valid basis to limiting guided groups and not the non-guided. If SEKI finds that there are problems with overuse, damage, human waste etc then the reduction required in the Whitney Area needs to be applied to all users, guided and non-guided. SEKI does not propose a 20% proportional reduction for the non-guided parties in the Whitney area. Why not?*
> [Business, #205]

Response: The WSP/EIS is following the mandate of the Wilderness Act as supported by the statement "commercial services *may* be performed. . ." (Wilderness Act Section 4(d)(5)); emphasis added). Wilderness Act Section 4(d)(5) states that commercial services are optional and subordinate to other allowed activities in wilderness. Section 6.4.4 of NPS *Management Policies 2006* states: "Wilderness oriented commercial services . . . may be authorized. . . . if they are consistent with the wilderness management objectives contained in the park's wilderness management plan, including the application of the minimum requirement concept. Activities such as guide services for outfitted horseback, hiking, mountain climbing, or river trips and similar activities may be appropriate and may be authorized if conducted under the terms and conditions outlined in the park's wilderness management plan and /or in legislation authorizing these types of commercial uses."

In accordance with law and policy, each of the action alternatives (alternatives 2-5) analyzed different levels of commercial services in the parks' wilderness. For example, alternative 3 proposes a notably higher level of allowed commercial-service support, and alternative 4 proposes a notably lower level of commercial-service support. The preferred alternative (alternative 2) actually allows for near current levels of commercial services wilderness-wide, except in the Mount Whitney Management Area.

Concern 148: Commercial services in the Mount Whitney Management Area should be increased.

> *It is our understanding that the goal of the preferred alternative is to reduce the use in the Whitney Management Area. We believe that commercial use in the Whitney Zone should be expanded.*
> [Business, #6]

> *The primary factor in the other alternatives that we cannot support is the drastic reduction of non-stock commercial services, either specifically in the Mt. Whitney Management Area or throughout the parks. For example, Alternative 2 proposes a 20% reduction from an already limited number of CSDs. It appears that the overall intent may be to limit all use to that area, but the only step being taken is to reduce opportunities for the guided public. While the Mt. Whitney area is popular with users of all types, being the highest peak in the lower 48 states, we believe that other types of management solutions could be implemented in lieu of a dramatic CSD reduction (higher level of required professional qualifications, adjusting guide: client ratios, etc.).*
> [Recreational Group, #153]

Response: The preferred alternative allows for near current levels of commercial services wilderness-wide, except in the Mount Whitney Management Area. The Mount Whitney Management Area has high levels of visitor use and the resulting impacts of this use (e.g., high levels of trail encounters and campsite impacts) are addressed in "Chapter 2: Alternatives" of the WSP/EIS. Relative to the desired conditions established in "Chapter 1: Purpose and Need" and the objectives of the preferred alternative, these levels of use and associated impacts have been determined to be inconsistent with the preservation of wilderness character within the Mount Whitney Management Area. Each of the action alternatives in the WSP/EIS propose potential management actions to ensure that use of the Mount Whitney Management Area meets desired conditions for the preservation of wilderness character and the objectives of each of the action alternatives. One of these management actions is a reduction in the amount of commercial use of the Mount Whitney Management Area. Other management actions that address the impacts of visitor use are also proposed for the Mount Whitney Management Area (see table 23 in chapter 2).

The preferred alternative (alternative 2) has been modified to propose a reduction of commercial services in the Mount Whitney Management Area. The proposed reduction equals 10% of the four-year average of commercial use during 2010 to 2013 (rather than a 20% reduction as proposed in the draft WSP/EIS).

Concern 149: Commercial services in the parks' wilderness should be reduced. Commercial services should be monitored to determine that only necessary services are provided. Commercial outfitters that use stock should be limited in where they can go in the parks. One commenter would like to see commercial services phased out completely.

> *Commercial packstock enterprises. . . Your plan should at least strictly regulate these businesses to ensure that they are providing only "necessary" services (as required by the Wilderness Act).*
> [Individual, #124]

> *I am not supportive of pack operations in the Sierra high country. The existing "Backcountry Management Plan" and "Stock Use Plan" are old, out of date documents that do not reflect current strategies for addressing high-country wilderness areas. They should have specific regulations for any commercial services that identify allowed locations, elevations, numbers of visitors and the number of stock animals permitted. I, for one, suggest that all such commercial operations be limited to those areas below*

9,000 msl elevations due to the sensitive nature of the alpine environment. In addition, an appropriate plan would also include realistic Adaptive Management practices to initiate when indicator thresholds of overuse are tripped.
[Individual, #162]

Every current activity that degrades this in ANY significant way would be phased out over a relatively short time, say 10 years. Thus all commercial for-profit activities would vanish for their negative impact on wilderness preservation is overwhelming.
[Conservation/Preservation, #60]

Response: The Extent Necessary Determination (appendix B) establishes limitations on the types and levels of activities that may be supported by commercial service providers in the wilderness of these parks. This appendix was developed pursuant to the direction of Section 4(d)(5) of the Wilderness Act. Commercial Service providers are also subject to the conditions of their commercial use authorizations and concessions contracts, which contain additional restrictions on their operations in these parks.

Concern 150: The NPS should a conduct yearly analysis to determine the need for commercial services and the information should be used to generate quotas for the following year.

The need for the type and appropriate level of commercial service should be reviewed annually. An assessment of the need for those services should be based on previous experience. Impacts on the wilderness resource should be carefully examined at the end of each season and used to set quotas for the following year.
[Conservation/Preservation, #60]

Response: The Wilderness Act does not require the NPS to conduct a yearly evaluation of the amount of commercial services that may be authorized. Commercial service operators are required to report their use, and consolidated and individual commercial service use data will continue to be collected and analyzed regularly. The Stock Use and Meadow Monitoring and Management Strategy (appendix D) contains adaptive management elements that allow NPS to adjust restrictions on all stock users, including commercial service providers, in order to preserve wilderness character. In addition, the Extent Necessary Determination (appendix B) explains that the NPS may change CSD allocations in the future, following appropriate compliance and public involvement, in response to new information, changed conditions, or changes in visitor use patterns.

Concern 151: The commercial camp at Bearpaw Meadow should be closed because of the damage it already has incurred. The camp, as it is now, is not viable. The area could be restored to natural conditions. A replacement camp could be constructed in Upper Lake Canyon that would support backpackers with various levels of experience and endurance.

It's evident that the Bearpaw Meadow High Sierra Camp, especially after the removal of Wolverton Stables, is not viable (too difficult to get to for most hikers and too hard to resupply) and probably should be removed. Could a quasi-replacement camp, but more like a slightly upgraded version of White Wolf in Yosemite, be feasible for upper Lake Canyon? With the purchase of the private inholding there, a once or twice daily shuttle bus could use the existing road to shuttle less athletic members of the public, along with staff, to the facility, and also make it much easier to resupply than the usual high sierra camp. More athletic hikers could come in from restored former trails up Paradise Creek and off of Mineral King Road. New trails could go the short distance to Oriole Lake (admittedly nothing special other than perhaps to see wildlife, but this still would become

the sole lake in either park that non-athletes could see) as well as to the Oriole groves, Paradise Ridge and perhaps out to a viewpoint on Castle Rocks.
[Individual, #11]

13. 15. Close the commercial camp at Bearpaw Meadow, and restore the site to natural conditions.
[Recreational Group, #123]

A possibility for Lake Canyon just below Oriole Lake. . . Could a quasi-replacement camp, but more like a slightly upgraded version of White Wolf in Yosemite, be feasible for upper Lake Canyon? With the purchase of the private inholding there, a once or twice daily shuttle bus could use the existing road to shuttle less athletic members of the public, along with staff, to the facility, and also make it much easier to resupply than the usual high sierra camp. More athletic hikers could come in from restored former trails up Paradise Creek and off of Mineral King Road. New trails could go the short distance to Oriole Lake (admittedly nothing special other than perhaps to see wildlife, but this still would become the sole lake in either park that non-athletes could see) as well as to the Oriole groves, Paradise Ridge and perhaps out to a viewpoint on Castle Rocks. I refer to this as possibly a slightly upgraded version of White Wolf because it would be nice to have rustic wood cabins similar to White Wolfs, but with minimally adequate air conditioning due to the high summer heat in west-facing Lake Canyon (below 6,000 feet elevation). Tent cabins may not be realistic if this is rattlesnake country.
[Individual, #120]

Response: The Bearpaw Meadow High Sierra Camp is a commercial lodging enterprise, operated during the summer months through a contracted concessioner, which provides tent-cabin lodging and meals at a cost to the user. Reservations for Bearpaw are required and it is typically at or near capacity during peak season. From 2006 to 2012, the Bearpaw facility had an annual average of 1,500 visitor service days. A contracted concessioner operates the camp within a 32-acre designated potential wilderness addition (per the California Wilderness Act [1984] and its accompanying House of Representatives Committee Report 98-40 [1983]). A designated potential wilderness addition is federal land that Congress intends to become fully designated wilderness upon the cessation of an existing and allowed nonconforming use that is normally prohibited by the Wilderness Act that is associated with that land. The NPS monitors conditions in the area to make sure that the camp is not causing unacceptable impacts on the parks' resources.

Concern 152: Bearpaw Meadow High Sierra Camp should be retained and expanded with an extended season.

I also strongly favor continuing and (if possible) enlarging Bearpaw Meadow High Sierra Camp; extending it's season, especially opening earlier, would also be useful.
[Conservation/Preservation, #170]

Bearpaw High Sierra Camp As levels of population increase around the world there are some needs to evolve alongside that change, while maintaining the integrity of the mission for the people and protecting the wilderness area. Rather than remove the camp we would encourage an increase of 4 additional tent cabins within the land assignment over a several years span to address this issue. Bearpaw High Sierra Camp is a significance part of visitor services for 80 years and should remain available to the public for future generations. The High Sierra Camp should be utilized as a vehicle to promote and perpetuate the need for preservation of wilderness area by teaching people ethical environmental practices, and becoming stewards of the park.
[Business, #160]

Response: The Bearpaw Meadow High Sierra Camp is proposed to be retained in the preferred alternative with its current capacity and with a season similar to what it now has. Other alternatives consider removing it completely, or expanding or reducing its season (see table 45 in "Chapter 2: Alternatives"). Because Bearpaw Meadow High Sierra Camp would remain operational into the foreseeable future, an alternative high sierra camp is not necessary.

Concern 153: The Pear Lake ski hut should be retained as a non-commercial facility, potentially managed by a non-profit organization, a cooperating association, or as a concession-operated facility.

> *Allow a not-for-profit organization to manage the Pear Lake Hut as a non-commercial enterprise for use in winter and summer.*
> [Individual, #71]

> *Commercial Services: I agree with the sentiment expressed in Alternative 4, Overall the types, amounts, and areas in which commercial services are allowed would be notably reduced compared to alternative 1. However, as much as I would like to see Bearpaw Meadow High Sierra Camp closed, realistically, I know that is not going to happen. I agree with Alternative 3 on the Pear Lake Ski Hut: Use of the Pear Lake Ski Hut would continue through a cooperating association or as a concession-operated facility.*
> [Individual, #88]

Response: The preferred alternative includes the continued operation of the Pear Lake ski hut under the management of a partner and/or non-profit organization. Pear Lake Ski Hut will continue to serve as a ranger station in the summer.

Concern 154: Commercial service providers should lose their right to obtain wilderness permits for repeat citations.

> *Any party leader or commercial operator who is cited more than twice in a span of two years should be prohibited from obtaining a wilderness permit for three years.*
> [Individual, #88]

Response: Violating wilderness restrictions and regulations (including the conditions of permits) may lead to fines and or the revocation of commercial service providers' authority to operate in these parks.

Concern 155: The NPS should recognize the various types of commercial services that use the parks and decisions made in the WSP/EIS should reflect the varied use.

> *There are many types of use/users in the Mt Whitney Zone and I ask that care is given when writing the final plan to account for all of these uses, not just the most common scenarios. Typical scenarios would be Rock Climbers on a 1-3 day trip to summit Whitney or an adjacent peak, hikers on a 1-3 day trip to summit Whitney, JMT and PCT through-hikers summiting Whitney and traveling through the Zone. But theres also folks like us that hike the JMT and have stock to support us. Our itineraries through the Zone, as described earlier, are inherently more complicated due to the nature of these trips as well as additional regulatory limitations imposed on commercial use such as not being able to enter/exit via Trailcrest. The Extent Necessary Determination deems commercial use necessary and so provisions must be provided to practically realize that public need.*
> [Business, #90]

Response: These parks realize there are a variety of proper wilderness activities supported by commercial service providers. Details on this are contained in appendix B: *Extent Necessary Determination for Commercial Services in the Wilderness of Sequoia and Kings Canyon National Parks*.

Topics Related to Popular Areas

Concern 156: The document should clearly and consistently identify what are the most popular areas and what are the areas with sensitive resources. The document does not present rationale for why Lamarck Col (Darwin Canyon) was singled out to the exclusion of other areas as a sensitive area.

The proposal itself is well written and presented. However, it is light on the details of why certain areas are considered more sensitive.
[Individual, #9]

Which are the most popular areas?
[Individual, #97]

There are several problems with how Alternative 2 uses the two categories of most popular areas and sensitive areas: The document does not clearly and consistently identify what are the most popular areas and the areas with sensitive resources. Sometimes the document seems to combine these two groups and treat them as one when referring to the most popular areas, while sometimes the document seems to only be referring to the eight most popular areas (as opposed to the one sensitive area) when using the term most popular areas or one of the equivalent terms like busy areas. The reader has no way of knowing because the document uses language so inconsistently. The document does not present a persuasive case that the eight areas included in the list of the most popular areas are indeed the most popular areas. . . The document uses a variety of language to describe the category of most popular areas of the wilderness where concerns regarding visitation levels exist. Sometimes the terms busy areas and busy trails seem to be used to refer to this group of either eight or nine most popular areas. Sometimes the document uses the term popular areas (as opposed to most popular areas) when it may really mean this group of the eight or nine most popular areas, but that really is not clear. The document uses language in such an inconsistent manner that there is no way for a reasonable reader to know on what popular or busy areas or trails the parks are proposing to take what action in Alternative 2.
[Individual, #97]

Table A-6 (Visitor Capacity Monitoring - Encounter Sub-zones) on page A-28 provides data on just how popular different trails really are. From that table, it is apparent that the following trails are as popular as some of the trails that the Draft WSP includes in its list of the eight most popular areas: o Roads End o Mineral King Valley o Little Baldy Trail o Paradise Creek Trail Redwood Canyon o Crabtree R. S. to Trail Crest o Evolution Basin & Valley o Dusy Basin o Little Five
[Individual, #88]

Under the Planning Objective for Alternative 2 section (page 96), the document has a generic statement that visitor use levels would be reduced in some popular areas to preserve opportunities for solitude or other wilderness-character qualities. But the reader is not told what these popular areas are.
[Individual, #97]

There are a number of areas in the parks that are at least as sensitive as Lamarck Col (Darwin Canyon). The document does not present any rational reason for why this one sensitive area was singled out to the exclusion of the rest. Sensitive should presumably be related to vegetation or other ecological criteria such as slow recovery time for alpine vegetation, but the document just seems to throw it out there with no explanation. It seems like there should be some relationship between popular (high use) endangering some ecological limit as a result (thus, sensitive).
[Individual, #97]

Response: Popular areas are simply those areas that receive consistent use, or where use has led to impacts on wilderness resources. Expressions such as "popular" are not intended and are not stated to be rigid categories, but rather use the common meaning of the word to signify "liked or enjoyed by many people." Likewise, the word sensitive is used in a variety of cases to mean "easily hurt or damaged." Sensitive resources may or may not be present in popular areas. Popular areas were identified through permit information and input from wilderness rangers, resource management specialists, and maintenance crews. For a summary of potential site-specific management actions under the preferred alternative (see table 23 in "Chapter 2: Alternatives").

Topics Related to Measures, Indicators, and Standards

Concern 157: The WSP/EIS should clearly state which measures have specific standards, identify what the standards are, use consistent language in defining measures and standards, and clarify which measures apply to day-use versus overnight use.

Weighted Value per Campable Mile (WVCM) for selected monitoring sites (and extrapolated across wilderness); these vary by travel/use zone and alternative. The document is not clear about the specific wording of this measure and the associated metric. Page A-14 says that the measure of campsite condition would be adopted to ensure that the number of campsites and their condition does not exceed standards. The metric of Weighted Value per Campable Mile (WVCM), derived from Parsons and Stohlgren, 1987, would be used. Number of encounters with individuals per hour on 90% of peak season (quota season) days for selected monitored trail segments (and extrapolated across wilderness) - these vary by use/trail class category and by alternative. The document is not clear about the specific wording of this measure and the associated metric. Page A-14 says that the measure of trail encounters would be adopted to ensure that encounters of other people by hikers/stock users on trails does not exceed standards. The metric of people encountered per hour (EPH), adopted from the generally applied groups per hour, would be used. All of the visitor capacity measures and standards should be identified in Table A- Does the VUD measure have an established standard? Clarify the paragraph on page A-5 about other measures that the parks monitor to inform management decisions about visitor capacity and serve as a source of information about wilderness character conditions. Make it clear that none of the measures in this category have established standards as that term is defined on page 7.
[Individual, #97]

Under the Impacts of Alternative 2 on Wilderness Character - Opportunities for Solitude or Primitive and Unconfined Recreation section (page 374), the document says that Alternative 2 would apply new trail encounter standards that would protect opportunities for solitude in most areas, and increase opportunities for solitude in up to five areas that are near or exceed the trail encounter standard: the Mount Whitney area, Evolution

Basin and Valley, the JMT near Rae Lakes, the Mount Langley approach, and the trail between Crabtree Ranger Station and Trail Crest. In these areas a variety of management actions could be taken to reduce encounter frequencies, such as reducing night limits, reducing maximum party size, reducing commercial services, lowering trailhead quotas, or other measures. These measures would improve opportunities for solitude but could involve trade-offs in terms of the unconfined quality of recreation in those areas by adding new restrictions that may decrease visitor freedom and spontaneity. These probable management actions should be clearly communicated under the Description of the Alternative section. The definition of the trail encounter measure is poorly defined. The trail encounter measure is not written in such a way that a reasonable person could understand what aspect of visitor experience and wilderness character is actually being measured and preserved. The associated standards do not have a clear and concise meaning.
[Individual, #97]

At different points in the plan, the trail encounter measure and standard is stated in at least four different ways: 1. The maximum number of people encountered per hour on 90% o days within the quota season (generally from the Friday before Memorial Day through the last Saturday in September). 2. Number of encounters per hour (or encounters with individuals per hour or number of people encountered per hour, terminology varies) on 90% o peak season (quota season) days. 3. Numbers of trail encounters on designated trails or routes measured as number of people encountered per hour. 4. Trail encounters (encounters per hour on 90% o quota-season days). What is the minimum acceptable trail encounter condition that the parks are committing to maintain? The trail encounter measure and standard established in the WSP might - or might not - indicate that the parks are committing to maintain the following minimum condition: Use levels for a particular trail segment will be maintained at levels where encounters with other people will be at or below [the standard] encounters per hour for at least 90% o days during the quota season (generally from the Friday before Memorial Day through the last Saturday in September). If that were the measure and standard, the minimum acceptable condition that the parks are committing to maintain, could a reasonable person deduce it, given the way that it is stated in the Draft WSP? If that were the measure and standard, could a reasonable person figure out how to reliably and consistently measure conditions so as to determine whether or not conditions were outside standard? That is, determine when management action should be triggered to bring conditions back within standard. How would a reasonable person measure: The maximum number of people encountered per hour for a given day for a given section of trail? Would the observer hike the same direction as the predominant flow of traffic or against it? Would the observer need to count for a certain minimum number of hours during the peak part of the hiking day to have a representative sample for that day? Would the observer count encounters while they were hiking or while they were sitting beside the trail? Would the observer include encounters with government employees, or should those be ignored?
[Individual, #97]

Critical information on exactly how standards for stock and human impacts were to be determined were left out.
[Conservation/Preservation, #116]

What measures and standards are being adopted in the WSP? The parks should state which measures and standards it is proposing using clear and parallel language. Then

the document should use language consistently so that the reader knows what is really being proposed.
[Individual, #97]

The document then muddies the waters and indicates that it does not always follow the terms that it has defined. On page A-5, the document says that The parks also monitor the conditions of a wide variety of social, natural, and cultural resources. These measures inform management decisions about visitor capacity and serve as a source of information about wilderness character conditions, but they do not necessarily [emphasis added] have explicit standards that trigger management action. . . . the document seems to say that even if these measures do have established standards, these standards wont trigger management action when monitoring shows that the measure has gone outside standard. That is an entirely different use of the term standard from the way the Draft WSP defined it on page 7. A document should not use a key term in two significantly different ways. That is unnecessarily confusing.
[Individual, #97]

The document says that the monitoring plan will be developed in the future. The measure (or metric) that is going to be measured has to be clearly defined at some point. Otherwise, it cannot be replicated. Either the Draft WSP has to do this or the monitoring plan has to do this. In this case, the standard has already been set. We know what the answers (the standards) are, even though the document has not yet clearly defined the unit that is to be measured. The standards looks good, but the standards are meaningless if there is no clear definition of what the metric is that is to be measured. The document basically says that the definition of the metric with all its details will be worked out later in the monitoring plan. That is so wrong. You have to define what you are measuring before you can establish the answer; that is how science works. What the parks are doing is not scientifically defensible.
[Individual, #97]

Response: The measures proposed in the WSP/EIS to manage visitor capacity with specific standards are stated in the "Process to Address Visitor Capacity" section of "Appendix A: Visitor Capacity," namely campsite condition, grazing capacities (as elaborated in "Appendix D: Stock Use and Meadow Monitoring and Management Strategy"), and trail encounter frequency. These are also restated in table A-1. A summary of standards for these measures are contained in table A-4. A complete list of standards for campsite condition is contained in tables A-5 a, b, and c, and represented in figure A-3. A complete list of standards for trail encounter frequency is contained in table A-6, and represented in figure A-4. These tables are contained in appendix A.

Appendix A also discusses several other measures, such as counts of overall VUDs or counts of fire management actions that provide an important source of information about visitor use and wilderness character but which do not have explicit standards that will be used to trigger management action. Because "Appendix C: Wilderness Character Monitoring Strategy" uses the expression "measures" to mean any variable for which data are collected to assess a trend regarding wilderness character, this use of the term "measure" is retained.

The encounter standard is defined in the "Process to Address Visitor Capacity" section of "appendix A and should be interpreted as the number of people encountered per hour that should not be exceeded on 90% of quota season days. The language describing this standard has been modified for clarity, and the new language has been applied in other locations of the WSP/EIS for consistency.

The measure WVCM is used to characterize the condition of areas that contain campsites. It is derived by first assigning a condition class, ranging from 1 to 5, to each campsite in a defined wilderness travel sub-zone. The number of sites within each condition class is then multiplied by a weighting factor specific to each condition class to create a weighted value for each condition class. These five weighted values are then added to create a total weighted value for the camping area. This total weighted value is then divided by the length of campable areas along water bodies (i.e., not including areas of talus, steep slopes, or other properties that make it unusable for camping) to create a weighted value per campable mile.

Condition class is assigned based on the following attributes: vegetation density, vegetation composition, total area of campsite, area of barren core of campsite, developments, litter and duff, social trails, and mutilations (See Parsons and Stohlgren 1987). Note that a few high-class sites (most heavily impacted) can greatly outweigh many low-class sites (least impacted).

Here is an example for a given sub-zone:

Sub-zone has:	15 Class 1 sites	–	multiplied by weighted value factor of 1	=	15
	8 Class 2 sites	–	multiplied by weighted value factor of 6	=	48
	4 Class 3 sites	–	multiplied by weighted value factor of 30	=	120
	1 Class 4 site	–	multiplied by weighted value factor of 75	=	75
	0 Class 5 sites	–	multiplied by weighted value factor of 150	=	0
			Total weighted value	=	258

This sub-zone has 6 miles of water courses/shoreline, of which 40% is campable. The number of campable miles is derived by multiplying the 6 miles times 0.4 (i.e., 40%), resulting in 2.4 campable miles. The WVCM of the sub-zone is then determined by dividing the total weighted value (258) by the campable miles (2.4) – 258/2.4 = 107.5. This imaginary sub-zone has a WVCM of 107.5.

VUD is described in the “Process to Address Visitor Capacity” section of “appendix A as a measure that informs management decisions about visitor capacity and serves as a source of information about wilderness character conditions, but does not have explicit standards that trigger management action. For the preferred alternative, appendix A also explains that “each year, total annual VUDs would be discussed and analyzed by an interdisciplinary group at an annual meeting on wilderness management. If the observed values exceeded these expected values, action would be taken to better understand the sources and consequences of this change in total use.” VUD, as a wilderness-wide aggregate measure, is not an appropriate measure on which to base site-specific management actions but is a useful measure for identifying changes in aggregate visitor use, which may or may not be reflected in other visitor capacity measures, such as encounter frequency or campsite condition. These do have site-specific standards that would trigger site-specific management action if standards are exceeded. An increase in VUDs by itself does not indicate the need for management action if that increase in aggregate use does not cause site-specific standards for other measures to be exceeded.

Some measures relate to both day-use and overnight use, and others relate only to overnight use. Trail encounter frequency, for example, does not distinguish between day and overnight visitors, while campsite condition is obviously related only to overnight camping. Grazing measures would apply to all parties that choose to graze stock, although these are usually overnight parties. Other measures such as visitor-use days are obtained from the permit database for overnight use, and therefore only reflect overnight use. The wider range of measures related to overnight use reflects the wider range of impacts that is associated with overnight use. For clarity, the sentence in appendix A regarding limits and overnight use was omitted in the WSP/FEIS. Appendix A commits to monitoring all three visitor capacity measures that have explicit standards and managing to ensure that conditions remain in standard.

Concern 158: The WSP/EIS should explain the method for deriving the proposed standards from encounter monitoring data, how the standards protect conditions at non-peak times, and how the standards protect conditions well before unacceptable impacts occur.

It is unclear how the Draft WSP uses the measure of total annual visitor use days (VUDs). Partly this is a case of using the term standard in significantly different ways. Partly this is a problem with how the VUD standard is written.
[Individual, #97]

Under the Visitor Capacities and Encounter Standards section of Key Elements of Alternative 2 (page 97), the document says that Alternative 2 would retain existing types and levels of use that would be allowed in wilderness in an attempt to provide opportunities and access for appropriate wilderness experiences. Limited and targeted controls would be applied only in those areas where levels and types of use may be leading to some localized degradation of wilderness character. Based on the objectives for this alternative, the overnight visitor capacity would be set at 134,000 VUDs. Ten-year average overnight use would be limited to 108,000-114,000 VUDs/year. That suggests that these numbers might represent a VUD standard as that term is defined on page 7; that is, a threshold which conditions should not exceed. The document strongly implies that if this presumed VUD standard were exceeded, management action would be taken to bring conditions back within standard. Under the Visitor Capacities and Encounter Standards section of Key Elements of Alternative 2 (page 97), the document says that Each year, total annual VUDs would be discussed and analyzed by an interdisciplinary group at an annual meeting on wilderness management. If determined to be out of standard, management actions to bring the measure back into standard would be adopted. That language also strongly suggests that VUD is being adopted as a measure to be compared against an established standard which would then trigger management action.
[Individual, #97]

What is the purpose of the standards that are being adopted in the WSP? The Draft WSP adopts four visitor capacity measures for which standards seem to have been established. Apparently only three of these really meet the definition of a standard (as that term is defined on page 7) and are part of the visitor capacity framework. How are these limits derived to establish a visitor experience or resource protection limit of some sort that shouldn't be exceeded? Without that rationale, the limits represented by these standards could just as well be a random number. What was the purpose for setting these standards? What do they represent? What are they supposed to accomplish? Are these three visitor capacity measures and standards being established for the dual purposes of ensuring that visitor use remains at existing levels and ensuring that visitor experience and resource impacts remain within the established standard? If those two purposes were achieved, would that also ensure the preservation of wilderness character?
[Individual, #97]

I think the WSP made two mistakes in the way that it sets the trail encounter standards. It only put a cap on peak use for each trail. That took care of the trouble periods, at least in theory. But it did nothing to protect the quieter periods. And by capping the peak periods on the peak trails, it will quite likely encourage faster growth in those lesser used places and periods. So people who previously had the highest quality wilderness experience (as measured by the opportunity for solitude) will potentially experience a significant loss of that opportunity. I hate to see those quiet times lost. There are some people in some areas

who value the opportunity to hike a particular trail over the opportunity to experience solitude. They really want to go to Mist Falls, or Mt. Whitney, or wherever. They realize that part of the price they will have to pay for this experience is seeing a relatively large number of people. They might like to be on the trail with fewer people, but given the choice, they would much rather experience a few extra encounters than miss the chance to hike that particular trail.
[Individual, #97]

Appendix D addressed the issue of unacceptable impact on grazed meadows and stream banks. However, the document does not appear to describe what constitutes the level of unacceptable impact for the other two visitor capacity measures: campsite condition and trail encounters. At best, this says that the parks considered the need to provide outstanding opportunities for solitude or a primitive and unconfined type of recreation somewhere in the parks. There is no documentation to indicate that the parks determined the unacceptable level of impacts for either the campsite condition or the trail encounter measure. Under the Process to Address Visitor Capacity section (page A-5), the document says that Standards have been established at points well before unacceptable impacts are reached to ensure the preservation of wilderness character. The document presents no evidence to support this assertion that standards have been established at points well before unacceptable impacts are reached to ensure the preservation of wilderness character. I'm not so sure this is the case, especially for the trail encounters standard measure. Without a rationale, I don't see how the parks can justify that assertion, especially for the trail encounters standards. It doesn't appear that the parks have the data available to back up such an assertion. Plus the trail encounter standards are being established at points that will allow a potentially significant loss in the opportunity for solitude, both at peak use areas and during peak-use times, and also at non-peak areas and during non-peak times. By setting the standards in this manner, the parks are allowing a potentially significant degradation of wilderness character.
[Individual, #97]

The document does not provide evidence that the trail encounter standards have been established at points that will ensure the preservation of wilderness character. Under the Process to Address Visitor Capacity section (page A-3), the document says that Standards have been established at points well before unacceptable impacts are reached to ensure the preservation of wilderness character. However, the document presents virtually no evidence that the trail encounter standards were established at such points. The document does not even describe how it determined what was the maximum acceptable level of impacts to trail encounters or to the loss of the opportunity for solitude. What will visitors experience when conditions reach this minimum acceptable condition described by the standard? What is the minimum acceptable trail encounter condition that the parks are committing to maintain?
[Individual, #97]

By establishing this line represented by the trail encounter standard, the parks are committing to hold the line for at least 90% of the days during the quota season, but up to 10% othe days may encounter conditions more crowded than the condition identified by the standard (e.g., 15 encounters per hour on the Mt Whitney (McClure-1) trail segment). The document did not disclose what this means in terms of the number of visitors who would experience these conditions. More than 10% of visitors would come during those 10% pk days, but the document did not disclose this in the Description of the Alternative, nor did it assess this in the Environmental Consequences section. This impact on the

visitor experience and the opportunity for solitude should be clearly described and assessed. The document should provide evidence that the trail encounter standards have been established at points well before unacceptable impacts are reached to ensure the preservation of wilderness character. The document should describe how it determined what was the maximum acceptable level of impacts to visitors as measured by increasing trail encounters and decreasing opportunity for solitude. How do the parks detect whether the trail encounter measure has gone outside standard?
[Individual, #97]

The Draft WSP does not state what degree of certainty would be required before the parks would take management action to bring conditions back within standard. This is a significant shortcoming of the document. Establishing the necessary degree of certainty that conditions are outside standard is one of the keys to triggering management action.
[Individual, #97]

The document should have a clear description of what conditions are like when use has grown so high that park management action is triggered to bring conditions back within the established trail encounter standards. The document should provide evidence that there is a reasonable chance that the standard will be maintained. The trigger point and associated decision tree should be described with sufficient clarity for the reader to understand at what point park management would likely take action to bring conditions back within standard.
[Individual, #97]

The document should provide evidence that the standards for the visitor capacity measures were established at points well before unacceptable impacts are reached. The WSP should define what constitutes unacceptable impacts - as opposed to acceptable impacts - for each of these three visitor capacity measures.
[Individual, #97]

Preservation of wilderness character. The document says that the three visitor capacity standards were established at points well before unacceptable impacts are reached to ensure the preservation of wilderness character. The document doesn't appear to identify the point at which unacceptable impacts are reached. It is particularly important for the WSP to identify the maximum acceptable level of impacts for the trail encounter measure, or for the minimum opportunity for solitude. The WSP should then establish standards for the three visitor capacity measures at points well before unacceptable impacts are reached to ensure the preservation of wilderness character.
[Conservation/Preservation, #184]

Response: Standards are management selected values for a particular measure and are not derived from observational data or validated by any statistical method. It is a misapprehension that standards are derived from empirical observation or reflect existing conditions. Rather, they express desired conditions that should be maintained by taking management action when standards are exceeded.

Standards provide a single value for a measure of visitor use that managers can use as a trigger point for taking management action to protect a quality of wilderness, such as the opportunity for solitude or the naturalness of a campsite setting. Again, these evaluative trigger points are not obtained from empirical data regarding visitor use. Conceptually, opportunities for solitude are inversely related to encounter frequency for most visitors, and the naturalness of campsite is inversely related to campsite impacts and modification. But research into visitor attitudes towards visitor encounters and other impacts shows

considerable diversity among current wilderness visitors in terms of sensitivity to these types of conditions. The impact of changing conditions, such as increasing encounter frequency with other visitors, has a marginal effect, in which the number of visitors reporting impacts from encounters and the intensity of that impact increases with higher visitor encounter frequencies. However, there is therefore no "consensus" point at which unacceptable impacts occur to visitors collectively, and therefore no observable "standard" to be "derived" from observational data.

The purpose of the evaluative standards is therefore not to represent the attitude of all current visitors, or any particular subset of visitors, but rather to protect a range of conditions so that individual visitors that place a premium on certain conditions (such as low encounter frequency) will have opportunities to experience them. The standards establish the conditions that are considered acceptable, as defined by the parks' management, for a given location; they are not a response to an "unacceptable condition" that can be observed through research. Therefore, language regarding standards being set at levels "well before" unacceptable impacts have been reached is confusing, and has been removed.

While the encounter standards are intended to establish a maximum condition, the proposed visitor capacity framework does protect a range of conditions, since different standards have been developed to protect areas in four encounter frequency categories: very high, high, moderate, and low. This ensures that visitors will always have opportunities to plan trips to areas that are characterized by infrequent encounters with other visitors and considerable opportunities for solitude. In addition, visitor density in higher use areas shows variation according to the time of season and day of the week. Visitors can increase their opportunity to experience solitude by selecting the appropriate times for their visits to higher use areas. By ensuring that there is diversity in terms of visitor density, and therefore encounter frequency, visitors would have opportunities for solitude, and this aspect of Wilderness Character is protected.

Again, standards are selected, not derived, and represent desired conditions, not current conditions. However, in setting standards, the encounter frequencies observed during 2012 and 2013, despite often limited sample sizes, were an important information source for understanding the potential consequences of applying a given standard to a particular trail segment, in terms of which trail segments were likely to be subject to focused monitoring and potential corrective management action. The parks have also collected additional samples during the 2014 season, and this has increased the sample sizes for many trail segments. The statistic of interest (the 90th percentile) for each trail segment has been calculated and a 90% confidence interval was developed for each of those statistics using bootstrapping methods. Bootstrapping is an accepted statistical method that uses the sample data to create many (100-10,000) simulated samples from the data. While this does not necessarily solve the problem of small sample sizes, which limits reliable inferences about the population, it does allow an interval to be computed for smaller sample sizes, and those intervals can be compared to the proposed encounter frequency standard. Even if the calculated intervals are large, if the upper bound of the interval is below the standard, it can be assumed with at least a 90% probability that the actual condition is within standard. Likewise, if the lower bound of the standard lies above the standard, it can be assumed with at least a 90% probability that the actual condition is out of standard. When the confidence interval brackets the standard, even if the statistic of interest (the 90th percentile) is above or below the standard, a conclusion at the 90% confidence level cannot be made, and the status of that trail segment would be considered to be "near standard" and warranting additional data collection. The WSP/FEIS has been updated to include the 2014 samples and the status of the trail segments, grouped in analysis areas, given the confidence intervals.

Topics Related to Monitoring Plans

Concern 159: The WSP/EIS should clarify the protocols that were used in 2012 and 2013 encounter monitoring and the monitoring protocols that will be used in the future.

The visitor experience should be protected for all of the trails in the parks wilderness, not just for those on the list of the eight or nine most popular areas. It is not enough to establish a trail encounter standard for each trail. After establishing the standard, the trails have to be adequately monitored in order to collect a minimum sample size, the data have to be regularly analyzed (the problem analysis described on page 7), and management action has to be taken as necessary in order to keep conditions within standard. The WSP should explicitly commit to doing this for all the trails in the parks wilderness, not just those for the nine most popular and sensitive areas.
[Individual, #97]

Table C-2 on page C-10 says that trail encounter data is to be compiled for analysis every 5 years. Trail encounter conditions should not be allowed to grow unchecked for five years without checking the monitoring data to see whether conditions are outside standard. This would mean that visitors would potentially be experiencing conditions above the established standard for up to five years before the parks even do a problem analysis to determine whether management action is warranted to bring conditions back within standard. This impact on the visitor experience is not assessed in the Environmental Impact section of the document.
[Individual, #97]

The footnote to Table 55 presumably only provides some of the information in the 2012-2013 monitoring protocol; it does not seem like this could be the entire protocol. Either critical details were omitted from this footnote, or those details were left out of the monitoring protocol. Without those critical details, the reader cannot know whether the 2012-2013 monitoring sample data were reflective of how visitors used the trails. The reader wasnt even told whether the 2012-2013 monitoring protocol was designed to collect monitoring sample data that were representative of how visitors use the trails. For all the reader knows, the monitoring data may have been collected using convenience sampling. That would certainly have resulted in a biased sample. Was the 2012-2013 monitoring protocol designed to collect a reasonably unbiased sample? Were the observers trained in how to conduct the monitoring (as opposed to being sent a sheet of instructions, for example)? What kind of accuracy assessment was conducted on the data? The Table 55 footnote presumably only contained a portion of the 2012-2013 monitoring protocol. What about the other critical instructions given to the observers? Were observers instructed to hike the same direction as the predominant flow of traffic or were they told that it was okay to hike against it? Were observers instructed to count for a certain minimum number of hours during the day in order to have a representative sample for that day? Were observers instructed to count encounters while they were hiking or while they were sitting beside the trail? Were observers instructed to include encounters with government employees, or were those to be excluded? The WSP should provide the complete 2012-2013 monitoring protocol because then the reader would have a better sense of how well the trail encounter standards in Alternative 2 reflect existing conditions.
[Individual, #97]

The document appears to be saying that the future trail encounter monitoring protocols are not linked to the 2012-2013 protocol, are not linked to the established standard, and can be changed by the parks whenever they choose without public involvement. That would effectively be allowing the parks to redefine the trail encounter measure without public involvement.
[Individual, #97]

The definition of the trail encounter measure will remain unchanged. It assumes that the parks will continue to sample the trail encounter measure in the future in a way that is consistent with how it sampled this measure in the past. Whether or not that assumption is valid is impossible for the reader to know because: The document does not fully disclose the details of the trail encounter monitoring protocol that was used in 2012 and 2013 in order to create the standards. All that the reader has is the information provided in a footnote to Table 55 (Observed Number of Encounters per Hour with Individuals: 2012-2013) on page 278. That footnote says encounters within 25 feet only were recorded, individuals were counted only once, and congregation points such as trail junctions and scenic vistas were omitted. The 2012-2013 protocol presumably involved much more sampling direction to the observers than this. " The document does not disclose the details of the trail encounter monitoring protocol that the parks intend to use in the future. The document does not even commit that the future monitoring protocols will produce measurements that are consistent with the 2012/2013 protocol that was used to create the trail encounter standards. In the Trail Encounters section under the Actions to Preserve Wilderness Character Given the Types and Amounts of Use Proposed in Alternative 2 (page A-14), the document says that A monitoring plan will be developed to establish protocols and schedule monitoring frequencies to ensure that areas remain within their applied standard. No other detail about this plan is provided. The document does not define the trail encounter measure with sufficient precision so that it would be a straightforward technical matter to write the monitoring protocol. That is, the protocol could be written in multiple ways so that very different monitoring results could be obtained. The trail encounter standards look precise, but they have no real meaning since the measure has not been clearly and precisely defined. The Draft WSP appears to be saying that the future trail encounter monitoring protocol are not linked to the 2012-2013 protocol, are not linked to the established standard, and can be changed by the parks whenever they choose without public involvement. That is wrong. That is not drawing a line in the sand. That would effectively be allowing the trail encounter standard to be redefined in the future without public involvement.
[Individual, #97]

It is understandable that the parks want to put off the technical details of the monitoring protocol to some future monitoring plan. But the WSP should provide guidance to that monitoring plan so that both the public and the technicians writing the monitoring plan know what that plan will be doing. Otherwise, the WSP would be empowering the monitoring plan to effectively change the definition of the trail encounter measure. If that were to happen,, then an observer measuring a trail segment using the future monitoring protocol might well come up with a different measure than the observers who were collecting the data in 2012 and 2013. The resulting measures would not be the same because the observers would not be measuring by the same protocol. The trail encounter standards were set based on the 2012-2013 monitoring protocol; not based on the yet-to-be-developed monitoring protocol. The parks are proposing to set the standard in the WSP, but not figure out how to sample the associated metric until some point in the future. That is so wrong. The measure and standard are inexorably linked. You change the rules when you change your monitoring protocol; the way you measure something. By changing the way observers measure use, the parks can effectively increase visitor capacity after the WSP is completed; even though the trail encounter standards remain unchanged. That is a serious problem with the WSP.
[Individual, #97]

Since the trail encounter measure is not precisely defined in the WSP, the details of how to measure it will have to be worked out in some future plan. There are no constraints on how that measure can change in the future. The WSP makes no commitment that it will reflect the measure and monitoring protocol from 2012-2103 that was used to establish the standards in Alternative 2.
[Individual, #97]

I've been in parks where I had to stay on a regimented schedule as I moved through the wilderness. The wilderness may have been beautiful, but it lost a huge feeling of wilderness when management started exercising that kind of command and control. I don't like the idea of a wilderness ranger being able to tell me that I am in the wrong location, or that I need to move faster. I think the parks have lost sight of your objective. Figure out what the purpose of the various carrying capacity measures are for. The purpose should not be to establish a trail encounter standard and enforce it. The purpose should be to protect the visitor experience and preserve wilderness character. Regimenting the visitor experience is not the way to achieve those purposes.
[Individual, #97]

Unaddressed: the cultural component in the 5th wilderness character quality: need to clarify other features of value, feasibility of application, relevance, data sets to support measures for other features of value still need to be developed. Request WSP leaves an opening to make use changes as necessary to accommodate new information, when other features of value are identified and addressed. Request wilderness character mapping project to begin ASAP, to address the cultural component of the 5th other features of value character quality of wilderness. We believe stock packing is a feature of this value, based on historical use patterns, prior to the establishment of the parks. Per the draft trail management and classification system: the current trail system reflects a varied history. Packers have contributed to that trail history by participating in trail rehab, building, maintenance, and have demonstrated historical use. We request reasonable effort to be made to continue sufficient access opportunities to trails, to the extent practical, as commercial stock packing is a compatible purpose for which these trails have been established.
[Business, #182]

Visitor Capacity and the Extent Necessary Determination. . . are based upon a three year sample size. The sample is comprised of three abnormal years (2010-2012) and seems inadequate for historical trends. At this point 2013 and 2014 usage should be included in the final WSP. The explanation for how the adjustment factor was derived seems incomplete. The small sample of anomalous years being used as a benchmark for the park use is only part of the issue.
[Business, #196]

Response: To collect preliminary monitoring data, the parks used wilderness/trailhead rangers, resource crews, and volunteers to collect information on wilderness encounters. Observers conducted an opportunistic sampling that allowed encounter data to be collected in conjunction with other field responsibilities. Because the goal was to observe encounters from the perspective of the visitor, observers collected encounter information when they were able to travel an entire trail segment without substantial detours. Data was gathered between the hours of 0800 and 2000 when visitors are generally expected to travel, except on Mount Whitney, where monitoring occurred at any time of the day. Observers were encouraged to select sampling periods that were as diverse as possible in terms of the different days of the week, different times of the day, and different directions on the trail segment. The observation date, start

time, end time, direction and mode of travel, other comments, and the number of encounters with people and pack/saddle stock were collected on a standardized encounter-observation form that was provided to all participants in the preliminary monitoring program. Data was also collected using this protocol during the 2014 quota season. In the future, the monitoring program will be enhanced with a more standardized sampling method, most likely a quota sample that achieves a representative balance of months and weekend days versus weekdays.

Concern 160: The WSP/EIS should disclose the statistical tests applied to the 2012 and 2013 monitoring data, the tests that will be applied to future monitoring data, the desired confidence level to take management actions, and the sample sizes necessary to provide that confidence level.

> *Sampling used to define existing conditions. It is unclear how the 2012 and 2013 sample data used to create the standards in Alternative 2 (Table A-6 on page A-28) was collected, and if it was done in a manner representative of how visitors use the trails. It is unclear if any type of statistical test was performed on that 2012 and 2013 sample data to see how well it represents the way visitors use the trails. If feasible and appropriate, the NPS should consider performing a statistical test on the 2012-2013 sample data to demonstrate that the trail encounter standards reasonably represent existing conditions and that they approximate how visitors use the trails.*
> [Conservation/Preservation, #184]

> *The standards in Alternative 2 are based in large part on encounter frequencies collected by NPS staff during the 2012 and 2013 summer seasons. Table A-6 on page A-28 shows how much data were available to the parks to establish those standards. That table shows that the sample sizes were relatively small for most of the trail segments. The parks purport that the standards in Alternative 2 represent existing conditions. But the 2012 and 2013 monitoring sample period was inadequate to represent existing conditions for two reasons: The sample was not collected in a manner that represents actual use. Most statistical formulas assume zero bias occurs during sampling. One example of sample bias is inconsistent observations (e.g., one observer walks the same direction as the majority of hikers when counting encounters while another observer walks the opposite direction). In such a case, it will never be known how the results relate to actual conditions. Did monitors over-report or under-report the actual crowding that existed? The sample size was too small to be reliable. A basic assumption of most of the applicable statistical formulas is that a large sample size has been collected. Due to excessive random variation, formulas may give erroneous results with small samples. Relatively large sample sizes are required when working in the extreme tails of the distribution (e.g., 90th percentile). Published papers recommend a minimum of 50 observations to estimate the actual proportion of the visitor population when working near the 90th percentile. These are the minimums just to apply statistical formulas without violating the basic assumption of a large sample size. Significantly larger sample sizes are usually required to obtain reasonably precise answers. These are critical shortcomings in the data used to establish the trail encounter standards for Alternative 2. Given these problems with this underlying data, it is not scientifically defensible for the WSP to maintain that the trail encounter standards established in Alternative 2 represent existing conditions. This should be disclosed to the reader.*
> [Individual, #97]

> *Despite its appearance of precision, the trail encounter standard as currently stated is so poorly defined that it is subject to wide interpretation. It is not the required line in the sand. It does not clearly identify the trigger point at which park managers will need to*

take action to bring conditions back within standard. It does not clearly identify the decision tree that park managers will use in evaluating the results of monitoring data to determine whether the trigger point has been reached. The WSP should clearly describe the relationship of future trail encounter monitoring protocols to the 2012-2013 protocol that the Alternative 2 standards are based on. The WSP should also commit that changes to the trail encounter monitoring protocols in the future would only be made through a process that includes public involvement. The WSP does not use a consistent definition of the trail encounter measure. The parks apparently prepared some sort of monitoring protocol in order to collect the data in 2012 and 2013 necessary to establish the Alternative 2 trail encounter standards. The document strongly implies that these standards represent existing conditions. The document further implies that maintaining these trail encounter standards will ensure that existing conditions and opportunities for solitude will be retained. The Environmental Consequences section reflects this; it shows little difference / impact on visitor use / opportunity for solitude between the no-action alternative and Alternative 2. Is that correct; were the trail encounter standards in Alternative 2 established at a point that will ensure that existing levels of use will be retained throughout the parks wilderness areas?
[Individual, #97]

The Draft WSP proposes a trail encounter measure and standard that is based on the 90th percentile. So in order to determine whether or not actual conditions are outside standard, the problem analysis (as that term is defined on page 7) will necessarily have to focus on the extreme tails of the monitoring sample distribution. That would seem to require a relatively large sample size in order to provide a relatively high degree of confidence that actual conditions are outside standard. 1. The Draft WSP does not disclose how much data is required in order to get a statistically useful result. It does not disclose how confident the parks would have to be in the result of the problem analysis of the monitoring sample before taking management action to bring conditions back within standard. (This is a function of the decision tree that the parks choose to use. The Draft WSP does not disclose that decision tree.) If the sample size were too small, management action might not be triggered because management would have low confidence in the analysis.
[Individual, #97]

Although the document does not disclose the parks decision tree, it seems highly unlikely that the parks have designed a decision-making process that will keep actual trail encounter conditions within the established standard. The math just wouldn't work out; either the minimum sample size would have to be very large, or managements acceptable degree of uncertainty would have to be very large. That's one of the problems with designing a trail encounter measure that requires working in the extreme tails of the distribution (e.g., 90th percentile). For all the public knows, if the sample size were small, management might allow actual trail encounter rates to significantly exceed standards before they were sufficiently confident that management action was required. For the document even to say that management actions are bringing conditions back within standard is arguably misleading. What the document is really proposing is to bring conditions back to a point that the problem analysis can no longer detect that conditions are outside standard. That point is probably significantly above the trail encounter standards established in the WSP. Much of this discussion is based on assumptions about what the parks proposed decision tree is. It is hard to know any of this with certainty because the Draft WSP did not disclose the parks decision tree. The public has no way of knowing with confidence how the parks intend to make their decisions

about when and whether conditions are outside standard and management action is warranted. The WSP should disclose this decision tree because it is so critical to the carrying capacity process. The Draft WSP is misleading when it implies that the parks have the ability to detect when trail encounter conditions exceed the established standard and have the ability to bring conditions back within the established standard. The way that the document seems to so casually conflate sample conditions with actual conditions is not scientifically defensible. It is at the root of many of the basic problems with the carrying capacity component of the WSP.
[Individual, #97]

Even if trail encounter conditions were kept within standard, conditions in Alternative 2 would not really be similar to existing conditions. Under the Visitor Capacities and Encounter Standards section of Key Elements of Alternative 2 (page 97), the document says that Alternative 2 would retain existing types and levels of use that would be allowed in wilderness in an attempt to provide opportunities and access for appropriate wilderness experiences. Does this mean that the trail encounter standards in Alternative 2 were established at a point that would ensure the retention of existing levels of visitor use and the existing opportunities for solitude throughout the parks wilderness areas? A reasonable reader might assume the following: 1. The parks are managing for actual trail encounter conditions (the real world conditions that visitors experience) instead of for the monitoring sample conditions. 2. The parks intend to analyze their monitoring sample data to see how well it represents actual conditions experienced by visitors. 3. The parks decision-making process requires relatively high confidence that actual conditions are outside standard in order to trigger management action to bring conditions back within standard. Are those valid assumptions? If those are correct assumptions, then the parks will likely allow actual conditions to go significantly above the nominal standard established in the WSP before they have sufficient confidence that conditions are outside standard and management action back within standard. The consequence of working with a relatively small sample size is that conditions have to be relatively far outside standard before this becomes obvious from the monitoring data.
[Individual, #97]

There seem to be at least four conceptual possibilities for how the parks intend to approach the problem analysis: 1. The parks intend to manage for the monitoring sample conditions rather than for the actual conditions experienced by visitors. The parks will analyze the monitoring sample data and make management decisions based on that. The parks do not intend to analyze the monitoring sample data to see how well that data represent actual conditions experienced by visitors. 2. The parks do not intend to analyze the monitoring sample data to see how well the data represent actual conditions experienced by visitors. They will just make the assumption that the sample data represent actual conditions with essentially 100% auracy. 3. The parks are willing to take management action based on relatively small sample sizes with relatively low confidence (high degree of uncertainty) that actual conditions are outside standard. 4. The parks need a relatively large amount of data in order to have sufficient confidence that actual conditions are outside standard and conclude that management action is required. That would indicate the Draft WSP is written in a misleading way since it gives no indication of this. The parks have not presented a convincing case that they have a realistic plan to collect the necessary amount of data, especially for the trail encounter measure. The document should indicate which of these four approaches it intends to pursue in doing the problem analysis. The document should then provide evidence that

the parks have a practical plan to implement this approach and detect whether the trail encounter measure has gone outside standard.
[Individual, #97]

Are the standards based on sample or actual conditions? A reasonable reader would assume that the parks intend to use this sample data to make decisions about what the real world conditions are; that is what the discipline of statistics is all about. But the Draft WSP never explicitly states that the parks intend to manage for actual conditions (the real world conditions that visitors experience) as opposed to sample conditions. And if the WSP does intend to manage visitor capacities for actual conditions, it does not commit to doing this in a scientifically defensible manner. So for the sake of clarity, the WSP should state what exactly the parks are committing to manage for. For each of the three visitor capacity measures, are the parks committing to keep actual conditions (the real world conditions that visitors experience) within standard? Or are they committing to keep the monitoring sample conditions within standard? For each of the three visitor capacity measures, the WSP should identify what standard it is committing to for the monitoring protocol. Which of the following best describes the WSP standard?
[Individual, #97]

The Draft WSP presents the conditions in Alternative 2 as representing existing conditions. The document also presents that the trail encounter measure and standards in Alternative 2 were established at a point that will ensure that visitor conditions will continue that way. That is only possible if the following were true: The parks are managing for actual conditions (the real world conditions that visitors experience), as opposed to sample conditions. Therefore, the trail encounter measure and standards must be based on actual conditions, not sample conditions. The trail encounter measure and standards adopted in Alternative 2 represent existing conditions. Are the above true? The problem trying to base the standards on a small sample size is particularly important. If the parks did a statistical analysis on that data to see how well it represented actual conditions, the results would presumably have disclosed a high degree of uncertainty. That is, the parks could only have a relatively low level of confidence that the 2012 and 2013 monitoring sample data represent existing conditions (the real world conditions that visitors experience), not sample conditions. The Draft WSP implies that it is dealing with real conditions, not sample conditions. Did the parks perform such an analysis of its sample data? If not, it should do such an analysis and disclose the results. The parks should perform such an analysis so that the reader knows how well the standards in Alternative 2 reflect existing conditions.
[Individual, #97]

It is hard from this to get a clear understanding of what the decision-making process is for the three established visitor capacity standards. Possibly it something like this: The parks will periodically monitor the three established visitor capacity measures according to approved protocols. The results will then be discussed and analyzed by an interdisciplinary group at an annual meeting on wilderness management (that is the problem analysis discussed on page 7). That group will then compare the results of the monitoring against standards that were established in the WSP. Based on that, the interdisciplinary group will make a recommendation to park management as to whether conditions are outside standard or not. If conditions are outside standard, the interdisciplinary group will also recommend what action should be taken to bring conditions back within standard. Park management will then decide what to do based on those recommendations. Is that a reasonable description of the decision-making process

for the three established visitor capacity standards? If not, what is it? For these measures and standards to work, the parks must at least: 1. Clearly adopt the measure and clearly establish the standards. 2. Present a plan demonstrating that the parks have the ability to detect when conditions are outside standard and trigger management action to bring conditions back within standard. This does not necessarily have to be a detailed plan, but it should at least explain the concept and be plausible and persuasive. 3. Present a plan demonstrating that the parks have the capacity to bring conditions back within standard. This should be more than just a list of the tools in the parks management toolbox. It should demonstrate that the parks have given some thought to the use of those tools and concluded that they will be sufficient to bring conditions back within standard.
[Individual, #97]

The document should draw a line in the sand that can be clearly measured so that all parties - including the readers - will know when conditions are outside standard. As opposed to a standard that is subject to a variety of interpretations. The measure, as currently stated, fails to pass that test. Two different observers could readily measure use on the same section of trail on the same day and come up with very different results. If the measure cannot be replicated, the standard is not useful for achieving the purposes for which it was established. The measure and standards may look good, but if an outside group cannot independently measure trail encounter conditions and determine whether conditions are within or outside standard, then the standards as stated in the Draft WSP are meaningless. That is a serious problem.
[Individual, #97]

The term management action is defined on page 7 as implemented following a problem analysis; triggered by monitoring of a measure against a defined standard. The monitoring program is supposed to ensure that areas remain within their applied standard. So a reasonable reader might read this to say that the monitoring program triggers management actions which ensure that areas remain within their applied standard. But the visitor capacity framework, as presented in the Draft WSP, really does not do that. This portion of the document is very misleading. The visitor capacity framework, as presented in the Draft WSP, cannot possibly deliver the results that the document suggests. How many visitors would likely experience conditions outside standard before conditions were brought back within standard? The Description of the Alternative did not describe this condition.
[Individual, #97]

It is not enough for the WSP to state that encounters won't exceed standards or that the parks will ensure that areas will remain within their applied standard. The plan should clarify the parks' intent when it comes to implementation of the various standards established in the plan. For each of the three visitor capacity standards established in the WSP, the plan should clearly state to what extent the parks commit to (1) Detect actual conditions (as opposed to sample conditions) are outside standard, and then (2) Take action to bring conditions back within standard.
[Individual, #97]

The WSP should identify whether it has a realistic plan for creating these monitoring plans and an estimated timetable for when this will happen. The document says that the monitoring plans will address sampling frequency. The monitoring plans should also address minimum sample size, sampling design, sample bias, proposed method of analysis, and addressing degree of uncertainty. Without this information, the parks will

not know how much confidence they can expect to have in using monitoring sample data when doing the problem analysis described on page 7. The WSP should say whether the parks intend to collect monitoring data for the three established visitor capacity measures in a way that will produce reasonably unbiased sample data. The WSP should establish guidance for the two monitoring plans. Are the trail encounter standards being written for the actual population, informed by monitoring data? If so, then that monitoring plan has to be written to assess the degree of uncertainty in providing that estimate. But if the WSP is establishing the measures and standards keyed directly to the sample data (without regard to the real world conditions that visitors experience), then the monitoring plan could rely on convenience sampling and disregard calculating the degree of uncertainty.
[Individual, #97]

Response: The primary information used in developing the encounter-frequency standards were samples of existing conditions that were observed in 2012 and 2013. These observations were augmented for the WSP/FEIS with additional encounter-data collected in 2014. See also response to Concern 158. Data collection will continue on an annual basis as part of a monitoring plan that will be developed after the WSP/EIS ROD. The degree to which these observations from 2012 to 2014 accurately represent real conditions does depend on the sample sizes that were achieved in those three initial seasons and, in many cases, these sample sizes are small. For this reason, the parks propose a cautious approach to the results of this data, using calculated confidence intervals to qualify the management response, but not by establishing a particular sample size or confidence level as a prerequisite for taking management action.

The NPS has calculated the statistic of interest (the 90th percentile) for each trail segment, and has developed a 90% confidence interval for each of those statistics using bootstrapping methods. While this does not necessarily solve the problem of small sample sizes, which limits reliable inferences about the population, it does allow an interval to be computed for smaller sample sizes, and those intervals can be compared to the proposed encounter-frequency standard. Even if the calculated intervals are large, if the upper bound of the interval is below the standard, it can be assumed with at least a 90% probability that the actual condition is within standard. Likewise, if the lower bound of the interval lies above the standard, it can be assumed with at least a 90% probability that the actual condition is out of standard. When the confidence interval brackets the standard, even if the statistic of interest (the 90th percentile) is above or below the standard, a conclusion at the 90% confidence level cannot be made, and the status of that trail segment would be considered to be "near standard" and warranting additional data collection. The WSP/FEIS has been updated to include the 2014 samples and the status of the trail segments, grouped in analysis areas, given the confidence intervals. It is anticipated that future monitoring data will be subject to a similar confidence-interval estimate.

While reducing uncertainty is a goal for any monitoring plan, it is important to recognize that the parks' management has the authority to take management action in the face of uncertainty based on best available information, not on any particular level of statistical confidence. If a sample result from a given season of monitoring suggests an out-of-standard condition, the confidence interval for that sample result would be an important consideration for managers who are contemplating a response. Managers, however, have a variety of other information sources regarding problems associated with visitor use, such as anecdotal information from the parks' staff or the public, and these types of information may also be used as a factor in selecting a management response when reviewing monitoring results and confidence intervals. The purpose of the monitoring data is to help managers make informed decisions about management actions, not to constrain management action with arbitrary sampling requirements.

Concern 161: The WSP/EIS should explain how future monitoring will comply with Directors Order 11B: Ensuring Quality of Information Disseminated by the NPS.

Will the two monitoring plans be written to scientific standards? the parks should put a process in place to assure that these monitoring plans will meet the standards of objectivity, accuracy, integrity, and utility described in Directors Order 11B: Ensuring Quality of Information Disseminated by the National Park Service. http://www.nps.gov/policy/dorders/11b-final.htm The monitoring plans should address not only (1) how the data is to be collected (the monitoring protocol), but also (2) how that data is to be analyzed (the problem analysis described on page 7). Those are the two key components that the parks management will rely on in making decisions about whether conditions are outside standard.
[Individual, #97]

The parks should put a process in place to assure that the problem analysis described on page 7 will meet the standards of objectivity, accuracy, integrity, and utility described in Directors Order 11B: Ensuring Quality of Information Disseminated by the National Park Service. http://www.nps.gov/policy/dorders/11b-final.htm. The monitoring sample data should be formally analyzed to determine how well it represents actual conditions (the real world conditions that visitors experience), as opposed to sample conditions. The parks should consider the results of that statistical test in deciding whether to take management action. The WSP should disclose what the parks would do if that test showed a high degree of uncertainty.
[Individual, #97]

Response: The NPS will continue to comply with all applicable law and policy, including the policies that are provided in NPS Director's Orders, including 11B. These parks will continue to act in accordance with the scientific integrity standards established by the NPS and the Department of the Interior.

Concern 162: The WSP/EIS should define key terms and describe the general approach to conducting the problem analysis presented in the "Purpose and Need for the Plan" section of "Chapter 1: Purpose and Need."

The WSP should disclose, at least in general terms, how the parks intend to do the problem analysis described on page 7. In particular, what level of certainty is required to trigger management action? Are the parks really proposing to trigger management action based on convenience sampling? Or are they committing to sample in a manner that is reasonably representative of how visitors use the trails?
[Individual, #97]

Multiple unexplained critical details. The Draft WSP talks on page 7 and elsewhere about management action which is implemented following a problem analysis which in turn is triggered by monitoring of a measure against a defined standard. The document describes the process in concept, but appears to leave out key information on the operational and analysis details that hold the process together. Is the problem analysis a statistical test of the monitoring data against the defined standard? If so, what degree of confidence does the park manager have to have in the results of that statistical analysis before management action will be triggered? 80% 8% 9%? big a sample size is required to provide the degree of confidence that the manager requires? How many wilderness rangers or other people are required to collect that minimum sample size? Do the parks have a reasonable plan and expectation for putting that many people in the field to collect that big a sample size?
[Conservation/Preservation, #184]

> *Explanation of problem analysis. The Draft WSP talks on page 7 and elsewhere about management action which is implemented following a problem analysis. But the document does not appear to explain how the parks plan to conduct the problem analysis and the decision-making process. The WSP should describe what the parks means by this problem analysis. How will the parks analyze the monitoring data and determine whether or not to take management action? Will this just be an interdisciplinary group of people talking about the data, or will this be based on a statistical analysis of the data? The WSP should describe the general approach that the parks intend to use to analyze the monitoring data and determine whether it is outside the standard. This problem analysis is crucial to the success of the carrying capacity process. In addition to describing the problem analysis, the WSP should commit to making the results of the problem analysis available to the public.*
> [Conservation/Preservation, #184]

Response: The "Purpose and Need for the Plan" section of "Chapter 1: Purpose and Need" does not present any processes, but rather quotes definitions of key terms from reference manuals and handbooks. In this case, "management action" is defined as "implemented following a problem analysis; triggered by monitoring of a measure against a defined standard" (NPS 2014a). The Wilderness Stewardship Handbook does not elaborate any specific process for analyzing a visitor capacity problem. It is accepted as principle, however, that management action should be taken with full consideration of the context in which a standard is exceeded.

It is important to recognize that the parks' management has the authority to take action in the face of uncertainty based on best available information, not on any particular level of statistical confidence. If a sample result from a given season of monitoring suggests an out-of-standard condition, the confidence interval for that sample result would be an important consideration for managers who are contemplating a response. If confidence in the sample is low, the best response may be the collection of additional data, and the management action may be to focus subsequent monitoring on this sample location. Managers, however, have a variety of other information sources regarding problems associated with visitor use, such as anecdotal information from the parks' staff or the public, and these types of information may also be used as factors in selecting a management response when reviewing monitoring results. The purpose of the monitoring data is to help managers make informed decisions about management actions, not to constrain management with creating burdensome sampling requirements. The park's internal decision-making is not subject to NEPA and is a deliberative process that is protected under exemption 5 of the Freedom of Information Act.

Topics Related to Management Actions

Concern 163: The WSP/EIS should disclose which management actions would be taken in response to out-of-standard conditions, which management actions would be taken in day-use areas, which management actions would be taken in high-use areas (identified in table 14, but inconsistently elsewhere), and whether outside agency support would be required.

> *The Visitor Access impact section for Alternative 2 (page 521) says that trailhead quotas would remain at their existing levels, approximately; but there could be a reduction in quotas in busy areas. That suggests that management actions would only be considered for the nine most popular and sensitive areas. Is that what this statement means? If not, what is the significance of this statement?*
> [Individual, #97]

No comprehensive plan is presented for bringing the trail encounter measure back within standard. What potential controls does the Draft WSP offer for bringing the trail encounter measure for those trail segments back within standard? The parks could probably present a fairly convincing case that they have sufficient management controls in place to bring two or three of those popular areas back within standard. But it is not apparent that the parks could present a persuasive case that they have such controls in place for two of the popular areas. For those trail segment that are out of standard, the document should disclose approximately how much of the use on those trails is controlled by the parks and how much comes in from outside the parks. The document should identify whether the parks think that they can bring conditions back within standards by themselves if necessary, or whether it is critical to obtain the support of outside agencies to bring conditions back within standard. Proposing cooperation is good, but if the parks have no effective fallback plan, this should be disclosed.
[Individual, #97]

The WSP does not adequately assess the actions required to bring trail encounter rates back within standard in Alternative 2. The Draft WSP, in various places, says that four or five areas are near or exceed the trail encounter standard established in Alternative 2. That is at present levels of use. If there were an increase in use, then there would be additional crowding. The Draft WSP does not clearly assess the actions required to reduce encounter frequency on these trail segments. The basic problem is that there are too many people on these four or five trail segments. That is why there are too many encounters. That is why there is not enough opportunity for solitude. The document should have a clear assessment of the impact of taking action to bring trail encounter rates back within standard. The WSP should be honest with the reader and clearly disclose what the problem is, and clearly disclose what the necessary solutions are likely to be.
[Individual, #97]

Under the Description of the Alternatives - Alternative 2 section (page xix), the document says that some popular areas would have additional restrictions (e.g., closing additional meadows along the JMT and HST to grazing), but less popular areas would have some restrictions eased (e.g., allowing campfires in specific areas, increased night limits, etc.). Education would be essential to inform visitors of where they could expect fewer encounters and how to practice Leave No Trace travel and camping techniques in wilderness. This language is so innocuous as to be seriously misleading. The document should be forthright and disclose to the reader what management actions are most likely to be required. The management actions most likely to be required in the four or five popular areas are not going to be closing meadows. Based on the evidence presented in the document, it seems implausible that closing those meadows to grazing would reduce use enough to bring the trail encounter rate back within standard. The required management actions will presumably be actions that more significantly reduce the number of hikers on the trail. The document generally fails to disclose this information. For example, nothing in the language about closing meadows would lead the reader to conclude that the parks need to reduce the number of hikers along one of the most popular portions of the PCT/JMT as it passes through Evolution Basin and Valley.
[Individual, #97]

In Table 14, the document actually does list proposed management actions for four of the popular trail segments with some clarity. But these management actions do not match those listed elsewhere. For example, proposed management actions listed in different

parts of the document for the Evolution Basin and Valley portion of the PCT/JMT include: page xix (Description of the Alternative): Closing additional meadows along the JMT and HST to grazing. page 99, Table 14 (Key Elements): Obtain better data to confirm observations; consult with USFS on quota reductions; impose overnight stay limit. " page 124, Table 23 (Area-specific Management Actions): Coordinate with Yosemite National Park and the USFS to improve the quota system for the JMT and PCT. Quotas may be reduced at certain trailheads. page 374, (Impacts of Alternative 2 on Opportunities for Solitude or Primitive and Unconfined Recreation): Alternative 2 would apply new trail encounter standards that would protect opportunities for solitude in most areas, and increase opportunities for solitude in up to five areas that are near or exceed the trail encounter standard: the Mount Whitney area, Evolution Basin and Valley, the JMT near Rae Lakes, the Mount Langley approach, and the trail between Crabtree Ranger Station
[Individual, #97]

Under the Actions to Preserve Wilderness Character Given the Types and Amounts of Use Proposed in Alternative 2 (page A-14), the document says without qualification that the Evolution Basin and Valley section of the PCT/JMT is already out of standard. Table 23 (Area-specific Management Actions under Alternative 2) on page 124 says indications are that use is increasing on this trail. This is a significant issue, but the document fails to state this in clear language that the reader can readily understand. The number of hikers or hiker nights on this section of trail has to be reduced now to bring conditions back within the trail encounter standard established in Alternative 2. The impact is that people who want to hike the PCT/JMT now will be turned away or else they will have to move through this section more quickly, spending fewer nights on average. And if use is increasing as the document believes, then even more people will be turned away in the future. That should be stated in clear language in the Description of the Alternative and in the Environmental Consequences section.
[Individual, #97]

The WSP needs to present evidence that the parks have a practical plan to detect when the trail encounter measure has gone outside standard and trigger management action to bring conditions back within condition. If this point is not identified, then conditions can just continue to slip further and further outside standard before management action is triggered to bring them back within standard. If the parks performed a power analysis (or equivalent statistical test) on the sample data shown in Table A-6, they almost surely learned that there was a relatively high degree of uncertainty that actual conditions were outside standard. The WSP should disclose the results of that statistical test. Did that test indicate a relatively high degree of uncertainty that actual conditions were outside standard? If that were the case, does this represent the parks decision tree? Are the parks really willing to take management action when the degree of uncertainty is this high? This has important ramifications, both operationally and for the visitor experience. Alternatively, if the parks made their determination that conditions in these four areas were outside standard without performing an adequate statistical test on the monitoring sample data, that should be disclosed.
[Individual, #97]

Perhaps the parks could find an effective management action besides permits or quotas. In some areas it might be possible to manage trail encounter rates through the reduction of parking lot size. However, the feasibility of such an approach is not clearly articulated in the document.
[Individual, #97]

There is another significant problem with the trail encounter standard as it is applied to trails in the overnight areas of the wilderness. When encounter rates go outside standard in these areas, the document seems to expect to bring conditions back within standard primarily by reducing trailhead quotas. The WSP seems to make the unstated assumption that visitors will voluntarily abide by their permits and avoid the popular areas that they really wanted to go visit. When the parks detect that conditions are outside standard, are they committing to bringing them back within standard? In numerous places the Draft WSP seems to commit to taking action to retain existing conditions, ensure that areas remain within their applied standard, ensure the preservation of wilderness character, etc. But in other places, there are suggestions that this may not be the case; that the standards do not really represent a line in the sand. That when the monitoring results indicate conditions are outside standard, there might be ways to avoid taking management action to bring conditions back within standard.
[Individual, #97]

One of the actions listed in Table A-3 (Management Actions to Return Out-of-Standard Measures to Within Standard) is "Re-sample the area in question using developed sampling protocol to check/verify preliminary sampling results (initial to WSP implementation)." It is not clear what the phrase "initial to WSP implementation" means. But the main point is how much resampling might go on before the parks feel sufficiently confident in monitoring results and problem analysis to take management action. It seems plausible that sample sizes will often be relatively small given the remoteness of many of the parks' wilderness trail segments and the number of government employees that will likely be hired in the expected funding climate. A power analysis or equivalent statistical test performed on such a small sample data would often result in a relatively high degree of uncertainty that conditions are actually outside standard. More data would be needed. That is a major problem with the design of the visitor capacity measure and standard program as presented in the Draft WSP. The parks haven't demonstrated in the document that it has the capacity to effectively implement it. The parks have designed a trail encounter monitoring approach that is very labor intensive. Are there many examples of large national parks or forests that have successfully implemented a trail encounter monitoring program on this scale? That is, programs that involved routinely collecting large amounts of trail encounter data in a large wilderness setting, analyzing that data, and using the results of that analysis to trigger management actions? If not, the WSP should disclose this. Based on the data presented in the Draft WSP, it looks like the parks are proposing a trail encounter monitoring plan that is infeasible; it cannot achieve the results that are implied in the document. It looks good on paper, but it cannot be implemented in practice. - In the Trail Encounters section under the Actions to Preserve Wilderness Character Given the Types and Amounts of Use Proposed in Alternative 2 (page A-14), the document says that "A monitoring plan will be developed to establish protocols and schedule monitoring frequencies to ensure that areas remain within their applied standard."
[Individual, #97]

Response: The WSP/EIS discloses types of management action that could be taken in response to encounter frequencies that currently appear to exceed standards. The management actions suggested in table 14 and table 23 in “Chapter 2: Alternatives” are consistent with those discussed elsewhere in the document. These management actions are intended to be used with full consideration of the site specific context of the capacity problem, and to be applied adaptively. Visitor education, interpretative efforts, trail re-routes, changes to trailhead quotas, and overnight stay-limits are examples of management actions

that are discussed in the WSP/EIS and would be considered in response to a visitor conflict or other capacity problem. The visitor capacity programs included in the WSP/EIS, such as Limits of Acceptable Change and VERP, are intended to provide a basis for a rational but adaptive response to problems associated with visitor use.

The WSP/EIS acknowledges that some trailheads that visitors use to access parts of NPS-managed wilderness are not managed by the NPS quota system. When monitoring reveals an encounter frequency that appears out of standard, NPS managers would develop a response that is site-specific and accounts for limits to NPS management authority. Working with other agencies, such as USFS, to reduce their trailhead quotas is one possible management response that is acknowledged in the WSP/EIS. Applying overnight limits is another possible response that could be developed, adaptively, possibly in combination with USFS consultation, to respond to a site-specific capacity problem. In such cases monitoring would also continue to observe the effectiveness of management responses in bringing conditions back within standard. It is not useful to propose a single "comprehensive" hypothetical plan for management responses that are by necessity site-specific and adaptive.

Day-use is another important context for interpreting a measurement that suggests that encounter frequency has exceeded a standard. For example, while “Appendix A: Visitor Capacity” does not at this time propose a permit system for day-use under alternative 2, such a system could be implemented in the future if conditions warrant. Permits for day-use parking at particular trailheads, or other method to control the amount of parking available for day-users, are other approaches that could be considered if conditions warrant such a management action. However, such a proposal has not been made in the WSP/EIS for any particular area.

Concern 164: The document fails to consider adaptive management in lieu of alternative-based restrictions for those alternatives that restrict either hiking/backpacking or recreational stock use. Adaptive management techniques like visitor education, interpretive opportunities, and the rerouting of segments of trail where conflicts are known to occur were suggested.

> *Draft WSP/DEIS Fails to Consider Adaptive Management in Lieu of Alternative-based Restrictions For those WSP alternatives that restrict either hiking/backpacking or recreational stock use, we encourage the Park Service to disclose the body of science being relied upon to form the basis of the proposed restrictions. As an alternative to be included in the WSP, we propose the application of adaptive management techniques like visitor education and interpretive opportunities, the rerouting of segments of trail where conflicts are known to occur, or other less onerous restrictions including additional quotas regarding either the number of parties-or even revisiting the concept of zoning (or merely temporal zoning)-in lieu of WSP alternatives that begin with the assumption that private stock use must be limited.*
> [Recreational Group, #186]
>
> *Certainly, existing adaptive management frameworks like Limits of Acceptable Change (and the NPS version, Visitor Experience and Resource Protection) could be employed in the SEKI WSP in order to lay a foundation for the collection of visitor data on potential user conflicts and management options to minimize or avoid unacceptable impacts that unreasonably interfere with park programs or activities.*
> [Recreational Group, #186]

Response: Visitor education/interpretation and trail re-routes are management actions that are discussed in the WSP and would be considered in response to a visitor conflict or other capacity issues. The visitor

capacity program included in the WSP/EIS is intended to provide a basis for a rational, but adaptive response to problems associated with visitor use.

Mitigation - Suggested Changes or Modifications to Mitigation Measures

Concern 165: Mitigation needs to be more thoroughly discussed in the WSP/EIS, including what measures would be taken and their effectiveness.

> *The general problem with the WSP/DEIS is that it does not even recognize things are a problem in the first place, so it can't mitigate them. Mitigation measures must be discussed in sufficient detail to ensure that environmental consequences have been fairly evaluated.*
> [Recreational Group, #235]
>
> *Broad generalizations and vague references to mitigation measures do not constitute the detail as to mitigation measures that would be undertaken, and their effectiveness, that agency is required to provide.*
> [Recreational Group, #235]
>
> *Once adverse environmental impacts are identified, the agency must then describe what mitigating efforts it could pursue to off-set the damages that would result from the proposed action. Here, the WSP/DEIS falls short. For example, NPS must properly disclose that areas closed to grazing will undergo some recovery in soil compaction and disclose the area affected. There is no discussion of the consequences this mitigation will actually be expected to result in. Without such a discussion, the proposed mitigation is too vague and does not provide the detail as to the measure's effectiveness for dealing with the impacts of stock grazing in meadows.*
> [Recreational Group, #235]

Response: Mitigation measures are discussed in detail in the WSP/EIS, including the "Mitigation Measures Common to All Alternatives" section in "Chapter 2: Alternatives." In this section, mitigation measures are clearly identified for a variety of topics, including measures to manage visitor capacity, measures to protect wilderness character and visitor experience, measures to protect wild and scenic rivers, measures to protect employees, and measures to protect cultural and natural resources. Mitigation measures have also been clearly articulated in several appendices such as "Appendix D: Stock Use and Meadow Monitoring and Management Strategy" and "Appendix K: Trail Management and Classification System for Sequoia and Kings Canyon National Parks."

Concern 166: The NPS could seek an outside group that would be willing to sign a Memorandum of Agreement to maintain stock facilities such as drift fences and hitch rails.

> *If concern exists over the ability of the Park Service to maintain drift fences and hitch rails in park Wilderness, our local BCH California units would be happy to enter into a Memorandum of Understanding to be responsible for their upkeep and ongoing maintenance, as per specifications desired by the NPS. We believe this is a mitigation measure that should be included in the WSP/EIS.*
> [Recreational Group, #186]

Response: The opportunity for a Memorandum of Agreement with an outside group could be pursued upon plan implementation depending on the final approved alternative.

Alternatives: Environmentally Preferable Alternative/NEPA 101 & 102

Concern 167: Alternative 4 should be identified as the environmentally preferable alternative, not alternative 5. Actions under alternative 4 would reduce impacts to a greater extent. Additionally, the WSP/EIS does not give proper rationale for choosing alternative 5 as the environmentally preferable alternative.

> *DEIS Alternative 4, rather than DEIS Alternative 5, is the environmentally preferable alternative. Although Alternative 5 reduces visitor use across the board, Alternative 4 reduces the most impactful uses, even as those impacts are defined by the DEIS itself, particularly structures and grazing. This distinction was not taken into account in the designation of the environmentally preferable alternative in the DEIS.*
> [Individual, #46]
>
> *The DEIS failed to properly determine that Alternative 4 is clearly the environmentally preferable alternative.*
> [Business, #238]
>
> *The DEIS (pp. xxiii, 222) provides no sound rationale for identifying Alternative 5 as the environmentally preferable alternative. The DEIS's assessment, although highly inadequate, nonetheless clearly indicates that Alt. 4, relative to the other alternatives, would have less extensive and intensive negative impacts on nonnative vegetation, water quality, and soils due to Alt. 4 's restrictions on stock grazing and use in wilderness. For these same reasons, available information indicates that Alt. 4 would have far greater ecosystem benefits to aquatic resources and meadows than any of the other alternatives. Alt. 4 also has far less impacts on alpine vegetation, wood, and soil conditions due its restrictions on campfires.*
> [Business, #238]

Response: Alternative 4 and alternative 5 would have similar results for the protection and preservation of natural resources. Beneficial effects on soils, water quality, vegetation (wetlands and meadows), invertebrates, and special-status species would occur due to decreases in the number of stock that would likely result because there would be no grazing wilderness wide. There would be further restrictions on commercial access; therefore, there would be reduced opportunities for primitive and unconfined recreation and reduced recreational diversity and variety of individual choice. Alternative 4 is the most protective of high-elevation forests because there would be no campfires allowed wilderness-wide; it would enforce the greatest restrictions on Yosemite toad habitat; and it would have substantial beneficial effects on native plant communities. However, alternative 4 would also result in the most adverse effects on cultural and historic resources. In addition to removing a significant historic resource at Bearpaw Meadow, alternative 4 would also remove three ranger stations that are listed or eligible for listing on the National Register, resulting in an adverse effect on these cultural resources. Alternative 4 would create the most improvement in the undeveloped quality, but may result in a reduced level of wilderness management overall. When weighing the overall effects of alternative 4, it would rank as the second-most environmentally preferable alternative after alternative 5. Alternative 5 would best fulfill the responsibilities of the NPS to select the alternative that has the fewest impacts to the biological and physical environment and that balances the preservation and protection of natural, aesthetic, historic, and cultural resources with visitor use. Therefore, the NPS selected alternative 5 as the environmentally preferable alternative.

CHAPTER 3: AFFECTED ENVIRONMENT

Special-Status Species

Concern 168: Establishing trails on Mount Langley could affect the Mount Langley essential bighorn sheep herd unit, as this could be an important lambing area for Sierra Nevada bighorn sheep.

> *Another area of concern, is restricting human use in sensitive areas where Mountain Bighorn Sheep are found. For example, there are two small herds of sheep in Miter Basin, which is becoming a very popular destination. Will there be a quota system for this very scenic sheep area?*
> [Individual, #145]

> *Alternative 2 Element 2 Trails: I am opposed to placing the proposed trails in the Mt. Langley area in this category. They would be more appropriately placed in Alternative #3. I believe this area is a stronghold for raising the lambs of the Mt Langley heard. Although some repots state that humans don't interfere with the sheep, I am unaware of any reports that address lambing areas.*
> [Individual, #158]

Response: It is unlikely that bighorn sheep in the Mount Langley herd unit use areas within the parks for lambing to any significant degree. Among the eastern herd units, lambing almost always occurs (approximately 99% of lambing events) at mid-elevations on the eastern slopes of the Sierra Crest, outside of the parks (Wehausen, pers. comm. 2014).

Socioeconomics

Concern 169: The WSP/EIS does not describe the regional economy properly. Inyo County should be analyzed separately, as it is geographically separated from Fresno and Tulare counties by the Sierra Nevada mountain range.

> *The DEIS mischaracterizes the regional economy by including Inyo County with Fresno and Tulare Counties. Although Inyo County shares a boundary with Fresno and Tulare Counties, they are geographically separated by the Sierra Nevada Mountain range, with extremely limited direct access from Inyo County to Tulare or Fresno County, and they do not share a regional economy.*
> [County Government, #237]

Response: The regional economy is described separately for Inyo, Fresno, and Tulare counties in the "Socioeconomics" section of "Chapter 3: Affected Environment." Differences among the economies of the three counties are also discussed. See specifically tables 60, 61, 62, 63, and 64, which present the following data for each county: area and federal land management characteristics, population change, projected population growth, employment by place of work, and selected tourism-related establishments and employment.

Visitor Use

Concern 170: The WSP/EIS should include a section devoted to projections of visitor use, and should explain the assumptions that are used for these projections, including assumptions about

overnight use, day-use, and use of popular areas, such as the JMT. The WSP/EIS should also acknowledge the potential increase in day-use areas of the wilderness close to the frontcountry that was forecast in the GMP.

The Visitor Access impact section for Alternative 2 (page 521) is so vague and superficial as to make it impossible for a reasonable reader to determine whether the parks anticipate having impacts on those visitors who use the day use areas of the wilderness. Visitor use is apparently assumed to be flat or declining in day use areas of the wilderness close to the frontcountry. Is that the case? That seems implausible, and it is contrary to the forecast contained in the GMP. But the reader has no way to know whether the WSP is making such an assumption because there is no clearly articulated visitor use projection section.
[Individual, #97]

The document does not adequately describe and assess the impacts of imposing visitor capacity standards on visitors. The document should have a clear description and assessment of the impacts of imposing visitor capacity standards on visitors. When any of these three visitor capacity standards trigger management actions to bring conditions back within standard, this management action can result in several potential impacts on visitor. The most important of these is the impacts on visitors from moving use in from peak periods/areas to quieter periods and areas. Visitor use under existing conditions right now is somewhat similar to a bell curve. Imposing capacity limits through quotas or other means will tend to flatten out use so that it becomes greater during the non-peak periods. This will result in an increase in use (and a reduced opportunity for solitude) during non-peak use periods between existing conditions and the condition that will exist if use were to get displaced from peak periods. These impacts are not clearly addressed in the Environmental Consequences section of the WSP. Part of the problem is that there is no clearly articulated and defensible visitor projection section in the document to use as a basis for the impact analysis.
[Individual, #97]

The Draft WSP seems to assume that overall growth in use of the overnight portions of parks wilderness areas will be relatively flat. But then the document says indications are that use is increasing on the John Muir Trail (JMT). This should be described in the visitor projections section, especially since portions of that trail appear to already be near or over the trail encounter standard established in Alternative 2.
[Conservation/Preservation, #184]

The GMP forecast that day use in frontcountry areas of the parks could grow significantly. http://www. nps. gov/seki/parkmgmt/gmp. htm. The WSP should recognize that there is a reasonable chance that visitor use could increase significantly in those day use areas of the wilderness close to the frontcountry. It should have an effective approach for dealing with that visitation, one that achieves the purposes of the visitor capacity measures and standards. The impacts of that approach should be assessed in the Environmental Consequences section of the document. The document says that Alternative 2 is designed to retain existing levels of use and opportunity for solitude throughout the wilderness. The GMP forecast that day use in frontcountry areas of the parks could grow significantly. If day use were to increase and if the parks manage visitor capacity (specifically the trail encounter measure) to retain existing levels of use and opportunity for solitude, then some management action will be required.
[Individual, #97]

Among other things, the WSP should clarify the extent to which growth in visitor use (both day use and overnight use) could be accommodated while protecting wilderness character. The document should acknowledge the potential increase in day use that was forecast in the GMP. In addition, the Environmental Consequences section of the document should fully assess the impacts on visitors from moving use in from peak periods/areas to quieter periods and areas. Increase in use (crowding conditions) between what now occurs during non-peak times and the condition that would exist if use were to get displaced from peak periods and areas. Along with a decrease in the corresponding opportunity for solitude during those times and in those areas. The document says that Alternative 2 was designed to retain the existing use levels. But the trail encounter standards only represent the use levels at the peak periods. That means that (at best) the parks are only managing to preserve conditions at the peak periods; to keep the opportunity for solitude from getting worse during these peak periods. But the parks are not managing to preserve the existing conditions during the non-peak periods. If use were to increase, these are the time periods that would see an increase in use (and a reduced opportunity for solitude). This should be described and assessed in the document.
[Individual, #97]

The plans description of visitation projections is unclear- - The WSP should provide a clear description in one place of the visitation projections for all portions of the wilderness and the assumptions that went into making those projections.
[Conservation/Preservation, #184]

But it is difficult to figure out just what the visitor use projections are and what assumptions they are based on. That appears to be the case because the discussion of the visitor use projections are scattered throughout the document, making them hard to find. In other cases, it is difficult to understand the underpinning or rationale for certain statements and assumptions. For example, the document says on page A-6 that visitor capacity limits are primarily for overnight use. This is supposedly because at this time and in the foreseeable future, day visitor use is anticipated to remain at acceptable levels. The document should provide supporting justification for that statement, which appears to contradict what was within the GMP, which stated that there would likely be a shift from overnight use toward day use.
[Conservation/Preservation, #184]

The document says on page M-4 that the parks wilderness areas can be understood as three different types of locations. There are low-use and high-use overnight areas, but the wilderness also includes day use areas close to the frontcountry. However, when it comes to visitor use projections and the assessment of visitor impacts, the document seems to focus primarily on the overnight categories, the portions of SEKI wilderness that are furthest removed from the frontcountry.
[Conservation/Preservation, #184]

There is no visitor projection section. But the document seems to assume that growth in visitor use in the parks wilderness areas will be less than the projected increase in the surrounding population. Does the WSP assume this for all of the wilderness areas, or only for the overnight portions of the parks wilderness?
[Individual, #97]

Response: The WSP/EIS does not make projections of visitor use, but it does acknowledge certain trends, particularly those derived from recent visitor surveys (Martin and Blackwell 2013). According to permit data, overall wilderness visitor use has not increased since the 1990s despite statewide and regional population increases. Current total wilderness visitor use is less than that experienced during the late 1970s and early 1980s. While wilderness visitor use may increase in the future, there is no basis in the available data to assume this will occur.

The GMP did not specifically forecast a potential increase in day-use areas of the wilderness, but did project an increase in visitor use in low use frontcountry (nonwilderness) areas. Overall, visitor use in Sequoia and Kings Canyon National Parks has been stable since 2007 when the GMP was completed. There has not been a substantial increase in visitation, in fact, post-GMP, visitation peaked in 2010-2012, but has since decreased to levels below the 2007 level. While overall visitor use has not increased in recent years, there has been a shift towards shorter overnight trips, day trips, and popular areas (Martin and Blackwell 2013). The purpose of both permit quotas and condition standards is to control the change that could result from increasing visitor use. In popular areas, increases in overnight use is constrained by both permit availability and visitor capacity standards, and day-use is constrained by visitor capacity standards, in particular, by the visitor encounter standards that apply to areas receiving day-use.

Visitor Survey

Concern 171: The wilderness visitor survey indicated that visitors do not perceive the current conditions as being problematic. More people identified issues with other hikers rather than stock users.

> *According to the parks 2011 Wilderness Visitor Survey, as described in more detail elsewhere in this comment letter, statements of hiker-horse conflict are not widely claimed nor are they generally held with strong conviction. Nonetheless, the draft WSP/EIS and its Appendix H, the plans accompanying Wilderness Information and Education Strategy, fail to explore the perception of conflict in any detail. The existence of hiker-horsemen conflict is treated largely as fact and blown out of proportion in the draft WSP/EIS. As such, alternatives developed in the WSP represent merely a continuum of potential restrictions to horse and stock use in park Wilderness (thereby adversely affecting the unconfined and self-directed nature of our Wilderness experience) and have not been demonstrated to be necessary for the purposes of preserving wilderness character.*
> [Recreational Group, #171]
>
> *Indeed, the report summary states (page 162): In every potential problem explored in both 1990 and 2012, the overall average extent of the problem decreased, some substantially. Consequently, the WSP/DEIS fails to document these trends and, in light of this data, offer a valid rationale for proposals to further restrict stock use at this time. As described in additional detail throughout this comment letter, the parks 2011 Wilderness Visitor Survey contains abundant data to demonstrate specific restrictions proposed in the WSP/EIS for recreational stock use are not supported by the vast majority of visitors surveyed.*
> [Recreational Group, #171]
>
> *Page 69 of the Martin and Blackwell Report shows that there are not widespread conflicts on park Wilderness trails as reported by hikers/backpackers. Question 31 asks: "Did the actions or behavior of any other group or individual interfere with your enjoyment of the wilderness on this trip?" Nearly 80% (78. 5%) of respondents replied*

'No." This result, taken from the comments of hikers, reveals that even the vast majority of hikers/ backpackers do not appear to view stock use as a conflict and would not be quick to jump behind supporting restrictions to stock use.
[Recreational Group, #138]

Response: The visitor use survey of 2011 provided valuable information to help inform decisions, but it was not the only source of information considered. The parks know that there is a continuum of visitor attitudes toward stock in wilderness, from those who regularly use stock to those who would like to see stock completely prohibited. This WSP/EIS seeks a reasonable balance between allowing the traditional activity of stock use and providing opportunities for visitors who desire to have a stock-free experience. Stock is prohibited in some areas of the parks where there are concerns about visitor safety (trails too narrow and precipitous to allow safe passage), popular hiking areas (mostly day-use areas), and resource protection (from vegetation to wildlife).

Concern 172: The results of the wilderness visitor survey were not translated properly into the WSP/EIS. Few visitors reported an issue with large stock groups in wilderness; however, the plan decreases maximum stock party sizes, creates hiking only trails and treats ungrazed meadows as a social value.

Designation of Hiker-Only Trails Not Supported by Wilderness Visitor Survey Available data collected by the Park Service, including the parks 2011 Wilderness Visitor Survey, does not support the need for designation of hiker-only trails in park Wilderness. In fact, the survey revealed a remarkably low level of reported hiker-horse conflict. The questionnaire used with hikers and backpackers in the field included a question that goes straight to the heart of potential on-trail conflict. Question 31 asked: Did the actions or behavior of any other group or individual interfere with your enjoyment of the wilderness on this trip? (Report, p. 69). Among 622 respondents to this question, nearly 80% (8.5%) No. That overwhelming response should immediately signal to the Park Service that the vast majority of hikers/backpackers in SEKI Wilderness do not view recreational stock use as a conflict. Yet the DEIS fails to disclose and discuss this particular piece of compelling data.
[Recreational Group, #171]

Results of the parks 2011 Wilderness Visitor Survey, for example, do not support a reduction in the maximum party size for stock users. Of the nearly 600 hikers / backpackers who answered the question, 86. 6% of respondents reported they had either no or a Small Problem seeing Groups with Too Many Horses. Only 5.7% noted it as a Big Problem (Report, p. 77, Table 34h). Based on these numbers alone, the WSP/EIS fails to document public demand as supporting a decrease in maximum stock party size. If there were other rationale, we would hope this would be made clear in the WSP/EIS.
[Recreational Group, #186]

Designation of Meadows Closed to Grazing for Social and Scenic Values Not Supported by Parks Wilderness Visitor Survey Results of the parks 2011 Wilderness Visitor Survey do not support a desire by hiker and backpackers to view ungrazed meadows. The reported mean of respondents who ranked stock damage to meadows (e.g., trampled vegetation) was 1. 55, which puts it about halfway on the referenced scale as being between Not a Problem to a Small Problem.
[Recreational Group, #186]

Response: The visitor use survey of 2011 provided valuable information to help inform decisions, but it was not the only source of information considered. Stock is prohibited in some areas of the parks where there are concerns about visitor safety (trails too narrow and precipitous to allow safe passage), high hiking use areas (mostly day-use areas), and resource protection (e.g., vegetation and wildlife). Reduction in party sizes, for people and stock, provide for improved opportunities for solitude, and is supported by data in the 2011 visitor survey, and the 1993 study on hiker and stock user conflict (Watson et. al 1993). The prohibition of grazing in a few specific meadows provides for improvements in the natural quality of wilderness and the scenic public purpose.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

Wilderness Character

Concern 173: There is no evidence in the WSP/EIS that stock have an impact on wilderness character and that management actions are justified.

Many of the restrictions imposed on stock users in the alternatives set out in the DEIS are based on the assertions by very few hikers/backpackers that seeing individuals riding stock destroys their wilderness experience. To accommodate these assertions, NPS is proposing to give hikers/backpackers exclusive privileges on certain trails. However, this proposal is utterly irrational because the alleged harm to these individuals' wilderness experience by seeing stock users would result from the seeing anyone on the trail, regardless of whether that person on stock or foot. There is no explanation anywhere in the DEIS for how or why seeing stock destroys a wilderness experience, but seeing other hikers/backpackers does not. Given this fact, the allegation that seeing stock users reduces the wilderness experience appears to be a wholly contrived allegation.
[Recreational Group, #251]

We voice opposition to proposed restrictions that do not appear necessary to preserve wilderness character, particularly where less onerous restrictions and/or visitor education might be used in combination to preserve wilderness character. As demonstrated elsewhere in this comment letter, such options appear yet to be contemplated in the WSP. For example, another stated objective of the WSP process is to work to reduce conflicts between user groups as well as between users and sensitive resources (Executive Summary, p. vi, emphasis added). Regarding the former, the draft WSP fails to consider options (i. e. , mitigation) regarding visitor education to address identified hiker-horse conflict, whether or not the conflict is real or perceived. Instead, alternatives articulated in the draft WSP, including the Preferred Alternative, appear to take statements on the existence of conflict at face value.
[Recreational Group, #171]

The biological analyses for Alternatives 2 through 5 merely infers that less human use in park Wilderness would bring minimal, if any, population-related benefit to threatened species, as no measurable impacts would occur at a population level (Draft WSP/EIS, p. 378, regarding Alternative 3, which ironically would Provide More Opportunities for Primitive Recreation). Consequently, the draft WSP/EIS fails to make the case that either current or additional private stock use would adversely affect sensitive species. Nor does it make a compelling case that restricting private stock use (i. e. , Alternatives 2, 4 and 5) is necessary in order to preserve the natural quality of wilderness, to preserve general wilderness character, or for the more stringent purpose of protecting critical habitat under the authorities granted to the Park Service under the Endangered Species Act.
[Recreational Group, #171]

We would argue that viewing even a handful of grazed meadows would unlikely cause a Wilderness backpacker to declare their experience ruined and/or that park Wilderness had lost its naturalness. In our view, it is partly an issue of scale. While the presence of a given grazed meadow-or even a trail tread carved through a meadow in park Wilderness-might detract somewhat from the naturalness element associated with wilderness character, the WSP/EIS analysis is deficient when it tries to imply that the scale of any loss of naturalness is significant as a result of the act of viewing a grazed meadow(s). In summary, we offer that the WSP/EIS is deficient in that it proposes to prohibit currently open meadow grazing to recreational stock use even though doing so would unnecessarily limit stock users opportunities to recreate in an unconfined, self-directed manner, subject only to those regulations that are necessary to preserve wilderness character. We contend the WSP/EIS fails to adequately document the need for such regulations.
[Recreational Group, #186]

Further, the draft WSP/EIS fails to disclose how the presence of drift fences and hitch rails materially affects the parks wilderness character. To the contrary, the parks Wilderness Character Assessment (2014) makes a case that while these structures might reduce the undeveloped quality of wilderness character they also help to protect certain natural features such as subalpine forests and lakeshores.
[Recreational Group, #186]

Response: Stock can have an effect on wilderness character (as can humans) by impacting natural systems (e.g., meadows and water courses), thus degrading their natural state. This can come in multiple forms, from overgrazing leading to meadow plant composition change, physical alterations to stream banks altering hydrologic regimes, and by transporting invasive non-native species that then displace native species (these impacts are analyzed in Chapter 4). Large groups of people, with or without stock, can impact other visitors' opportunity to experience solitude. The largest stock groups tend to have the most impact. The controls that this plan puts on stock are to ensure these potential impacts are controlled.

Concern 174: Reducing stock and removing hitch rails would negatively affect stock users by diminishing their opportunity for unconfined recreation in the parks' wilderness.

In multiple management documents SEKI proclaims that stock use is a historic and traditional use that will be continued while being subject to management provisions to minimize potential damages caused by stock grazing. But the proposed removal of 12 drift fences and gates and the removal of 23 hitching rails in the PA is counter to the preservation of stock use as is the closing of an additional 17 meadows to grazing in the PA. If stock use is concentrated in fewer and fewer meadows, there is a greater potential for damage to the remaining meadows which will result in demands for more closures and more restrictions. The removal of drift fences and gates and hitching rails has a very significant negative effect on the wilderness experience of stock users.
[Recreational Group, #230]

For example, the proposal to convert the trail leading to Milestone Basin to a Class 1 trail would ultimately exclude pack stock users form this beautiful basin, which is of significant importance to stock users. Knowing the basin would be off-limits to stock users would diminish opportunities for unconfined recreation in park Wilderness.
[Recreational Group, #186]

Response: The removal of drift fences and hitch rails will decrease the level of development in wilderness, thus improving its wilderness character. Removing grazing from specific meadows will improve their naturalness, consequently improving wilderness character. Allowing grazing in many meadows allows the traditional activity of stock use in these parks to continue. Requiring stock users to be more self-reliant in holding and controlling their animals (to limit impacts) is also consistent with the preservation of wilderness character. Additionally, having meadows closed to grazing does not prohibit stock users from camping there, provided they carry feed and hold their animals. Park managers realize that these controls put more responsibility on the stock users, but believe that these controls are reasonable and achievable.

Concern 175: Stock have a greater impact on wilderness character than hikers.

> *Stock have a much bigger impact than hikers on the important stewardship goals of preserving the wilderness in an untrammeled state, in a natural state, and also reduce the sense of solitude.*
> [Individual, #39]

Response: Stock have impacts on wilderness resources, as do hikers. The emphasis of this WSP/EIS is to ensure that proper activities can occur in wilderness without undue impacts, which is why this plan proposes to implement a system of controls and restrictions in order to provide for "the use and enjoyment" and the preservation of wilderness character of these parks' wilderness lands.

Concern 176: A trail classification system is not necessary to protect wilderness.

> *Further, the draft WSP/EIS fails to demonstrate that the development of a Trail Classification System (i.e., new regulation) is necessary in order to preserve wilderness character.*
> [Recreational Group, #186]

Response: The development of a Trail Management and Classification System (see "Appendix K: Trail Management and Classification System for Sequoia and Kings Canyon National Parks") provides the parks' management with a consistent framework to maintain trails in wilderness. The Trail Management and Classification System is consistent with law and directly follows policy (see NPS *Management Policies 2006,* Section 6.3.10.2, and 9.2.2.2). Appendix K is a guiding document that these parks will use to ensure the preservation of wilderness character through consistent and appropriate management of trails.

Concern 177: Allowing stock manure in wilderness is a violation of the pristine character of the wilderness.

> *Manure catchers required on ALL stock animals (park-wide) for all day trips/rides. Manure to be packed out and disposed appropriately outside wilderness, or scattered away from trails and surface waters (including wetlands). NPS at SEKI to immediately begin research to test/develop manure catchers for overnight wilderness use (as it did to advance the development of bear-proof food canisters in the 1980s-90s), with goal of developing manure catchers for backcountry use within five years from execution of the ROD. Every five years after adoption of ROD, formally consider research results and require manure catchers for all stock use (park-wide) as soon as feasible. (See additional notes re: manure catchers, below.) Notes re: Manure Catchers: The DEIS improperly dismisses manure catchers with a single paragraph (at Vol. 1, p. 221). First, the DEIS acknowledges that manure catchers may be effective & for day trips, yet it fails to*

consider any alternative that would adopt this important mitigation measure for day trips. Such casual dismissal of an acknowledged potentially effective mitigation measure is arbitrary and capricious. Second, the DEISs arguments for why manure catchers may not be effective for longer wilderness trips appear to have been completely manufactured to arrive at a predetermined outcome (i. e. , business as usual). The NPS could require, for ALL commercial and administrative stock use, that manure catchers be worn and emptied (i. e. , manure scattered) away from surface waters and trails, which would in truth PREVENT the current concentration of stock manure on trails and PREVENT the controllable discharge of manure into water sources. The DEIS simply pronounces (without any reasoned analysis) that manure catchers are not suitable for typical trips in the parks wilderness because animals would be required to wear them for many hours or days. The DEIS provides no reasoned analysis at all to allow the public or decision-makers to understand why the authors concluded that wearing manure catchers for many hours somehow renders them not suitable as a mitigation measure in SEKIs wilderness. The truth is that manure catchers could greatly reduce the concentration of manure on trails, and substantially reduce the pollution of water sources by stock manure. Thus, this promising mitigation measure must be evaluated and considered in more detail.
[Recreational Group, #123]

Response: Preserving wilderness character involves maintaining the "primeval (i.e., natural) character," while allowing for primitive types of recreation. Stock use is an appropriate and accepted form of primitive recreation in the parks. Though some wilderness users find stock manure unpleasant, at current levels and the levels anticipated in the preferred alternative, it does not represent an unacceptable impact on wilderness character. The Wilderness Act does not mandate that a "pristine" environment be preserved, as the word "pristine" does not occur in the Act. Moreover, such an unreasonably stringent standard would preclude many common forms of visitor use and enjoyment of wilderness, because all visitor use is associated with some form of impact on wilderness character. Overnight camping, for example, is associated with vegetation loss that would fail to meet a "pristine" standard, but which is not considered to be an impairment of wilderness character. Impairment is the standard provided by the actual language of the Wilderness Act. The WSP/EIS, however, has been altered to include a series of mitigations on Stock Manure Handling Best Practices.

Wilderness – Cumulative Effects

Concern 178: The continued existence of the dams within wilderness should be considered in the cumulative effects analysis.

SCE recommends the addition of language to the Wilderness Stewardship Plan to implement section 1902(1)(C)(Footnote 1-1 0mnibus Public Land Management Act of 2009:Section 1902. Designation of Wilderness Areas: (1) John Krebs Wilderness (C) Potential Wilderness Additions - The designation of the potential wilderness additions (A) shall not prohibit the operation, maintenance, and repair of the small check dams and water impoundments on Lower Franklin Lake, Crystal Lake, Upper Monarch Lake, and Eagle Lake. The Secretary is authorized to allow the use of helicopters for the operation, maintenance and repair of the small check dams and water impoundments on these same lakes.) of the Omnibus Public Land Management Act of 2009 that ensures SCE can continue to perform operation, maintenance, and repair of its facilities, infrastructure, and associated access by roads, trails, and air.
[Business, #253]

Response: The statute designating the John Krebs Wilderness and the Sequoia-Kings Canyon Wilderness addition (PL 111-11, Omnibus Public Land Management Act of 2009) is referenced in the "Background" section of "Chapter 1: Purpose and Need" and in "Appendix E: Wilderness Legislation Related to Sequoia and Kings Canyon National Parks" (which contains the full text of the portion of the statute relevant to these parks). The existence of the dams, and the Designated Potential Wilderness Additions which they and their affiliated lakes lie within, are described in the "Private Lands, Non-Conforming Uses, and Retained Rights" section of chapter 1. The dams and existing operations related to the dams are included in the "Wilderness Character," "Special-Status Species," and "Cultural Resources" sections of "Chapter 3: Affected Environment." The dams and their maintenance operations are also discussed in the "Cumulative Effects Analysis Method" and "Wilderness Character" sections of "Chapter 4: Environmental Consequences."

Soils

Concern 179: The NPS should assess the potential impacts of stock on soil compaction under each of the alternatives.

> *The DEIS fails to reasonably assess the impacts of stock under the alternatives on soil compaction. This is a major defect, for several reasons. First, horses and mules inevitably and significantly compact soils that they travel over due to the relatively high pressure these animals exert on soils, which is up to 10 times greater than that from hikers (Pickering et al. , 2010). Second, all of the DEIS alternatives except Alt. 4 allow grazing by horse and mules in wet areas that are especially susceptible to compaction. Third, soil compaction has numerous adverse hydrologic impacts. Fourth, these impacts of soil compaction are quite significant for aquatic and meadow ecosystems. Fifth, it is well-documented that soil compaction lowers soil productivity significantly and persistently, due to its impacts on soil hydrology and root penetration. Sixth, although it is not reasonably disclosed in the DEIS, soil compaction is enduring. Seventh, the hydrologic and biotic impacts of soil compaction by stock are likely to combine with climate change impacts to exacerbate total ecosystem impacts.*
> [Business, #238]

> *The DEIS does not credibly differentiate among the alternatives with respect to stock-caused soil compaction. This is a severe defect because there is considerable difference among the alternatives in the total area, location of areas, and their susceptibility to compaction that are subject to stock travel and grazing.*
> [Business, #238]

Response: Information about the parks' soils is presented in "Chapter 3: Affected Environment" of the WSP/EIS and potential impacts to soils including compaction are analyzed in "Chapter 4: Environmental Consequences." The Natural Resource Conservation Service is conducting ongoing soil surveys (2011-2016) throughout the parks; these surveys have evaluated soil compaction, among other attributes. Preliminary results, which include targeted assessments of soils in meadows that are subject to grazing, indicate that there is no evidence of soil compaction in grazed meadows. This is consistent with the analysis in the WSP/DEIS, which concluded that evidence of compaction is largely absent from meadows subject to grazing. This additional information has been added to the WSP/FEIS with a summary of the meadow area subject to potential compaction by stock for each of the alternatives. For instance, of the approximately 23,000 acres of meadow throughout the parks, most grazing is expected to occur within 5,763 acres of named forage areas under the preferred alternative.

Concern 180: The NPS should assess the potential for erosion and resulting soil loss and sediment delivery to streams due to stock activities. The NPS should disclose the number of streams crossed by trails in order to make known the number of locations where stock on trails may elevate erosion and the delivery of sediment to streams. The NPS should differentiate among the alternatives with respect to potential impacts from erosion and sediment delivery.

> *The DEIS also fails, in many ways, to credibly assess stock-related erosion and resulting soil loss and sediment delivery to streams due to stock activities allowed under the alternatives. Available scientific literature unambiguously indicates that horse use elevates trail erosion. However, the DEIS fails to reasonably assess the magnitude and location of this elevated erosion and stream impacts under the alternatives, because it fails to examine and disclose the total number and length of locations where this is likely to occur under the alternatives.*
> [Business, #238]

> *It is well-established that a significant amount of sediment generated from disturbances that are within 100 feet slope distance of streams is ultimately delivered to the stream system (USFS and USBLM, 1997). The amount of trail within this distance of streams and lakes that is subject to stock use is also likely to significantly differ among some of alternatives due to the previously described differences in the length of trail open to stock travel (DEIS, Table ES-1, p. xv). However, the DEIS fails to assess and disclose the amount of trail subject to stock use that is within l 00 feet of streams and lakes under the alternatives. Therefore, the DEIS failed to reasonably examine and disclose the magnitude of trails that are likely to contribute to increased sediment delivery due to accelerated erosion caused by stock use.*
> [Business, #238]

Response: The analysis of soil erosion and impacts of sediment to water quality in "Chapter 4: Environmental Consequences" of the WSP/FEIS takes into account the impacts of stock activities. The WSP/FEIS has been revised to include an additional analysis of trail-stream crossings and trail segments within 100 feet of waterways. It is not feasible to isolate the contribution that stock make to sediment loads because of variations among slope, soil, bedrock, substrate, the size and seasonality of streams, local weather, antecedent conditions, and local utilization levels at the scale of such crossings. The additional analysis provided in the WSP/FEIS does not change the conclusions reached in the WSP/DEIS about the expected impact of the alternatives on erosion.

Concern 181: The NPS should analyze bare ground conditions in grazed meadows and the potential effect of elevated bare ground on soils and resources, which may be affected by soil loss and sediment-related impacts. The NPS should include bare ground data collected as part of the existing monitoring protocols in the analysis of environmental effects.

> *The DEIS also fails to reasonably disclose the erosional impact of bare ground in grazed meadows. Legions of studies have consistently documented that erosion on bare soil is vastly elevated relative to vegetated soils, although this well-documented effect is not adequately disclosed or properly analyzed.*
> [Business, #238]

> *The DEIS also fails to adequately analyze the likely impacts of the alternatives allowed stock grazing on bare ground levels and related erosional impacts in meadows subject to stock grazing. Notably, the DEIS (p. 416) acknowledges that grazing can increase bare ground in meadows. Cole et al. (2004) documented that bare ground increased with*

increased grazing in mountain meadows. The DEIS's failure to reasonably examine bare ground effects under the alternatives is a considerable defect. The alternatives differ considerably in the extent and level of stock grazing, which affect bare ground levels. This defect must be rectified by assessing likely impacts of the alternatives on bare ground levels in meadows, taking into account existing bare ground conditions, and resulting impacts on erosion, topsoil loss, soil productivity, sediment delivery and affected aquatic systems.
[Business, #238]

The DEIS fails to analyze and disclose bare ground conditions in meadows and it's effect on soils and resources affected by soil loss and sediment-related impacts. SEKI's own data indicate several meadows have significantly elevated levels of bare ground, although this is not analyzed or described in the DEIS. Based on the bare ground criteria for ecological condition classes among Sierra Nevada meadow types (DEIS, App. D, Table D-3, p. D-25), bare ground data for grazed meadows (Abbott et al., 2003; Haultain and Frenzel, 2012; Hopkinson et al. , 2013), meadows with elevated bare ground levels indicative of low ecological condition include: Colby, Redwood, Big Pete, Wallace, Lower Crabtree, Rock Creek Crossing, and Rock Creek Lake meadows. There are but a few examples from available data-it is likely there are many more meadows in low ecological condition due to elevated bare ground within SEKI.
[Business, #238]

Elevated erosion from bare ground near streams contributes to elevated sedimentation, turbidity, and suspended sediment levels. These impacts adversely affect aquatic macroinvertebrates, as the DEIS acknowledges. Elevated sediment delivery to lakes reduces their volume over time, contributing to accelerated lake loss via sedimentation. Elevated turbidity harms the natural aesthetics of wilderness streams.
[Business, #238]

Response: "Chapter 4: Environmental Consequences" of the WSP/FEIS has been revised to include additional analysis of the number of forage areas and total meadow area that could potentially have elevated levels of bare ground due to grazing. A range of possible changes in bare ground under each alternative is also presented. In most instances it is unlikely that erosion would be exacerbated by bare ground because the low slopes and surrounding vegetation found in meadows would resist sediment transport. Data collected as part of the residual biomass monitoring protocol provides an estimate of bare ground in some meadows, and this information is used to inform management actions as part of the adaptive management program. The additional analysis in the WSP/FEIS does not use bare ground data from residual biomass plots to describe current condition or assess condition under the action alternatives. The biomass plots are located specifically to quantify conditions in individual meadows and to inform site specific management actions. Generalization of impacts from residual biomass plots to all meadows in the parks is not appropriate as those subjectively chosen sites are limited in number, not representative of entire meadows, and are not representative of all meadows open to stock use.

Concern 182: The NPS should ensure the timely adjustment of stock use in response to increases in bare ground and resulting potential erosion of meadow soils.

The DEIS also fails to adequately analyze the likely impacts of the alternatives allowed stock grazing on bare ground levels and related erosional impacts in meadows subject to stock grazing. Notably, the DEIS (p. 416) acknowledges that grazing can increase bare ground in meadows. Cole et al. (2004) documented that bare ground increased with increased grazing in mountain meadows. The DEIS's failure to reasonably examine bare

ground effects under the alternatives is a considerable defect. The alternatives differ considerably in the extent and level of stock grazing, which affect bare ground levels. This defect must be rectified by assessing likely impacts of the alternatives on bare ground levels in meadows, taking into account existing bare ground conditions, and resulting impacts on erosion, topsoil loss, soil productivity, sediment delivery and affected aquatic systems.
[Business, #238]

Response: "Appendix D: Stock Use and Meadow Monitoring and Management Strategy" of the WSP/EIS describes how bare ground levels in meadows ("Bare Soil" section) and the potential for erosion in areas of stock use ("Site Visits and Condition Assessments" section) would be monitored. Appendix D describes how this monitoring would be used to ensure timely adjustments to stock use using several management tools described in the "Grazing Management Tools and Techniques" section.

Concern 183: The NPS should assess the impacts of stock activities on organic matter in soils. The NPS should include residual biomass data collected as part of the existing monitoring protocols in the analysis of environmental effects to assess whether stock grazing has reduced sources of organic matter in meadow soils. The NPS should analyze the location, number, and area of meadows that may be subject to depletion of sources of organic matter as reflected in residual biomass monitoring results.

The DEIS fails to reasonably assess the impacts of stock activities allowed under the alternatives on organic matter in soils. This is key defect because organic matter is vital to important soil functions, such as soil productivity (the capacity of soil to provide plant growth) and soil hydrology, including the ability of soils to absorb, store, and release water from snowmelt and rain. Soils higher in organic matter are have higher infiltration rates and are able to store more water, other factors being equal. All of these factors influence the function and condition of meadows and affected aquatic ecosystems.
[Business, #238]

The FEIS must disclose the location, number, and area of meadows that have likely undergone significant depletion of sources of organic matter, based on the failure to meet residual biomass targets. The FEIS must also examine and disclose the depletion of sources of organic matter in soil due to the stock activities allowed under the alternatives, and its persistent effect on ecosystem functions and conditions.
[Business, #238]

Response: "Chapter 4: Environmental Consequences" of the WSP/FEIS has been revised to disclose the potential impacts of grazing on the form and total amount of soil organic matter and to include additional analysis of the number of forage areas and total meadow area that could have altered levels of soil organic matter due to grazing. Chapter 4 has also been revised to describe the potential magnitude of the impacts to soil organic material under each alternative. This analysis discloses that that there is likely minimal impact on most nutrient pools at the proposed grazing levels and that the meadow area subject to these minimal impacts varies across alternatives. Data collected as part of the residual biomass monitoring protocol provides an estimate of utilization in some grazed meadows and productivity in some ungrazed meadows, and this information is used to inform management actions as part of the adaptive management program. The additional analysis in the WSP/FEIS does not use utilization or productivity data from residual biomass plots to describe current condition or assess condition under the action alternatives The biomass plots are located specifically to quantify conditions in individual meadows and to inform site specific management actions. Generalization of impacts from residual biomass plots to all meadows in the

parks is not appropriate as those subjectively chosen sites are limited in number, not representative of entire meadows, and are not representative of all meadows open to stock use.

Concern 184: The NPS should assess the potential for cumulative soil productivity impacts due to stock activities. The NPS should use available residual biomass monitoring data to assess meadow condition relative to soil productivity.

> *Stock grazing and trampling degrades soil productivity in numerous ways, including via the combined impacts of compaction and the loss of topsoil and organic matter in soils. However, the DEIS does not reasonably assess cumulative soil productivity impacts due to stock activities allowed under the alternatives. This is a severe defect, because it is well-established that stock grazing impacts reduce soil productivity, as Cole et al. (2004) also documented in mountain meadows.*
> [Business, #238]

> *The DEIS does not properly make known that there is considerable evidence that soil productivity has been significantly diminished by stock in many grazed meadows in SEKI. RBM data indicate that many of these meadows are in a poor condition with respect to the production of plant biomass.*
> [Business, #238]

> *The DEIS (e.g., App. D.) concedes that proposed grazing levels under several of the alternatives will further degrade productivity in many meadows. The FEIS must examine these alternatives' continued impacts on soil productivity in combination with existing conditions to reasonably differentiate among the alternatives with respect to soil productivity. The FEIS must also disclose that the Alt. 4 is likely to contribute to increasing soil productivity over time in the meadows of SEKI by reducing grazing and associated trampling impacts due to the alternatives' prohibition on grazing by stock.*
> [Business, #238]

Response: "Chapter 4: Environmental Consequences" of the WSP/EIS assesses and discloses impacts to productivity from stock use using methods described in the vegetation methodology section. The analysis includes an estimate of the number of forage areas and total meadow area that would be predicted to have impacts to productivity due to grazing and the predicted degree of the change in productivity under each alternative. Data collected as part of the residual biomass monitoring protocol does not estimate productivity but does provide an estimate of the amount of biomass (absolute value or percentage) remaining on the most heavily grazed portion of selected meadows at the end of the season. This information is used to inform management actions as part of the adaptive management program. The WSP/EIS does not use the data from residual biomass plots to describe current condition or assess condition under the action alternatives. The biomass plots are located specifically to quantify conditions in individual meadows and to inform site specific management actions. Generalization of impacts from residual biomass plots to all meadows in the parks is not appropriate as those subjectively chosen sites are limited in number, not representative of entire meadows, and are not representative of all meadows open to stock use.

Concern 185: The NPS should assess the potential effects of stock activities on soil nutrification, including the potential impacts of soil nutrient enrichment on nonnative invasive vegetation and ecosystem function.

> *The DEIS fails to reasonably examine soil nutrification due to stock activities allowed under the alternatives. This is a severe defect, because nutrient enrichment of soil by*

horses is known to be a significant impact (Pickering et al., 20 l 0), although this is not adequately examined or disclosed in the DEIS. Due to the volume and composition of excreta, horses have far greater effect on soil nutrient enrichment than hikers (Pickering et al. , 2010), although this is not adequately examined or disclosed in the DEIS.

Trails, tethering areas, and other areas with considerable use can become considerably enriched with nutrients, favoring non-native vegetation (Pickering et al. , 2010). Nutrients leached from nutrient-enriched soils to water bodies accelerate eutrophication, including increased algal biomass, loss of water clarity, and degradation of natural aesthetics. This is already happening in SEKI where data indicates that phosphorus is elevated in surface water draining areas with stock use (Clow et al. , 2014). Research has documented elevated algal biomass in waters draining areas with stock use in SEKI (Ursem et al. , 2009; Derlet et al. , 2012). This contribution to accelerated eutrophication of alpine lakes is significant because it interacts with climate change, which is likely to accelerate eutrophication in various ways (Jeppesen et al. , 2010).
[Business, #238]

The DEIS did not adequately assess the alternatives cumulative impacts on the spread and establishment of nonnative vegetation.
[Business, #238]

Response: The vegetation methodology section in "Chapter 4: Environmental Consequences" recognizes that grazing animals can redistribute nutrients and indirectly favor nonnative species. Chapter 4 assesses the potential for nutrient enrichment of soils. The magnitude of these impacts largely depends on the extent and intensity of grazing and stock travel. Recent studies of managed grazing in Sierra Nevada montane meadows similar to those found in the parks have concluded that there is minimal impact on most soil nutrient pools due to moderate grazing (Blank and Morgan 2010). The impact analysis in chapter 4 concludes that the extent and intensity of grazing and stock travel under the action alternatives 2, 3 and 5 will be light to moderate and therefore will likely not result in soil nutrification.

Concern 186: The NPS should assess potential nutrient loading to soils by stock. The NPS should couple known grazing levels for different areas with animal/day nutrient excreta estimates to generate estimates of potential nutrient input to soils.

The DEIS's significant defects regarding soil nutrient enrichment by stock must be rectified. SEKI has data to tractably provide estimates of nutrient loading to soils by stock, including animal unit night (AUN) estimates for different areas (e.g., Hopkinson et al. , 2013). This can be used with animal/day nutrient excreta data to provide estimates of nutrient input to soils. The FEIS should also identify areas that are likely hotspots for soil nutrient enrichment. The DEIS's deficiencies in these respects should also be corrected by properly discussing the impacts of soil nutrient enrichment on critical ecosystem processes and conditions, including nonnative invasive vegetation, water quality, synergy with climate change, and the naturalness of ecosystem appearance and function.
[Business, #238]

Response: Nutrients present in the manure of grazing stock are obtained from the vegetation the animals graze upon and are returned to an environment where they can be assimilated by plants or soils. In the wilderness, nutrients do not accumulate in the same way as manure from animals fed imported hay in unvegetated corrals. Therefore, total manure production does not provide an accurate estimate of the effects of stock use on nutrient availability. The WSP/EIS acknowledges that these nutrients could be redistributed from grazed areas to loafing areas, camps, and trails where the nutrients can favor some

species over others. Recent studies (Blank and Morgan 2010 and Norton et al. 2013) found that moderate grazing had a minimal impact on most pools of nutrients stored in meadow soils in the Sierra Nevada. Best management practices for handling stock manure are described under mitigations in Chapter 2 of the WSP/EIS.

Water Resources

Concern 187: The WSP/EIS does not fully analyze the potential impacts on water quality from stock use. Stock use could impact water quality through increased nutrient loading and eutrophication, increasing erosion and sedimentation, and contributing biological waste to surface water.

> *Stock, particularly horses and mules, introduce a significant amount of manure to wildlands in SEKI, resulting in significant nutrient loading to SEKI watersheds. This includes the direct deposition of stock manure at stream fords, which the DEIS (p. 474) acknowledges, but fails to properly assess in regard to nutrient loading and consequent eutrophication of water bodies. Nutrients from stock manure are also ultimately transported to SEKI waters via surface runoff (Clow et al., 2013) and leaching from soils. Nutrient delivery to SEKI waters is extremely significant impact because it accelerates eutrophication, including increased algal growth which causes a loss of water clarity and degradation of natural aesthetics.*
> [Business, #238]
>
> *The DEIS fails to note that the documented elevated biological pollution in waters draining areas subject to stock use in SEKI comport with the nature of excreta deposition by stock. Unlike hiker excrement, which is buried, stock excreta is deposited on the soil surface where it is easily transported by surface runoff. Stock animals also produce far greater levels of excreta than hikers (Pickering et al., 2010). As the DEIS acknowledges, stock excreta is also commonly deposited directly in streams at fords. Although it is not made known or analyzed in the DEIS, stock excreta is also frequently deposited directly in streams in areas open to stock grazing.*
> [Business, #238]
>
> *Many wet meadows subject to stock grazing are also hydrologically connected to streams and lakes, resulting in the relatively efficient and rapid conveyance of significant levels of biological contamination to water bodies. It is well-established that stock manure, particularly from horses, has appreciable levels of pathogenic contaminants (Derlet et al., 2008; Pickering et al., 2010).*
> [Business, #238]
>
> *The DEIS does not properly assess the impacts of allowed pack stock activities under the alternatives on water quality*
> [Recreational Group, #235]

Response: The WSP/EIS assesses the impacts of stock use to water quality from nutrients in "Chapter 4: Environmental Consequences." The NPS has reviewed numerous rigorous studies to assess anthropogenic nutrient enrichment, particularly atmospheric deposition of regionally and globally derived nutrients (e.g., Clow et al. 2013; Fenn et al. 2003; Vicars et al. 2010). This information is used to assess the potential impacts from visitor use, including stock use. These studies indicate that atmospheric deposition of nutrients is many times greater than those derived from stock (Vicars et al. 2010 and Fenn et al. 2003). Additionally, atmospheric nutrients are introduced into the parks from outside sources, while grazing

stock do not introduce additional nutrients into the ecosystem but primarily accelerate conversion and redistribute nutrients derived from meadow vegetation growing within the parks. Riparian vegetation and soils are very effective at capturing nutrients from non-point nutrient sources such as manure (Mayer et al. 2007; Dosskey et al. 2010).

The WSP/EIS assesses the impacts of stock use to water quality from pathogens in chapter 4. The NPS is aware of anecdotal reports of increased water-borne algae (i.e., eutrophication). Some studies have attempted to link water quality impacts such as coliforms or eutrophication to stock, but they lack the scientific rigor necessary to inform NPS management decisions. Clow (2013) provides the best indication of current water quality conditions in the parks' wilderness. Clow (2013) found low levels of *E. coli*, nutrient, and particulates in the parks except during some storms when values increased for short periods of time and concluded that visitor use appears to have a small but statistically significant influence on stream water quality. It is unlikely that any ecologically significant impacts arise from these small changes. There is no scientifically robust literature indicating that the levels of recreational and administrative stock use like that which occurs in the parks results in eutrophication, and it is possible that atmospheric deposition of nutrients coupled with rising average annual temperatures and fewer river-scouring flows could be responsible for some increase in eutrophication.

The WSP/EIS assesses the impacts of stock use to water quality due to erosion and sedimentation in the "Soils" sections of "Chapter 3: Affected Environment" and "Chapter 4: Environmental Consequences." Incised trails are clear indications that human and stock traffic contribute to soil loss, but there is no evidence that levels of erosion under current or proposed alternatives threaten any ecological systems within the wilderness. Additional information about the extent of stock use impacts to bare ground in meadows and the number of trail stream crossings has been added to the WSP/FEIS analysis, although this new information does not change the conclusion that current water quality conditions found throughout wilderness are generally good, the magnitude of potential effects is small, and potential effects of visitor use would be localized.

Concern 188: The WSP/EIS does not adequately assess the potential magnitude of sediment-related water quality degradation from stock use. The NPS should provide an analysis of the number of locations, such as at trails and grazing areas adjacent to streams.

> *The DEIS fails to provide an index of the magnitude of water quality degradation by sediment under the alternatives, because the DEIS did not examine and disclose the total number of locations where sediment delivery from stock impacts are likely to occur under the alternatives. The DEIS (p. 474) acknowledges that stock use at stream fords results in the delivery of elevated soil erosion to streams. However, the DEIS does not examine or make known the number of such fords by trails open to stock use under the alternatives. The DEIS also fails to assess and disclose the amount of trail subject to stock use and meadows open to grazing that is within 100 feet of streams under the alternatives. In so doing, the DEIS did not even provide indices of the impacts of allowed stock activities under the alternatives, and, thus, fails to adequately differentiate among the alternatives with respect to their sediment-related impacts on water quality.*
> [Business, #238]
>
> *The DEIS fails to adequately assess stock impacts on stream banks, and resulting effects on sediment-related water quality conditions due to stock activities. Streambank damage by stock is especially likely where stock graze along stream banks or access streams for water.*
> [Business, #238]

Response: The WSP/EIS assesses the impacts of stock use to water quality due to erosion and sedimentation in "Chapter 3: Affected Environment" and "Chapter 4: Environmental Consequences." The mechanisms that lead to erosion are disclosed in the WSP/EIS in the " Factors That Contribute to Soil Impacts" section of chapter 4 and are: climate, topography, soils, and land use. Stock are considered under the "land use" category. Because stock impact soils in various ways as they move through the parks, it is difficult to ascertain impacts due to differing land uses at each site open to stock. Confounding any analysis, land use must be considered alongside climate, topography, and soils. Climate and vegetation varies spatially and temporally throughout the parks. Topography and soils also vary widely throughout the parks. As a result, it is not possible to isolate the amount of sediment that stock contribute to water quality from that generated by other contributing sources. The WSP/EIS has been revised to include an additional analysis of trail-stream crossings and trail segments within 100 feet of a waterway.

The WSP/EIS describes current conditions and explains that erosion is correlated to the different use levels associated with each alternative. Furthermore, the WSP/EIS provides an adaptive management framework that allows the NPS to monitor conditions and take actions when warranted.

Historically, there was evidence of grazing-induced stream erosion and incision resulting from prolonged grazing of domestic livestock (cattle and sheep). Those historic grazing patterns were orders of magnitude greater in scope and intensity than the grazing that occurs today in the parks. Along with the prohibitions on domestic livestock production within the parks, the NPS also works to mitigate and rehabilitate streams and meadows that were damaged by past livestock grazing. Under current conditions, there is little evidence of accelerated streambank erosion due to stock and streams appear to be within their natural range of variability. It is likely that impacts due to stock and foot traffic are slight and not significant against the backdrop of natural impacts due to wildlife.

Leave No Trace© and NPS guidelines provide guidance to stock users regarding best management and handling practices to minimize impacts to streambanks. These are communicated to all stock users both prior to entering the wilderness and during field contacts. Streambank alteration is assessed qualitatively during site visits to meadows and as a part of regularly scheduled meadow monitoring activities. The proposed adaptive management strategy provides tools for more quantitative measures of streambank alteration as conditions warrant.

Concern 189: The WSP/EIS does not fully assess the potential of stock to alter hydrologic regimes in meadows.

> *The DEIS does not reasonably analyze and disclose the impacts of allowed pack stock activities under the alternatives on ecosystem hydrology (quantity, pathways, and timing).*
> [Recreational Group, #235]
>
> *The DEIS did not properly assess the cumulative effect of existing conditions and stock activities allowed under the alternatives on the timing, quantity, pathways and storage of water in SEKI ecosystems. This a severe defect, because: a) these hydrologic conditions and processes profoundly affect ecosystems; b) they have already been significantly altered by stock grazing and trampling, particularly in meadows; d) the impacts are on hydrology are highly persistent, and, c) they will continue to be significantly affected by stock activities allowed under the alternatives.*
> [Business, #238]
>
> *Stock trails also significantly alter hydrology in areas with naturally high water tables, such as wet meadows. Stock use significantly deepens trails (Abbott et al. , 2003;*

Pickering et al. , 2010). Deepened trails are more likely to intersect shallow groundwater in wetter meadows, effectively acting as groundwater drains that lower water tables, desiccating meadows and reducing late summer and fall sources of streamflow. The physics of water flow in soils makes this draining of groundwater inevitable when trail incisions intersect water tables (Kirkby, 1978) and the phenomena is commonly and easily observable in wet meadows with deep stock trails in the Sierra Nevada. The incisions by stock-deepened trails in meadows also act as barrier to downslope movement of water in soils (Kirkby, 1978), which can result in desiccation of areas downslope of entrenched trails.
[Business, #238]

The DEIS must be revised to rectify the defects related to the hydrologic impacts of packstock. In order to provide indices of hydrologic alteration, the FEIS must identify the number, area, location and types (e.g., fen, wet, etc.) of meadows that have had significant reductions in organic matter sources and soil compaction due to grazing. As discussed in the foregoing, SEKI has the data on stock use and biomass to provide such indices. The FEIS should also assess and make known the number, area, location and types (e.g., fen, wet, etc.) of meadows affected by stock trails, in order to provide an index of hydrologic alteration due to stock trails. Because hydrologic alteration also affects stream flows, these indices of hydrologic alteration must be assessed and made known at the scale of subwatersheds.
[Business, #238]

Response: The WSP/EIS assesses the potential for altered meadow hydrologic regimes in the "Soils" and "Vegetation" sections of chapter 4. "Chapter 3: Affected Environment" and "Chapter 4: Environmental Consequences" of the WSP/EIS disclose impacts due to erosion and compaction and how this can impact meadow vegetation. Although stock have the potential to alter hydrologic regimes in meadows by contributing to increased erosion and compaction, there is no evidence that current levels of stock use significantly alter hydrologic regimes in wilderness meadows.

Additional information has been added to the "Soils" section of chapter 4 that further assesses the extent and magnitude of impacts to soil compaction and erosion potential from stock use. Historically, meadows in some locations experienced substantial hydrological effects as a result of past management practices (see the "Irreversible or Irretrievable Commitment of Resources" section of chapter 4 and the "History of Stock Use and Associated Impacts" section of "Appendix D: Stock Use and Meadow Monitoring and Management Strategy"). Records of these historical impacts serve as guideposts for future actions, and current meadow management protocols are sufficiently stringent to protect meadow hydrology. Proposed alternatives would not threaten hydrologic regimes within the wilderness. Under all alternatives, the parks would continue to evaluate impacts to stream channels in meadows using the monitoring strategy in appendix D and manage stock use to ensure that alterations to hydrologic regimes do not occur.

Vegetation and Riparian Areas

Concern 190: The WSP/EIS does not sufficiently assess the potential impacts on vegetation from nonnative species, especially due to stock use and grazing. The NPS should assess the interaction of bare ground in meadows subject to grazing and the potential introduction and spread of nonnative plants.

There is also the issue of pack animals bringing in non-native invasive weeds on their hooves and in their feed. There needs to be some regulation that addresses this problem.
[Individual, #130]

The DEIS did not adequately assess the alternatives cumulative impacts on the spread and establishment of nonnative vegetation.
[Business, #238]

Despite the DEIS's recognition that bare ground and stock grazing increase the probability of additional nonnative vegetation invasions, the DEIS does not assess the interaction of existing bare ground in meadows that are subject to grazing under the alternatives.
[Business, #238]

The combination of stock grazing's effects on propagules introduction and bare ground greatly increases the likelihood of the establishment and spread of nonnative vegetation (DEIS, p. 416). Therefore, the DEIS's failure to assess bare ground conditions in meadows subject to grazing under the alternatives renders the assessment of grazing impacts on nonnative vegetation severely flawed and inadequate.
[Business, #238]

Response: The WSP/EIS describes the impacts on nonnative species establishment on vegetation and the role of disturbance and bare ground on the potential for nonnative species introductions (see the "Vegetation" sections of "Chapter 3: Affected Environment" and "Chapter 4: Environmental Consequences"). The WSP/EIS notes that grazing can elevate bare ground levels and that grazing related disturbance increases the risk of nonnative plant establishment. The analysis of nonnative species introductions in the WSP/EIS takes into account the role of stock in creating bare ground and nonnative species introductions. Data collected as part of the residual biomass monitoring protocol provides an estimate of bare ground in some meadows, and this information is used to inform management actions as part of the adaptive management program. However, it is not appropriate to extrapolate from the residual biomass plots — which are located specifically to quantify conditions in individual meadows and to inform site specific management actions — to all meadows in the parks because these subjectively chosen sites are limited in number, are not representative of entire meadows, and are not representative of all meadows open to stock use. In addition, the WSP/EIS has been revised to include an estimate of the expected extent and degree of bare ground impacts in meadows under the alternatives. This additional analysis has not changed the conclusions reached in the WSP/EIS about the expected impact of the alternatives on nonnative species introductions. In order to further minimize nonnative species introductions, all of the action alternatives including the preferred alternative would prohibit the use of unprocessed feed products in wilderness, incorporate information about nonnative plant introductions into educational and outreach materials, and systematically monitor areas used by stock in order to detect and manage nonnative plants should they be introduced.

Concern 191: The WSP/EIS does not sufficiently assess the effectiveness of proposed mitigation measures related to limiting the introduction and spread of nonnative plants by stock.

The DEIS also fails to reasonably assess the effectiveness of proposed measures related to stock management effects (App. D) and nonnative vegetation strategy (App. N) with respect to limiting the spread of nonnative vegetation. This is a serious deficiency in the DEIS, because the approaches in App. N and App. Dare unlikely to be effective in stemming ongoing nonnative vegetation invasions due to the lack of required effective measures to reduce the spread of nonnative vegetation. Instead of applying more effective measures to limit nonnative vegetation spread and establishment, such as those previously discussed, App. N and App. D primarily rely on detection of infestations and post-detection treatments. It has long been recognized that post-detection treatments are

generally ineffective at stemming nonnative vegetation invasions and are far more ineffective than preventing nonnative vegetation establishment. These limitations of the nonnative vegetation strategies in App. D and N must be adequately assessed and disclosed in the FEIS.
[Business, #238]

As another example, App. N recognizes that stock manure is a vector for weed spread and requires that it be removed from corrals. However, App. N makes no similar requirement for the significant amount of stock manure deposited in backcountry wilderness areas.
[Business, #238]

Response: "Appendix D: Stock Use and Meadow Monitoring and Management Strategy" and "Appendix N: Strategy for Reducing Nonnative Plants in Wilderness" describe a number of tools for detecting and addressing resource concerns, including widely accepted methods for preventing, detecting, and responding to nonnative plant introductions. These tools are incorporated into the action alternatives as mitigation measures. The mitigation strategies do not rely solely on prevention or eradication of nonnative plants but consist of a number of overlapping prevention, early detection, and eradication measures, including measures specifically targeted to stock use.

The WSP/EIS adopts several measures specifically designed to mitigate the potential introduction of nonnative plants by stock. These include the requirement to use processed feed or fermented hay, removal of invasive plants around NPS and concession stables, targeted monitoring of areas used by stock, and limitations on stock travel and grazing in sensitive areas such as Kern Canyon meadows where velvetgrass (*Holcus lanatus*) control efforts are ongoing. The alternatives allow the parks' managers the option of initiating additional stock closures as needed to address invasive plant concerns. The WSP/EIS also discusses the effectiveness of mitigation measures proposed to limit the introduction and spread of nonnative plants by stock. For example, the WSP/EIS explains that the requirement to use processed feed or fermented hay will likely reduce but not eliminate the possible introduction of nonnative plants from stock.

The assessment of the expected environmental consequences of the alternatives in the WSP/EIS explicitly takes the probability of success of the prevention and early detection mitigations into account (see the "Factors that Contribute to Vegetation Impacts" subsection of the "Vegetation" section in "Chapter 4: Environmental Consequences").

Concern 192: The WSP/EIS does not sufficiently examine the relationship between plant productivity and elevation and the vulnerability of meadow vegetation to grazing impacts. One commenter suggested that the WSP/EIS does not properly disclose the conclusions of an internal NPS report assessing meadow vegetation and residual biomass in grazed meadows (Schelz, 1996). This report recommended that meadows at elevations greater than 9,700 feet in the parks be closed to grazing due to their low production of vegetation and their high degree of sensitivity to the adverse impacts of grazing.

The DEIS does not properly disclose that SEKI's own report assessing meadow vegetation and residual biomass in grazed meadows (Schelz, 1996) recommended that meadows at elevations greater than 9,700 feet in SEKI be closed to grazing due to their low production of vegetation and their high degree of sensitivity to the adverse impacts of grazing. Backcountry reports have also recommended closing meadows above 10,000 feet to grazing due to their sensitivity to impacts (Kenan, 2001). The DEIS fails to

disclose this information and that SEKI's own data indicate, in several ways, that these recommendations are sound.
[Business, #238]

The DEIS's (p. 221) suggestion that the meadow moisture availability at higher elevations affects productivity is not particularly relevant nor does it provide a sound reason for eliminating grazing of higher elevation meadows. Wetter meadows, which tend to have higher plant productivity than drier meadows, are more susceptible to persistent and highly cumulative physical damage to from stock grazing, as previously discussed. Further, the DEIS's own estimates of plant productivity for moist and wet meadows are made solely as a function of elevation, under the incorrect assumption that they are in "good" condition (pp. D-42 to D-43, App. D).
[Business, #238]

Response: Areas closed to all grazing vary across alternatives and include many of the higher elevation areas of the parks. Maps provided in "Chapter 2: Alternatives" and as supplementary information at http://parkplanning.nps.gov/sekiwild display these areas, and summaries of the meadow and wetland acreage open to grazing in "Chapter 4: Environmental Consequences" disclose the impact of the alternatives.

Under alternatives that allow grazing, the WSP/EIS describes in chapter 4 and throughout "Appendix D: Stock Use and Meadow Monitoring and Management Strategy" how productivity generally decreases with elevation and therefore the ability to sustain grazing on a per-area basis also decreases with elevation. None of the available data or scientific literature indicates that there is a threshold elevation above which properly managed grazing has unacceptable impacts. In an internal NPS report, Schelz (1996) recommended that grazing of low-productivity, high-elevation meadows should be re-evaluated during the WSP/EIS process and provided the following caveat regarding the recommendation to close all high elevation meadows to grazing: "The following recommendations call for drastic changes in the way stock use is managed and controlled in our wilderness meadows. Thus, these should be regarded as goals for the near future which should be included in the upcoming Wilderness Management Plan." Elevation is known to be a driver of biophysical processes — including plant productivity and decomposition — and thus influences the ability of meadows and uplands to sustain grazing. However, other factors such as moisture availability are also important and do not always correlate with elevation. Therefore, after careful consideration, a single elevation limit above which grazing would be prohibited was dismissed from detailed analysis (see the "Alternative Elements Considered but Dismissed from Detailed Analysis" section of chapter 2).

Rather than adopting a single elevation limit, elevation and productivity have been incorporated into the analysis of impacts and the stock use management strategy in several ways. Under the management strategy in appendix D, productivity is one of the factors used to set limits on the total amount of grazing allowed in each open meadow per season. Utilization values used to set limits on the total amount of grazing per meadow per season take into account the elevation zone of each meadow and the sensitivity of vegetation types in each meadow (spanning a spectrum of wetness) to different kinds of impacts.

Concern 193: The NPS should base estimates of plant productivity and site specific grazing capacities on existing residual biomass monitoring data rather than modeled productivity estimates.

SEKI has relatively abundant data on biomass production in the meadows of SEKI that can be assessed the accuracy of plant production estimates and resulting estimates of

forage availability and use levels in App. D. However, the DEIS is devoid of any such tractable and critically important analysis.
[Business, #238]

The DEIS plainly failed to use SEKI's own data to reasonably assess meadow productivity and grazing capacity. a) DEIS significantly overestimates meadow productivity and grazing capacity in SEKI meadows; and, b) that the DEIS's unwarranted assumption that SEKI meadows are in "good" condition with respect to productivity (DEIS, p. D-42 to D-43, App. D) is unsound and in conflict with available data on actual plant biomass productivity in the meadows of SEKI.
[Business, #238]

Response: Residual biomass data on ungrazed reference sites does provide an estimate of productivity for a portion of individual meadows, and where applicable, that information has been used to evaluate and inform the modeled grazing capacity estimates. However, it is not appropriate to extrapolate productivity from residual biomass plots to all meadows in the parks to develop grazing capacities. The plots are located specifically to quantify conditions in individual meadows and to inform site specific management actions. The subjectively chosen study sites are limited in number, are not representative of entire meadows, and are not representative of all meadows open to stock use. Capacities calculated with the productivity values in "Appendix D: Stock Use and Meadow Monitoring and Management Strategy" would be used as a starting point for managing the total amount of grazing to levels that limit stock induced changes to plant composition, density, cover and/or vigor, and productivity. As noted in appendix D, these capacities have been and would continue to be refined in the future through the adaptive management approach adopted in the parks' proposed strategy for monitoring and managing grazing in wilderness. This flexibility will allow the parks to incorporate future monitoring results as well as any new information about meadow characteristics and the relationship between grazing levels and impacts into the management of grazing. Finally, grazing capacities would be only one of several management tools to limit impacts from grazing stock. For example, management action would be taken to address resource concerns identified during monitoring even if grazing capacities were higher than the use levels that precipitated the concerns.

Concern 194: The WSP/DEIS does not fully assess the condition of meadows that would be subject to continued grazing under the alternatives. The NPS should incorporate existing bare ground monitoring data into the analysis of environmental effects in order to assess the extent of compaction and potential susceptibility to erosion of meadow soils.

The DEIS fails to examine and disclose the condition of meadows in SEKI, including those that would be subject to grazing under the various alternatives. This is a key defect in the DEIS, because continued grazing of degraded meadows is likely to perpetuate or exacerbate their degraded condition. Such an assessment of meadow condition is quite tractable. Although the impacts of stock grazing in meadows are strongly influenced by ecological conditions in meadows, the DEIS failed to assess actual meadow conditions in assessing the impacts of allowed grazing in meadows under the alternatives. Therefore, the DEIS failed to reasonably assess grazing impacts and properly differentiate among the alternatives. These defects must be rectified by rationally factoring meadow conditions in meadows subject to grazing under the alternatives into the assessment of grazing impacts under the alternatives.
[Business, #238]

Response: The analysis of grazing impacts on vegetation in "Chapter 4: Environmental Consequences" of the WSP/EIS provides an assessment of the current extent and degree of grazing impacts by using

current grazing levels to describe these impacts for alternative 1. These include expected impacts to productivity, basal vegetation cover, and relative abundance of graminoids. Chapter 4 of the WSP/FEIS has been revised to include an estimate of the expected extent and degree of bare ground and compaction impacts in meadows under each of the alternatives. Ongoing soil surveys being conducted throughout the parks by the Natural Resource Conservation Service have evaluated compaction among other attributes. Preliminary results, which include targeted assessments of soils in meadows that are subject to grazing, indicate that there is no evidence of soil compaction in grazed meadows (Cathy Scott, pers. comm. 2014). This supports the observation that visible evidence of compaction is largely absent from meadows subject to grazing. Neither the limited bare ground data available in residual biomass plots nor the new bare ground analysis in the WSP/FEIS change the conclusions reached in the WSP/DEIS about the expected impacts — including soil compaction, erosion, loss of ground cover — of the alternatives on soils or vegetation.

Data collected as part of the residual biomass monitoring protocol provides an estimate of bare ground in some meadows, and this information is used to inform management actions as part of the adaptive management program. The revised analysis in the WSP/FEIS does not use bare ground data from residual biomass plots to describe current condition or assess condition under the action alternatives. The plots are located specifically to quantify conditions in individual meadows and to inform site specific management actions. Generalization of impacts from residual biomass plots to all meadows in the parks is not appropriate as those subjectively chosen sites are limited in number, not representative of entire meadows, and are not representative of all meadows open to stock use. The analysis in the WSP/FEIS does not use the bare ground values from Weixelman and Zamudio (2001), which generated low, moderate, and high ecological condition classes for bare soil cover values based on monitoring data from a comprehensive multiyear study in U. S. Forest Service meadows in the Sierra Nevada. These values have been used as a starting point to inform condition class development in Sequoia and Kings Canyon wilderness meadows, but until they can be related to comparable results from meadows in Sequoia and Kings Canyon in a systematic way, they remain preliminary and are being used in concert with other monitoring results to inform grazing management decisions. Through the adaptive management program described in "Appendix D: Stock Use and Meadow Monitoring and Management Strategy," the NPS will revise these condition class values based on monitoring data collected from meadows with visitor and stock use as well as meadows with no to low use levels (reference sites) to detect changes in condition unrelated to direct human use or management actions. Exposed bare soil also occurs due to natural phenomena, such as wildlife activity, drought, and/or flooding, and therefore, some background level of bare soil is expected.

Concern 195: The WSP/DEIS analysis of environmental effects does not take into account the sensitivity of meadows to grazing impacts.

> *DEIS fails to properly assess and identify meadows that have been robbed of significant sources of organic matter, which the DEIS concedes is critically important to meadow productivity and function. Notably, many meadows have frequently been grazed at levels that leave too little residual biomass to maintain the organic matter in meadow soils that is essential to the maintenance of meadow productivity. Although SEKI has data to identify these meadows, the DEIS makes no such critically important assessment of organic matter and meadow productivity conditions.*
> [Business, #238]

Response: The analysis of grazing impacts on vegetation in "Chapter 4: Environmental Consequences" of the WSP/ EIS takes into account many factors which influence the sensitivity of meadows to grazing impacts using methods described in the "Vegetation Methodology" section. These factors include broad elevation zones (upper montane and subalpine vs. lower montane/woodland), subalpine vegetation types

(three vegetation types that span a moisture gradient from wet to dry), and the susceptibility of different vegetation types to different kinds of impacts (productivity, basal cover, and relative graminoid cover). This analysis of impacts also includes a detailed breakdown of how much area is subject to grazing impacts by three Cowardin wetland systems, five meadow moisture classes, as well as the amount of lakeshore meadow and peat accumulating meadow subject to stock impacts. This detailed analysis provides an abundance of information about the expected impacts to wetlands and meadows of each of the alternatives in the WSP/EIS.

Concern 196: The WSP/DEIS does not fully assess the impacts of proposed grazing levels on plant productivity, which is an important indicator of ecosystem structure and function.

> *Although the DEIS makes some estimates of the magnitude of meadow productivity sacrificed for the sake of stock grazing, based on Cole et al. (2004), these estimates are extrapolated in erroneous fashion. The losses in meadow productivity documented by Cole et al. (2004) were from a study spanning five years. There is no indication in Cole et al. (2004) that the documented losses in meadow productivity caused by stock grazing at relatively light levels would not continue to increase over time due to the cumulative impacts of stock grazing, although this is not or assessed or disclosed in the DEIS.*
> [Business, #238]

> *Instead of assessing the full suite of ecological impacts of grazing in meadows based on their innate attributes and condition, and comparing these impacts to SEKI's wilderness obligations, the DEIS clearly based stock utilization levels solely on the basis of stock-grazing logistics and overestimation of plant biomass productivity (App. D; See also Fig. 2). Meadows deemed to be more valuable to grazing have higher forage utilization levels, regardless of the condition or attributes of those meadows, which, notably, are not assessed or made known in the DEIS. The amount of residual biomass left on site under the limits is not the only issue due to associated impacts of grazing on meadows. As Abbott (2003) correctly noted, SEKI's biomass data " . . . is not sufficient to determine residual biomass needed to maintain present ecological condition or to improve meadow conditions to a more desirable state." A more complete consideration of grazing impacts and meadow susceptibility is needed to provide sound limits, but this was not done in the DEIS.*
> [Business, #238]

Response: The WSP/EIS uses the best information available on productivity in the meadows of the Sierra Nevada to assess the impact of grazing. The WSP/EIS assesses the potential impacts of grazing on productivity using the methods described in the "Vegetation Methodology" section of "Chapter 4: Environmental Consequences." Chapter 4 of the WSP/EIS includes both an estimate of the number of forage areas and total meadow area where productivity would potentially be affected due to grazing under each alternative, as well as the predicted degree of reduced productivity. This analysis takes into account elevation zones (upper montane and subalpine vs. lower montane/woodland), subalpine vegetation types (three vegetation types that span a moisture gradient from wet to dry), and the susceptibility of different vegetation types to different kinds of impacts (productivity, basal cover, and relative graminoid cover). Together with monitoring protocols and adaptive management described in "Appendix D: Stock Use and Meadow Monitoring and Management Strategy," the proposed grazing levels are designed to ensure that meadows are protected from the potential effects of overgrazing, and that impacts are kept within limits that ensure the resiliency of meadow ecosystems and protect wilderness character.

Wildlife and Wildlife Habitat

Concern 197: The WSP/EIS should analyze the impacts of competition between stock and the parks' native species.

> *If stock are grazing in the wilderness, they are, defacto, competing with local, natural animals - It is up to naturalists to study whether this may have negative impacts on native species - But, as a visitor to the wilderness, I come to see the local species and suspect I see fewer of them when stock are around*
> [Individual, #39]

Response: Impacts to local wildlife species was analyzed and discussed in the "Impact Topics or Issues Dismissed from Further Analysis – Wildlife" section in "Chapter 1: Purpose and Need." The types of impacts associated with wildlife that relate to wilderness visitor use and administrative activities include disturbance or displacement, injury or mortality, habitat alteration, and/or behavior alteration. For most species, these disturbances in wilderness are generally not measurable and are localized; they may affect individuals, but do not affect the species or habitat overall.

Stock grazing and trampling in meadows and riparian areas would adversely impact habitat used by some meadow-dependent bird species and enhance habitat used by other species that are benefitted by light to moderate levels of grazing (e.g., Brewer's blackbird) (Bock et al. 1993; Steel et al. 2012). However, it is reasonable to conclude that impacts from stock grazing and trampling to birds would be less than minor (Steel et al. 2012) and research conducted within the parks demonstrates that there are minimal impacts of stock grazing to invertebrates, a primary food source for many bird species.

See "Chapter 4: Environmental Consequences" for the analysis of special-status wildlife species with the potential to be affected by the alternatives.

Concern 198: Visitor use should be restricted in sensitive areas, such as special-status species habitat.

> *Another area of concern, is restricting human use in sensitive areas where Mountain Bighorn Sheep are found. For example, there are two small herds of sheep in Miter Basin, which is becoming a very popular destination. Will there be a quota system for this very scenic sheep area?*
> [Individual, #145]

Response: There would be a combined party-size limits of eight people and stock under the preferred alternative (alternative 2) for day rides on the Class 1 trail into Miter Basin above Penned Up Meadow. If new class 1 trails are established in bighorn sheep habitat, there could be an increased frequency of bighorn sheep / human encounters under alternative 2. However, new Class 1 trails, such as one proposed to replace the numerous social trails on Mount Langley, could concentrate visitor use which would benefit bighorn sheep. Also, as the informal trails are restored, habitat would be restored in this area, resulting in beneficial effects on bighorn habitat.

Overall, bighorn sheep could continue to be disturbed during visitor interactions, but there would be no measurable difference in impacts associated with disturbance across the alternatives. There are currently few adverse effects on bighorn sheep due to stock interactions at foraging areas, and this is not expected to change under any of the action alternatives. In the context of laws and policies that protect special-status species, the impacts of the alternatives would not be significantly adverse or beneficial, and they

would not result in population-level impacts, and thus would not result in jeopardy for the Sierra Nevada bighorn sheep.

In addition, in the section "Mitigation Common to All Alternatives" in "Chapter 2: Alternatives" there is a list of measures to minimize impacts on Federally Listed Species including bighorn sheep.

Special-Status Species

Concern 199: The analysis of impacts on mountain yellow-legged frog and Yosemite toad are not sufficient. The analysis is general and does not relate the actions of the alternatives to impacts that are known to occur. The localized impacts described in the analysis most likely would result in population-level effects; however, this is not stated in the WSP/EIS. In addition, the WSP/DEIS contains conflicting statements regarding the impacts to these special-status species, and mitigation measures for the protection of special-status species should be included in the plan.

> *The WSP/DEIS is substantially lacking in analysis of the impact of the proposed action on the Yosemite Toad ("YT') and the Mountain Yellow Legged Frog ("MYLF').*
> [Recreational Group, #235]
>
> *The YT and MYLF habitat is described in the WSP/DEIS, along with common stressors on the species' well being. WSP/DEIS at 300-304. However, the WSP/DEIS is lacking meaningful analysis regarding the known impacts on the YT and the MYLF in regards to the alternatives discussed. Instead, it states conclusions and identifies general impacts without explaining them in relation to the proposed WSP/DEIS in any meaningful way. For instance, stock grazing is expected to occur in primary YT habitat (meadows) and recreation will likely overlap with all segments of YT habitat. WSP/DEIS at 302. This is the extent of the analysis of stock use on YT habitat. The DEIS is ridden with reference to impacts, trampling and habitat degradation, but reference does not equal analysis.*
> [Recreational Group, #235]
>
> *Even the draft EIS analyses of the potential for disturbance by recreational stock use and trampling of Yosemite toad and Yellow-legged frog is qualified numerous times throughout the draft WSP/EIS as representing merely a minimal overall adverse effect on Yosemite toad populations (given) the scale of the parks. This is because the amount of toad/frog habitat readily accessible by private stock users is infinitesimally small as compared to overall habitat both within SEKI Wilderness and the Sierra Nevada. Yet the draft WSP/DEIS contains several conflicting statements regarding the severity of impacts to threatened species. For example it states: Yosemite toad populations may be adversely affected by degradation of habitat due to the presence of trails and injury or mortality from human or stock trampling. Under alternative 1, there are few locations where Yosemite toad populations are known to exist near trails; therefore, the overall potential for degradation and trampling under this alternative would continue to be limited (DEIS, p. 366).*
> [Recreational Group, #171]
>
> *The draft WSP/EIS is therefore deficient as it fails to disclose a rationale to further regulate private stock use (Alternatives 2, 4 and 5) in the absence of identified natural or cultural resource-related regulatory triggers. While a remote potential nonetheless remains for stock users and hikers/backpackers alike to trample individual toads/frogs or their habitat, we implore the Park Service to consider other measures to mitigate documented threats to threatened species and wilderness character. Such measures could*

include re-routing of problematic trails, enhanced visitor education, placement of interpretive materials, or targeted seasonal closure of known vulnerable habitats, if deemed necessary. These site-specific measures stand in contrast to the approach currently applied in the draft WSP that includes sweeping restrictions in terms of maximum party size, trails available for stock-related travel, broad closures to grazing of open meadows, and wholesale prohibitions of meadow grazing (Alternative 4) and off-trail travel (Alternative 5).
[Recreational Group, #171]

Response: The results of the impact analysis on mountain yellow-legged frog and Yosemite toad are summarized in the Executive Summary and Summary of Impacts Table of the WSP/EIS. "Chapter 3: Affected Environment" discusses the existing conditions of the mountain yellow-legged frog and Yosemite toad, including a discussion of current stressors and threats to these special-status species. A thorough analysis of the impacts on these species for each of the alternatives is presented in the "Special-status Species" section of "Chapter 4: Environmental Consequences." The reader should refer to the "Mountain Yellow-legged Frogs" section and the "Types of Impacts on Mountain Yellow-legged Frogs" subsections for a complete discussion of the impact analysis for mountain yellow-legged frogs under each alternative. For a complete discussion of the impacts to Yosemite toads, the reader should refer to the "Yosemite Toad" section and "Types of Impacts on Yosemite Toad" subsections under each alternative. The analysis of the alternatives included three primary means by which the mountain yellow-legged frog and Yosemite toad could be adversely affected, all of which are related to recreational activities: (1) disturbance during encounters with hikers and stock, (2) injury or mortality due to trampling by hikers and stock, and (3) degradation of habitat due to trails and/or stock use.

The conclusion that impacts on mountain yellow-legged frogs could result in population-level effects is mentioned in the analysis of mountain yellow-legged frogs in the "Special-status Species" section of chapter 4. It can be found in "Types of Impacts on Mountain Yellow-legged Frogs" — "Injury and Mortality due to Trampling" and "Degradation of Habitat," and within the analysis of each of the alternatives. The conclusion that impacts on Yosemite toads could result in population-level effects is mentioned in the analysis of Yosemite toads in the "Special-status Species" section of chapter 4. It can be found in "Types of Impacts on Yosemite Toad — Degradation of Habitat" and within the analysis of each of the alternatives. However, these conclusions are qualified by the statement that population effects could occur *if* management let unacceptable recreational impacts or habitat degradation occur (emphasis added). A long record of monitoring mountain yellow-legged frog and Yosemite toad populations has shown that, in the few places where frogs/toads and moderate- to high-use overlap, there has been no evidence of population effects from recreation. Likewise, a long record of monitoring meadow condition has shown that habitat degradation has not occurred due to packstock grazing and access (see "Impacts of Alternative 1: No-action / Status Quo" in the "Vegetation" section of chapter 4). In addition, the percentage of habitat with current or recent detections of mountain yellow-legged frogs or Yosemite toads that overlaps with packstock grazing/access or trails is relatively small. For example, an analysis conducted by the parks for consulting with the USFWS on these newly listed species (NPS 2014d, Sequoia and Kings Canyon National Parks, Wilderness Stewardship Plan, U.S. Fish and Wildlife Service Consultation Package, October 2014) shows that, of 64,187 acres of lake, stream, and meadow habitat with current or recent detections of mountain yellow-legged frogs, 17,384 acres (27%) would have packstock grazing or access under alternative 2. A smaller amount of meadow habitat with current or recent detections of Yosemite toads (6,599 acres) would have packstock grazing or access under alternative 2. An even smaller amount of habitat with current or recent detections of mountain yellow-legged frogs or Yosemite toads would overlap with trails (356 acres). Therefore, the analysis appropriately discloses that there is potential for population effects, but that the potential is extremely low.

It may seem as if the WSP/DEIS has conflicting statements, such as, "Yosemite toad populations may be adversely affected by degradation of habitat due to the presence of trails, and injury or mortality from human or stock trampling. Under alternative 1, there are few locations where Yosemite toad populations are known to exist near trails; therefore, the overall potential for degradation and trampling under this alternative would continue to be limited." In this case the term "adversely," used to describe impacts to special-status species, has a specific definition by the USFWS (see the "Special-status Species — Methodology for Analyzing Impacts" section in chapter 4) in which trampling of one individual or degradation of critical habitat of a listed species would be considered an adverse effect. However, as described in the analysis, past trampling events have been extremely rare and are expected to continue to be extremely rare in the future under alternative 2. In addition, due to the life-history strategies of the Yosemite toad and mountain yellow-legged frog, in which a small percentage of individuals survive to adulthood under natural conditions, occasional individuals lost to trampling would not be measurably different than background conditions and thus would be highly unlikely to have adverse effects at the population level.

The WSP/EIS includes measures to minimize impacts on special-status species in "Mitigation Common to All Alternatives" section in "Chapter 2: Alternatives":

> "To limit the potential for adverse effects from the presence of hikers and stock in Yosemite toad habitat, the following mitigation measures would be implemented under all action alternatives:
>
> - Existing trails that go through or near meadows used by Yosemite toads would be rerouted away from those meadows.
> - Park staff and visitors would be educated about how to avoid impacting Yosemite toads and encouraged to exercise caution when they encounter populations.
> - Monitoring would be used to determine if effects of visitor use on Yosemite toads or their habitats are approaching unacceptable levels; visitor use would be adjusted in Yosemite toad habitat to prevent or mitigate degradation.
>
> To further limit the potential for adverse effects from increased presence of hikers and stock in mountain yellow-legged frog habitat, the following measures could be implemented:
>
> - Existing trails that run immediately adjacent to waters used by mountain yellow-legged frogs could be rerouted away from those waters.
> - New Class 1 trails could be designed to avoid running immediately adjacent to waters used by mountain yellow-legged frogs.
> - Educate hikers and stock users about the status and importance of mountain yellow-legged frogs, the parks' efforts to restore and conserve them, and encourage exercising caution when they encounter populations.
> - If monitoring detects habitats used by mountain yellow-legged frogs as being degraded due to overuse from stock grazing and/or hiker and stock traffic, visitor use restrictions could be changed to prevent or mitigate degradation.
> - Off-trail travel could be limited near certain mountain yellow-legged frog populations, reducing the potential for trampling events."

In addition mitigation measures may be added in the future as knowledge about stressors increases.

Cultural Resources

Concern 200: The Area of Potential Effect (APE) identified in the WSP/DEIS does not encompass the entire cultural landscape. The trails of the parks are historic; however, the document did not

evaluate the trails for historical significance. Additionally, the trails extend beyond the boundaries of the parks, connecting the trails to commercial pack stations, creating a cultural landscape. The whole landscape must be considered. Because the document fails to properly identify historic trails and cultural landscapes, the impacts to the cultural resources cannot be adequately characterized. The document should state when the formal evaluation of the historic value of each trail segment will be conducted, and the NPS should consult with the California SHPO, as well as adjacent federal agencies, to determine the cultural significance of the historic trail system that extends from the parks to lands beyond.

The DEIS limits the Area of Potential Effect (APE) to the wilderness areas of the park, without considering the ramifications of their actions which extend beyond agency, park, and wilderness boundaries. The parks actions create an adverse effect on historic structures and landscapes outside of the APE. The DEIS should expand the APE to include the commercial stock facilities addressed in their plan. While specific names of operators and operations were not particularly addressed in the plan, it can be assumed that the plan is addressing the commercial operators which currently hold a CUA with the parks.
[Business, #182]

It is noted that the WSP addresses commercial stock use, but fails to include recent wilderness and non-wilderness INF studies, plans, and RODs regarding both front country and John Muir Wilderness. The only plan referred to is the 2001 Wilderness Plan for the INF/Sierra Forest. The parks did not utilize the information in the 2007 ROD Commercial Pack Station and Pack Stock, Outfitter Guide Permit Issuance completed by the Inyo National Forest. If they had utilized this available information, they would have known that the pack stations located on the eastern and western portions of the Sierra Nevada range utilizing the John Muir Wilderness are national register eligible. Together they comprise a historic district/landscape connected by a vast network of trails which travel in out of front and back-country, non-wilderness/wilderness, as well as forest and park administrated areas. Because these historic places are National Register eligible, they must be treated the same as being listed on the National Register of Historic Properties.
[Business, #182]

Features of Value: Appendix K, page K-10 addresses how formal evaluation of historic value of each trail segment should be conducted, but does not indicate when or if this will be accomplished. Without this evaluation, the historic character, and historic context is at risk for adverse effect, as the trails management/classification plan cannot address this issue.
[Business, #182]

Travelways of social importance; WSP should address fluid connection between NPS and USFS lands, administrated separately, but connected by trails, leading to historic facilities, creating a large historic landscape, much like historic Pony Express Stations situated in various states, connected by trails which are only now being evaluated for their historical significance.
[Business, #182]

We request that the parks consult with CA SHPO re the trails, and to spend adequate time to identify, evaluate and nominate properties to the NR. It is clear insufficient time has been allowed on this portion of federal planning, and thus has not been a

consideration when addressing trail classifications, uses, and design. The parks have not completed an independent NEPA regarding the trail classification process, and the public was not given the chance to comment on the process as it was not presented in draft form, but rather is being squeezed into this WSP.
[Business, #182]

Wilderness does not exist in a vacuum, and therefore any federal planning, particularly that of the Department of Interior which manages the NRHP, should be farther reaching, and include collaboration with adjacent federal agencies, and members of the public in regards to potential effects on National Register eligible properties
[Business, #182]

The DEIS does not satisfy the NEPA process re the new proposed trail classification, and because the trails have not been evaluated for historical significance, the classification of trails has the potential to erode, diminish, and apply an adverse effect on trails which serve as a landscape feature of commercial pack stock use, and their associated features of historic pack stations.
[Recreational Group, #201]

Response: The NPS has historically worked and will continue to work, as capacity and fiscal resources will allow, to ensure compliance with section 106 as well as section 110 of the NHPA.

In compliance with NHPA, the parks locate, inventory, and nominate cultural resources, including trails that may be eligible for listing on the NRHP. The strategy for preserving potentially historic trails is included in attachment 4 in "Appendix K: Trail Management and Classification System for Sequoia and Kings Canyon National Parks." Trails are divided into five tiers for the purposes of prioritizing needs for the evaluation of historic properties and features per NPS-28: Cultural Resource Management Guideline and Section 110 of the NHPA. The NPS will work with the California SHPO to develop a strategy for completing these evaluations and preserving the historic trail systems in the parks.

NHPA includes guidance such as 36 CFR 800.4, which stipulates that federal agencies must determine and document the Area of Potential Effect (APE). This includes seeking information from other organizations likely to have knowledge of, or concerns with, historic properties in the area. Section 110 of NHPA also states that "agency preservation-related activities are to be carried out in consultation with other Federal, State, and local agencies, Indian tribes, Native Hawaiian organizations, and the private sector."

The parks are in the process of ensuring that the APE is adequate, which includes not only public review and comment but review and concurrence by the California SHPO. As discussed in "Chapter 5: Consultation and Coordination," the NPS notified the California SHPO on March 30, 2011 of the intent to prepare an EIS. The preliminary draft alternatives were provided to the California SHPO on October 25, 2012. Consultation with the California SHPO has been formally initiated and will continue throughout the environmental compliance and implementation process.

Concern 201: The use of stock on the trails in Sequoia and Kings Canyon National Parks is historic, and therefore, culturally valuable.

The current trail system reflects a varied history. Packers have contributed to that trail history by participating in trail rehabilitation, construction, and maintenance. There is considerable historic stock use on the trail system and any changes will result in a loss of historical and cultural values. Commercial stock packing is a compatible purpose for

which these trails have been established. Because the formal trail system in the parks predates wilderness designation, historical use must be considered. Trails should preserve the diversity of users, providing equal access to the area.
[Recreational Group, #201]

Response: The preferred alternative recognizes stock use as an allowed use on trails, except where there are overriding resource protection or visitor safety concerns.

Socioeconomics

Concern 202: The failure of the WSP/EIS to properly assess the cumulative socioeconomic impacts violates NEPA. There was no economic analysis completed for any of the alternatives in respect to the loss of jobs and businesses that would occur with the restrictions and closures that are aimed specifically at commercial stock operations, specifically the proposed restrictions limiting commercial stock to access the Mount Whitney Management Area.

There was no economic analysis completed for any of the alternatives about the loss of jobs, and possibly the complete loss of businesses that would occur with the restrictions and closures that are aimed specifically at commercial stock operations. There is little to no discussion about the positive benefits of having a thriving packing industry that can assist groups and families in visiting the wilderness. There is discussion about past groups that frequented the areas (eg: Sierra Club trips). but there is no desire expressed to see that level of use re-occur. The DEIS does not address the impacts and effects of the potential closure of historic businesses that could likely occur with the proposed grazing restrictions, camping closures, and new trail management plan.
[Recreational Group, #201]

The proposed restrictions limiting commercial pack stock to access the Mt. Whitney zone is a 'deal killer. ' These additional limitations . . . will have a profound impact on the commercial pack stations that supply the hikers and other outfitters who have permits and clients to climb Mt. Whitney. The existing limits (camping, Mt. Whitney access, and grazing) have already resulted in a 60% impact to business and more restrictions with be devastating. The Plan should actually decrease the number of individuals able to the Whitney zone, and should increase the commercial service providers. The number of search and rescues that are conducted on Mt Whitney each year not only costs hundreds of thousands of dollars of tax funds - but also costs lives. Clients of outfitters may be injured, but because they are with their guides, they do not cause massive searches with up to 50 people per day, with helicopters and other air support searching for them. Outfitters play a valuable role in providing their clients with wilderness skills and equipment. Thus, a greater share of the quota for Mt. Whitney should be reserved for the commercial service providers.
[Recreational Group, #201]

The DEIS's failure to properly assess the cumulative socioeconomic impacts violates NEPA.
[Recreational Group, #251]

NFRA stated in its comments that the DEIS was defective because "[t]here was no economic analysis completed for any of the alternatives about the loss of jobs, and possibly the complete loss of businesses that would occur with the restrictions and closures that are aimed specifically at commercial stock operations." This very serious

defect, which results in NPS essentially ignoring a very devastating impact of the plan. See CFR § 1508.14 ("When an environmental impact statement is prepared and economic or social and natural or physical environmental effects are interrelated, then the environmental impact statement will discuss all of these effects on the human environment"); see North Carolina Wildlife Federation v. North Carolina Dept. of Transp. , 677 F. 3d 596,604-605(4th Cir. 2012)(noting deficient socioeconomic data in the EIS, the court held that "[w]hen relevant information is not available during the [impact statement] process and is not available to the public for comment[,]. . . the [impact statement] process cannot serve its larger informational role, and the public is deprived of [its] opportunity to play a role in the decision-making process.").
[Recreational Group, #251]

Response: Uncertainties regarding the timing, scale, and the responses to the management alternatives by wilderness visitors and commercial packers alike preclude quantitative analysis. Alternatives 2 and 3 would allow increased use supported by commercial services, while alternatives 4 and 5 limit the number of users but extends night limits in many areas and maintain current limits on consecutive nights per trip and per season (see tables ES-1 and 45, Elements 7, 8 and 11). Consequently, the net effect on commercial service providers is indeterminate. Nonetheless, the potential for adverse economic effects on individual service providers is acknowledged (see table ES-2 and 53, Socioeconomics and the alternative 4 analysis of the ""Socioeconomics" section of "Chapter 4: Environmental Consequences"). Additional discussion addressing the uncertainties has been added to "Socioeconomics" section of chapter 4.

Concern 203: The commercial service providers in Inyo County would be impacted greater by the commercial service limitations in the preferred alternative, as Inyo County relies heavily on tourism.

Adverse impacts to Inyo County community economies due to limitations on visitor-use, stock use, and commercial services would be disproportionate to those anticipated for counties on the west side of the Sierra, which have significantly larger populations, more diverse economies, and greater economic growth opportunities through development of private land than Inyo County. It is essential that the DEIS recognize the significant and detrimental impacts specific to Inyo County's economy and cultural heritage that would result from curtailing these recreational and commercial opportunities. The DEIS neglects to consider the Inyo County General Plan as part of the planning efforts of adjacent lands and wilderness areas. Specifically, the DEIS conflicts with goals and polices addressing collaboration with State and Federal partners to increase access to recreation in public lands, continued branding and marketing of Inyo County as a destination, expansion of existing and new businesses, and preservation of our historical heritage (see attached Appendix A).
[County Government, #237]

I am concerned however by the adverse socioeconomic impacts identified in the preferred alternative that will impact gateway communities to the National Parks; specifically those impacting visitor-use levels, stock use and grazing, and commercial services in the National Parks. I believe restrictions to these activities in the National Parks will have direct adverse impacts to the economy of Inyo County. My concern focuses specifically on the DEIS proposal to limit visit-use and commercial operations in the Mount Whitney Management Area, Mount Langley, Rae Lakes, Lamarck Col, and Dusy Basin. As identified in Chapter 3 of the DEIS, nearly one-third of all employment in Inyo County is related to tourism serving establishments. The dependence of Inyo County community economies on visitors to National Parks is disproportionately high due to the large

percentage of federally managed land in Inyo County and the geographically remote character of the eastern sierras. Many of the most popular destinations in Sequoia and Kings National Parks are accessed from trailheads originating in Inyo County, and the relationship between gateway communities and economic vitality is evidenced by the two most economically robust communities in Inyo County, Lone Pine and Bishop, which provide access to Mount Whitney and Dusy Basin, respectively. Limiting or reducing the day-use and overnight quotas, stock-use and commercial operations will have direct and proportionate adverse impacts to Inyo County residents and businesses, and the health of Inyo County's economy generally.
[County Government, #237]

Page 562 states "the gross income derived . . . . . total expenditure associated with wilderness use represents a very small proportion of the overall regional economy" This might be true for west side communities but not so for east side where wilderness expenditure is a very significant proportion. I draw your attention to the 2008 Economic and Fiscal Impacts and Visitor Profile of Mono County Tourism. Where the report finds that 69.7% of visitors came for outdoor recreation and of that 47.5% went hiking. While it is true that the majority of these people will not access SEKI from the Eastside outdoor recreation and wilderness is important to our communities in Inyo and Mono Counties. Please do not discount us.
[Business, #205]

Response: The relative greater dependency of the Inyo County economy on outdoor recreation and tourism is acknowledged in "Chapter 3: Affected Environment." The potential for disproportionate effects on commercial services active in the Mount Whitney Management Area is also acknowledged in "Chapter 4: Environmental Consequences." However, available data regarding recreation use and commercial services suggest that the resulting economic effects (due to the potential reduction in commercial use of 10% of the 2010-2013 average in the Mount Whitney Management Area) would not constitute a significant threat to the Inyo County economy. Additional discussion has been added to the "Socioeconomics" section of "Chapter 4: Environmental Consequences."

Visitor Use

Concern 204: The analysis of visitor access in the WSP/EIS states that quotas may be reduced and destination quotas implemented; this would greatly impact visitor access, and therefore, visitor experience. However, the WSP/EIS does not describe how these changes would impact visitors.

The Environmental Consequences section seems to assume that the trail encounter standards in Alternative 2 were established at a point that would ensure the retention of existing levels of visitor use and the existing opportunities for solitude throughout the parks wilderness areas. It shows little difference in the impact on visitor use and the opportunity for solitude between the no-action alternative and Alternative 2.
[Individual, #97]

Just as important, the document does an inadequate job of addressing the impact of controls on visitors. The Environmental Consequences section has only a vague statement about visitor impacts; it is so vague and superficial as to be virtually meaningless. In describing the methodology for analyzing impacts on visitor encounters (page 517), the document says "Note that effects on solitude or opportunities for primitive or unconfined recreation are analyzed in the Wilderness Character section in this chapter. . . None of the alternatives would extend or reduce the quota period, and no

change to the seasonal nature of overnight visitation is expected to occur. The effect of visitor encounters on opportunities for solitude or primitive and unconfined recreation was discussed in the Wilderness Character section in this chapter; therefore this topic will not be further discussed under the Visitor Use section." The above section sounds reasonable on its face. But it really says that the only significant effects on visitor encounters are those that are described and analyzed as effects on solitude or opportunities for primitive or unconfined recreation in the Wilderness Character section. The Visitor Access section on page 521 says that trailhead quotas would remain at their existing levels, approximately; but there could be a reduction in quotas in busy areas. Existing destination quotas would continue to be applied and additional destination quotas may be added for specific areas. A reduction in trailhead quotas in busy areas, and the application of additional destination quotas could impact some visitors wanting to visit these areas. Visitors may need to change their entry point, destination, or the day of the week they enter the wilderness. If day-use permits or quotas are implemented, visitors may decide not to utilize those trailheads, or may not be able to obtain a permit at the trailhead of their choice, resulting in an adverse effect on visitor use and experience.
[Individual, #97]
The EIS should adequately describe the impact on visitors as a result of the proposed carrying capacity process, especially if use were to increase is some areas. Visitors in Alternative 2 would get a different experience than in the no-action alternative or existing conditions. For example, there would likely be increased use during shoulder seasons, and therefore decreased opportunities for solitude. There would be additional constraints and less freedom. Because of small sample size, use levels could go well above standard before monitoring detected this and provided enough information to trigger management action to bring conditions back within standard. If day use levels were to increase, these visitors would likely encounter capacity constraints where none existed before. These visitor impacts were not adequately described and assessed in the Draft WSP.
[Individual, #97]

The portion of the Environmental Consequences that describes the Methodology for Analyzing Impacts on Visitor Use (page 517) seems reasonably comprehensive. It recognizes the potential for impacts on both visitor encounters and visitor access. But the document did not follow through with a meaningful description of the impacts that Alternative 2 would have on visitor access and visitor encounters if visitor use were to increase. The Environmental Consequences section of the document assesses these two impact topics in such a vague and superficial way as to be virtually meaningless. The document needs a clear description and assessment of the impacts of imposing visitor capacity standards on visitors. The Description of the Alternative and Environmental Consequences sections of the document, as currently written, fails to provide that. The document implies that there will be negligible impacts on visitors, except in four popular areas that experience trail encounter rates higher than the proposed standard in Alternative 2. Such language is misleading at best.
[Individual, #97]

Response: The NPS does not agree that the preferred alternative "would greatly impact" visitor access and the visitor experience. As explained in "Chapter 4: Environmental Consequences," alternative 2 allows for continued access and use; however, in some popular areas visitor use could be affected by reduced trailhead quotas, destination quotas, or day-use quotas. Visitors would continue to have opportunities to experience the wilderness both on- and off-trail. Wilderness conditions would continue to

improve in many areas. There would be fewer facilities, and visitors would continue to have the opportunity to receive support from commercial service providers to engage in proper activities in most areas of the wilderness.

Visitor Experience

Concern 205: The WSP/EIS should clearly describe the changes in visitor use patterns and their relationship to encounter rate. Some changes are not clearly described. Although the changes would reduce encounter rates and provide a better wilderness experience, it is not clearly explained in the document.

> *One of the proposed actions for the Evolution Basin and Valley portion of the PCT/JMT is to impose an overnight stay limit in Alternative 2. That would certainly reduce the encounter rate because through-hikers would not have as many encounters with people who are camping in the basin. But this idea is not clearly communicated in the document. The proposed action will make a significant change to how people use Evolution Basin and Valley. The parks are proposing to convert this area of the parks to more of a through-hiking experience and reduce the opportunity for camping, a wilderness experience that many people now enjoy. That change in use pattern is not clearly described in the Description of the Alternative, nor is it adequately assessed in the Environmental Consequences section. This is true for the actions being contemplated for the other popular trails. The proposed change in visitor use patterns should be clearly described in the Description of the Alternative, and the impact on the visitor experience should be assessed in the Environmental Consequences section.*
> [Individual, #97]

Response: Visitor use patterns are managed only at the point of entry (trailhead quotas), and in some areas, by night limits. Once in the wilderness, visitors determine their own trip route with few limitations. The "Opportunities for Solitude or Primitive and Unconfined Recreation" section for the preferred alternative in "Chapter 4: Environmental Consequences" describes the effects of management actions on visitor encounters in the highest use areas. Other areas would be similar to the no-action alternative, where trailhead quotas remain consistent with no action. Visitors would continue to have opportunities to experience the wilderness both on- and off-trail.

Concern 206: The impact analysis for visitor experience is misleading, as it claims that the preferred alternative would have few impacts. However, trail encounters would increase and visitor experience would decline prior to monitoring methods detecting a change in standards. Additionally, when quotas are filled, the trail encounter standards may force visitors to other areas that are currently not heavily used, which may reduce solitude for some visitors.

> *The document says on page A-3 that If the standard is exceeded, then specific management actions will be taken to address the situation to ensure that the wilderness resource/character is protected and any deterioration of condition is arrested before there are unacceptable impacts to wilderness resources and experiences. The document does not describe the impacts of that increased trail encounter rate on the visitor experience, the reduction in the opportunity for solitude. The Draft WSP uses the trail encounter standards to describe one visitor experience condition. But in reality, the WSP proposes to deliver a more crowded condition by the time the problem analysis detects that actual conditions (the real world conditions that visitors experience) have gone above standard and management action is warranted.*
> [Individual, #97]

The Environmental Consequences section did not assess the impacts of that encounter rate on the visitor experience. The document indicates that there would be few impacts on the visitor experience from Alternative 2, either from crowding, decrease in the opportunity for solitude, or from management actions taken to stay within standard. That is misleading at best.
[Individual, #97]

When visitors are turned away during the peak times because a quota is filled, many of them will likely switch to time periods or to trails where the quota is not filled. That will increase use in those periods. The end result is that what are now the quieter periods will be managed more closely to the established standard. There will be reduced opportunities for solitude during those periods. That is one consequence of the proposed action, and this impact should be assessed in clear language (not just in a vague and superficial way) in the Environmental Consequences section.
[Individual, #97]

Response: Trailhead quotas (table 46 in "Chapter 2: Alternatives") are similar to current levels with some new quotas on trails where currently none exist. The analysis in "Chapter 4: Environmental Consequences" under the "Opportunities for Solitude or Primitive and Unconfined Recreation" section for the preferred alternative, acknowledges that there may be impacts to individual visitors wanting to visit specific areas when quotas are filled; however, where visitors opt to go instead would be a personal choice.

Visitors would continue to have opportunities to experience the wilderness and solitude both on- and off-trail, with off-trail use providing the best opportunities for solitude. The preferred alternative provides for relatively high use in some popular areas and increases opportunities for solitude in a number of areas that are near or exceed the trail encounter standard. Other areas would be managed for lower levels of use.

Park Operations

Concern 207: Per 16 USC 45f, the parks cannot issue commercial use permits for the Mineral King area; therefore, there would be no impacts on park operations.

Page 535. If commercial pack stations are reopened at Wolverton and Mineral King, concessions office would be charged with managing additional concessions contracts." And back to Page 389. paragraph 5. Alternative 3 would result in more development in wilderness and therefor would result in the most adverse effects on this quality. Comment: My concerns hear is the Park's not recognizing the intent, and Law regarding, 45f Mineral King Valley Addition. Park hear indicating they have the option to give permits for commercial use's in Mineral King. Which 45f makes clearly they do not have. As refereed to earlier in the front this letter, regarding the Park preferred plan. To turn the MK. cabins over to private commercial operators. As called out in my third paragraph above.
[Individual, #28]

Page 537. This alternative would limit commercial services in the front country and wilderness more than the other action alternatives. There would be no additional commercial services at Wolverton and Mineral King. Comment: Commercial services at Mineral King. Do not exist now, and are not allowed by, 16 U. S. 45f Mineral King Valley Addition. As Congressionally enacted in 1987.
[Individual, #28]

Response: In Public Law 95-625 (November 10, 1978), transferring lands known as the Mineral King Valley and the Sequoia National Game Refuge to the management of the NPS, Congress established certain provisions relating to commercial purposes (Sec. 314(c)(3)). The provisions pertaining to use of property for commercial purposes is reserved for those existing cabin permittees who retained stated rights to continue use of their cabins (which reside on federally owned land). However, these permittees are subject to the restrictions on commercial uses as stated in the statute. The provisions regarding commercial purposes do not pertain to the authorities of the NPS to issue or control commercial services provided to the visiting public. The WSP/EIS proposes no changes to the use and occupancy of the permitted cabins.

Concern 208: The NPS should explore new methods of managing wilderness without the use of helicopters.

> *Administrative Functions Some of SEKI's methods of performing management functions in wilderness seem to be the product of a 19th- and early 20th-century mind set. The use of stock animals is an anachronism, a relic of 70 years ago. By doing some elementary research, staff at SEKI would soon become educated as to more advanced, more environmentally friendly methods. How could you justify employing ground and/or air vehicles/devices? The answer lies in Vol. I, page 349 of the WSP.*
> [Recreational Group, #254]

Response: The parks perform Minimum Requirement Analyses for all helicopter flights that are not conducted on an emergency basis to comply with the Wilderness Act (Section 4(c)), and have specific criteria that are reviewed prior to approving flights/landings (see "Appendix I: Minimum Requirements Analysis"). It is a stated management preference that wilderness administrative operations seek non-motorized means to accomplish tasks before resorting to helicopters.

CHAPTER 5: CONSULTATION AND COORDINATION

Consultation and Coordination: General Comments

Concern 209: The NPS should consult with the USFS regarding the proposed new trail on Mount Langley and removing food-storage boxes. Adding a new trail and removing food-storage boxes could put a strain on the other agency's resources.

> *Lastly, the park should consult with Inyo Natl Forest if a trail up Langley is being considered. With such few forest service rangers, their lands could be greatly impacted. An actual "trail" up a California 14'er would bring hordes of people to a sensitive foxtail pine forest. Pets in wilderness & human waste management along w/illegal campfires & trash all would be topics of concern (i.e., a new "Whitney Portal").*
> [Individual, #158]

> *Alternative 2 Element 4 Food Storage: With the surge of PCT hikers (& upcoming movie Wild) the park may see a sudden shift in use patterns. The JMTs also increasingly popular. Locking or removing boxes may cause repercussions on adjacent forest service lands. These agencies should be consulted.*
> [Individual, #158]

Response: The NPS has been coordinating with the USFS regarding any changes that could affect their resources or wilderness management throughout this wilderness stewardship planning process. The coordination between the agencies is described in "Chapter 5: Consultation and Coordination."

Concern 210: The WSP/EIS should describe the complications that could arise in coordinating with adjacent agencies to collaborate on reducing trailhead quotas for higher use areas. The WSP/EIS should also have a backup plan to reduce use if collaborating with other agencies fails.

> *Although somewhat unclear, the Draft WSP seems to suggest that the parks are proposing the following actions for those two popular areas: Mount Whitney (Crabtree-3): The document proposes Consulting with USFS regarding area use levels. The term consulting is a euphemism bordering on obfuscation. The parks know that what needs to be done is to lower the number of hikers who use this very popular trail. Evolution Basin and Valley (McClure-1): The document proposes Consulting and coordinating with USFS and Yosemite on quota reductions for PCT/JMT. Quotas may be reduced at certain trailheads. Impose overnight stay limit. Consulting and coordinating with other agencies and park units to reduce quotas on popular trails is a significant undertaking. Success in such a venture is far from certain. That should be disclosed in the Description of the Alternative and in the Environmental Consequences sections of the document. The document should disclose what the parks fallback plan is if those efforts fail to work.* [Individual, #97]

Response: As detailed in "Table 23: Area-specific Management Actions" under alternative 2, many of the actions for protecting wilderness character do not rely on collaborating with adjacent land managers to reduce trailhead quotas for higher use areas; that is just one strategy. However, successful collaboration is important and the NPS will continue to work with neighboring forests to retain this important relationship in the future.

APPENDICES

Appendix A: Visitor Capacity

Concern 211: The WSP/EIS should describe which measures will be monitored, when monitoring will occur, and where monitoring will occur.

> *Under the Process to Address Visitor Capacity section (page A-6), the document says that visitor capacity limits are primarily for overnight use. The justification for this is because at this time and in the foreseeable future, day visitor use is anticipated to remain at acceptable levels. No rationale is given for that statement. In the description of the management of visitor day-use capacity in Alternative 2 (page A-13), the document says that Day-use levels would not receive any new controls such as permits or quotas. Day use would continue to be monitored and may be the subject of people at one time (PAOT) or other monitoring methodologies to ensure that biophysical resources and wilderness experiences are not adversely impacted. That statement is not at all clear. The WSP is committing to measuring day-use levels, but it does not appear to be committing to monitoring any of the three visitor capacity measures that have established standards.* [Individual, #97]

> *Under the Process to Address Visitor Capacity section (page A-6), the document says that visitor capacity limits are primarily for overnight use. The justification for this is because "at this time and in the foreseeable future, day visitor use is anticipated to remain at acceptable levels." No rationale is given for this statement. The WSP needs to justify such an assumption. There would seem to be only two possible ways that the WSP could justify such an assumption: 1. Visitor use is assumed to be flat or declining in day use areas of the wilderness close to the frontcountry. That seems implausible, and it is*

contrary to the forecast contained in the GMP. But the reader has no way to know whether the WSP is making such an assumption because there is no clearly articulated visitor use projection section. 2. The Draft WSP has established the visitor capacity standards in the action alternatives high enough to accommodate anticipated growth in day use areas of the wilderness close to the frontcountry. If that were the case, the WSP would be saying that standards were established low enough in Alternative 2 to retain existing levels throughout the wilderness, but that the standards were established high enough to accommodate anticipated growth in day use areas of the wilderness close to the frontcountry. The WSP cannot have it both ways. Under the Management of Visitor Capacity Proposed in Alternative 2 section (page A-13), the document says "Day-use levels would not receive any new controls such as permits or quotas." No rationale is given for this statement. Does this statement really mean that the parks are just ruling out permits and quotas as a means of managing day-use levels? It seems implausible that the parks would be ruling out all new permit and quota controls as a means of managing day-use levels.
[Individual, #97]

How often will the three visitor capacity measures be monitored? In the Selection of Measures section (page C-4), the document discusses selection of the two primary aspects of visitor use to monitor: trail encounters and campsite conditions. It says that standards for these two measures have been established for all action alternatives of the WSP and would be applied in the future. The document does not give any sense of when in the future the parks intend to start this monitoring or how often it will occur.
[Individual, #97]

Given the budget that the parks can reasonably expect during the next few years, the document should disclose how much monitoring of each of the three established visitor capacity measures the parks can reasonably expect to accomplish, at least in general design. It seems unlikely that the parks can achieve a sample size to achieve its implied objective for the trail encounter measure.
[Individual, #97]

Human nature being what it is, the NPS has to hire rangers to enforce its rules and regulations. This is true in the wilderness just as in the frontcountry. Somebody has to be the enforcer. I assume that wilderness rangers will be checking permits to verify compliance. Did the wilderness traveler enter at the proper trailhead on the proper day? Are they in the proper zone? Did they stay too many nights in Evolution Basin and Valley? Is that really how you're designing the system? If so, that is a significant impact on the wilderness experience. That impact should be assessed in the Environmental Consequences section of the document.
[Individual, #97]

On page 512, the socioeconomic impact section says that Alternative 2 would not necessitate or support substantive changes or reprioritization of budgeted resources to fund park operations in wilderness. That seems to say that the parks intend to accomplish monitoring of the three established visitor capacity measures within existing budgeted resources, without substantive changes or reprioritization of budgeted resources. Is that the meaning of this statement?
[Individual, #97]

On Page A-14, the document says that trail encounter standards were established for the day-use areas. Table A-6 (Visitor Capacity Monitoring - Encounter Sub-zones) on page A-28 also clearly shows that trail encounter standards have been set for trails that are in day use areas of the wilderness close to the frontcountry. A reasonable reader would conclude that the parks intend to monitor trail encounters on those trails just like on all the other trails in the parks wilderness areas. But it is not clear that this is how the parks really propose to monitor use on trails in day use areas of the wilderness close to the frontcountry; the WSP does not explicitly make that statement.
[Individual, #97]

Which of the trails will be monitored for the trail encounter measure? Table A-6 (Visitor Capacity Monitoring - Encounter Sub-zones) on page A-28 establishes standards for essentially all of the trails in the parks wilderness areas. In numerous places, the document implies - but never explicitly states - that the parks intend to monitor trail encounters on all of those trails. A reasonable reader would conclude that the parks intend to monitor trail encounters on all of the trails that have established standards. Is that what the parks intend to do? Even if the parks do not intend to monitor trail encounter on trails in day use areas of the wilderness close to the frontcountry, a reasonable reader would conclude that the parks intend to monitor trail encounters on all the trails in the overnight areas of the wilderness. But it is not even clear that the parks really do propose to monitor trail encounters on all of those trails in the overnight areas of the wilderness; that commitment is never explicitly made. What does the phrase extrapolated across wilderness mean in the definition of the trail encounter measure? Does that mean that every trail and route, even those not included in Table A-6, has an established standard? If that is the meaning of this phrase, it should be expressed more clearly.
[Individual, #97]

Is the intent to decide in the monitoring plan which trails will be monitored and which trails will not? The WSP should clearly state which of the trails that have established standards will be monitored to ensure that conditions remain within standard. If the intent is to monitor some trails differently than others (e.g., the group of nine most popular trails), this should be clearly called out. Then the document should use language consistently so that the reader knows what is really being proposed. Under the Permits and Quotas section of Key Elements of Alternative 2 (page 96), the document says that areas to be monitored for continued acceptable levels of use that may require a future trailhead quota change includes only the trails in the nine most popular and sensitive areas. What about all the other trails in the parks wilderness for which trail encounter standards have been established as shown on Table A-6? What is the significance of excluding those trails from the above group of nine areas? Are those other trails going to be monitored for continued acceptable levels of use that may require a future trailhead quota change?
[Individual, #97]

Management of carrying capacity in day use areas. The three visitor capacity measures are focused on those parts of the parks wilderness where there is overnight use, far removed from the frontcountry. The monitoring program appears to largely not focus on those parts of the wilderness where day use occurs. But those are the areas where use could most likely increase relative to existing conditions, and where the opportunity for solitude is most likely to decrease relative to existing conditions. Yet the Environmental Consequences section assumes that this will not occur. The WSP should commit to

> *regularly monitoring the three visitor capacity measures throughout the parks wilderness areas, including the parts of the wilderness where day use occurs. If there are areas where the WSP does not anticipate regularly monitoring one of those measures, then that should be clearly stated and justified.*
> [Conservation/Preservation, #184]

> *The Draft WSP does not present a compelling argument that the parks can put enough government employees and/or volunteers in the wilderness to collect the required quantity of monitoring sample data. The Draft WSP also fails to disclose whether any large national park or forest has ever successfully implemented a trail encounter monitoring program on this scale. The program, as designed, appears to be too labor intensive to be practical to implement within existing budgeted resources as the plan indicates on page 512.*
> [Individual, #97]

Response: "Appendix A: Visitor Capacity" commits to monitoring all three visitor capacity measures that have explicit standards and managing to ensure that conditions remain in standard. Monitoring for grazing conditions and visitor encounter frequency is already occurring. A monitoring plan for campsite condition would be adopted after a ROD is published for the WSP/FEIS.

Appendix A establishes visitor encounter standards for all types of trails, including areas subject to day-use. Decisions about how to commit monitoring resources will be made adaptively, and will be adjusted to focus on areas where potential problems are detected.

Some measures relate to both day-use and overnight use, and others relate only to overnight use. Trail encounter frequency, for example, does not distinguish between day and overnight visitors, while campsite condition is obviously related only to overnight camping. Grazing measures would apply to all parties that choose to graze stock, although these are primarily overnight parties. Other measures such as VUDs are obtained from the permit database for overnight use, and therefore, only reflect overnight use. The wider range of measures related to overnight use reflects the wider range of impacts that is associated with overnight use. For clarity, the sentence in the "Step 5: Establish Visitor Capacities" section of appendix A regarding limits and overnight use was omitted in the WSP/FEIS.

Concern 212: There are concerns with visitor capacity at Mount Whitney. Reducing use in the Mount Whitney Management Area by restricting use by people who have permits from the parks is an unfair burden and if use patterns change and fewer through hikers utilize the area local wilderness permit holders should be allowed to increase use.

> *One of the primary areas of growth is the annual onslaught of PCTers and JMT through hikers, something that, on an anecdotal basis, is increasing every year. Any restrictions in use should be based on as complete of a picture as possible and take into account the impacts that through hikers create. Trying to reduce use in the Mount Whitney area by restricting use by people who have SEKI permits is an unfair burden and if use patterns change and fewer through hikers utilize the area local wilderness permit holders should be allowed to increase use. Without having a complete baseline long term management could prove difficult.*
> [Business, #196]

Response: If future observed visitor use patterns suggest that a larger number of permits could be issued while maintaining desired conditions, managers would have the latitude to increase the permit volume at that time.

Concern 213: Visitors seeking solitude on the trail to Mount Whitney would seem to be looking in the wrong place.

> *There are concerns that increased use necessitates reduced opportunities for solitude. From a practical standpoint the marginal detraction of solitude between encountering 45 people an hour vs. 59* people an hour would be negligible, yet it would afford hundreds of more people the opportunity to climb Mt. Whitney every year. Indeed, visitors seeking solitude on the Mt. Whitney trail would seem to be looking in the wrong place. Further, it is our opinion that while the Mt. Whitney area is extremely busy relative to other areas in the Park, there are no safety hazards that would necessitate additional restrictions to use.*
> [Business, #196]

Response: While the visitor density in the Mount Whitney Management Area may be inconsistent with some visitors' definition of solitude, it is nonetheless necessary to control visitor density at a level that the parks' managers consider compatible with the purposes of wilderness.

Appendix B: Extent Necessary Determination (END) for Commercial Services

Concern 214: The END for commercial services, does not demonstrate that commercial stock use is necessary.

> *The DEIS Extent Necessary Determination ("END") for commercial services, Appendix B, does not demonstrate that commercial stock use is necessary. The END makes the following conclusion regarding commercial stock use: "Stock riding, packing, and camping are activities that are proper for realizing the public purposes of wilderness." However, nothing in the DEIS shows they are necessary in and of themselves as a COMMERCIAL activity. The DEIS erroneously concludes that necessity for commercial service arises from the need of people to hire commercial stock if they do not own stock themselves. That is one step removed and says nothing about whether commercial stock use itself is necessary for those same people to access the wilderness at all, i. e. to realize the public purpose of wilderness. The DEIS concludes only that stock use in the abstract is a proper activity in wilderness. The DEIS does not conclude that commercial stock use is necessary in the wilderness above and beyond individual stock use. The reason why the DEIS does not conclude that commercial stock use is necessary in this manner is that it cannot. The DEIS would have to assume that all stock use, including by individuals, is necessary (which the DEIS does NOT conclude), and only then make the argument it actually makes, which is that commercial use should be allowed on the basis of economic equity since most people do not own stock. The hypocrisy of this economic equity argument is particularly evident given the relative affluence and comfort level required for an overnight commercial stock trip relative to the cost of accessing the wilderness without such commercial aid.*
> [Individual, #46]

Response: As explained in the END, the NPS interprets Section 4(d)(5) of the Wilderness Act to require an initial finding as to whether a particular activity (e.g., stock use) is "proper" for realizing one of the public purposes of the Act. This approach is consistent with the plain language of Section 4(d)(5), which states that commercial services may be performed "to the extent necessary *for activities which are proper* for realizing the recreational or other wilderness purposes" of a wilderness area. Having concluded that stock use is a proper activity in wilderness, the END then proceeds to determine whether commercial services are necessary to support that activity and, if so, what is the amount (i.e., the extent) of commercial services that would be allowed. This last step involves consideration of desired conditions

and visitor capacities to ensure that the amount of commercial services allowed preserves wilderness character.

Concern 215: There is a concern that commercial service providers are making the determination about which services are necessary versus unnecessary, and that there is an economic bias in such determinations.

> *Allow commercial services of SEKI's wilderness only to the extent that such services are truly necessary. Please don't allow the commercial service providers themselves to continue making the determination about which services are necessary vs. unnecessary. It is plainly obvious that they have an economic bias in such determinations. . .*
> [Business, #117]

Response: The NPS has the authority to make a determination about the necessity for and extent of commercial services and has exercised this authority through the END process.

Concern 216: The phrase "extent necessary" should not be a blanket authorization for visitors to utilize commercial services to any extent. The document should consider that "extent necessary" may refer to a commercial activity that would enhance the agency's ability to protect the resource, or a special provision for disabled people or for only those who can demonstrate a need for commercial support.

> *You also assume that "extent necessary" refers to access to wilderness. How do you know that? Perhaps the phrase refers to commercial activity that would enhance the agency's ability to protect the resource. Perhaps it refers to some sort of special provision for disabled people. Perhaps it means that only those who can demonstrate a need for commercial support may avail themselves of such support. You haven't considered any of those possibilities. In any event, the phrase "extent necessary," coming, as it does, after the statement that there shall be no commercial enterprise in wilderness, cannot possibly be blanket authorization to all comers to utilize commercial services to any extent whatsoever. "Extent necessary" is a limiting phrase, not, as you would have it, one that removes all limits.*
> [Recreational Group, #254]

Response: The END is not a "blanket authorization" but rather an authorization for a specific amount of commercial support for specific activities that are proper for realizing wilderness purposes, namely, the recreational, scenic, scientific, educational, conservation, and historical purposes. The Wilderness Act makes no mention of visitor disability or any other attribute of particular visitors, but instead states that commercial services may be allowed for activities that are proper for realizing wilderness purposes. The END therefore focuses on attributes of those activities as factors for determining the necessity for commercial support. The amount of commercial services allowed under each alternative is tied to the desired conditions and visitor capacities for that alternative to ensure that wilderness character is preserved.

Concern 217: Meaningful criteria must be applied to determine the "necessity" of commercial stock services in wilderness. To be meaningful, the criteria must refer to the physical needs of persons wishing to explore wilderness, not to provide a means for those who are circumventing trailhead quotas, who use stock to haul unnecessary items into the backcountry, or who are seeking convenience and ease.

SEKI's WSP/DEIS conflates the stringent "extent necessary" preservation language of the Wilderness Act with the public's wishes to take trail rides; their difficulties as individuals -versus large groups - in obtaining stock to use on SEKI's wilderness trails; the support that accompanies stock use on wilderness trails (such as caring for, feeding and maintaining stock); and the public's general lack of skill and knowledge in riding and using stock in the wilderness. None of these categories is a proper foundation from which to analyze whether commercial stock use is "necessary" in wilderness areas. SEKI's approach to the issue applies improper criteria, is not meaningful, minimizes the sacred protections of the Wilderness Act, and simply caters to commercial interests. SEKI's approach does not truly balance the impact of the commercial activity with its impacts on wilderness.
[Recreational Group, #235]

The NPS must apply meaningful criteria in the FEIS to meet the Act's narrow exception for commercial services. Criteria that should be met regarding necessity have been outlined in our past comments and are detailed once again here. To be meaningful, the criteria must refer to the physical needs of persons wishing to explore wilderness, not to provide a means for those who are circumventing trailhead quotas, who use stock to haul unnecessary items into the backcountry, or who are seeking convenience and ease. These uses of commercial stock do not constitute necessity.
[Recreational Group, #235]

The facts do not support a finding of necessity. Private stock is less than 20% of recreational stock use. The NPS uses this figure to attempt to demonstrate a "need" for commercial services to facilitate this recreational activity. WSP/DEIS Appx. B-18. The NPS is not tasked with facilitating recreational activity desired by a small percentage of users at the extreme environmental cost of degrading the wilderness and negatively impacting the experience of other park visitors. The great majority of visitors to SEKI (93%) of the park on foot. Yet, by referring to cost and individual difficulty as the primary reasons for the need of commercial stock services, the NPS continues to treat stock use as an accepted and favored activity in the parks that will continue simply because of its historical use in SEKI. Additionally, the current trailhead quota system has the undesired consequence of allowing those individuals who are denied access via the regular quota, and who can afford the tariff, to gain access to wilderness by hiring commercial stock.
[Recreational Group, #235]

SEKI should prohibit commercial stock-packing enterprises from providing or transporting excessive, bulky and/or heavy luxury items which are unnecessary to experience the wilderness (i.e., camp furniture, floats, ice chests, excessive beverages & fresh foods, etc.). Such items are clearly unnecessary to enjoy a true wilderness experience, and transporting such items requires more stock animals, which degrades trails, pollutes water, and harms wildlife habitat. . . . Please correct these deficiencies by reducing and limiting commercial services to the extent that is truly necessary.
[Individual, #117]

No commercial day rides within wilderness, and no commercial stock use in the Mt. Whitney Management Area.
[Recreational Group, #123]

Response: The Wilderness Act, including Section 4(d)(5), makes no mention of visitors' physical needs or provides any restriction on items brought into Wilderness other than those identified in Prohibition of Certain Uses in Section 4(c). Individual visitor's physical needs are therefore not used as a criterion for the necessity of commercial support.

These parks are aware that some visitors find certain items in the wilderness setting distasteful (e.g., chairs and ice chests). However, putting restrictions on these items is neither necessary nor practicable. All visitors, regardless of commercial support, are restricted from using items identified as prohibited in Section 4(c) of the Wilderness Act, and are required to comply with established restrictions on behavior as it affects the wilderness (and National Park) environment, both natural and social (see "Appendix F: Wilderness Regulations and Permit Conditions"). It is worthwhile to note that the issue of what some visitors deem to be "unnecessary items" was addressed in High Sierra Hikers Association vs. U.S. Department of Interior, May 29, 2012. The court, in denying the validity of the claim of "unnecessary items," stated, "It is not appropriate for one group of the parks' users to impose its vision of wilderness etiquette over others" (High Sierra Hikers Association v. U.S. Department of the Interior, 2012 U.S. Dist. LEXIS, 74124 (N. D. Cal.)).

In all action alternatives (alternatives 2-5), all visitors entering the parks' wilderness on NPS-managed trailheads are subject to NPS trailhead permit quotas, which do not give preference to those supported by commercial services, and which cannot be "circumvented." Those visitors entering these parks via USFS managed trailheads are subject to similar quotas, though some of the USFS managed trailheads do have separate quotas for private and commercial service supported use (and which were established through a court action: High Sierra Hikers v. Randy Moore, 561 F. Supp. 2d 1107 (E. D. Cal 2008)

Concern 218: The NPS must weigh the impact of all relevant factors and potential consequences of permitting commercial stock use on wilderness character and preservation.

> *Despite the lack of adequate findings, if one applies the competing interests tests, the END fails. For example, the END further fails in its attempt to properly weigh competing interests by failing to address the-denial of permits to hikers while there exist, at some popular trailheads, special quotas for commercial stock users. Pack stock are utilized much less for wilderness travel than travel by those who go on foot, yet the END does not take this into account when it determines that commercial services are necessary to facilitate wilderness travel.*
> [Recreational Group, #235]

> *The impacts on the resources of the park are well documented, id . , yet the WSP/DEIS failed to adequately assess and make known to the public the impacts of stock use. With these faults in raising issues, specific findings cannot be made, the required balancing between wilderness values and commercial services cannot be conducted, and subsequent reliance by the NPS on the END is wholly deficient.*
> [Recreational Group, #235]

Response: The WSP/FEIS discloses impacts associated with stock use, and considers these impacts in combination with other factors, such as the way in which the activities that may be supported by a commercial service realize the recreational or other purposes of wilderness." Section I: Activities which are Proper for Realizing the Recreational or Other Purposes of Wilderness" section of "Appendix B: Extent Necessary Determination for Commercial Services" identifies activities that are proper for realizing wilderness purposes and the ways in which these activities are regulated to protect wilderness character. Table B-4 in appendix B discusses the relationship between proposed visitor capacities and proposed commercial allocations, and the consequences for wilderness character. "Section V: Summary"

of appendix B summarizes the factors that were considered in determining proposed commercial service allocations for each alternative. There are no "special quotas" for wilderness visitors supported by commercial service providers, and all commercial service providers will be limited to the annual overall (parkwide and for the Mount Whitney Management Area) allocations of commercial service days as established in the END.

Concern 219: The END should include the positive role that the commercial pack stations play in accomplishing the goal of wilderness education.

> *The WSP identifies Wilderness Education and Information as a goal for all park divisions to take, yet there is no discussion in the Extent Necessary Determination about the positive role that the commercial pack stations play in accomplishing that goal for the Park Service.*
> [Recreational Group, #201]

Response: The END recognizes that commercially supported activities can contribute to several of the Wilderness Act's public purposes. The END acknowledges this in the following passage: "It is worthwhile to note that these [public] purposes are rarely, if ever, discrete; that is, a recreational activity would commonly involve scenic or educational pursuits, or even both."

Concern 220: The END failed to address the 5th wilderness character. The END also failed to assess impacts from non-commercial visitor use entering from other sources, such as Yosemite National Park. These visitors are not included in the parks' statistics; however, they should be incorporated into the data and their visits should be included in the visitor-use days.

> *In determining the END the establishment of measures and standards failed to address the 5th wilderness character, and does not address non-commercial visitor use entering from other sources. Until a collaborative permit system is in place, the parks do not really know how many visitors they have at any one time, their location, destinations, and the intensity of the visit. In determining the END, if considering assigning a hard fast VUD number, we request instead the parks work on clarifying true visitor numbers and recognize how much smaller the commercial use numbers (stock and non-stock) are. Per Appendix B B-40 the limits on commercial services imposed by this plan should be recalculated when changes in patterns occur (and they will due to new restrictions) and once true visitor use patterns can be tracked, we request flexibility and evaluation of increased use. We appreciate and agree with the findings and recognition of commercial packing as a proper activity for wilderness.*
> [Business, #182]

> *One issue I'm concerned about is that lack of ability to included JMT and PCT users who start on other jurisdictions (e.g., Yosemite) in the park use statistics. I think a way needs to be found to include these use numbers if the park is to be able to have a true picture of [Individual, #12]*

> *Reported Visitor Use Days (VUD) non-commercial use must be significantly higher than reported d/t the statement in the DEIS that visitors who obtained their wilderness permits from other sources (other than the parks) were excluded in the calculations. Therefore the percentage of total commercial use is much smaller in relation to total VUD. Better reporting has come from the commercial users apparently, and therefore the parks actually do not have an accurate number of non-commercial visitors from which to develop any kind of visitor capacity plan.*
> [Business, #182]

Response: The fifth quality of wilderness character, "Other Features of Value" (which are: "other" ecological, geological, scientific, educational, scenic, or historical values) from Section 2 (c)(4) of the Wilderness Act is generally supported by the analysis of the first four qualities, and through associated compliance activities, including the Section 106 process under the NHPA and the NEPA analysis contained in "Chapter 4: Environmental Consequences" of the WSP/EIS.

The "Alternative Visitor Capacities" section of "Appendix A: Visitor Capacity" considered the amount of visitors entering from origins other than those in the three adjacent national forests and the parks. Although precise data for the numbers of visitors traveling through the parks from these other locations are unavailable, there is general data available on which to base reasonable estimates (see table A-2 in appendix A). The parks will be working to collect this visitor use data more accurately in the future to guide and improve management actions. It should be noted that visitors entering the parks from these more distant origins are rarely guided by commercial service providers, though they do regularly use resupply services.

Appendix D: Stock Use and Meadow Monitoring and Management Strategy

Concern 221: The proposed strategy for monitoring and managing stock use is insufficient to prevent impacts to meadows, identify impacts in a timely fashion, or ensure consistent compliance with forage utilization limits. The thresholds for management actions described in the proposed strategy are not sufficient to protect meadow systems from potential degradation due to grazing impacts.

> *The proposed SUMP in the DEIS is inadequate to consistently prevent significant damage to meadows, identify meadow damage in a timely fashion, or ensure consistent compliance with forage utilization limits.*
> [Business, #238]
>
> *The SUMP's TMA are not adequate to protect meadow systems from major degradation due to grazing impacts. The TMA are also inadequate to ensure that effective measures are taken in timely manner to arrest and reverse meadow degradation by grazing.*
> [Business, #238]
>
> *Under the SUMP TMA, once significant degradation has been documented, more monitoring is called for rather than arresting the cause of degradation, as exemplified for bare ground (Table D-4, App. D). Notably the SUMP TMA do not require that the additional monitoring be completed within a specific timeframe. As a result, serious and major degradation can persist or be exacerbated by continued grazing before additional monitoring assessments are made. Importantly, the TMA for bare ground in Table D-4 (App. D) are not true thresholds that require management action. Instead, they are clearly identified as "potential" thresholds for bare ground conditions.*
> [Business, #238]
>
> *The SUMP and IMA (App. D) plainly do not include concrete requirements to implement specific on-the-ground measures to reduce, arrest, or reverse meadow degradation by stock that might ultimately be identified. Therefore, the DEIS must make known that the outcome of SUMP, if adopted, cannot be assessed with any certainty, because there are no specific measures that certain to be implemented. Instead, the SUMP only provides a menu of approaches that might be taken, several of which, such as increasing "education" (Table D-4, App. D), do not have predictable on-the-ground outcomes.*
> [Business, #238]

> *While the WSP/DEIS states that grazing will be "managed," it does not explain other than the Stock Use and Meadow Management Plan ("SUMMP"), which NPS previously admitted is to be replaced by the WSP/DEIS. See WSP/DEIS at iii. This proposed management approach is confusing, seems circular, and guaranteed not to produce any management functions. It also further proceeds with a balancing test, stating that the managing will occur "to maximize protection of resources while allowing visitors traveling with stock continued access to forage." WSP/DEIS at 116.*
> [Recreational Group, #235]

Response: The proposed strategy for managing stock use is designed to prevent unacceptable impacts to meadows through implementation of multiple complementary field protocols and a suite of adaptive management tools. Because grazing is both self-reported and documented by field staff at regular intervals, managers are able to track the timing, duration, and intensity of use throughout the season. Meadow condition is evaluated during and at the close of the grazing season by both field rangers and professional ecologists. The frequency of site visits is determined by documented use levels and patterns, which are largely well established and predictable, as well as through regular communication with commercial outfitters and administrative packers. As part of the annual work planning process, administrative packers share their grazing plans with wilderness managers early in the season; commercial outfitters are required to submit trip itineraries to the parks two weeks in advance of entering the wilderness. These requirements facilitate the focusing of monitoring efforts on popular locations as the need arises. Field staff are trained to recognize impacts before they become significant and protocols are in place to communicate observations to managers so that appropriate action can be taken in a timely manner. Wilderness rangers encountering resource issues in the field that require immediate action are trained to recommend closure or other limits to their district ranger, who then have the authority to implement temporary restrictions as necessary to ensure resource protection.

The proposed grazing limits and opening dates are site-specific, and are revised as additional information becomes available to address meadow-specific vulnerability to impacts. Thresholds for management action are designed to provide managers with a range of tools which are triggered by either use levels and/or conditions. The responsiveness of the management system has been demonstrated and documented (Haultain and Frenzel 2014; Haultain and Frenzel 2013).

Taken together, the complementary elements of the management program at the parks — monitoring, which includes residual biomass and bare ground, stream bank alteration, stock use, species composition, repeat photography, and regularly scheduled site visits; an opening-date system based on moisture, soil, and vegetation conditions; management tools including the ability to rest meadows when needed, as well as adjust use levels through controls on party size and length of stay; and ongoing research into meadow function and the effects of grazing on meadow ecology — is designed to protect meadows by preventing, minimizing, and/or mitigating impacts.

The proposed strategy for managing stock use has been revised in the WSP/FEIS to better describe how the adaptive management program triggers actions that prevent unacceptable resource impacts.

Concern 222: The proposed strategy for monitoring and managing stock use does not address the potential impacts of stock use on the aesthetic experience of some visitors. Potential aesthetic impacts include trampling of vegetation and streambanks, bare ground, deepened or widened trails, changes in hydrology, and the presence of manure.

> *RBM and proposed forage utilization guidelines (App. D) do not protect vegetation attributes that are important components of meadow appearance. The DEIS suggests*

limiting grazing utilization to targets of about 25 to 45% of biomass produced in meadows subject to grazing mainly as a function of touted logistical value to facilitate stock grazing. Meeting these quantitative goals is highly unlikely to protect vegetation conditions that affect meadows aesthetics, because the removal of half the height of meadow plants only equates to a forage utilization of 20% of the biomass of these same plants (Neuman, 1993). The loss of more than half of the height of grazed vegetation would be an aesthetic impact that is easily observable, yet be considered to meet forage utilization goals for most meadows subject to grazing under the SUMP. Therefore, the proposed utilization levels clearly do not protect meadow aesthetics.
[Business, #238]

Many of the previously discussed impacts of stock use that are not captured by the SUMP or RBM also affect the aesthetics of meadows, including stream bank damage, bare ground, deepened and/or widened trails, and drier meadows.
[Business, #238]

Stock excrement in meadows is an obvious aesthetic impact. However, the SUMP and RBM does not assess the magnitude of stock excrement in meadows or the resulting impacts on aesthetics.
[Business, #238]

Response: The WSP/EIS acknowledges the impacts of stock use on some visitors' experiences. The impacts are discussed and analyzed in the "Visitor Use" sections of "Chapter 3: Affected Environment" and "Chapter 4: Environmental Consequences" of the WSP/EIS. Maps illustrating allowed stock use across alternatives are available in "Chapter 2: Alternatives" and as supplementary material at http://parkplanning.nps.gov/sekiwild. In addition, a detailed assessment of the meadow area subject to grazing (where stock waste, grazed vegetation, and other stock impacts could potentially affect visitor experience) is provided in the "Vegetation" section of "Chapter 4: Environmental Consequences."

The WSP/EIS recognizes the value of ungrazed meadows to visitor experience. Because aesthetics are highly subjective, the WSP/EIS does not define specific standards for aesthetic impacts in meadows open to stock use. Instead, opportunities to experience ungrazed meadows would be ensured by closing some of the meadows in the parks to all grazing or all stock travel, monitoring and managing stock use, and enforcing stock use and grazing restrictions. The action alternatives propose to provide a range of opportunities for visitors to experience solitude, pursue opportunities for primitive and unconfined recreation, and to observe and enjoy ungrazed meadows. These include areas open to both stock travel and grazing, open to stock travel but closed to grazing, and extensive areas of the parks which are closed to all stock travel and grazing. The amount of meadow area in each of these categories under each alternative is evaluated and presented in chapter 4. The preferred alternative closes six additional meadows for the express purpose of providing visitors with the opportunity to experience ungrazed meadows along major trail corridors; coupled with closures for other purposes this alternative significantly increases these opportunities.

Concern 223: The use of range monitoring methods is inappropriate for managing grazing by recreational and administrative stock in wilderness. The proposed strategy for monitoring and managing stock use relies on a single measure — the amount of vegetation removed from a meadow — and thus does not take into account all potential ecological and social impacts.

The meadow monitoring methodology is completely unsuitable to this effort. It was adapted from range monitoring and, because it measure only the amount of grass removed from a meadow, is inappropriate for use in wilderness where ALL impacts -

aesthetic as well as ecological - need to be monitored. Meadow monitoring measures one very narrow aspect of stock impact. Once again, the aesthetic impacts of stock are completely ignored.
[Conservation/Preservation, #116]

FEIS Must Provide a Preventative Rather Than ad hoc Approach to Managing Stock Use in SEKI Wilderness A. Background The Wilderness Act establishes a "National Wilderness Preservation System." 16 USC Sect. 113l(a). Preservation is the core goal of the Act. Preservation requires, necessarily, prevention of further harm or remediation of harm caused.
[Recreational Group, #235]

As to the physical and organic impacts of stock animals on SEKI Wilderness, the WSP/DEIS attempts to utilize a system of current monitoring programs to determine when an area within SEKI has been over utilized by stock use/grazing. See, e. g . , WSP/DEIS pg. 366, pg. 373; see also WSP/DEIS Appx. D. This system, however, is faulty. It allows for the degradation of wilderness and encourages a pattern of attempted restoration rather than preservation. See id. (the monitoring procedures described in the Stock Use and Meadow Management Plan in Appendix D referred to in the Alternatives is a reactive strategy and describes a system of damage and restoration, rather than protection).
[Recreational Group, #235]

Response: As described in "Appendix D: Stock Use and Meadow Monitoring and Management Strategy," the proposed strategy for monitoring and managing grazing in wilderness includes several complementary monitoring protocols. Several of these protocols have been adapted from the field of range management, including the residual biomass monitoring protocol, the stock use monitoring protocol, and the species composition monitoring protocol. These provide tested methodology for quantifying specific ecological parameters which are not unique to range management, including the amount of vegetation and bare soil present in a meadow, and for detecting changes in species composition. The field of range ecology also provides management tools proven effective in the management of recreational stock, including the establishment of night and head limits, and opening dates for grazing. These monitoring and management techniques have been modified to reflect the unique needs of wilderness managers, specifically with regard to minimizing the use of installations in wilderness and responding to use which is highly variable with regard to timing, frequency and intensity. The use of productivity models to estimate grazing capacity, as described in appendix D, also represents a traditional range management tool modified for application to wilderness management. Although the capacity model is used to determine grazing levels, it differs from range management applications in that the proposed levels are designed to meet specific wilderness stewardship goals as opposed to those of livestock production.

The amount of vegetation consumed by grazing animals would be just one measure employed by the proposed monitoring strategy, although several other impacts of interest are correlated with it. Monitoring would also include evaluations of impacts to soils and sensitive areas (e.g., hoof prints, trampling, and streambank alteration), presence of nonnative plant species, changes in species composition, and changes in bare ground. Management action would be taken to address such impacts even if the amount of vegetation consumed was within standard.

As noted in response to concern statement number 221, because aesthetics are highly subjective, the WSP/EIS does not define specific standards for aesthetic impacts in meadows open to stock use. Instead, opportunities to experience ungrazed meadows would be ensured by closing some of the meadows in the

parks to all grazing or all stock travel, monitoring and managing stock use, and enforcing stock use and grazing regulations.

Concern 224: The proposed strategy for monitoring and managing stock use should provide specific procedures for monitoring of trampling impacts to capture how trampling can potentially affect meadow function, condition, and aesthetics.

> *The SUMP does not provide or require any sound monitoring of trampling impacts. The RBM in the SUMP only measures residual biomass and bare ground in some "core" (grazed) and "reference" (ungrazed or "lightly" grazed) areas in some meadows estimated to have undergone relatively heavy stock use over several years (Neuman 1993; 1994). This monitoring is not adequate to capture how stock trampling impacts significantly affect meadow function, conditions, and aesthetics.*
> [Business, #238]

> *The SUMP and RBM are not adequate for assessing the impacts of stock trampling on meadows. These limitations of the RBM and SUMP are significant because the impacts of trampling by stock persistently affect meadow function and condition in numerous ways. Therefore, RBM and SUMP have very limited utility in consistently identifying and assessing these impacts, resulting conditions, and the status of affected ecological functions of meadows.*
> [Business, #238]

Response: "Appendix D: Stock Use and Meadow Monitoring and Management Strategy" describes how trampling and other mechanical stock impacts will be monitored through site visits and bare-ground monitoring. Appendix D summarizes the kinds of impacts that would be monitored and the management actions that would be taken in response.

As noted in response to concern statement number 221, because aesthetics are highly subjective, the WSP/EIS does not define specific standards for aesthetic impacts in meadows open to stock use. Instead, opportunities to experience ungrazed meadows would be ensured by closing some of the meadows in the parks to all grazing or all stock travel, monitoring and managing stock use, and enforcing stock use and grazing regulations.

Concern 225: The proposed strategy for monitoring and managing stock use does not adequately address the potential for stock use and grazing to result in soil compaction.

> *Neither the SUMP nor the RBM assess the inevitable soil compaction and meadow damage caused by stock use. This is a significant defect, because, as previously discussed, soil compaction has numerous persistent adverse impacts on meadow function and condition. The proposed monitoring (App. D) of deep (ca. 1 inch or greater) hoofprints is not a surrogate for monitoring of soil compaction, because significant compaction can occur in the absence of such hoofprints, especially in drier meadows.*
> [Business, #238]

Response: The NPS recognizes that visitor use, including stock use and grazing, has the potential to result in soil compaction. This is particularly true in areas where use is concentrated, such as along trail corridors, in camps and in animal holding areas. In such areas a certain amount of compaction is expected and accepted as a consequence of recreational and administrative stock use. Preliminary results from ongoing soil surveys (2011-2016) by the Natural Resource Conservation Service in the parks have found no evidence of compaction in meadows despite levels of grazing that were notably higher in the past than

the present. These soil scientists speculated that high levels of biological activity have allowed soils to recover from historic impacts and that this activity provides resiliency to compaction under current grazing levels.

The proposed strategy for monitoring and managing stock use relies on the measurement of proxy variables, preventive management strategies, and adaptive management to provide for recovery should impacts occur. Soil compaction is addressed indirectly through the use of measures that are known to be closely correlated with changes in soil condition, including bare soil, changes in vegetation composition, and plant production. Quantitative data on bare ground is collected in conjunction with residual biomass and species composition monitoring; these data are used to inform decisions regarding grazing management on an annual basis. The opening date system serves to prevent soil impacts by restricting stock use in meadows during periods of high soil moisture, while grazing limits are designed to maintain grazing at levels that would not result in significant soil compaction. In the event that such impacts may occur, the adaptive management strategy allows for changes in grazing levels, including periods of rest, in order to allow for recovery. Field assessment of trampling impacts and erosion potential employed by wilderness field staff, both during mid-season site visits and during residual biomass monitoring, is key to the early detection and prevention of unacceptable levels of soil loss and compaction.

Concern 226: The residual biomass monitoring protocol described in the proposed strategy for monitoring and managing stock use does not adequately assess forage utilization by stock, grazing impacts to meadows, or biomass condition and trend. It is also not suited to evaluating trends in meadow condition, as the locations of the grazed and ungrazed plots do not appear to be fixed. The NPS should disclose the potential shortcomings of the monitoring protocol, including issues regarding the availability of ungrazed reference sites for comparison.

> *The selection and applicability of "reference" areas are major problems that seriously affect the veracity of RBM results. These are critical issues because the RBM uses reference areas as: 1) the indicator of the amount of residual biomass produced/present in meadows in the absence of consumption by stock; 2) as a "yardstick" to estimate of residual biomass consumption (forage utilization) by stock in core, grazed areas; and 3) assess the consistency of residual biomass in core areas relative to reference areas with management targets for forage utilization and/or percent residual biomass in meadows grazed by stock. Therefore, RBM results are quite sensitive to reference area conditions.*
> [Business, #238]

> *The fundamental problems related to the applicability of reference areas presents a major obstacle to accurate assessment of meadow impacts, forage utilization, and meadow biomass conditions and trends via RBM, although the DEIS fails to disclose these obvious and major limitations of the SUMP and RBM.*
> [Business, #238]

Response: The residual biomass program is only one element of the stock use monitoring and management program in place in the parks. The NPS makes a concerted effort to co-locate grazed (core) and ungrazed (reference) plots in order to minimize non-grazing related environmental factors. Where confounding factors appear to be at play, this is noted and taken into account when interpreting monitoring results. Although they are not permanently marked (in order to minimize the use of installations in wilderness), the location of these plots is fixed over time (Frenzel and Haultain 2014) and they are easily relocated using site maps, photographs, and geographic positioning devices. Plots are only moved in response to major changes in the way that stock graze a particular area or in the event of significant changes in the physical environment such as stream channel realignment or debris flow; these events are rare and are thoroughly documented when they do occur. Therefore, residual biomass plots can

provide some information about trends. Academic reviews of the residual biomass monitoring methods have affirmed their utility for managing recreational stock use (Abbott et al. 2003; Hopkinson et al. 2013). Residual biomass monitoring provides a reasonable estimate of the amount of biomass left at the end of the grazing season and an estimate of the amount of biomass removed through grazing (where reference sites are available) on the most heavily grazed portion of a meadow. By focusing monitoring efforts on the most heavily grazed area of each meadow, the resulting data are likely to overestimate impacts at the meadow scale, and thus are designed to trigger responsive management action before impacts become unacceptable or irreversible. As the relationships between residual biomass and utilization with other attributes of interest (productivity, basal cover, relative graminoid cover, and soil nitrogen and carbon) have been described by research in similar study areas, monitoring residual biomass provides an effective way to predict impacts which are not monitored directly. Because residual biomass and utilization are responsive to changes in the timing and amount of grazing, they can also be used to assess the efficacy of management actions.

Under the monitoring strategy proposed in "Appendix D: Stock Use and Meadow Monitoring and Management Strategy," the residual biomass protocol would represent only one of several monitoring techniques used to detect impacts from grazing stock. The adaptive management system is designed to ensure that management action would be taken to address resource concerns identified during monitoring even if those concerns were not reflected in residual biomass and utilization values. For example, if deep hoofprints are observed in a sensitive area, such as a spring, seep, or near a rare plant population, action would be taken to mitigate soil impacts, such as a midseason grazing closure or a modification in stock regulations at the site, as appropriate. Consistent with adaptive management principles, the proposed strategy for monitoring and managing stock use has been revised to reflect that as improved methods of monitoring biomass and utilization become available, they would be incorporated into the monitoring methods as appropriate.

Concern 227: The forage utilization limits described in the proposed strategy for monitoring and managing stock use are not sufficient to protect and restore meadow conditions and functions. As residual biomass monitoring is conducted at the end of the growing season, concern is raised over the ability of the NPS to determine when grazing limits have been exceeded.

> *Due to their inherent susceptibility and/or degraded condition, it is likely that the recovery of many meadows requires the suspension of grazing.*
> [Business, #238]
>
> *There is not strong scientific evidence that currently recommended forage utilization limits are adequate to protect and restore meadow conditions, functions, and aesthetics.*
> [Business, #238]
>
> *The DEIS's assessment of the impacts of forage utilization levels for lower elevation meadows in SEKI, which are partially based on a consideration of decomposition rates, and, hence, the provision of organic matter to meadows, may not protect meadow functions associated with organic matter and residual biomass in meadows, due to cumulative effects.*
> [Business, #238]
>
> *There are also major problems with the implementation of forage utilization limits. RBM only occurs towards the end of the grazing season, which is highly inadequate for ensuring that forage utilization limits on biomass loss are not exceeded. It is well-established that the successful implementation of utilization limits requires that*

> *utilization levels are monitored during the period of grazing and with the data used to suspend grazing before utilization limits are exceeded.*
> [Business, #238]

Response: The site-specific grazing levels proposed in the WSP/EIS are based on the best available information about the effects of varying utilization values on ecosystem structure and function in the meadows of the Sierra Nevada (see the "Existing utilization guidelines" section of "Appendix D: Stock Use and Meadow Monitoring and Management Strategy"). They take into account such factors as elevation zones (upper montane and subalpine vs. lower montane / woodland), subalpine vegetation types (three vegetation types that span a moisture gradient from wet to dry), and the susceptibility of different vegetation types to different kinds of impacts (productivity, basal cover, and relative graminoid cover) as detailed in appendix D (see the "Proposed Utilization Rates for Action Alternatives Allowing Grazing" section of appendix D). Furthermore, the management strategy provides additional management tools (site visits, grazing opening dates, grazing night and head limits, temporary grazing closures) and the flexibility to adjust grazing proactively as needed to address impacts other than defoliation (see the "Grazing Levels" and "Validating and Refining Estimated Capacities" sections of appendix D). As described in the "Proposed Utilization Rates for Action Alternatives Allowing Grazing" section of appendix D, the grazing capacities proposed for alternatives 2, 3, and 5 would keep grazing to levels that would limit changes to vegetation and soils attributes, and allow for appropriate management response before irreversible impacts occur.

Because grazing is both self-reported and documented by field staff at regular intervals, managers are able to track the timing, duration, and intensity of use throughout the season. Meadow condition is evaluated during and at the close of the grazing season by both field rangers and professional ecologists. The frequency of site visits is determined by documented use levels and patterns, which are largely well-established and predictable, as well as through regular communication with commercial outfitters and administrative packers. As part of the annual work planning process, administrative packers share their grazing plans with wilderness managers early in the season; commercial outfitters are required to submit trip itineraries to the parks two weeks in advance of entering the wilderness. These requirements facilitate the focusing of monitoring efforts where they are most needed, and allows field staff to recommend changes in grazing management throughout the season.

Concern 228: The proposed strategy for monitoring and managing stock use would be improved by an expanded discussion of the potential for Type II statistical errors when estimating the amount of biomass remaining on a site at the end of the growing season.

> *The most rational approach to setting levels of statistical significance is to base it on the expected ecological costs associated with making Type II and Type I errors, respectively. However, these considerations do not appear to have been incorporated into the RBM. As a result, it is likely that costly type II errors will regularly occur in the assessment of whether residual biomass levels and/or forage utilization levels comply with targets. The DEIS fails to disclose the significant probability of Type II errors inherent in RBM monitoring and analysis.*
> [Business, #238]

Response: The monitoring strategy in Appendix D does not establish criteria for statistical significance. However, estimates of uncertainty which disclose the probability of Type I and Type II errors would be calculated and reported for the residual biomass values obtained by the double-sampling methodology described in Appendix D. Rather than establish formal error rates, this approach allows managers to take into account the uncertainty in the monitoring results when formulating actions, as they would not be limited to taking action when a certain level of statistical significance is obtained. Recognizing that there

is uncertainty in any estimation process, and that the ecosystems being monitored are subject to a high degree of variability in weather, climate, and use patterns, the proposed strategy relies on a suite of overlapping and complementary monitoring protocols in order to minimize the chance that important impacts are not detected by a single monitoring measurement.

The uncertainty around these estimates is thus taken into account when reporting and evaluating monitoring results. Rather than establish formal error rates, this approach allows managers to consider all estimates including any uncertainty, including the potential for Type I and Type II errors in their precision, and thus they are not limited to taking action when a certain level of statistical significance is obtained. Recognizing that there is uncertainty in any estimation process, and that the ecosystems being monitored are subject to a high degree of variability in response to changes in weather, climate, and use patterns, the proposed strategy relies on a suite of overlapping and complementary monitoring protocols in order to minimize and mitigate such errors.

Appendix E: Wilderness Legislation Related to Sequoia and Kings Canyon National Parks

Concern 229: "Appendix E: Wilderness Legislation Related to Sequoia and Kings Canyon National Parks" should contain a complete copy of 16 USC 45F.

> *Your current Park: Appendix E is lacking. I request again all of 16 USC 45f to be added to "this Park Draft at Appendix E. section. (a) "Mineral King Valley ." (b) "transfer of Sequoia National Game Refuge. (c) "Acquisition of property." and the call out at (c) "commercial use of such property . . . incompatible with such purposes.*
> [Individual, #28]

Response: It is not the intent of appendix E to contain all legislation relevant to the parks, only that which deals directly with the designation of wilderness in these parks. The Act transferring the Sequoia National Game Refuge (Mineral King Valley and surrounding lands) to the management of Sequoia and Kings Canyon National Parks (PL 95-625) is listed in the "References" section of the WSP/EIS.

Appendix H: Wilderness Information and Education Strategy

Concern 230: The parks should acknowledge the function that commercial service providers provide in educating their clients on Leave No Trace © and other wilderness messages, and the parks should consider using licensing to enhance or professionalize that function. In addition, the term "commercial," as used throughout the WSP/EIS, carries negative connotations and is a very loaded term.

> *It should be required of commercial stock users to educate their clients about wilderness etiquette with the expectation that wilderness impacts will be minimal and sustainable.*
> [Individual, #145]

> *Mt Whitney Zone D. Trailcrest. I ask that consideration be given to allowing commercial services to enter/exit the Whitney Zone via Trailcrest. I understand that this would need to happen in cooperation with Inyo National Forest. Several management goals would be resolved by opening this pass to commercial use: [. . .]4. It would allow for guides to be present in this high-use area as agents of SEKI who would interface with the general public and offer additional educational, LNT, and safety services.*
> [Business, #90]

As such, we guides fill two very important roles for the public who wishes to visit SEKI wilderness areas:[. . .] 2. Commercial services allow trained, professional guides to act as agents of SEKI, educating our guests about the park, the wilderness, history, natural history, and Leave No Trace practices. The benefits of guides as agents/educators are twofold; Our guests receive an enriched wilderness experience while visiting SEKI, while SEKI benefits by having trained professionals educating people about Leave No Trace, wilderness ethics and principles, and the parks own history and culture. In addition to the direct benefits for the commercially guided public and SEKI itself, there are other benefits related to non-guided wilderness users that we encounter. We guides, especially at SYMG, always wear logoed uniforms and look professional. It is very common to have the general public approach us with questions ranging from where should I camp or where can I find water, to what is that bird or what tree is this pinecone from? We can answer all of those types of questions. The result is that as agents of SEKI we guides can disseminate information important to preserving wilderness character as well as generally enhancing the wilderness experience of the general public we encounter. Furthermore, I have seen many times over situations where the non-guided public needs medical help. I myself have been approached (while guiding a trip) to assist in giving medical attention to a hurt person, and to aid in creating an efficient plan for care/evacuation. Another common situation for us (relative to the number of times we are there) is encountering folks on Mt Whitney who have altitude sickness. Again, I myself have turned people around on the trail and sent them to lower elevations. So to summarize, guides operating with valid CUAs in the SEKI wilderness add additional elements of safety and education for the general public as well as for our own guests, thus benefiting all wilderness users and SEKI itself.
[Business, #90]

The AMGA is an educational institution, an accrediting body, and a standard setting organization that is our nations sole representative to the twenty-five member-countries International Federation of Mountain Guides Associations (IFMGA), the international governing body responsible for guiding standards around the world. Since its genesis in 1979, the AMGA has grown to represent over 2,900 members that are represented in 49 states and 13 countries, over 30 Accredited Guide Services and educational institutions, and 60 Corporate Partners. Each year the training provided by the AMGA reaches over 700,000 people through direct contact between certified guides, climbing instructors, accredited businesses, and their clients. [. . .] Commercial Services We do want to acknowledge the work that has gone into developing the END process recently outlined in Reference Manual #41, and assessing the aspects of wilderness recreation that may require commercial services for some members of the public, such as specialized equipment and knowledge. The AMGA agrees with that assessment, and believes that professional mountain guides help fulfill all of those aspects for the guided public, in addition to setting the example to the self-guided public. With regards to mountaineering, SEKI already requires professional credentials for lead guides operating under a CUA, which provide a baseline assurance of an assessed degree of professionalism and skill, including Leave No Trace. The AMGA would be happy to work with park staff to continue refining that program to provide the best possible outcomes with regard to resource protection and public safety, and assuring that all mountaineering guides are professionally trained for the terrain on which they work. We believe that properly trained and credentialed mountain guides are a resource to both the public and the park, and can serve as effective partners for public education and wilderness stewardship.
[Recreational Group, #153]

Commercial Stock Use is a service to the public. The providers help educate their guests on proper wilderness behavior, camping etiquette, sanitation methods, and safe travel. The WSP identifies Wilderness Education and Information as a goal for all park divisions to take, yet there is no discussion in the Extent Necessary Determination about the positive role that the commercial pack stations play in accomplishing that goal for the Park Service. - - Benefits of having successful Commercial service providers: - they provide a valuable service to the public to enjoy their public lands; - they provide handicapped users access to the wilderness; - they allow hikers to take long distance trips by providing resupply services; - they provide rescues and evacuations thereby reducing non-conforming wilderness use of helicopters and other mechanized means of travel; - they augment Park services in participating in administrative work including backcountry communication, collaborative rescues, lost hiker searches, trail clean up and re-habilitation, and trash reduction, and - they are an extension of the public service the parks provide.
[Recreational Group, #201]

The term "Commercial" used throughout the plan carries negative connotations and is a very loaded term. We prefer to look at those using the Park as "guided" and "non-guided." The guests who come to SMC are all the "public" They are however those who choose to make use of the Park through the services that SMC can offer for a lot of reasons. Time, safety and a lack of skills are just some of those reasons. It is not up to the Park to place a value upon those reasons and to decide that the choice to go by one's self is of greater value then the choice to go with a guide. It is the Park's job to make sure that all of the public has equal opportunities and is offered equal protection in those choices under the law. Education should be the primary mechanisms for protection and this is not used enough. This is somewhere that guides can assist SEKI. Please use us!!! As a guide part of my job is that of an educator. The educational element of the plan ignores totally the contributions that trained guides can make. Alternative 4 is designed to "Emphasize undeveloped and non-commercial recreation. This alternative by its very title emphasizes that commercially facilitated recreation is something only to be tolerated and needs to be limited since it necessitates development. A more proper title would simply be "Emphasize undeveloped recreation." The bias against "Commercial" based recreation is implicit. I believe that this can be better titled simply, Undeveloped Recreation. Alternative 2 also seeks to reduce the guided public under the title of "Protect Wilderness Character" but fails to reduce use by the non-guided. A well-guided group in the mountains is indistinguishable from a non-guided one. If there are any differences it is probably that the guided group is better educated, better prepared, has great local knowledge and is able to travel upon the land more responsibly and lightly. Rather than seeking to limit the guided public SEKI should be encouraging them. A valid view is that all groups must be under the supervision of a qualified leader trained in natural history, LNT and wilderness skills. In other words someone who looks very much like a trained professional guide. But limiting the non-guided is hard to do; limiting the guided is far easier and thus becomes the chosen option.
[Business, #205]

Response: "Appendix H: Wilderness Information and Education Strategy" acknowledges the information-sharing efforts made by the parks with commercial service providers and by many commercial service providers and their clients. Appendix H points out that commercial service providers are partners with the parks in disseminating this information. Wording has been added to the "For Assistance" section in appendix H to clarify this intent. Future operational or adaptive management efforts could consider licensing, training, required sharing of the parks' wilderness information, and

similar programs. The WSP/EIS uses the terms "commercial" and "commercial services" to describe guided trips in accordance with the vocabulary of the 1964 Wilderness Act and related policy.

Concern 231: The parks should seek ways to broaden the demographics of those who use and care about wilderness.

> *Demographics Most wilderness users belong to one demographic group; White people of European ancestry. The demographics of California are obviously changing. Latinos are now about 50% of California's population and growing rapidly. The Oriental portion of our population is growing rapidly as well. Those ethnic groups as well as black visitors are seldom seen in wilderness. The Sierra Club is concerned that general public support for wilderness may decrease if those ethnic groups do not begin to use wilderness for all of the reasons delineated in the Wilderness Act. We do not have a simple solution to this problem but feel that all of us who value wilderness must reach out to those groups and help them understand the value of wilderness and experience positive visits to this outstanding resource. This perhaps may be the most serious threat to the future of protecting our invaluable wilderness resource in SEKI and elsewhere in the Sierra Nevada. We suggest that you, other wilderness managers at Yosemite National Park and the National Forests and the Bureau of Land Management that manage wilderness in the Sierra Nevada, conceive of various ways to help make wilderness relevant to the lives of underserved ethnic groups and vigorously implement a plan to encourage a wider group of ethnic people to learn about the value of the wilderness resource and to enjoy its use. The Sierra Club would be pleased to participate in such an effort.*
> [Conservation/Preservation, #60]

Response: "Appendix H: Information and Education Strategy" outlines strategies and methods to ensure that the wilderness of these parks is welcoming to all. The first objective of the strategy is "Diverse people feel welcomed and encouraged to connect with wilderness." The parks will continue to cooperate on common issues with our neighboring land management units and affiliated groups. The strategy includes statements about reaching a broad variety of audiences. Wording has been added to appendix H to clarify this intent.

Concern 232: Use of and reliance on electronic technologies in the wilderness, including the potential impacts on wilderness qualities from electronic technology should be addressed in the parks' informational efforts.

> *One of my chief concerns is that your draft plan appears to be devoid of any serious treatment of what has become one of the most important wilderness issues of our time: the explosion in use of and reliance on modern electronic technological gadgetry. Your plan should address this issue in two ways: First, you should include a provision that explicitly directs NPS staff to EDUCATE visitors about the adverse impacts of electronica on the wilderness experience. Your plan should specifically direct NPS staff to actively discourage the use of electronic gadgets in wilderness, in order to promote the "disconnect" from modern contrivances that is at the heart of the wilderness experience (i. e. , actively urge visitors to leave their gadgets at home, via your website, bulletin boards, and wilderness handout materials). Second, you should adopt and announce an explicit policy that the NPS WILL NOT RESPOND via helicopter to any signal/s from "SPOT" or other such beacon devices, unless you have enough SPECIFIC details about the situation (in text, voice, or image) to VERIFY that there is some specific life-threatening emergency.*
> [Individual, #86]

> *Limit visitors' use of and reliance on electronic devices. The Wilderness Stewardship Plan should direct NPS staff to educate all visitors about the negative impacts of these electronic devices and discourage visitors from bringing them into the SEKI Wilderness. Furthermore, the WSP should adopt an explicit policy that the NPS will NOT respond with helicopters to signals from "SPOT" or other beacon devices without specific corroborating details about a legitimate life-threatening emergency to warrant helicopter use. Too many wilderness visitors expect a helicopter airlift for non-emergency situations and that endangers not only the SEKI Wilderness but NPS staff as well.*
> [Conservation/Preservation, #166]

Response: The use of hand-held electronic devices may detract from some visitors' ability to experience the self-reliance that characterizes wilderness, but provided that these devices do not notably impact the experiences of others (e.g., through excessive noise or lights), their use is a personal choice. That is, they are not necessarily consistent with wilderness experience, but the Wilderness Act does not specify their prohibition. This topic is addressed in chapter 2 under "Alternative Elements Considered but Dismissed from Detailed Analysis." The parks have developed an internal procedure on how best to respond to personal locator beacon activations, and this operational detail is not within the scope of this WSP/EIS. Educational efforts will inform the public of the detriments and benefits of electronic devices.

It was not the goal to list every possible subject that might be addressed in information-sharing efforts in appendix H, knowing that such topics will change over time. Future operational plans will develop more detailed topics and related information to produce the most relevant information for future sharing efforts. The term "electronic technologies" is now specified in the list of topics in appendix H.

Appendix J: Climbing Management Strategy

Concern 233: The social impacts section of "Appendix J: Climbing Management Strategy" is insufficient and should include available survey statistics that would provide a perspective on the number of climbers, the distribution of climbing resources, and the distribution of climbers across the landscape.

> *The Social Impacts sub-section of Appendix J is insufficient. We recommend that the Social Impacts section include available survey statistics that would provide perspective on the number of climbers, the distribution of climbing resources and the distribution of climbers across the landscape. The Visitor Use section of the WSP notes that 3% of the 25,000 - 35,000 annual overnight wilderness visitors engage in technical climbing. This indicates that approximately 1000 climbers per year overnight in the wilderness. Based on the number of climbers using SEKIs wilderness (and the probable spatial distribution of climbers), it is important to recognize that climbers have an extremely low impact on other climbers and, more importantly, other wilderness visitor groups. It is also imperative to note that the vast majority of climbers have never placed a fixed anchor, opting instead to climb established climbing routes thereby avoiding the burden of the careful deliberation and labor associated with placing a fixed anchor in wilderness. Acknowledging the visitor-use statistics associated with climbing is critical in order to provide proper perspective for the entire Impacts of Climbing And Mitigation section of Appendix J.*
> [Recreational Group, #161]

Response: "Appendix J: Climbing Management Strategy" states: "The intent of this appendix is to focus on a limited set of issues, impacts, and mitigations that are directly related to climbing in wilderness. This appendix is not intended as a comprehensive climbing management plan, but will serve as interim

guidance on climbing activities in the absence of such a plan. A future climbing management plan would more thoroughly document and analyze use levels and patterns, identify significant issues, and implement detailed management actions to comprehensively address climbing related issues." In the "Research and Monitoring" section, it also states: "The parks have sporadically conducted informal surveys of a small proportion of known and potential climbing areas. Given this limited information, a comprehensive inventory would be of value in assisting the proper management of climbing. It is a goal of the parks to develop and maintain an inventory and monitoring program to gather detailed information on how climbing activities affect wilderness character and resources. This inventory would be conducted prior to or in conjunction with the future development of a comprehensive climbing management plan." Data on the amount of climbing and number of climbers, approximately 3% of the wilderness users surveyed, is limited at this time to anecdotal information and data collected during the 2011 Wilderness Visitor Survey.

Concern 234: Comments on fixed anchors included moving the definition of "fixed anchors" to earlier in the document and removing the requirement that climbers obtain approval via the proposed permit system to replace fixed anchors.

> *The Hardware/Equipment sub-section of Appendix J introduces the types of equipment that are used for technical climbing. We recommend that the definition of the term 'fixed anchors be included in this sub-section, or earlier, rather than later in the document (currently defined in the Public Use of Fixed Anchors sub-section). Defining the term fixed anchor is critical to a discussion on climbing hardware and equipment.*
> [Recreational Group, #161]
>
> *Although we support the statement, fixed anchors which are currently in place may remain, we do not agree that climbers should need approval, via the proposed permit system, to replace fixed anchors. The Access Fund contends that facilitating the climbing communitys maintenance of existing fixed anchors is essential to fixed anchor management in wilderness. Replacing an inadequate fixed anchor is not considered an emergency or self-rescue situation - it is simply an element of typical wilderness climbing best practices. Therefore, we recommend that the word only be removed from the statement, [t]he placement of new fixed anchors without receiving prior permission is allowed only when necessary to enable a safe means of descent in order to facilitate emergency retreat, during self-rescue situations. Wilderness fixed anchor management must also provide provisions (programmatically or case-by-case basis) to allow climbers some level of control, while in a wilderness setting, to make decisions regarding fixed anchor placements where no other options are available.*
> [Recreational Group, #161]
>
> *The Access Fund recommends that fixed anchor replacements and new, semi-permanent fixed anchors (e.g., pitons, slings and nuts) do not necessitate a Special Use Permit. The ability to control personal safety decisions is fundamental to the self-reliant component of the wilderness climbing ethic. Programmatic fixed anchor authorization, similar to climbing management strategies at Zion and Rocky Mountain National Parks, is an effective way to preserve the wilderness quality of solitude or primitive and unconfined recreation.*
> [Recreational Group, #161]

Response: "Appendix J: Climbing Management Strategy" has been modified to more clearly define fixed anchors as consisting of two types: permanent and removable (see the "Background" and "Hardware/Equipment" sections in appendix J for these expanded definitions). Only those fixed anchors

which are permanent (e.g., bolts) would require prior approval for placement or replacement (see the "Public Use of Fixed Anchors" section in appendix J).

Concern 235: The sentence "[n]ew, bolt intensive climbing routes (e.g., sport climbs and bolt ladders) are not appropriate in wilderness and are prohibited" should be qualified with "bolt-intensive climbs are defined by the concentration of human activity which they support, and the types and levels of impacts associated with those routes."

> *The statement, [n]ew, bolt intensive climbing routes (e.g., sport climbs, bolt ladders) are not appropriate in wilderness and are prohibited, needs to be qualified with: 'bolt-intensive climbs are defined by the concentration of human activity which they support, and the types and levels of impacts associated with those routes.*
> [Recreational Group, #161]

Response: Bolt intensive routes are not appropriate in wilderness and are defined by the number and concentration of bolts, as well as by the concentration of human activity which they support. Director's Order-41, Section 7.2 Climbing, states: "Climbing management strategies will address ways to control, and in some cases reduce, the number of fixed anchors to protect the park's wilderness resources or to preserve the untrammeled, undeveloped, and outstanding opportunities for solitude qualities of the park's wilderness character." Therefore, any new bolt intensive routes are not appropriate, and the parks will work to reduce the number of bolts (i.e., permanent fixed-anchors) in wilderness in order to protect wilderness character.

Concern 236: It was recommended that the statement "the NPS, when it encounters fixed anchors during the parks' operations, may remove those fixed anchors deemed unsafe, unnecessary, or intrusive to wilderness" be elaborated to include a commitment to notify the public of any administrative actions with regard to fixed anchors.

> *Administrative actions regarding fixed anchors must be well substantiated and noticed to the public. Therefore, the Access Fund recommends that the statement, [t]he NPS, when it encounters [fixed anchors] during park operations, may remove those fixed anchors deemed unsafe, unnecessary, or intrusive to wilderness , be elaborated to include a commitment to notify the public of any administrative actions with regard to fixed anchors.*
> [Recreational Group, #161]

Response: "Appendix J: Climbing Management Strategy" has been modified to include a method by which a variety of information on climbing could be communicated to the public (see the "Patrol, Education and Enforcement Program" section of appendix J).

Appendix K: Trail Management and Classification System

Concern 237: The trails planning process should include a survey of stock user attitudes and preferences.

> *The trails planning process should include a similar survey of stock user attitudes and preferences as that applied in the 2011 Wilderness Visitor Survey.*
> [Recreational Group, #171]

Response: The WSP/EIS did not rely heavily on the 2011 Wilderness Visitor Survey in the development of the trails management and classification system. In determining which trails would be open to specific

uses and the classification of trails, information about terrain, trail condition, sensitive resources, and total and relative amounts of stock and foot traffic were considered (see the "Alternative 2 – Protect Wilderness Character by Implementing Site-specific Actions, Element 8 Stock Use" section of "Chapter 2: Alternatives, which reads: "some [trails] would be closed to stock travel entirely for reasons including visitor safety, resource protection, and/or popular day-use by hikers"). In addition, park staff have a long history of working with stock groups, both private and commercial service providers, and are aware of their concerns and preferences (as exemplified by their comments submitted throughout this planning process). Public input has been considered in this WSP/EIS in the development and refinement of the alternatives. A separate stock-user survey may be desirable in the future, but it is not necessary for this WSP/EIS.

Concern 238: The document should quantify either in the text or in tabular form the total miles of trails that are proposed as Trail Class 1.

> *For example, application of the proposed Trail Class 1 (TC1) would create a new class of trails within park Wilderness that essentially would no longer be maintained for public use. Yet remarkably, the draft WSP/EIS fails to quantify-either via text or in tabular form-the total miles of trail that are proposed as Trail Class 1. Absent this information, the public is precluded from making informed comments on the trail classification system.*
> [Recreational Group, #186]

Response: The WSP/EIS describes the total miles of trails that are proposed as Trail Class 1in several places (see tables 47a - 47e in "Chapter 2: Alternatives"). In addition, attachment 1 in "Appendix K: Trail Management and Classification System for Sequoia and Kings Canyon National Parks" lists all trail segments by trail class and allowed use for the preferred alternative. Chapter 2 of the WSP/FEIS has been updated to include a complete list of trail classifications per alternative.

Concern 239: For cost-savings, the Trail Management and Classification System should include the concept of the use of qualified volunteers that could partner with the NPS to help maintain existing trails and/or construct new trail segments.

> *Nowhere in the draft Trail Management Plan is the concept of the use of qualified volunteers, including the Backcountry Horsemen of California, mentioned as a partner that might be utilized to help maintain existing trails and/or construct new trail segments. Instead, the plan ignores the potential and valuable contributions of partner organizations and volunteers and, as such, appears to reflect an insular and go-it-alone mentality that we find troubling.*
> [Recreational Group, #186]

> *Granted, there remains significant fixed cost for the Park Service associated with trails-related design, environmental compliance, and crew oversight. But there could be cost-savings associated with utilizing skilled (i.e., certified) volunteers in trail maintenance and construction. The potential for such cost-savings should not be overlooked. By reaching out to and including partners, additional opportunities for trails-related grant writing and partnerships could appear.*
> [Recreational Group, #186]

Response: The WSP/EIS outlines what the desired conditions are for the parks' wilderness. The decisions about how to accomplish the goals of the plan are operational decisions, not planning decisions. The plan neither prescribes nor precludes use of volunteers. The trail classification system is not being adopted primarily to save trail maintenance costs; it was developed primarily as a means to ensure appropriate

levels of development and the desired range of visitor recreational opportunities (see the "Protect Wilderness Character" section of "Appendix K: Trail Management and Classification System for Sequoia and Kings Canyon National Parks").

Appendix P: Permitted Research Program and Process

Concern 240: The benefit to visitors from the opportunity to interact with and learn from scientists conducting research in the wilderness should be addressed in the WSP/FEIS.

> *I also would like to see some recognition that much of the research conducted in the park wilderness is of interest to the visitor and the opportunity to interact with and learn from scientists working there is a benefit. As I read the draft science is mostly portrayed as an impact, with benefits in terms of the knowledge gained but not as a direct and immediate benefit to the user.*
> [Individual, #12]

Response: The NPS agrees that there are beneficial effects from research conducted in wilderness. Research allows the parks' managers to better understand conditions and react to changes. Visitors who come across researchers in wilderness may also benefit from interactions with researchers, but this depends on the researcher and the visitor. In some situations, research in wilderness can have an adverse effect on wilderness character. More information on research and the Omnibus Management Act has been added to the WSP/FEIS.

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Appendix R

Consultation with the U.S. Fish and Wildlife Service

ON THE PREVIOUS PAGE
Bighorn Sheep
NPS Photo

APPENDIX R:

CONSULTATION WITH THE U.S. FISH AND WILDLIFE SERVICE

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Suite W-2605
Sacramento, California 95825-1846

In Reply Refer to:
FF08ESMF00-
2015-F-0201

MAR 11 2015

Memorandum

To: Park Superintendent, Sequoia and Kings Canyon National Parks, National Park Service, California (Attn: Nancy Hendricks)

From: Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California

Subject: Biological Opinion on the Wilderness Stewardship Plan in Sequoia and Kings Canyon National Parks for the Endangered Mountain Yellow-legged Frog, Endangered Sierra Nevada Yellow-legged Frog, and the Threatened Yosemite Toad

This is in response to your June 30, 2014, request for formal consultation with the U. S. Fish and Wildlife Service (Service) on the Wilderness Stewardship Plan in Sequoia and Kings Canyon National Parks in California. At issue are the adverse effects on the endangered Northern Distinct Population Segment of the mountain yellow-legged frog (*Rana muscosa*), endangered Sierra Nevada yellow-legged frog (*Rana sierrae*), and the threatened Yosemite toad (*Anaxyrus canorus*). Your letter was received by the Service on June 30, 2014. This biological opinion is issued under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*)(Act).

Many of the published peer-reviewed papers and unpublished reports on the Sierra Nevada yellow-legged frog and the Northern Distinct Population Segment of the mountain yellow-legged frog were issued prior to the analysis and taxonomic reclassification by Vredenburg *et al.* (2007). These two species have undergone elevation of subspecies and other changes in their systematics and taxonomy; possess similar morphologies, behaviors, biologies, and ecologies; and within this programmatic biological opinion when the information applies to both animals, they will be collectively referred to as "mountain yellow-legged frog."

The Service concurs with the National Park Service's determination that the proposed project may affect, but is not likely to adversely affect the endangered Sierra Nevada Distinct Population Segment of the bighorn sheep (*Ovis canadensis*) and the proposed threatened Western Distinct Population Segment of the Pacific fisher (*Martes penanti*). The Wilderness Stewardship Plan includes the following measures for the bighorn sheep: 1) New Class 1 trails will be constructed in a manner that minimizes opportunities for people to approach bighorn from above or constructed completely outside of bighorn habitat. Limiting human approaches from above would be beneficial because

bighorn generally run uphill when alarmed. 2.) Increased educational efforts cautioning Park staff and visitors not to approach bighorn will be increased; and 3) Helicopter use in bighorn sheep habitat will be scheduled to avoid sensitive periods (e.g. lambing season) and would avoid flying low or landing within one mile of bighorn sheep. This concurrence is based on the determination that the activities that comprise this project will have insignificant or discountable effects on these two animals.

This biological opinion is based on: (1) letter from the National Park Service to the Service dated April 17, 2014, and attached information (Biological Assessment); (2) *Sequoia and Kings Canyon National Parks California Wilderness Stewardship Plan and Draft Environmental Impact Statement Volumes 1 and 2* dated June 2014, that was issued by the National Park Service (Plan); (3) *Status of the Mountain Yellow-legged Frog, Yosemite Toad and Pacific Chorus Frog in the Sierra Nevada, CA* prepared by the U.S. Forest Service; and (4) other information available to the Service.

During emergency activities such as wildfire suppression, the National Park Service should initiate emergency consultation in accordance with the section 7 implementation regulations as outlined in 50 CFR § 402. The Service considers the protection of firefighters and other personnel to be of paramount importance.

Consultation History

2011-2015	The National Park Service and the Service discussed the proposed project in several telephone, email, and in-person meetings.
October 15, 2014	The Service and the National Park Service discussed the proposed project on the telephone, including the project description, conservation measures, bighorn sheep, Pacific fisher, and the section 7 process.
March 3, 2015	The Service and the National Park Service discussed the bighorn sheep on the telephone.
March 6, 2015	The Service and the National Park Service discussed the project description on the telephone.
March 10, 2015	The Service and the National Park Service discussed the conservation measures on the telephone.

BIOLOGICAL OPINION

Description of the Proposed Action

Sequoia National Park and Kings Canyon National Park (Park) are administered as a single 865,964 acre unit of the National Park Service (Figure 1). The two National Parks are located on the western slope of the Sierra Nevada in east-central California from the low western foothills at approximately 1400 feet to the summit of 14,500 foot Mount Whitney. Two wilderness areas are located within SEKI, including the Sequoia-Kings Canyon Wilderness and John Krebs Wilderness. These wilderness areas, along with proposed wilderness which under policy is managed as wilderness, encompass approximately 97percent of the Parks. The entirety of Sequoia and Kings Canyon

National Parks is within Tulare and Fresno counties in California. Eleven additional peaks over 14,000 feet are located along the eastern boundaries. A wide variety of habitats occur across the elevation gradient including chaparral- and oak-dominated communities in the foothills, mixed conifer and giant sequoia groves at mid-elevations, red fir and lodgepole pine forests in the subalpine zone, and alpine lakes surrounded by granite peaks at the highest elevations

The goal of the Wilderness Stewardship Plan is to encourage wilderness use and minimize restrictions while preserving wilderness character. The Wilderness Stewardship Plan will provide management direction for two designated wilderness areas, several potential wilderness additions, and an area of proposed wilderness. The total designated wilderness in Sequoia and Kings Canyon National Parks is 808,078 acres, approximately 93.3 percent of the Parks' total of 865,964 acres. In addition, because the southern end of the Hockett Plateau (approximately 29,500 acres) remains proposed wilderness, it is managed as wilderness. The Parks also contain several designated potential wilderness additions, including the area around the Pear Lake Ski Hut and Bearpaw Meadow High Sierra Camp. These would become wilderness when and if the non-conforming activities (e.g., commercial enterprise) and/or facilities are removed. Altogether, designated and proposed wilderness areas comprise nearly 97 percent of the total acreage of Sequoia and Kings Canyon National Parks. Wilderness Acreages in Sequoia and Kings Canyon National Parks:

There are eleven elements that comprise the Wilderness Stewardship Plan:

1. Visitor-use Levels: The Wilderness Stewardship Plan will retain existing types and levels of use that would be allowed in wilderness in an attempt to provide opportunities and access for appropriate wilderness experiences. Limited and targeted controls would be applied only in those areas where levels and types of use may be leading to some localized degradation of wilderness character. The overnight visitor capacity would be set at 134,000 Visitor Use Days. Ten-year average overnight use would be limited to 108,000–114,000 Visitor Use Days/year. To ensure that there are opportunities for solitude, the Parks would adopt a measure of the number of people encountered per hour (EPH) on trails and would take action based on established standards. The standards would vary depending on the desired condition of solitude in a given area. For this measure, each trail would be assigned to one of four encounter-rate standards: very high use (primarily Mount Whitney and day-use areas), high use (generally Class 3 trails, with some exceptions), moderate use (generally Class 2 trails, with some exceptions), and low use (generally Class 1 trails, with some exceptions).

   Daily trailhead quotas would not change at this time, with the possibility of some future quota reductions in specific targeted areas. Areas to be monitored for continued acceptable levels of use that may require a future trailhead quota change include Bishop Pass (Dusy Basin), Bubbs Creek (Rae Lakes Loop), Cottonwood Lakes / New Army Pass (Mount Whitney and Mount Langley), Cottonwood Pass (Mount Whitney), Lamarck Col (Darwin Canyon), HST (from Crescent Meadow and Wolverton), Lakes Trail (Emerald and Pear lakes), Sawtooth Trail (Monarch Lakes), and Woods Creek (Rae Lakes Loop).

   Visitors entering Park wilderness via trailheads managed by Sequoia-Kings Canyon National Parks on the west side of the Parks would be subject to established quotas regardless of whether they were traveling as private individuals or groups, or with support from commercial service providers. Quotas could only be exceeded on rare occasions through a formal request to, and approval by, the superintendent.

Those visitors entering the Parks' wilderness via trailheads managed by the Forest Service on the east side of the Parks are subject to the trailhead quotas of Inyo National Forest. Most of these quotas are "combined" (i.e., one quota for both private and commercially supported users), and some are "split" (i.e., separate quotas for private users and commercially supported users). Visitors also enter the Parks' wilderness from more distant Yosemite National Park and Forest Service managed trailheads (e.g., Sierra and Sequoia National Forests), some of which have quotas and some of which do not. These visitors are subject to the entry policies of the agency issuing the permits at the trailhead.

Current destination quotas at Emerald and Pear lakes would continue to apply. Additional destination quotas may be added to protect wilderness character at specific locations such as Bearpaw Meadow, Dusy Basin, Guitar Lake, Hamilton Lake, Monarch Lakes, Rae Lakes, and other areas.

No day-use permits or quotas would be implemented at this time but they may be considered in the future in popular areas to achieve desired conditions.

The National Park Service would continue to work with the Forest Service to manage and improve the quota and permitting systems (e.g., adjust the Mount Whitney exit quota), to add trailheads currently not included in the quota system (e.g., Tehipite Valley and Kern River), and on other relevant cooperative cross-boundary wilderness-management issues.

2. Trails: Most of the approximately 650 miles of wilderness trails in Sequoia and Kings Canyon National Parks are already designated and constructed. A few existing trail segments are inadequately constructed to support projected use and will be target for further development. Some trails are more developed than projected use patterns require, and they will be maintained to a lower development class. A few trails will be designated hiking-only where there are threats to sensitive resources or visitor safety issues. Where the designated unmaintained routes listed in the 1986 Stock Use Meadow Monitoring Plan are still passable to stock, and where stock travel does not pose undue threats to natural and cultural resources they would be designated as Class 1 trails and targeted for appropriate construction and maintenance.

3. Campfires: Recreational campfires would be allowed in the foothill and montane forest areas where adequate wood supplies exist. To protect downed wood resources, campfires would be prohibited in most of the high-elevation forests and woodlands. In areas where available wood could be burned without unduly depleting ground fuels or consuming paleo resources, variances could be established for specific areas above these elevations in the future. In addition, site-specific prohibitions would be implemented where downed wood resources cannot sustain campfires, including: Hamilton Lakes, Mineral King Valley, Pinto Lake, and Redwood Canyon. Recreational campfires will be allowed up to 10,000 feet in the San Joaquin, Kern, and Kings River drainages, and up to 9,000 feet in the Kaweah and Tule River drainages. The proposed action allows recreational campfires in 395,710 acres of the 837,806 acres of wilderness in the Parks (47percent of the wilderness).

Park Superintendent – Sequoia and Kings Canyon National Parks 5

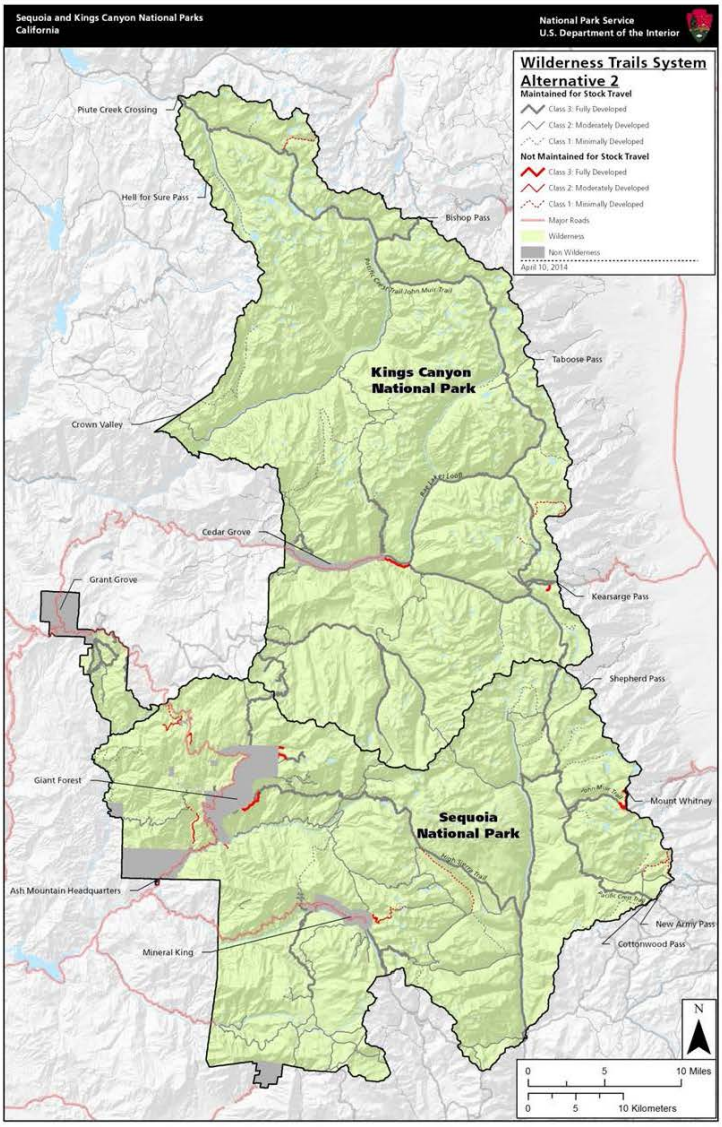


Figure 1: Wilderness Trail System at Sequoia and Kings Canyon National Parks. The trails are constructed and currently in use.

4. Food Storage: Portable containers would be required for overnight use at North Dome, Dusy Basin, Rae Lakes Loop and Rock Creek areas, and may be required in other areas in the future in response to increased incidents. In areas where portable containers are not required, counterbalance hanging would be allowed.

   Food-storage boxes would be retained at the most popular areas and new ones would be considered for areas meeting criteria for placement (e.g., Rae Lakes Loop and HST). Criteria for retention or placement include proximity to trailheads, area visitation levels, quality of bear habitat, and frequency and severity of historic incidents. Where criteria are not met, the undeveloped quality of wilderness character would be improved by removing food-storage boxes. In the future, additional food-storage boxes may be installed in response to site-specific issues or incidents.

   The Wilderness Stewardship Plan will retain 48 of the existing 86 food-storage boxes, and 25 would be removed. An additional 13 food-storage boxes would be considered for removal. Prior to removal of the additional 13, the Park would test the areas by temporarily locking food-storage boxes and/or by establishing a container requirement for visitors. If the testing is successful, the food-storage boxes would be removed. There may be additional food-storage boxes located in wilderness that have not been documented.

5. Human-waste Management: Cat-holes will be required where there are no privies or toilets. Requirements to pack out used toilet paper will be retained. Pack-out waste kits will be recommended for use in popular areas or where privies or restrooms are not feasible (e.g., lack of suitable soils, archeological concerns, or other resource concerns). Pack-out waste kits may be required in specific areas to minimize the need for privies and restrooms.

   Existing privies and restrooms will be evaluated and when they are beyond reasonable repair, or if they are located in unsuitable locations (low-use, close-in areas, where soils allow for cat-holes), they will be removed. The remaining privies would be retained and maintained. New privies will be considered for a few popular day-use areas where other methods have proved unsuccessful.

   Ten public-use privies will be retained, including Bearpaw Meadow (2), Crabtree, Franklin Lake, Kern Hot Spring, Monarch Lake, Paradise Valley (2), Roaring River, and Woods Creek Crossing. Seven public-use privies would be removed including privies in the Bearpaw Meadow area, Hockett, Middle Paradise, Sphinx, Roaring River (2) and Upper Funston areas. One public-use privy will be added at Rock Creek Crossing.

   Three additional public-use privies may be removed at Eagle Lake, Mosquito Lake, and Twin Lakes, but only after pack-out waste kits prove successful in the test areas. The public-use restroom buildings at Emerald and Pear lakes may be removed in the future if maintenance of the facility becomes cost prohibitive or if repairs or renovations are not cost efficient.

   The National Park Service will consider future implementation of new technologies for human-waste management as they are developed. The use of new technologies may require site-specific planning and compliance. Some technologies may require visitors to be more self-sufficient.

6. Party Size: The Wilderness Stewardship Plan includes party-size limits for people and stock. These limits are based on three numbers: the total number of people, the total number of stock, and the combined total of people and stock. The party-size limits differ for on-trail and off-trail travel. The total number of people allowed per party will be the same for hikers and stock users and is limited primarily to protect opportunities for solitude. The total number of stock allowed per party is limited primarily to protect the natural quality of wilderness in campsites, stock tie areas, and off-trail travel areas. The combined total of people and stock allowed in a party may be lower than the sum of the maximum allowed numbers of people and stock; it is limited primarily to protect opportunities for solitude and to control impacts from very large groups on the natural quality at camps.

   The maximum party sizes for Day Rides is 20 people, 20 stock, with a combined maximum of 40; On-Trail is 15 people, 20 stock, with a combined maximum of 28; and Off-Trail is 12 people, 12 stock, with a combined maximum of 14.

   The Wilderness Stewardship Plan keeps the current maximum numbers of people and stock for on-trail travel, but reduces the combined party size. Lower party-size limits are set for off-trail travel to preserve opportunities for solitude and to discourage development of informal trails. The combined party size for stock plus people is reduced to prevent impacts on solitude by the largest stock parties. Party-size limits for hikers would apply to boaters.

7. Camping/Campsites and Night Limits: Camping will be allowed in specific areas close to the front country (e.g., Colony Mill Trail, Don Cecil Trail, and North Dome) to allow a greater diversity of recreational opportunities where risks to resources are low. One or more universally accessible campsites will be constructed closer to a trailhead (e.g., near the confluence of Bubbs Creek and the South Fork Kings River), designed to meet wilderness standards.

   The locations of established stock camps will be identified and the National Park Service would recommend their use. In specific popular areas, stock users may be required to camp in designated stock camps. These areas may include Woods Creek Crossing, Rock Creek Crossing, and Big Pete Meadow. If an area is designated as a required stock camping site/area, backpacker camping will be prohibited. Criteria used for establishing stock-only campsites will include the areas' historic visitation by both backpackers and stock users.

   a. First Allowable Campsite: Camping is prohibited on these trails prior to the listed first-camp locations.

   b. Length of Stay/Night Limits for All Campers (stock-supported and backpackers): Campers will be limited to stays of 14 consecutive nights at a single location, 25 total nights per trip, and 75 total nights per year.

c. Designated Campsites: The use of designated campsites/camp areas will be mandatory in areas where past visitation has impacted resources, including Emerald and Pear lakes, Lower Paradise Valley, and Bearpaw Meadow. There will no longer be designated campsites in Middle and Upper Paradise Valley. Additional designated camp areas may be established in areas where concentrated use and limited campsites could create a risk of rapidly increasing physical or social campsite impacts. Areas to be monitored for a potential future change include Dusy Basin, Guitar Lake, Kearsarge Lakes Basin, Middle and Upper Rae Lakes, and Woods Creek Crossing. Designation of campsites or areas will require site-specific analysis to address issues such as hazard trees and archeological resources. The campsites at Upper and Lower Funston Meadows will no longer be designated for use by stock users only.

d. Campsite Condition Standards: The measure of campsite condition will be adopted to ensure that the number of campsites and their condition does not exceed standards. The metric of aggregate campsite impacts or Weighted Value per Campable Mile, will be used to measure campsite condition. Each area of the Park will be assigned to one of three levels of a campsite condition standard based on desired conditions: high use, moderate use, or low use. These areas, or subzones, are based on long-established wilderness travel zones, each of which is comprised of several subzones. The metric will be calculated at the subzone level. Each subzone has a specified Weighted Value per Campable Mile that serves as a standard. Under the proposed action, the standard will be 1000 for high use subzones, 500 for moderate use subzones, and 250 for low use subzones. A monitoring plan will be developed to establish protocols and schedule monitoring frequencies to ensure that subzones remain within their applied standard.

Under the standards developed for the proposed action, two subzones (83-1 Guitar Lake and 86-1 Kern Hot Spring) will be out of standard in the higher use category, and one subzone (80-3 Shepherd Pass Lake) would be out of standard in the moderate category. All other subzones will be within standard.

8. Stock Use: Visitors will have opportunities to travel with stock (horses, mules, burros, and llamas), from day rides to multi-day trips, in a manner that ensures the protection of wilderness character. Access and grazing will be managed to protect resources, provide other types of primitive recreation, and reduce conflict of user groups. The number of meadows available to grazing will be reduced.

a. On-trail: Visitors traveling with stock will continue to have access to most maintained trails in the Parks (650 of 691 miles). Stock parties will be allowed to travel up to 0.5 mile from trails in areas where they are allowed to camp. In areas open to day-use only, stock parties will be allowed to travel up to 100 yards from trails.

Approximately 530 miles of maintained trails will be open to camping with stock. Some trails will be open to stock parties for travel only, some would be open to camping for walking parties with burros and llamas but limited to travel only for parties with horses or mules, and some will be closed to stock travel entirely for reasons including visitor safety, resource protection, and/or popular day-use by hikers.

b. Off-trail: Stock parties will continue to be allowed to travel up to 0.5 mile from trails to reach camps. Travel more than 0.5 mile from maintained trails will continue to be allowed in four areas of the Parks: on the Hockett Plateau, on the Monarch Divide, in the Roaring River drainage, and along the western side of the Kern River watershed south from the Chagoopa Plateau.

c. Stock Grazing: Grazing will be managed to maximize protection of resources while allowing visitors traveling with stock continued access to forage. Grazing generally will be allowed in areas open to camping with stock (within 0.5 mile of maintained trails open to overnight stock use or in off-trail travel areas). Grazing will not be allowed in those areas open to stock travel only.

Grazing will be managed and informed by the results of the Stock Use and Meadow Monitoring and Management Strategy. Traditional methods of adjusting use levels and patterns will continue to be employed when necessary, including: adjusting the number of nights a given party may graze an area; adjusting the number of stock per party that may graze an area; adjusting opening dates to reflect moisture conditions, which are designed to prevent unacceptable mechanical disturbance to surface soil and vegetation; and temporarily closing an area to stock access or grazing.

Estimated grazing capacities for wilderness meadows have been developed using a model of biomass production and forage consumption that takes into account the elevation, soil moisture, and condition of the meadow. These capacities will continue to be used to inform grazing management, and will be refined as additional information is acquired. The capacity of individual meadows and uplands to sustain grazing will continue to be informed by each meadow's vulnerability to erosion or change in hydrologic function, susceptibility to invasion by nonnative plants, habitat requirements of sensitive plants and animals, productivity and the ability to sustain herbage removal, and the requirements of unique ecological communities such as peat-accumulating wetlands. Site-specific grazing capacities will be refined on an ongoing basis to protect resource integrity and to protect the natural quality of wilderness in the face of a changing climate.

These capacities also reflect the logistical importance of key meadows and forage areas for stock travel in popular areas. The methodology for developing grazing capacities for all Park meadows open for grazing, including those identified as important for those traveling with stock, is provided in the Stock Use and Meadow Monitoring Strategy in the Wilderness Stewardship Plan.

Areas closed to grazing will remain open to camping by visitors traveling with stock, but visitors will be required to hold and feed their animals. Administrative grazing will be managed to limit impacts on public grazing. With rare exceptions, visitors are given preference for limited grazing resources.

California or Nevada certified weed-free forage (baled or loose hay, hay cubes, or straw bedding) will be required when using hay products as supplemental forage or bedding in frontcountry zones. Feed carried into wilderness will be limited to commercially processed pellets, rolled grains, or fermented hay (e.g., Chaffhaye™). These products have a high level of mechanical milling, heat treatment, and/or anaerobic fermentation that result in much lower seed viability.

Baled or loose hay and compressed hay cubes, which have little to no processing, will not be allowed in wilderness.

The monitoring system described in the Wilderness Stewardship Plan will be implemented to track use, document conditions, and provide information for preventing and mitigating impacts. This monitoring program takes into account variation in annual climate, the characteristics of specific forage areas, and the inherent abilities of different species to withstand grazing and trampling pressure. Monitoring of species composition will continue in five pairs of grazed and ungrazed meadows on a five-year rotation, and repeat photography points would be updated as time and resources allow. Monitoring of residual biomass and bare ground, initiated in 1993, will continue to be implemented and the results used to inform decisions regarding grazing management. The National Park Service will continue to support research to further understand the effects of grazing on Sierran ecosystems, and to modify management of grazing and monitoring protocols as new information becomes available.

The meadows closed to grazing for scientific and social value by the 1986 Stock Use and Meadow Monitoring Plan will remain closed to grazing. The meadows closed to grazing due to high levels of visitation and resource concerns by the Stock Use and Meadow Monitoring Plan will remain closed with the exception of Tom Sears Meadow, which will be reopened to grazing.

The following additional locations which are otherwise open to overnight use will be closed to grazing due to high levels of visitation and resource concerns: Crabtree Lakes (closed to stock access and grazing above existing camp west of lowest lake), Darwin Meadow proper, Forester Lake Meadow, Guyot Creek Meadows (expanding the existing closure to the meadows east of the trail), Kern Hot Spring Meadow, Kettle Dome (Randle Corral) Meadows, Lake South America loop, Mineral King basin, Summit Lake Meadow, Upper LeConte Canyon above 10,000 feet in elevation, and Whitney Creek drainage above the Crabtree Ranger Station. Meadows associated with areas or trails closed to stock will be closed to grazing.

Recognizing that the opportunity to observe and experience ungrazed meadows is of value to many Park visitors, the following meadows along popular travel routes which are otherwise open to camping by stock will be closed to grazing: Bighorn Plateau and the meadow 0.6 mile south of Bighorn Plateau; Chagoopa Plateau #3 Meadow; Darwin Meadow; Grouse Meadow; Lower Crabtree Meadow; and Taboose Pass Meadow. These meadow closures will make it possible for visitors traveling along the JMT and HST to experience at least one ungrazed meadow in each drainage through which the trails pass. McClure Meadow will be closed to grazing until Evolution and Colby Meadows reach capacity.

Bubbs Creek below Junction Meadow, Evolution Lake to Muir Pass, Kern Headwaters, and Woods Lake Basin will be open to grazing by walking parties with burros or llamas, and closed to grazing by parties with horses or mules

Lower Whitney Creek (Strawberry) Meadow, Lower Soldier Lake Meadow, and Upper Vidette Meadow will be open to grazing by private parties only.

Hockett Pasture, JR Pasture, Kern Ranger Station Pastures, Lackey Pasture, and Upper Redwood Meadow will be open to administrative use and grazing only.

Park Superintendent – Sequoia and Kings Canyon National Parks 11

9. Administrative Structures: Administrative structures and developments will be the minimum necessary for the administration of wilderness, and similar to current conditions.

    a. The following ranger stations will be retained in their current locations: Crabtree, Hockett Meadow, Kern Canyon, LeConte Canyon, Little Five Lakes, McClure Meadow, Pear Lake, Rae Lakes, Roaring River, Rock Creek, Tyndall Creek

    b. The patrol cabins at Quinn, Redwood Meadow, and Simpson Meadow will be retained.

    c. Three ranger stations may be relocated, modified, considered for conversion, or replaced: Bench Lake tent platform may be moved to a more suitable location for patrol functions. Bearpaw Meadow Ranger Station will be removed and reconstructed to better meet the area's historic character. The Monarch tent platform will be converted to an administrative camp and the footprint would be reduced.

    d. Other Administrative Structures: Use of the Redwood Canyon Cabin by researchers will continue to be authorized.

    e. Administrative Pastures: Existing administrative pastures and associated structures will be retained (Hockett Meadow, Kern, Redwood Meadow, and Roaring River) in their current locale and within their current footprint.

    f. Crew Camps: Existing trail crew camps will be retained, but the number of long-term wood-storage boxes in each camp will be reduced to one. Other project crew camps for the administration of wilderness will be established as needed on a case-by-case basis with no equipment left on-site after project completion.

10. Front country Facilities to Support Wilderness Access and Use: Front country facilities that support activities in wilderness will encourage and/or facilitate visitor use and enjoyment of wilderness. Commercial service providers will be permitted to use some front country facilities, but other facilities will only be used by non-commercial or administrative entities.

    a. Kings Canyon National Park

        i. Cedar Grove Pack Station: The Cedar Grove Pack Station will continue to be operated under concession authority based on a contractual relationship with National Park Service with approved use types and levels. Stock camping sites will be developed at the Cedar Grove Pack Station primarily for private users. Holding pen/corral space, hitch rail(s), adequate Parking and turnaround space for stock trailers, campfire pit, picnic tables, restrooms, food-storage boxes, and water supply will be installed.

    b. Sequoia National Park

        i. Middle Fork Kaweah Trailhead: At the Middle Fork Kaweah Trailhead the National Park Service will provide improved Parking and turnaround space for stock trailers and a hitch rail; no other stock amenities will be provided. Commercial service providers will be allowed to use this trailhead. No camping for stock or backpackers will be allowed.

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ii. Mineral King Area: The Atwell Mill Campground will be adapted to accommodate stock camping in two or three sites. Facilities may include a holding pen, hitch rail(s), table, campfire pit, picnic table, and stock trailer Parking. The sites will be maintained through an agreement between the National Park Service and a cooperating partner. Commercial service providers will be allowed to use the Atwell/Hockett trailhead.

There will be no concessions operations at the Mineral King Pack Station. Existing facilities at Mineral King administrative corrals in east Mineral King Valley will continue to be used for the Parks' administrative purposes at the existing location or at a new location to reduce and minimize environmental impacts on wetlands and water quality. Existing stock facilities may be modified to allow for short-term public camping or staging and/or short-term camping by Commercial Use Authorization holders. Modifications to the site to provide for use by private individuals and/or Commercial Use Authorization holders will include adequate Parking and turnaround space for stock trailers, a small corral, water, a picnic table, and a vault toilet or restroom. These facilities will provide for stock camping for private parties (1 to 2 sites, one- or two-night limit). The site will be maintained through an agreement between the National Park Service and a cooperating partner.

iii. North Fork Kaweah Trailhead: At the North Fork Kaweah Trailhead improved Parking and turnaround space for stock trailers and additional hitch rail(s) will be provided. Commercial service providers will be allowed to use this trailhead and controlled through conditions of a permit. The area will be maintained through an agreement between the National Park Service and a cooperating partner. No camping for stock or backpackers will be allowed.

iv. South Fork Kaweah Campground and Trailhead: The South Fork Kaweah Trailhead will be modified to improve Parking and turnaround space for stock trailers at the trailhead, and a hitching post would be provided. Use primarily will be for private users, with limited commercial use by Commercial Use Authorization holders (managed via permit conditions) and administrative users. The site will be maintained through an agreement between the National Park Service and a cooperating partner.

v. Wolverton Area (trailheads and administrative corrals): The facilities in the Wolverton area will continue to be used for the Parks' administrative purposes. The Wolverton facilities may be modified to provide for stock camping for private parties and short-term staging for commercial service providers. Facilities such as adequate Parking and turnaround space for stock trailers, corral, hitch rail(s), picnic table(s), and campfire pit will be considered. Restrooms and a water supply exist currently at the Wolverton site. The site may be maintained through an agreement between the National Park Service and private partners.

11. Commercial Services in Wilderness: Specific wilderness activities have been determined to necessitate support from commercial services consist of backing packing and hiking, stock trips, including riding, packing, day rides, and overnight camping with stock, overnight camping with gear hauling support (stock spot, and stock and porter dunnage), oversnow travel (ski and snowshoe touring and winter overnight camping), climbing and mountaineering (summer and winter), fishing, river running, and photography.

The commercial services in the Wilderness Stewardship plan are similar to current conditions. However, the levels and types of commercial services that will be allowed will be specifically limited in the Mount Whitney Management Area, which is an area of approximately 27, 200 acres around Mount Whitney within Sequoia National Park. The Bearpaw Meadow High Sierra Camp will continue to be operated at near its current level of 1,700 use days by a Park concessioner. The Pear Lake Ski Hut will continue to be operated at near its current level of 1,500 use days during the winter months as a ski hut by a cooperating association under a cooperative agreement.

Conservation Measures

The National Park Service proposes to avoid and minimize effects to the mountain yellow-legged frog and the Yosemite toad by implementing the following measures:

1. Existing trails that go through or near meadows used by the Yosemite toad will be rerouted away from those meadows, when possible.

2. National Park staff and visitors will be educated about how to avoid impacting the Yosemite toad and encouraged to exercise caution when they encounter these animals.

3. Monitoring will be used to determine if effects of visitor use on the Yosemite toad or its habitat is approaching unacceptable levels. Visitor use will be adjusted in Yosemite toad habitat to prevent or mitigate degradation.

4. Existing trails that run immediately adjacent to waters used by the mountain yellow-legged frog will be rerouted away from these areas, when possible.

5. New Class 1 trails will be designed to avoid running immediately adjacent to waters used by the mountain yellow-legged frog.

6. The National Park Service will educate hikers and stock users about the status and importance of the mountain yellow-legged frog, the National Park Service's efforts to restore and conserve them, and encourage exercising caution when they encounter the animal.

7. If monitoring detects habitats used by the mountain yellow-legged frog are being degraded due to overuse from stock grazing and/or hiker use and stock traffic, visitor use restrictions will be changed to prevent or mitigate degradation, when possible.

8. Off-trail travel will be limited near certain mountain yellow-legged frog populations to reduce the potential of trampling, when possible.

9. Management actions that will be taken to return campsites in out-of-standard areas to within standard include: increased education to the public in specific areas; increased ranger patrols to achieve compliance; rehabilitation of impacted areas, site-specific actions such as modifying sites to render them uninviting to camping or implementation of site specific short- or long-term closures to camping; changing group size, night limit, or campfire restrictions; reduction of commercial visitor services in out-of-standard areas; and changing trailhead quotas.

10. Management actions that will be taken to return out-of-standard trail encounters to within standard include: increased education to the public in specific areas; changing group size, night limit, or campfire restrictions; reduction of commercial visitor services in out-of-standard areas; changing trailhead quotas; require day-use or special-management-area permits; and implementation of cross-boundary actions with the U.S. Forest Service.

11. National Park Service staff will comply with food storage, garbage disposal requirements, and the proper treatment of human waste at all times.

12. Proposed trail realignments in designated critical habitats will require review by National Park Service biologists or ecologists.

13. Projects will avoid in-stream work when possible. If in-stream work is required, activities will be coordinated with National Park Service hydrologists and compliance specialists.

14. When new raised causeways are required to prevent increasing trail associated resource impacts or to provide adequate trail footing, these causeways will be constructed so as to minimize the effects on natural hydrologic processes, in consultation with a National Park Service hydrologist.

15. A monitoring system is employed to track use, document conditions, and provide information for preventing and mitigating impacts from pack stock grazing. The monitoring program takes into account variation in annual climate, the characteristics of specific forage areas, and the inherent abilities of different species to withstand grazing and trampling pressure. The strategy for managing stock use is designed to prevent significant impacts to meadows through implementation of multiple complementary monitoring protocols and a suite of adaptive management tools. Taken together, the complementary elements of the management program at SEKI—monitoring, which includes residual biomass and bare ground, stock use, species composition, repeat photography, and regularly scheduled site visits; an opening date system based on moisture, soil, and vegetation conditions; management tools including the ability to rest meadows when needed, as well as adjust use levels through controls on party size and length of stay; and ongoing research into meadow function and the effects of grazing on meadow ecology—is designed to protect meadows by preventing, minimizing and/or mitigating impacts.

10. The National Park Service has the authority to adjust the number of nights a given party may graze an area; adjust the number of stock per party that may graze an area; adjust opening dates to reflect moisture conditions to prevent unacceptable mechanical disturbance to surface soil and vegetation; and temporarily close an area to stock access or grazing.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For the proposed action, the action area includes all lands including stock grazing and holding areas, approximately 477 miles of trails, and associated activities and infrastructure within the 808, 078 acres designated as Wilderness in Sequoia and Kings Canyon National Parks.

Status of the Species and Environmental Baseline

Sierra Nevada Yellow-legged Frog and Northern Distinct Population Segment of the Mountain Yellow-legged Frog

The Sierra Nevada yellow-legged frog and the Northern Distinct Population Segment of the mountain yellow-legged frog were both listed as endangered species on April 29, 2014, under the Endangered Species Act of 1973, as amended (Service 2014a).

The mountain yellow-legged frog was originally described as a subspecies of the foothill yellow-legged frog (*Rana boylii*). Populations in the Sierra Nevada were considered to be subspecies *sierrae*, and populations inhabiting three mountain ranges in southern California were thought to represent subspecies *muscosa*. Later analysis of additional morphological data indicated what was considered *R. boylii sierrae* and *R. boylii muscosa* were instead more likely to be subspecies of *Rana muscosa* (Zweifel 1955). Later, Macey *et al.* (2001) conducted a phylogenetic analysis of mitochondrial deoxyribonucleic acid (DNA) sequences of the mountain yellow-legged frog and concluded the species consisted of two major genetic lineages comprised of three distinct groups in the Sierra Nevada, and a fourth distinct group in the mountains of southern California.
Based on mitochondrial DNA, morphological information, and acoustic studies, Vredenburg *et al.* (2007) concluded the mountain yellow-legged frog in the Sierra Nevada consists of two distinct species - *Rana muscosa* and *R. sierrae*.

Rana sierrae, or the Sierra Nevada yellow-legged frog, is endemic to the northern and central Sierra Nevada and adjacent Nevada ranging from north of the Feather River including the Plumas and southern edge of the Lassen National Forests, south to the Monarch Divide on the west side of the Sierra Nevada crest in the Sierra National Forest, and near Independence Creek on the east side of the Sierra Nevada crest in the Inyo National Forest. In the Sierra Nevada, *Rana muscosa* ranges from the Monarch Divide south to Dunlap and Taylor meadows in the Sequoia National Forest (California Department of Fish and Wildlife 2011; Vredenburg *et al.* 2007). R. *muscosa* also occurs as a Distinct Population Segment in the Transverse and Peninsular Ranges in southern California, where it is listed as an endangered species. In the Sierra Nevada, the taxon ranges in elevation from approximately 4,500 feet to more than 12,000 feet (Vredenburg *et al.* 2005). However, the distribution of the Northern Distinct Population Segment of the mountain yellow-legged frog appears to extend below 4,500 feet in elevation at higher latitudes; for example, on the Plumas National Forest (USFS 2014). Eight-percent of the observations on the Plumas National Forest are below 4,500 feet elevation; of which, thirty-one of the observations were between 3,500 and 4,500 feet in elevation. Figure 2 provide the distribution of the Sierra amphibians within the Park.

Physical Description

The body length (snout to vent) of the adult mountain yellow-legged frog ranges from 1.5 to 3.25 inches (Dodd 2013b; Stebbins and McGinnis 2012; Lanoo 2005; Green *et al.* 2014; Jennings and Hayes 1994; Vredenburg *et al.* 2005; Wright and Wright 1949; Stebbins 1951; Zweifel 1955). Females average larger than males, and males have a swollen, darkened thumb base. Dorsal (upper) coloration in adults is variable, exhibiting a mix of brown and yellow, but also gray, red, or green-brown, and usually a pattern of dark spots. These spots may be large (0.25 inch) with a few, smaller and more numerous spots, or a mixture of both. Irregular lichen- or moss-like patches may also be present on the dorsal surface. The belly and undersurfaces of the hind limbs of the mountain

yellow-legged frog are yellow or orange colored, and this pigmentation may extend forward from the abdomen to the forelimbs. The adults may produce a distinctive mink or garlic-like odor when disturbed (Wright and Wright 1949; Stebbins 2003). Although these two species lack vocal sacs, they can vocalize in or out of water, producing what has been described as a flat clicking sound (Zweifel 1955; Stebbins 2003). Mountain yellow-legged frogs have smoother skin, generally with heavier spotting and mottling dorsally, darker toe tips (Zweifel 1955), and more opaque ventral coloration (Stebbins 2003) than the foothill yellow-legged frog, which is a conspecific species in some portions of the Sierra Nevada.

The Sierra Nevada yellow-legged frog and the Northern Distinct Population Segment of the mountain yellow-legged frog can be distinguished from each other physically by the ratio of the lower leg (fibulotibia) length to snout vent length (Vredenburg *et al.* 2007). Typically, this ratio is greater than or equal to 0.55 for the northern Distinct Population Segment of the mountain yellow-legged frog and less than 0.55 for the Sierra Nevada yellow-legged frog. In addition, adult Northern Distinct Population Segment of the mountain yellow-legged frog generally has longer limbs than Sierra Nevada yellow-legged frogs.

Mountain yellow-legged frogs deposit their eggs in globular clumps, which are often somewhat flattened and roughly 1 to 2 inches in diameter (Stebbins 2003; Lannoo 2005; Vredenburg *et al.* 2005). When the eggs are close to hatching, egg mass volume averages 78 cubic inches (Pope 1999). An egg has three firm, jelly-like, transparent envelopes surrounding a grey-tan or black vitelline capsule or egg yolk (Wright and Wright 1949). The clutch size varies from 15 to 350 eggs per egg mass (Livezey and Wright 1945; Vredenburg *et al.* 2005). The development of the egg is temperature dependent. In laboratory breeding experiments, eggs took from 18 to 21 days at temperatures of 41 to 56 degrees Fahrenheit to hatch after being laid (Zweifel 1955).

Mountain yellow-legged frog tadpoles generally are mottled brown on the dorsal side with a faintly yellow venter or underside (Zweifel 1955; Stebbins 2003; Vredenburg *et al.* 2005). Their total length may reach a maximum of 2.8 inches, the body is flattened, and the tail musculature is wide at 1 inch or more before tapering into a rounded tip (Wright and Wright 1949). The mouth has a maximum of eight labial tooth rows (Stebbins 2003).

Current Range and Distribution

Since the mountain yellow-legged frog observations made by Grinnell and Storer (1924), a number of researchers have reported disappearances of these two listed amphibian species from significant portions of their historical ranges in the Sierra Nevada (Hayes and Jennings 1986; Bradford 1989; Bradford *et al.* 1994; Jennings and Hayes 1994; Stebbins and Cohen 1995; Drost and Fellers 1996; Knapp and Matthews 2000a; Vredenburg *et al.* 2005; Martin 1992; Heller 1960; Jenkins 1994).

The current distribution of the mountain yellow-legged frog is primarily restricted to publicly managed lands within National Forests and National Parks at high elevations in the Sierra Nevada. National Forests with extant populations include the Plumas National Forest, Lassen National Forest, Tahoe National Forest, Humboldt-Toiyabe National Forest, Lake Tahoe Basin Management Unit, Eldorado National Forest, Stanislaus National Forest, Sierra National Forest, Sequoia National Forest, and Inyo National Forest. National Parks with extant populations of mountain yellow-legged frogs include Yosemite National Park, and Sequoia and Kings Canyon National Parks

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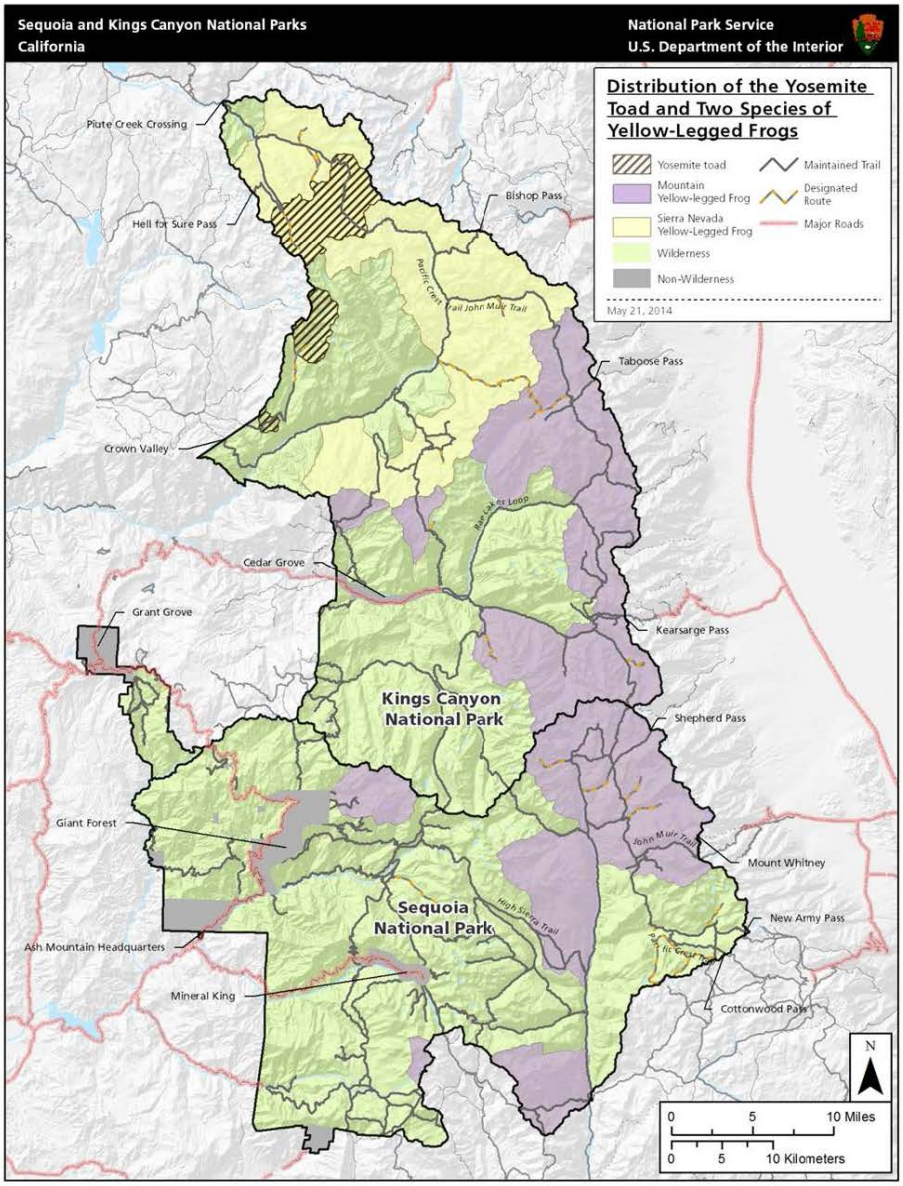


Figure2: Distribution of the Mountain Yellow-legged Frog and Yosemite Toad in Sequoia and Kings Canyon National Parks

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The number of known occupied sites, such as lakes, ponds, meadows, and streams, are estimated to be around 1,245 sites for the Sierra Nevada mountain yellow-legged frog and 12 sites for the Northern Distinct Population Segment of the mountain yellow-legged frog (Service 2014). There are important caveats to these estimates of the number of occupied sites. First, in some cases multiple observations may have been counted for a specific site. Second, not all aquatic habitats have been surveyed, and given the complexity of aquatic habitats, definitions of sites vary among scientists and land managers. Third, more surveys for these species have occurred in lake habitats. Than in other habitats. Finally, these numbers do not necessarily represent populations; a single population may occupy multiple sites.

Habitat and Life History

The mountain yellow-legged frog currently and historically inhabited lakes, ponds, marshes, tarns, meadows, and streams, largely in areas that were glaciated during the Pleistocene at elevations ranging from 4,500 feet to 12,000 feet (California Department of Fish and Wildlife 2014a, 2014b; Zweifel 1955). The two listed amphibian species are highly aquatic (Stebbins 1951; Mullally and Cunningham 1956; Bradford *et al.* 1993). Adults typically are found sitting on rocks along the shoreline, usually where there is little or no vegetation (Mullally and Cunningham 1956). Mountain Yellow-Legged Frog (*Rana sierra and R. muscosa* northern DPS) yellow-legged frogs may use a variety of shoreline habitats, both tadpoles and adults are less common at shorelines that drop abruptly to a depth of 2 feet than at open shorelines that gently slope up to shallow waters of only 2 to 3 inches in depth (Mullally and Cunningham 1956; Jennings and Hayes 1994).

The mountain yellow-legged frog is most abundant in high-elevation lakes and slow-moving portions of streams (Vredenburg *et al.* 2005; Zweifel 1955; Lannoo 2005; Mullally and Cunningham 1956). The borders of alpine ponds, lakes, and meadow streams above the tree line used by the two listed frogs are frequently grassy or muddy. The frog uses different aquatic habitats in various parts of its range, likely because of differences in availability. For example, the species is often found in streams in the northern and southernmost parts of its range where lakes are less common. At lower elevations within their historical ranges, they animals are known to be associated with rocky streambeds and wet meadows surrounded by coniferous forest (Vredenburg *et al.* 2005; Zweifel 1955; Zeiner *et al.* 1988). Adults use streams that vary from high-gradient channels replete with pools, rapids, and small waterfalls to reaches with marshy edges and sod banks (Brown *et al.* 2014; Zweifel 1955. Aquatic substrates vary from bedrock to fine sand, rubble consisting of rock fragments, and boulders (Zweifel 1955). Mountain yellow-legged frogs appear absent from the smallest creeks, possibly because these creeks have insufficient depth for adequate refuge and overwintering habitat (Jennings and Hayes 1994). Stream-dwelling yellow-legged frogs on the Plumas National Forest have been found in first order headwater streams to second order streams (Brown *et al.* 2014).

In the central and southern Sierra, the mountain yellow-legged frog breeds most commonly in permanent, deep lakes (Knapp and Matthews 2000a; Knapp *et al.* 2000b). In Yosemite National Park, occupancy was associated with deep water, elevation, absence of fish, and meadow vegetation on shorelines (Knapp 2005a). Adult mountain yellow-legged frogs breed in the shallows of ponds or in inlet streams (Vredenburg *et al.* 2005). Breeding has been observed in relatively shallow sites (< 1 foot) that dry frequently, but successful recruitment will only occur in water bodies that hold water for the duration of the 2-3 year larval period, even if only a small fraction of water remains (Lacan *et al.* 2008). They emerge from overwintering sites immediately following snowmelt, and will move

over ice to reach breeding sites (Pope 1999; Vredenburg *et al.* 2005). The females deposit their eggs underwater in clusters, which they attach to rocks, gravel, or vegetation, or under banks (Wright and Wright 1949; Stebbins 1951; Zweifel 1955; Pope 1999).

In lakes in the John Muir Wilderness and Kings Canyon National Park, the presence of tadpoles was associated with deep water depths, elevation, the absence of trout, higher proportions of silt, and degree of lake isolation (Knapp *et al.* 2000b). Frogs also breed less commonly in streams and meadows (Zweifel 1955). The larvae take two to three years to metamorphose into subadults (Bradford 1983; Zweifel 1955) and their deep water habitat protects them from freezing to death in the winter (Bradford 1983; Knapp *et al.* 2000b; Knapp 2005a). Habitat models, based on broad scale sampling throughout Yosemite National Park and portions of the John Muir Wilderness and Kings Canyon National Park, indicate that the probability of occupancy by mountain yellow-legged tadpoles increased as maximum lake depth increased from 0 to 13 feet or 16 feet and then remained relatively constant at greater depths (Knapp *et al.* 2000; Knapp 2005a). Desiccation of tadpoles in habitats that dry out during the summer was an important cause of mortality, and little evidence was found of winterkill in shallow water habitats (Lacan *et al.* 2008; Bradford 1983).

Bradford (1983) found that mountain yellow-legged frog die-offs sometimes result from oxygen depletion during winter in lakes less than 13 feet in depth. However, tadpoles may survive for months in nearly anoxic conditions in shallow lakes that are frozen to the bottom. Populations of mountain yellow-legged frogs have overwintered in lakes less than 5 feet deep that are assumed to have frozen to the bottom, and healthy frogs emerged the following July (Pope and Matthews 2001; Pope 1999). Radio telemetry indicated that the animals were utilizing rock crevices, holes, and ledges near shore, where water depths ranged from 0.7 foot to 5 feet (Pope and Matthews 2001). The granite surrounding these overwintering habitats probably insulates mountain yellow-legged frogs from extreme winter temperatures, provided there is an adequate supply of oxygen (Pope and Matthews 2001). In lakes and ponds that do not freeze to the bottom in winter, they may overwinter in the shelter of bedrock crevices as a behavioral response to the presence of introduced trout (Vredenburg *et al.* 2005).

Mountain yellow-legged frog tadpoles maintain a relatively high body temperature by selecting warmer microhabitats (Bradford 1984). During winter, tadpoles remain in warmer water below the thermocline, the transition layer between thermally stratified water. After spring overturn (thaw and thermal mixing of the water), they behaviorally modulate their body temperature by moving to shallow, near shore water when warmer days raise surface water temperatures. The tadpoles select the warmest temperature environments within an alpine lake, often using shallow shorelines during the day and moving offshore in the evening as surface temperatures cool (Bradford 1984). Warmer waters are conducive to faster development. During winter, tadpoles remain in warmer water below the thermocline, the transition layer between thermally stratified water. Tadpoles may take more than 1 year to mature (Wright and Wright 1949), and often require 2 to 4 years, to reach the metamorphosis stage in which they transform from tadpoles to frogs, depending on local climate conditions and site-specific variables (Bradford 1983; Bradford *et al.* 1993; Knapp and Matthews 2000b; Vredenburg *et al.* 2005).

The time required to reach reproductive maturity in mountain yellow-legged frogs is thought to vary between 3 and 4 years post-metamorphosis (Vredenburg *et al.* 2005; Zweifel 1955). Based on this, given the amount of time a tadpole takes to reach metamorphosis, it may take 5 to 8 years for a mountain yellow-legged frog to begin reproducing. Adults are long lived with a maximum recorded

age of 14 years (Vredenburg *et al.* 2005). Under normal circumstances, adult survivorship from year to year is very high (Pope 1999).

After breeding, adults may disperse into a larger variety of aquatic habitats (Pope and Matthews 2001). They appear to use a restricted set of lakes that provide suitable microhabitats for breeding and overwintering, then disperse into a greater number of sites during the summer months for feeding (Pope and Matthews 2001; Matthews and Preisler 2010; Pope and Matthews 2001; Wengert 2000). Frogs commonly are found basking in open areas near cover and water (Grinnell and Storer 1924; Mullally and Cunningham 1956; Storer 1925). Mullally and Cunningham (1956) found individuals more commonly along shallow, rocky shorelines often interspersed with vegetation rather than areas with large boulders from talus slope or sandy unprotected shorelines. The animals use a variety of cover including vegetation, logs, and partially submerged trees. Different habitats are used seasonally. Individuals select undercut banks and willows in August and rocky habitats in September and October (Pope and Matthews 2001). Similar to tadpoles, the adults and subadults seek warmer water, and Bradford (1984) found the abundance of frogs within a lake was significantly associated with warmer water. During the late afternoon and evening, mountain yellow-legged frogs move to offshore waters that are less subject to night cooling (Bradford 1984).

Mountain yellow-legged frog's display strong site fidelity and may return to the same overwintering and summer habitats from year to year (Pope 1999). In aquatic habitats of high mountain lakes, adults typically move only a few hundred yards (Pope and Matthews 2001; Pope 1999). In one telemetry study in lentic habitats, mountain yellow-legged frogs typically moved a few hundred feet during the active season (Brown *et al.* 2014; Pope and Matthews 2001). Distances greater than 0.621 mile have been recorded which included overland travel (Pope and Matthews 2001; Vredenburg *et al.* 2005). Moreover, given Barrowclough's (1978) caution that without extraordinary effort, population movement distances are consistently underestimated, the limited available data undoubtedly underestimate the movement patterns and capabilities of mountain yellow-legged frogs. At the scale of distances between lakes in many high Sierra basins, the data indicate that the species are capable of recolonizing other water bodies on a local scale. However, more studies of dispersal and movement will be necessary to elucidate their seasonal movements.

Adult mountain yellow-legged frogs move between breeding, feeding, or non-breeding active season, and overwintering habitats during the course of the year (Pope 1999a; Matthews and Preisler 2010). Adults sometimes travel over ice or snow to reach preferred breeding locations early in the season without apparent ill effects (Pope 1999a; Vrendenburg *et al.* 2005). Mullally and Cunningham (1956) stated that the animal avoids crossing dry ground over short distances, but individuals have been recorded moving overland for distances of 217 feet to 1312 feet (Pope and Matthews 2001; Vredenburg *et al.* 2005). However, the physical conditions under which the movements occurred are unclear. Movement of adults between habitats used in their seasonal rounds may be a function of the relative proximity of habitats that can fulfill their seasonal requirements, such as breeding, foraging, or overwintering; if all habitats that adults need are close to each other, seasonal movements may not be as great (Brown *et al.* 2014). In this context, trout occupancy in selected water bodies may force mountain yellow-legged frogs to move greater distances to fulfill their habitat requirements.

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Status and Threats

The mountain yellow-legged frog is imperiled by a variety of factors, especially invasive trout, chytrid fungus, and global climate change (Bradford 1989, 1991; Bradford *et al.* 1998; 1994; Drost and Fellers 1996; Lannoo 2005; Moyle *et al.* 1996; Knapp and Matthews 2000a; Armstrong and Knapp 2004; Knapp 2005a, 2005b; Finlay and Vrendenburg 2000; Knapp *et al* 2007; Lacan *et al.* 2008; California Department of Fish and Wildlife 2011; Bradford *et al.* 2011).

Demographic data on historical populations of mountain yellow-legged frogs are anecdotal and limited. Essentially, no data actually precede the fish-planting era in the high mountain lakes and streams; the earliest recorded plantings date from the mid-1800s (Knapp 2005a). Nevertheless, mountain yellow-legged frog data from the earliest 20th Century dates available describe them as having been abundant in aquatic habitats in the high Sierra Nevada. Grinnell and Storer (1924) reported that it [=Sierra Nevada yellow-legged frog] was "…the commonest amphibians in most parts of the Yosemite section. Its total range is…less than that of the Pacific tree-toad [=Pacific tree frog]; but it numbers, especially at the higher altitudes, far exceed those of the smaller species. This frog is the species most likely to come to the attention of fishermen and others who may walk along the banks of Sierran streams and lakes." They also reported that "Certain of the lakes in the higher parts of the Yosemite contain large numbers of yellow-legged frogs in …tadpole and adult conditions" (Grinnell and Storer 1924).

The decline of the mountain yellow-legged frog was first recorded in the 1970's when large populations were reduced in size to near extirpation (Bradford 1991). Subsequent surveys of formerly occupied sites found few remaining populations (Bradford *et al.* 1994; Drost and Fellers 1996). Between 1988 and 1991, Bradford *et al.* (1994) resurveyed sites historically known to support mountain yellow-legged frogs, based on surveys from 1955 to 1979. Animals were not detected at 27 historical sites on the Kaweah River; they were observed at 52 percent of the historical sites within Sequoia and Kings Canyon National Parks, and at 12.5 percent of the historical sites outside of these two protected locations. When the Sierra Nevada yellow-legged frog and the Northern Distinct Population Segment of the mountain yellow-legged frog are combined for the purpose of analysis, into one species, the mountain yellow-legged frog, for this resurvey effort detected them at 19.4 percent of historical sites (Bradford *et al.* 1994). Drost and Fellers (1996) repeated Grinnell and Storer's early 20th century surveys, and reported their presence at 2 of 14 historical sites. The two positive sightings consisted of a single tadpole at one site and a single adult female at the second. They located 17 additional sites with suitable mountain yellow-legged frog habitat, and detected three additional populations.

Davidson *et al.* (2002) reviewed 255 previously documented locations with mountain yellow-legged frog based on Jennings and Hayes (1994) throughout the historical range, and they concluded that 83 percent of these sites no longer support extant populations. Vredenburg *et al.* (2007) compared recent surveys from 1995 to 2004 with museum records of specimens collected between 1899 to 1994 and found that 93.3 percent of locations with historic records of the Sierra Nevada yellow-legged frog sites, and 95.2 percent of the sites with historic records of the Northern Distinct Population Segment of the mountain yellow-legged frog were extirpated. The California Department of Fish and Wildlife (2014a, 2014b) updated the Vredenburg *et al.* (2007) study utilizing historic locality records from museum specimens during the same time interval (1899–1994), and included updated recent locality information with additional survey data (1995–2010). These recent surveys failed to detect any extant frog populations within 0.63 mile of 220 of 318 localities with

historic Sierra Nevada yellow-legged frog records and 94 of 109 localities with historic mountain yellow-legged frog records. Based on this study, the estimated loss from historic occurrences is 69 percent for the Sierra Nevada yellow-legged frog and 86 percent for the Northern Distinct Population Segment of the mountain yellow-legged frog.

In 2002, 302 water bodies known to have been occupied by the mountain yellow-legged frog and 744 sites where the species had not been detected were resurveyed between 1995 and 1997 (Knapp 2005a). Animals at 59 percent of the previously occupied sites, and 8 percent of previously unoccupied sites were recolonized (Knapp 2005a). These data suggest an extirpation rate five to six times higher than the colonization rate within this study area. The documented extirpations appeared to have occurred non-randomly across the landscape, typically spatially clumped, and included the disappearance of all or nearly all of the mountain yellow-legged frog populations in a watershed (Knapp 2005a). The California Department of Fish and Wildlife (2014a, 2014b) assessed data from sites where multiple surveys were completed since 1995 at least 5 years apart. The Sierra Nevada yellow-legged frog was not detected at 45 percent of sites where they previously had been confirmed, and the mountain yellow-legged frog including the endangered Southern Distinct Population Segment, was not detected at 81 percent of the historically occupied sites. These data combined with the Forest Service's monitoring data suggest that declines continued into the 1990s.

The Forest Service conducted bioregional monitoring for the mountain yellow-legged frog on National Forest lands within the species' range in the Sierra Nevada as part of their Sierra Nevada Amphibian Monitoring Program (Brown *et al.* 2014). This monitoring effort provided scientifically-based estimates for statistical comparisons of occupancy and relative abundance across 5-year monitoring cycles based on a sample of 208 watersheds (Brown *et al.* 2014). The results of this monitoring, from 2002-2009, found mountain yellow-legged frog breeding activity in 4 percent of watersheds rangewide, and the species has declined in both distribution and abundance. Evidence of breeding was found in only 47 percent of watersheds where the animal had been found relatively recently (1990-2001), and in only 2 percent of watersheds where the species had last been observed prior to 1990. Moreover, relative abundances were low; only an estimated 9 percent of occupied watersheds were large, numbering more than 100 frogs or 500 tadpoles, and more than half of the watersheds (57 percent) had fewer than 20 animals (>10 tadpoles and >10 adults or subadults) (Brown *et al.* 2014).

The introduction of trout to historically fish-free lakes in the Sierra Nevada reduced the distribution and abundance of the Sierra Nevada yellow-legged frog and the Northern Distinct Population Segment of the mountain yellow-legged frog (Bradford 1989; Knapp and Matthews 2000a; Knapp 2005a). Prior to the mid-Nineteenth Century, almost all lakes and associated streams in the Sierra Nevada above 6000 feet were fishless (Moyle *et al.* 1996). As a result of 150 years of fish stocking throughout the region, however, all watersheds now contain as many as five non-native trout species (USFS 2013b). Currently, these areas may be functioning as population sinks for the mountain yellow-legged frog because the fish are either self-sustaining or their reintroduction to waterways and waterbodies imperils the amphibians.

The biological and ecological characteristics of the mountain yellow-legged frog make it especially vulnerable to predation and subsequent extirpation by introduced trout (Bradford 1989; Bradford *et al.* 1998; Finlay and Vredenburg 2007; Knapp and Matthews 2000a; Knapp *et al.* 2001). First, adult mountain yellow-legged frogs are highly aquatic and inhabit alpine lakes, most of which now contain trout. Second, in contrast to the tadpoles of other Sierra Nevada frog species that complete their

metamorphosis to their terrestrial stage in a single summer, mountain yellow-legged frog larvae generally require at least two years to complete metamorphosis. This overwintering requirement restricts successful breeding and development to permanent water bodies that typically are deeper than six feet, however, they may be subject to predation by introduced trout in these locations (Brown *et al.* 2014; Bradford 1983; Knapp and Matthews 2000a; Mullally and Cunningham 1956). And third, by excluding the mountain yellow-legged frog from deep lakes, trout increase the isolation of the remaining populations of these amphibians.

In 2000, the California Department of Fish and Wildlife declared that no waters would be approved for fish stocking in which the mountain yellow-legged frog were present or where the presence of this animal was unknown due to a lack of recent surveys (California Department of Fish and Wildlife 2011). Based on an assessment of the status and distribution of the amphibian and the impacts on it from fisheries. The California Department of Fish and Wildlife reduced the number of high elevation Sierra Nevada waters stocked by 77 percent (California Department of Fish and Wildlife 2011). This was due in part to efforts to eliminate stocking of waters in the immediate vicinity of mountain yellow-legged frog populations, but also because of the results of resource assessments that showed that many trout populations were self-sustaining and did not require stocking to persist (California Department of Fish and Wildlife 2011).

The National Park Service has removed exotic trout from a number of alpine lakes with the goal of restoring habitat for the mountain yellow-legged frog. The Service issued a biological opinion for this program in 2014 (Service 2014c).

Sequoia and Kings Canyon National Parks currently has an in-progress habitat restoration program that includes exotic trout eradication. In 2001, the National Park Service began to implement preliminary experimental restoration of mountain yellow-legged frog (National Park Service 2001, 2009A). The primary goal was to assess the feasibility of the use of gill nets and electrofishers to eradicate nonnative fish from low- to moderate-use individual lakes having short associated streams. From 2001-2013, the National Park Service had removed more than 50,200 fish from targeted lakes and streams. By 2013, fish were fully eradicated from 10 lakes and nearly eradicated from nine lakes. The final five waterbodies previously approved for nonnative fish eradication were initiated in 2012 and are expected to be completed by 2016-2017.

In nine of the lakes eradicated of fish, mountain yellow-legged frogs remained disease-free 3 years after trout removal. Average tadpole density in these nine lakes increased by 13-fold (from 0.8 to 10.1 per 10 m of shoreline; $P = 0.008$), while average ranid density increased by 14-fold (from 0.8 to 11.1 per 10 m of shoreline; $P = 0.004$). One lake showed an overall 49-fold increase from 0.9 to 43.9 individuals per 10 m of shoreline (NPS 2011B). Two of these populations (LeConte = Sierra Nevada yellow-legged frog; Spur = Northern Distinct Population Segment of the mountain yellow-legged frog) are now likely the largest in the entire range of each species.

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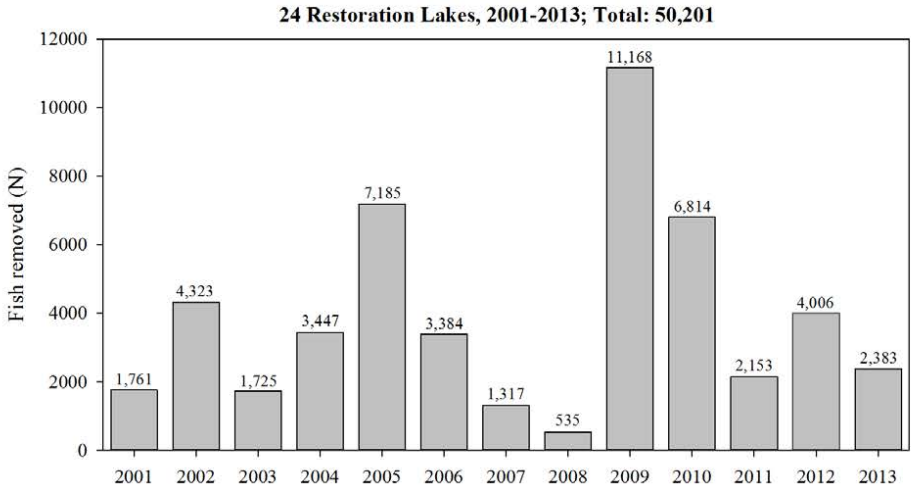


Figure 3: Total number of nonnative fish removed from a total of 24 fish removal lakes and adjacent streams in Sequoia and Kings Canyon National Parks, including nine lakes in Sixty Lake Basin, three lakes in Upper LeConte Canyon, three lakes in Upper Bubbs Creek, two lakes in Kern Point Basin, one lake in Pinchot Basin, two lakes in Upper Basin, and four lakes in Amphitheater Basin. From 2001 to 2013, a total of 50,201 nonnative fish were removed during 17,161 gill net set-and-pull events totaling 8,331,245 net hours, and 1,271 electrofishing events totaling 497 hours of output.

Another significant threat to the mountain yellow-legged frog is chytrid fungus (*Batrochytridium mycosis* = *Bd*). This fungus may have arrived in the Sierra Nevada in the 1960s or 1970s (Vredenburg *et al.* 2010) and is now present in most aquatic habitats in this bioregion. *Bd* is a waterborne fungus which is transmitted by a free-swimming zoospore that infects the keratinized tissue of amphibian skin (Berger *et al.* 1998). It disrupts critical skin functions such as osmoregulation (Voyles *et al.* 2007, 2009). Post-metamorphic frogs are most susceptible to the disease. It is responsible for amphibian declines and extinctions worldwide (Skerratt *et al.* 2007; Longcore *et al.* 1999; Mao *et al.* 1999). The chytrid fungus has contributed to widespread mountain yellow-legged frog declines throughout the Sierra Nevada (Briggs *et al.* 2010; Rachowicz *et al.* 2006; Vredenburg *et al.* 2010). Adults may shed *Bd* and persist with low levels of infection, but given their highly aquatic habitat requirements, likely are reinfected by tadpoles that can carry high infection loads (Briggs *et al.* 2010, Vredenburg *et al.*, 2010). Some populations appear to be persisting with chytrid at reduced abundances (Briggs *et al.* 2010). Research is underway to better understand the epidemiology of *Bd* in the mountain yellow-legged frog and to attempt to develop effective treatments (Stice and Briggs 2010; Vredenburg *et al.* 2010).

The majority of remaining mountain yellow-legged frog populations are small (Brown *et al.*, 2011) and many are isolated (Bradford *et al.* 1993; California Department of Fish and Wildlife 2011; Knapp *et al.* 2007). Small and isolated populations are vulnerable to stochastic events, such as severe weather or predation that can lead to their decline and extirpation (Shaffer 1981). Small populations also have increased chance of genetic drift and inbreeding, which can lead to losses in genetic variation (Service 2014a). The high degree of site fidelity also increases the vulnerability of small

populations if frogs continue to return to habitats that are no longer suitable due to fish introductions or climate change. Given the few populations remaining in the Sierra Nevada, losses of even a few populations of the mountain yellow-legged frog may be significant.

The Sierra Nevada yellow-legged frog and the Northern Distinct Population Segment of the mountain yellow-legged frog occur within the action area as demonstrated by: (1) recent observations of the mountain yellow-legged frog in the action area; (2) the biology and ecology of the animals, especially the ability of individuals to move distances and their ability to spend the dry months of the year in upland habitats with suitable environmental conditions; and (3) the action area contains physical features that provide refuge, forage, and dispersal habitat for the amphibians.

Yosemite Toad.

The Yosemite toad was listed as a threatened species on April 29, 2014, under the Endangered Species Act of 1973, as amended (Service 2014a).

The Yosemite toad was originally described as *Bufo canorus* by Camp (1916), who gave it the common name of Yosemite Park toad. Grinnell and Storer (1924) referred to it as the Yosemite toad when they found the species' range extended beyond the boundaries of Yosemite National Park.

Frost *et al.* (2006) divided the paraphyletic genus *Bufo* into three genera, assigning the North American toads, including the Yosemite toad, to the genus *Anaxyrus*. Feder (1977) found the Yosemite toads are the most genetically distinct member of the *boreas* group based on samples from a limited geographic range. However, it hybridizes with western toads in the northern part of their range (Blair 1972; Karlstrom 1962; Morton and Sokolski 1978). Shaffer *et al.* (2000) analysed a segment of mitochondrial DNA from 372 individuals collected in Yosemite National Park and Sequoia-Kings Canyon National Parks. They found there are significant genetic differences in Yosemite toads between the two National Parks. The genetic divergence in individuals from regionally proximate populations was high, implying low rates of genetic exchange.
Physical Description

The Yosemite toad is a moderately sized amphibian, with the adults ranging in size from 1.2 inches to 2.8 inches from the tip of their snout to their urostyle, a bony structure at the posterior end of the spinal column (Karlstrom 1962; Dodd 2013a; Lannoo 2005). A thin mid-dorsal stripe is present in juveniles of both sexes. The stripe disappears or is reduced with age; this process takes place more quickly in males (Dodd 2013a; Lannoo 2005). The iris of the eye is dark brown with gold iridophores (Dodd 2013a). The large paratoid glands are rounded to slightly oval in shape.

Male Yosemite toads are smaller than the females, and they have less conspicuous warts (Stebbins 1951, 2003; Stebbins and McGinnis 2012; Dodd 2013a; Green *et al.* 2014; Lannoo 2005). Differences in coloration between males and females are more pronounced in this species than in any other North American frog or toad (Stebbins 1951). Females have black spots or blotches edged with white or cream set against a grey, tan, or brown background color (Jennings and Hayes 1994). Males have a nearly uniform dorsal coloration of yellow-green to olive drab to darker greenish brown (Dodd 2013a; Green *et al.* 2014; Lanoo 2005).

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Current Range and Distribution

The Yosemite toad is restricted to the Sierra Nevada in California from the Blue Lakes region north of Ebbetts Pass in Alpine County to just south of Kaiser Pass in the Evolution Lake/Darwin Canyon area in Fresno County (Green *et al.* 2014; Dodd 2013a; Lannoo 2005; Stebbins and McGinnis 2012; Jennings and Hayes 1994; Liang *et al.* 2010; Liang and Stohlgren 2011). The species historically inhabits elevations ranging from 6,000 to 11,910 feet (Stebbins 2003; Stephens 2001).

Habitat and Life History

Terrestrial habitats utilized by Yosemite toad adults vary, particularly by elevation, and include forests, meadows, shrublands, rock outcrops, and talus. Mid-elevation meadows occur in yellow pine (mixed conifer) and lower edges of lodgepole-red fir forests. Meadows above 7,500 feet generally occur in lodgepole–red fir, subalpine and alpine ecosystems (USFS 2001b). Higher subalpine and alpine areas tend to be more open than lower elevation regions. Yosemite toads inhabit wet meadow habitats and lake shores surrounded by lodgepole or whitebark pines (Camp 1916; Dodd 2013a; Stebbins and McGinnis 2012; Lannoo 2005; Wang 2012). The species is most often found in areas with thick meadow vegetation or patches of low willows (Dodd 2013a; Mullally 1953). Liang (2010) observed Yosemite toads most frequently associated with, in order of preference: wet meadows, alpine-dwarf scrub, red fir, water, lodgepole pine, and subalpine conifer habitats.

The Yosemite toad generally is associated with meadows because these are the areas used as breeding habitat. After breeding, adults move into the surrounding uplands. Yosemite toads emerge at snowmelt to breed, generally May-June depending on location and snowpack, and are active above ground for approximately four months each year, reentering overwinter sites in the fall when the weather becomes cold (Kagarise Sherman and Morton 1993, Karlstrom 1962). Upon emergence, males form breeding choruses (Kagarise Sherman 1980, Kagarise Sherman and Morton 1984) and breeding takes place over a short period of time ranging from a few days to 2-4 weeks (Brown *et al.* 2012; Kagarise Sherman 1980; Sadinski 2004). Males usually remain at breeding areas for 1-2 weeks whereas females usually spawn within 1-2 days (Kagarise Sherman and Morton 1984). Eggs hatch in about 4-15 days, depending on ambient water temperatures. Tadpoles metamorphose in an average of 48–63 days and do not overwinter (Kagarise Sherman 1980; Karlstrom 1962).

Yosemite toads are found at both large and small sites (Liang 2010), indicating that this species is capable of successfully utilizing small habitat patches. Liang (2010) found that population persistence was greater at higher elevations, with an affinity for relatively flat sites with a southwesterly aspect. These areas receive higher solar radiation and are capable of sustaining hydric, seasonally ponded, and mesic breeding and rearing habitat. The Yosemite toad is more common in areas with less variation in mean annual temperature, or more temperate sites with less climate variation (Liang 2010).

The Yosemite toad is a late maturing, long-lived species. Females first breed when they are 4-6 years old and males at 3-5 years of age (Kagarise Sherman 1980). Estimates of apparent annual survival of adult males in six meadows ranged from 50 percent to 72 percent (Brown *et al.* 2012). Some females may live as long as 15 years and males up to 12 years (Kagarise Sherman and Morton 1984). Periodic years of high recruitment and high survival rates of adults maybe important for the long-term persistence of populations (Biek *et al.* 2002; Brown *et al.* 2012).

Yosemite toads likely are more nocturnally active than has previously been reported. They actively breed during the day, but a recent study found them to be equally active at night (Brown *et al.* 2009). Martin (2008) and Liang (2010) observed movement of adults both during the day and night, and they speculated that long distance movements occur during the hours of darkness.

The breeding habitat of the Yosemite toad include very shallow waters, most commonly in wet meadows, but also in lake edges, and slow-moving streams and sloughs (Kagarise Sherman 1980; Karlstrom and Livezey 1955; Karlstrom 1962; Martin 2008; Mullally 1953). On the Sierra National Forest, Liang (2010) observed breeding in both large and small meadows, indicating that this species is capable of successfully utilizing small habitat patches. Liang (2010) found breeding site occupancy was greater in seasonal waters in relatively flat sites facing a southwesterly direction with warmer water temperatures. Breeding sites were associated with higher elevations, less variable air temperatures, more precipitation in the warmest three months of the year, and less precipitation during the driest three months. Liang (2010) also noted that the species' distribution was related to a number of different factors rather than a small set of variables. In Yosemite National Park, Knapp (2005a) found high elevation and meadow shorelines were significantly correlated with occurrence. Roche *et al.* (2012a) found annual occupancy to be positively correlated with annual precipitation.

Late winter or early spring, male Yosemite toads exit their upland burrows before the females, and they spend more time in the breeding pools (Kagarise Sherman and Morton 1993). Most adult males appear to breed annually, whereas females may skip years between breeding (Kagarise Sherman 1980; Brown *et al.* 2012). Females have high lipid storage levels, and there may be a trade-off between its use to enhance overwinter survival and the energetic expense of breeding every year (Morton 1981). The Yosemite toad is a prolific breeder that lays many eggs immediately at snowmelt over a short period of time. The reproductive output of the females is relatively high with estimates that some individuals may lay from 1,100 to 2,000 eggs in a single season (Kagarise Sherman 1980; Karlstrom and Livezey 1955; Karlstrom 1962). Females may split their egg clutches within the same pool, or even between different pools, and eggs may be communally laid with other toads. Mortality of eggs and tadpoles caused by freezing or desiccation may be high in some years leading to low or no recruitment (Brown *et al.* 2012; Kagarise Sherman 1980; Sadinski 2004).

The characteristics of Yosemite toad breeding sites generally are associated with warm environments conducive to rapid development (Kagarise Sherman and Morton 1984; Karlstrom 1962). This includes hydroperiods of sufficient length for successful metamorphosis. The female Yosemite toads generally lay their eggs in very shallow, warm, and often ephemeral water at the edges of small pools or in flooded meadow vegetation, most commonly with no or low flow (Kagarise Sherman 1980; Mullally 1953; Sadinski 2004). The tadpoles are most commonly observed in shallow warmer water, and the will move from cooler to warmer locations within a breeding site (Mullally 1953; Karlstrom 1962; Kagarise Sherman and Morton 1984). The eggs are laid at depths ranging from 1.5 inches to 3 inches with a median depth of about 2.5 inches (Sadinski 2004; Kagarise Sherman 1980; Karlstrom 1962; Roche *et al.* 2012a).

After the breeding period, adults Yosemite toads disperse into meadows, ephemeral streams, seeps and springs, and uplands (Liang 2010; Martin 2008). One telemetry study on the Stanislaus National Forest found that they moved a maximum distance of 2,156 feet (Martin 2008), another study recorded an individual had moved 4,137 feet in the Sierra National Forest (Liang 2010), and Morton and Pereyra (2010) found animals 2,789 feet away from their breeding pools. Females are recorded to move further than males. In the telemetry study on the Sierra National Forest, the maximum

distance travelled by females was 4,137 feet versus 2,838 feet by males, and the average distance travelled by females was twice that of males (Liang 2010). At Tioga Pass Meadows, 64 percent of females were in the furthest zone, 2,789 feet from the breeding pools, compared with only 4 percent of males. In contrast, 54 percent of males were found in the breeding meadows, compared with 19 percent of females (Morton and Pereyra 2010). Liang (2010) found that most long-distance travel was undertaken in the first 60 days after the breeding period, and individuals often stayed in the same location for several days or weeks. Adult females utilized different habitat than adult males during the non-breeding season (Morton and Pereyra 2010). Morton and Pereyra (2010) found that during late July and August, over 60 percent of Yosemite toads in upland rocky hillside habitat were adult females and less than 10 percent were adult males. In lowland meadow habitat near a breeding pond, 54 percent of the individuals were adult males and about 19 percent were adult females.

Overwintering habitat of the Yosemite toad may include rodent burrows, crevices under rocks and stumps, and root tangles at the base of willows (Davidson and Fellers 2005, Kagarise Sherman 1980, Martin 2008). Some metamorphs appear to overwinter their first year in the terrestrial meadow habitat adjacent to their rearing site and move to more distant terrestrial habitat during mid-summer of their second year (Kagarise Sherman and Morton 1993; Morton and Pereyra 2010).

Individual Yosemite toads show fidelity to breeding meadows and adult habitats (Brown *et al.* 2012; Kagarise Sherman and Morton 1984; Liang 2010). In Tioga Pass Meadows, most of the males and females returned to the same breeding sites (Kagarise Sherman and Morton 1984). During four years of a mark-recapture study, only three of 37 males moved to different meadows to breed, though males did move among breeding areas within meadows (Brown *et al.* 2012). In one radio telemetry study, individuals used the same upland nonbreeding areas and sometimes the same exact site for multiple years (Liang 2010).

The only long-term, site-specific population study of the Yosemite toads found a dramatic decline over 2 decades of monitoring. Kagarise Sherman and Morton (1993) studied the species at Tioga Pass Meadow from 1971 through 1991, with the most intensive monitoring between the years 1971 to 1982. A decline in the average number of males entering the breeding pools declined from 258 to 28 during the mid-1970s through 1982. During the same time period, the number of females varied between 45 and 100, but there was no apparent trend in number observed. During the 1980s, both males and females continued to decline, and breeding activity became sporadic. By 1991, only one male and two egg masses was found by Kagarise Sherman and Morton (1993). A similar population decline was recorded in local nonbreeding habitat.

Status and Threat

The Yosemite toad is imperiled by a variety of factors, especially damage or loss of habitat, global climate change, and chytrid fungus (Lannoo 2005; Martin 2008; Green *et al.* 2014 Davidson and Fellers 2005; Brown *et al.* 2011). The exact number of the remaining populations of the Yosemite toad is unknown, but the number of known occupied sites such as lakes, ponds, and meadows, streams is estimated to be around 740.

High meadow habitat quality in the western United States, and specifically the Sierra Nevada, has been degraded by various stressors over the last century (Vale 1987; Ratliff 1985). These various stressors have contributed to erosion and stream incision, leading to meadow dewatering and encroachment by invasive vegetation (Menke *et al.* 1996). The legacy of these impacts remains

extant to this day in the ecosystems of the high Sierra Nevada (Vankat and Major 1978). Given the reliance of the Yosemite toad on these high meadow habitats for breeding, and early life history stage and adult survival, the various stressors likely have had an effect on the viability of their populations via the degradation of their habitat.

Since high meadows in the Sierra Nevada are dependent on their hydrologic setting, most meadow degradation is due fundamentally to hydrologic alterations. Montane meadows have been identified among the most vulnerable and impacted habitat types of the Sierra Nevada (Kattelmann and Embury 1996, U.S.Forest Service 2004). While impacts have varied depending on meadow hydrogeomorphic type (Weixelman *et al.* 2011), drying on meadow systems associated with streams where downcutting has occurred is one of the most significant forms of change that has occurred, primarily as a result of livestock overgrazing (Wagoner 1886; Ratliff 1985; Menke *et al.* 1996). Roads and historic logging practices have resulted in meadow degradation in the form of drying, stream incision and creation of headcuts (Service 2014b).

Livestock grazing was historically widespread in the Sierra Nevada and historically caused widespread degradation of meadows (Menke *et al.* 1996), such as those utilized by the Yosemite toad for breeding. Studies investigating the effects of livestock grazing on amphibians have found positive, negative, and no associations, though most were not conducted in alpine meadows (Adams *et al.* 2009; Bull and Hayes 2000; Burton *et al.* 2009; Ford *et al.* 2013; Jansen and Healey 2003; Knutsen *et al.* 2004; Roche *et al.* 2012a; Lind *et al.* 2011; McIlroy *et al.* 2013).

Until recently, the effect of chytrid to Yosemite toad population declines was relatively unknown. Although the animal is hypothetically susceptible due to their co-occurrence with the Northern Distinct Population Segment of the mountain yellow-legged frog and Sierra Nevada yellow-legged frog, the spread and growth of chytrid in the warmer pool habitats, occupied for a much shorter time relative to the frogs may render individuals less prone to epidemic outbreaks (Green and Kagarise, Sherman 2001; USFS *et al.* 2009). Fellers *et al.* (2007) documented the occurrence of chytrid infection of Yosemite toad in Yosemite National Park over at least a couple of decades, and populations of the animal persisted in spite of the continued presence of the pathogen. In a survey of 196 museum specimens, Dodge and Vredenburg (2012) reported the first presence of Bd infection in Yosemite toads beginning in 1961, with the pathogen becoming highly prevalent during the recorded declines of the late 1970s, before it peaked in the 1990s at 85 percent positive incidence. Dodge and Vrendenburg (2012) collected 1,266 swabs from live Yosemite toads between 2006 and 2011, and they found Bd infection intensities at 17–26 percent, with juvenile toads most affected. The results from these studies support the hypothesis that chytrid have played an important role in Yosemite toad population dynamics over the period of their recent recorded decline.

Fire likely plays a significant role in the evolution and maintenance of meadows utilised by the Yosemite toad in the Sierra Nevada. Under natural conditions, conifers are excluded from meadows by fire and saturated soils. Small fires thin and/or destroy encroaching conifers, while large fires are believed to determine the meadow-forest boundary (Vankat and Major 1978). Fire is thought to be important in maintaining open aquatic and riparian habitats for amphibians in some systems, and fire suppression may have thereby contributed to conifer encroachment on meadows (National Park Service 2010).

Trampling and collapse of rodent burrows by hikers, livestock, pack animals, pets, or vehicles may have led to direct injury or death of the Yosemite toad. Recreational activity also may harass individuals and disrupt their behavior (Karlstrom 1962). Recreational anglers may be the transport mechanism of introduced pathogens and parasites, and they have been observed using toads and tadpoles as bait (USFS *et al.* 2009). However, Kagarise Sherman and Morton (1993) did not find a relationship between the distance from the nearest road and the declines in Yosemite toad populations, suggesting that human activity was not the cause of decline.

Small and isolated populations are vulnerable to stochastic events that can lead to their decline and extirpation (Shaffer 1981). For example, small populations are more likely to be devastated by adverse environmental factors than large populations. Small populations also have increased chance of genetic drift and inbreeding that can lead to losses in genetic variation (Service 2014). A high degree of site fidelity also can increase the vulnerability of small populations if Yosemite toads continue to return to habitats that are no longer suitable due to, for example, meadow degradation or climate change. Finally, some management activities may not adversely affect Yosemite toad populations across their range, but potentially may have significant effects on specific populations. Losses of even a few populations may be important in a declining species, such as this animal.

The Yosemite toad occurs within the action area as demonstrated by: (1) recent observations of the species on Sequoia and Kings Canyon National Parks; (2) the biology and ecology of the animal, especially the ability of individuals to move, forage, and winter in uplands; and (3) the action area contains physical features that provide refuge, breeding, foraging, and dispersal habitat for the amphibian.

Effects of the Proposed Action

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, which will be added to the environmental baseline. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

There are two primary means by which the mountain yellow-legged frog and the Yosemite toad have the potential to be adversely affected by the proposed action: 1) direct effects from encounters with people and stock; and 2) indirect effects from people and stock, including degradation of habitat due to trails and/or meadow use. The amount or intensity of use, concentration, and timing of visitors, and the visitor's mode of travel influence the potential for adverse effects of the listed amphibians. The Conservation Measures in the Project Description of this biological opinion will minimize but not eliminate the potential for take of the mountain yellow-legged frog and the Yosemite toad.

1. Direct Effects from Encounters with Human and Stock

   Humans and stock can directly adversely affect all life stages of the mountain yellow-legged frog and the Yosemite toad through capture, harassment, injury, and death. All three listed amphibian species use a variety of aquatic and upland habitats where they may be stepped on and crushed, harassed, injured, killed or they may be subject to capture and harassment by visitors. Use of trails by humans and stock, and establishment and operation of camp sites, and administrative facilities may result in mountain yellow-legged frog and Yosemite toad being stepped on or harassed. However, public education, re-routing or limiting access to areas

inhabited by the mountain yellow-legged frog and Yosemite toad will minimize these effects. The only known mountain yellow-legged frog death caused by trampling by stock in Sequoia and Kings Canyon National Parks occurred in a meadow in Sixty Lake Basin (Brown *et al.* 2014). Stock access to this area has since been prohibited. Capture and harassment of these listed species by visitors likely will be a relatively random occurrence and is not anticipated to have a significant adverse effect.

Mountain yellow-legged frogs may be injured or killed by trampling and other movements by stock, or entrapment in deep hoof prints. Stock can step on all age classes while accessing water along streambanks, lakeshores, or meadows, or while foraging for riparian vegetation in these habitats which can result in injury or death. Although eggs are most vulnerable to trampling and disturbance, stock are not usually present during winter. Mountain yellow-legged frog tadpoles, subadults, and adults are relatively more mobile than Yosemite toads, and generally occur in habitats with more continuous and deeper water that provides more avenues for escape. Tadpoles will rapidly swim away to deeper water in lakes or stream channels. Adults and subadults will leap from the shoreline and submerge themselves under water to hide under stream banks or on the bottom of the lake or stream. However, all life stages commonly bask on shallow shorelines or on stream and lake banks, and are vulnerable to trampling by stock utilizing these occupied habitats to drink water, cross through habitats (e.g. streams), or forage on emergent or shoreline vegetation.

All life history stages of the mountain yellow-legged frog and the Yosemite toad may be captured and then released immediately or within a short period of time by humans, primarily children playing in streams and meadows, or exploring nature in adjacent habitats. However, the number of individuals captured likely will be low; and the amount injured or killed likely also will be low.

The mountain yellow-legged frog breeds in standing water during early summer immediately following snow melt (Stebbins and McGinnis 2012). This early summer breeding period corresponds to a time when people/stock access is both naturally limited due to lingering snow cover and wet ground conditions, and limited by the National Park Service by meadow opening dates. Thus, potential effects from trampling and/or disturbance of egg masses will be minimized.

Behaviors of the mountain yellow-legged frog that contribute to its exposure to potential effects from interactions with people and stock include periodic movements away from breeding habitat to forage at nearby aquatic habitats (Vredenburg *et al.* 2005). Individuals on shorelines in shallow water zones of meadows, creeks, or lakes, or migrating between waterbodies are at risk of being captured, harassed, injured, or killed. Mountain yellow-legged frogs sometimes congregate in large groups during the day, including tadpoles in warm, shallow water and subadults and adults bask on emergent shoreline vegetation, rocks, and logs (Rachowicz and Vredenburg 2004). After mountain yellow-legged frog eggs hatch during mid-summer, the tadpoles require 2-3 years until they metamorphose into more mobile subadults (Vredenburg *et al.* 2005). The long period of the early life history stages may increase their overall vulnerability to harassment, injury, and death.

However, given the relatively small number of populations near trails and the behaviors that mitigate the potential for adverse effects, the potential for trampling is highly unlikely to result in

adverse effects at the population level. For example, the population in Upper LeConte Canyon has increased substantially over the past 12 years (National Park Service 2013A), even though there is a high-use trail nearby that brings numerous people and stock in close proximity to the species on an annual basis. Individual mountain yellow-legged frog in populations immediately adjacent or close to trails in the upper Funston, Bubbs, South Fork Woods, Dusy, Middle Fork Kings, and Evolution watersheds would be subject to potential harassment during encounters with hikers and stock during the summer months.

Yosemite toads may be injured or killed by trampling and other movements by humans and stock, entrapment in deep hoof prints or other disturbances. Humans and stock can step on adults, subadults, tadpoles, and egg masses while in aquatic and upland habitats, including ponds, streams, and rodent burrows, resulting in injury or death. Eggs and tadpoles are potentially at a higher risk of trampling since these stages have no or low mobility and are often found in very small shallow pools with few escape options. Encounters between Yosemite toads and hikers and/or stock have the potential to cause death or injury. Toads in shallow burrows have occasionally been crushed by livestock (Jennings 1996; Service 2002).

Adult and subadult Yosemite toads are vulnerable to the direct effects of humans and stock because they are poor hoppers with low mobility, have an immobilization response to threats, and thus cannot quickly move out of the way. Recent metamorphs are extremely small (< 1 inch) with very limited escape abilities. The risk of trampling of large numbers of metamorphs is highest if humans and stock are present during the metamorphosis period when the amphibians are concentrated in breeding areas; subadults disperse into meadows and uplands. Outside of the breeding period, adults and subadults generally are found in upland habitats or in meadows. The risk of coming in contact with stock for all life stages is highest in meadows or near the perimeter of meadows. In the Bull Creek Watershed on the Sierra National Forest, Liang (2010) monitored several adults who utilized rodent burrows within 75 feet of a meadow throughout the summer. During a 2-yearlong study at Tioga Pass Meadow, Morton and Pereyra (2010) found 58 percent of 654 adult and subadult toads in the meadow bottoms rather than in upland areas, although adult males comprised the largest component of this group. Females predominately were found in uplands away from meadows. The impacts from grazing on individuals in upland habitats currently are unknown. When disturbed while basking at the edge of rodent burrows, Yosemite toad adults and subadults tend to retreat a short distance into the burrow and come back up to the surface in a short amount of time, potentially increasing their risk of being stepped on by nearby stock. Trampling of rodent burrows used for seasonal or overwintering refuge potentially may crush or injure individuals or permanently trap them underground resulting in their death.

2. Indirect Effects from Humans and Stock

Humans and stock can adversely affect the mountain yellow-legged frog and Yosemite toad through indirect effects to their aquatic and upland habitats. The effects include soil compaction, erosion, altering hydrology, pollution of surface and ground water, reduction or elimination of vegetation used as cover or as a food source by prey, and collapse of rodent burrows used as amphibian habitat. Grazing in Yosemite toad habitat would continue in limited locations in Kings Canyon National Park, such as in the upper and lower Blue Canyon area. Seven populations of mountain yellow-legged frogs are located near trails (upper Funston, Bubbs, South Fork Woods, Dusy, Middle Fork Kings, and Evolution watersheds). The Stock

Use and Meadow Monitoring Strategy and implementation of visitor use restrictions if habitat degradation is detected, as described in the Conservation Measures of the Project Description in this biological opinion, will minimize but not eliminate these adverse effects.

Unattended campfires could result in wildfires that kill or injure the mountain yellow-legged frog and Yosemite toad, or damage or destroy their habitats. Human food and other unsecured trash at campsites or other areas may attract increased numbers of ravens, and other predators of the mountain yellow-legged frog and the Yosemite toad. However, education and campground patrols will minimize these adverse effects.

There are several studies that examined the effects of recreational pack stock grazing on alpine meadow habitat (Olson-Rutz *et al.* 1996a, 1996b, Cole *et al.* 2004). Olson-Rutz *et al.* (1996a, 1996b) found that decreased cover and increased bare soil were correlated with grazing intensity and duration. Pack stock camps in the Bob Marshall Wilderness of Montana exhibited large areas of bare ground, increased soil compaction, and slower rates of water infiltration (Cole and Fichtler 1983). A study which evaluated the impacts of a range of pack stock utilization rates on three upper montane and subalpine meadow vegetation types in Yosemite National Park described the relationship between utilization rates and impacts to meadow attributes (Cole *et al.* 2004). The authors fit linear models for the relationships between utilization and productivity, basal vegetation cover, and relative graminoid cover, with variation by vegetation type and number of years of grazing. In dry *Carex filifolia* vegetation, statistically significant relationships for productivity and basal vegetation cover were reported. In mesic *Calamagrostis muiriana* vegetation, statistically significant relationships for productivity, basal vegetation cover, and relative graminoid cover were reported; the relationship with bare ground was statistically significant, but had poor predictive ability. In mesic to hydric *Deschampsia cespitosa* vegetation, only the relationship for productivity was statistically significant. Low intensity grazing may have no detectable impact on species composition and bare ground in Sierra Nevada meadows (Hopkinson et al. 2012, Lee 2013). As grazing intensity increases, bare ground and productivity impacts may develop before changes to species composition (McClaran 2000, Cole et al. 2004). Interannual variation in snowpack may also interact with grazing intensity to determine impacts (Lee 2013). Grazing impacts occur within a growing season but may persist after grazing ends (Olson-Rutz 1996b, Cole *et al.* 2004). The utilization standards which would be used to determine maximum grazing levels range from 25 percent to 45 percent. Based on the work of Cole et al. 2004, these utilization rates would, on average, result in changes to the most heavily grazed portions of meadows relative to comparable ungrazed vegetation. In upper montane and subalpine meadows, maximum utilization rates would be set to limit decreases in productivity, basal vegetation cover, and relative graminoid cover to 18percent or less.

In addition, a recent study in Sequoia and Kings Canyon National Park, Klinger *et al.* (in prep.) found little evidence that packstock grazing had consistent effects on species composition or plant community structure in meadows. Variation in species composition was driven primarily by random variation among meadows and environmental variables, rather than the influence of grazing, and structure did not vary in a direction that would be expected if grazing were having negative impacts. There were no consistent patterns of lower plant cover, more bare ground, or lower diversity in areas grazed by packstock.

Stock or human biological waste could directly impair water quality for the three listed amphibians through bacterial contamination or increasing nutrient levels (EPA 1991; Derlet *et al.*

2006, 2008, 2010 in USFS 2012). Reduction in water quality may compromise their immune function by inducing stress thus making larvae more susceptible to pathogens (USFS 2012). Increased nutrient loading may result in delayed metamorphosis or reduced size at metamorphosis of amphibians (Gerlanc and Kaufman 2005 in USFS 2014). A delay in metamorphosis could make the tadpoles more vulnerable to mortality from mid-season desiccation, snowfall or freezing. A reduced size at metamorphosis could affect the fitness of individuals following metamorphosis and prior to overwintering (USFS 2014).

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Introduced trout are predators of the mountain yellow-legged frog, exclude them from deep alpine lake habitats, increase the isolation of remaining populations, and affect the associated aquatic communities (Bradford 1989; Bradford *et al.* 1993; Finlay and Vredenburg 2007; Knapp and Matthews 2000a, 2000b; Knapp *et al.* 2007; Bahls 1992). In 2010, the California Department of Fish and Wildlife (2011) completed the Hatchery and Stocking Program Environmental Impact Report/Environmental Impact Statement (EIR), which included mitigation measures to reduce or eliminate impacts of hatchery operations and fish stocking on native species, including the mountain yellow-legged frog. A requirement of the EIR is all fish stocking funded by the Federal government that is conducted by the California Department of Fish and Wildlife must be evaluated using the Pre-stocking Evaluation Protocol. Because of stocking changes made in 2000, the EIR did not result in reductions by the State of California to benefit the mountain yellow-legged frog. In addition, the California Department of Fish and Wildlife may implement a Pre-stocking Evaluation Protocol when they have the authority to issue private stocking programs.

Chytrid fungus is an on-going threat to the three listed amphibians. This fungus may have arrived in the Sierra Nevada in the 1960s or 1970s (California Department of Fish and Wildlife 2011; Vredenburg *et al.* 2010) and is now present in most aquatic habitats in this bioregion. At present, few effective measures against chytrid exist, but the development of such interventions is the subject of intensive research (California Department of Fish and Wildlife 2011).

The average temperature in the United States has risen by approximately 1.5° Fahrenheit since 1895; more than 80 percent of this increase has occurred since 1980 (Adger *et al* 2007; Schiermeier 2012; Tollefson and Monarstersky 2012; Allen *et al.* 2013; Kadir *et al.* 2013; U.S. Global Research Program 2013; Hurteau *et al.* 2014; Melillo *et al.* 2014; Wright *et al.* 2013;). There is an international scientific consensus that most of the warming observed is the result of human activities (Adger *et al.* 2007; U.S. Global Change Research Program 2013; Merillo *et al.* 2014), and that it is due to increasing concentrations of greenhouse gases, including carbon dioxide, methane, and nitrous oxide, in the global atmosphere from burning fossil fuels and other human activities (Monastersky 2013; Adger *et al.* 2007). The temperatures in the United States will continue to rise, with the next few decades projected to see another 2°F to 4°F of warming in most areas. The amount of warming by the end of this Century is projected to closely correspond to the cumulative global emissions of greenhouse gases up to that time, ranging from 3°F to 10°F depending upon the level of emissions after the year 2050 (U.S. Global Change Research Program 2013). There are multiple mechanisms by which

global warming may push already imperiled species closer to or over the edge of extinction. Global warming increases the frequency of extreme weather events, such as heat waves, droughts, and storms (California Climate Action Team 2006; U.S. Global Change Research Program 2013). As global temperatures continues to rise, habitats are moving northward and upward in elevation, others will be eliminated, but in the near future, range contractions or extinctions of some species are more likely than simple northward or upslope shifts and this may be especially pronounced for Sierra amphibians owing to habitat fragmentation and the relative lower dispersal ability of these species. Since climate change threatens to disrupt annual weather patterns, it will result in a loss of habitats, food, or increased numbers of predators, parasites, and diseases.

For the Sierra Nevada ecoregion, climate models predict that mean annual temperatures will increase by 3.2 to 4.3 °F by 2070, including warmer winters with earlier spring snowmelt and higher summer temperatures (Point Reyes Bird Observatory 2011). Additionally, mean annual rainfall is projected during this time period to decrease from the current average by some 3.6–13.3 inches (Point Reyes Bird Observatory 2011). However, projections have high uncertainty and one study predicts the opposite effect (Point Reyes Bird Observatory 2011). Snowpack is, by all projections, going to decrease dramatically following the temperature rise and increase in precipitation falling as rain (Point Reyes Bird Observatory 2011). Higher winter streamflows, earlier runoff, and reduced spring and summer streamflows are projected, with increasing severity in the Sierra Nevada (Point Reyes Bird Observatory 2011). Snow-dominated elevations from 6,560–9,190 feet will be the most sensitive to temperature increases (Point Reyes Bird Observatory 2011). Meadows fed by snowmelt may dry out or be more ephemeral during the non-winter months (Point Reyes Bird Observatory 2011).

The Yosemite toad has a short active season and it requires very shallow ephemeral water for reproduction (Kagarise Sherman and Morton 1984). The amount of water in the breeding ponds is dependent on the amount and timing of the spring snowpack. As snow melts in the spring, meadow breeding areas flood and pools fill with water, and then dry out during the course of the summer. Rapid desiccation of breeding sites can lead to low or no recruitment of the Yosemite toad (Kagarise Sherman 1980). Reductions in snowpack may result in less available surface water, fewer pools for Yosemite toad reproduction and development of early life history stages (Adger *et al.* 2007; McMenamin *et al.* 2008). Low snowpack also may contribute to increased conifer encroachment of meadow habitat (Service 2014). Rising temperatures and early snowmelt may influence the Yosemite toad's behavior, the timing of reproduction and other phenological events, the duration of tadpole development, and resulting effects on survivorship (Blaustein *et al.* 2010; Walls *et al.* 2013).

The Sierra Nevada yellow-legged frog and the Northern Distinct Population Segment of the mountain yellow-legged frog have short active seasons, overwinter in aquatic habitats for about nine months each year, and require perennial water for reproduction (Bradford 1983, Lacan *et al.* 2008; Pope and Matthews 2001; Zweifel 1955). Reduced snow pack and increased evapotranspiration may result in desiccation of breeding areas, which in turn, may reduce their breeding success (Lacan *et al.* 2008). Rising temperatures and early snowmelt may influence the timing of mountain yellow-legged frog reproduction; reduce the time available for tadpole development, and adversely affecting survivorship (Blaustein *et al.* 2010; Walls *et al.* 2013).

Global Climate Change is highly likely to adversely influence ground water transport, reduced persistence of surface water that leads to lower water levels available for eggs, tadpoles, breeding, and other life history stages of the Sierra Nevada yellow-legged frog, Northern Distinct Population

Segment of the mountain yellow-legged frog, and the Yosemite toad. Therefore, ongoing Global Climate Change is highly likely to imperil these three listed species and the resources, including the aquatic areas, necessary for their survival.

Conclusion

After reviewing the current status of the Northern Distinct Population Segment of the mountain yellow-legged frog, Sierra Nevada yellow-legged frog, and the Yosemite toad, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conclusion that the project, as proposed, is not likely to jeopardize the continued existence of these listed species. The Service reached this conclusion because of the implementation of the conservation measures described in the Project Description of this biological opinion by the National Park Service.

INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as actions that create the likelihood of injury to a listed species to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary, and must be implemented by the National Park Service so that they become binding conditions of any grant or permit issued by the National Park Service as appropriate, in order for the exemption in section 7(o)(2) to apply. The National Park Service has a continuing duty to regulate the activity covered by this Incidental Take Statement. If the National Park Service: (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document; and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the National Park Service must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

Amount or Extent of Take

The Service, therefore, anticipates incidental take will result from the proposed The Service anticipates that incidental take of the Northern Distinct Population Segment of the mountain yellow-legged frog, Sierra Nevada yellow-legged frog, and the Yosemite toad will be difficult to detect because individuals may be difficult to locate due to their cryptic appearance and behavior;

subadults and adults may be located a distance from the streams, ponds, and lakes where they breed and develop; and the finding of an injured or dead individual is unlikely because of their relatively small body size. The conservation measures described above in the Project Description will substantially reduce, but do not eliminate, the potential for incidental taking of these three amphibians. Adverse effects to these animals also may be difficult to quantify due to seasonal fluctuations in their numbers, random environmental events, or additional environmental disturbances. Upon implementation of reasonable and prudent measure, take of the Northern Distinct Population Segment of the mountain yellow-legged frog and the Sierra Nevada yellow-legged frog in the form of capture, harm, and harassment of all eggs, tadpoles, subadults, and/or adults inhabiting or utilizing 808,078 acres of wilderness at Sequoia and Kings Canyon National Parks for the duration of the project, or the injury, or death of three (3) egg masses, three (3) tadpoles, and three (3) subadults/adults for the duration of the project, will become exempt from the prohibitions described under section 9 of the Act. Upon implementation of reasonable and prudent measure, take of the Yosemite toad in the form of capture, harm, and harassment of all eggs, tadpoles, subadults, and/or adults inhabiting or utilizing 808,078 acres of wilderness at Sequoia and Kings Canyon National Parks for the duration of the project, or the injury, or death of three (3) egg masses, three (3) tadpoles, and three (3) subadults/adults for the duration of the project, will become exempt from the prohibitions described under section 9 of the Act. Therefore, reinitiation will be triggered if the amount of incidental take is exceeded by the National Park Service.

Effect of the Take

The Service has determined that the level of anticipated take is not likely to result in jeopardy to the Northern Distinct Population Segment of the mountain yellow-legged frog, Sierra Nevada yellow-legged frog, and the Yosemite toad.

Reasonable and Prudent Measure

1. The National Park Service shall minimize adverse effects to the Northern Distinct Population Segment of the mountain yellow-legged frog, Sierra Nevada yellow-legged frog, and the Yosemite toad by implementing the conservation measures included in this biological opinion and as modified by the following terms and conditions.

Term and Condition

To be exempt from the prohibitions of section 9 of the Act, the National Park Service must comply with the following terms and conditions, which implements the reasonable and prudent measure described above. These terms and conditions are non-discretionary.

1. Camping by humans, and grazing and pasturing by stock shall be carefully managed, and in some areas prohibited, in meadows and other aquatic areas where the Northern Distinct Population Segment of the mountain yellow-legged frog, Sierra Nevada yellow-legged frog, and the Yosemite toad are breeding.

2. National Park Service staff and visitors shall be educated about how to avoid impacting the mountain yellow-legged frog, Sierra Nevada yellow-legged frog, and the Yosemite toad and encouraged to exercise caution when they encounter the animal.

3. The National Park Service shall provide the Service with a copy of the annual Stock Use and Meadow Monitoring field reports within ten (10) working days of completion.

4. The National Park Service shall provide the Service with a copy of any scientific or management report completed on the three listed amphibians and activities included in the Wilderness Stewardship Management Plan within ten (10) working days of issuance.

The reasonable and prudent measure, with its implementing terms and conditions, is designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take described for each species in the Amount or Extent of Take section is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The National Park Service must provide an explanation of the causes of the taking as soon as possible and review with the Service the need for possible modification of the reasonable and prudent measure.

Reporting Requirements

The Service must be notified as soon as possible if large numbers of the Northern Distinct Population Segment of the mountain yellow-legged frog, Sierra Nevada yellow-legged frog, and/or the Yosemite toad are found injured, sick or dead (e.g., due to illness, chemicals, or other factors), foul play is suspected, or unauthorized take of any listed species is observed or suspected. For such incidents, notification should be made by a National Park Service biologist, National Park Service law enforcement ranger, or other qualified National Park Service personnel. We recognize that the activities in this project will occur in the back country a substantial distance from roads, telephones, and cellphone service for long periods of time, so the notification should be made as soon as practicable. The report of the incident should include the date(s), location(s), habitat description, photographs, maps, preserved specimens (if possible), and any other pertinent information. The Service contact is the Chief of the Endangered Species Division (Forest/Foothill) at the Sacramento Fish and Wildlife Office at (916) 414-6600.

Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and databases. The Service has the following recommendations:

1. The National Park Service should continue their efforts to eliminate non-native trout from within the ranges of the Northern Distinct Population Segment of the mountain yellow-legged frog, Sierra Nevada yellow-legged frog, and the Yosemite toad.

2. The National Park Service should assist the Service in implementing the Conservation Strategy, and when completed, the final recovery plan for the Northern Distinct Population Segment of the mountain yellow-legged frog, Sierra Nevada yellow-legged frog, and the Yosemite toad.

For the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, we request notification of the implementation of any of the conservation recommendations.

REINITIATION – CLOSING NOTICE

This concludes formal consultation on the Wilderness Stewardship Plan in Sequoia and Kings Canyon National Parks for the endangered Northern Distinct Population Segment of the mountain yellow-legged frog, endangered Sierra Nevada Yellow-legged Frog, and Yosemite toad. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions about this biological opinion, please contact Chris Nagano, Chief Endangered Species Forest/Foothill Division at the letterhead address, email (Chris_Nagano@fws.gov), or at telephone (916) 414-6600.

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Literature Cited

Adams, M.J., C.A. Pearl, B. McCreary, S.K. Galvan. 2009. Short-term effect of cattle exclosures on Columbia spotted frog (*Rana luteiventris*) populations and habitat in northeastern Oregon. Journal of Herpetology 43:132–138.

Adger, N., P. Aggarwal, S. Agrawala, J. Alcamo, A. Allali, O. Anisimov, N. Arnell, M. Boko, . Canziani, T. Carter, G. Cassa, U. Confalonieri, R. Cruz, E. de Alba Alcaraz, W. Eastreling, . Field, A. Fischlin, B. Fitzharris, C.G. Garcia, C. Hanson, H. Harasawa, K. Hennessy, S. Huq, R. Jones, L. K. Bogataj, D. Karoly, R. Kliein, Z. Kundzewicz, M. Lal, R. Lasco, G. Love, X. Lu, G. Magrin, L.J. Mata, R. McLean, B. Menne, G. Midgley, N. Mimura, M.Q. Mirza, J. Moreno, L. Mortsch, I. Niang-Diop, R. Nichols, B. Novaky, L. Nurse, A. Nyon, M. Oppenheimer, J. Palutikof, M. Parry, A. Patwardhan, P. R. Lankao, C. Rosenzweig, S. Schneider, S. Semenov, J. Smith, J. Stone, J. van Ypersele, D. Vaughan, C. Vogel, T. Wilbanks, P. Wong, S. Wu, and G. Yohe. 2007. Working Group II Contribution to the Intergovernmental Panel on Climate Change Fourth Assessment Report. Climate Change 2007: Climate change impacts, adaptation and vulnerability. Brussels, Belgium.

Allen, M.R., J.F.B. Mitchell, and P.A. Scott. 2013. Test of a decadal climate forecast. Nature Geoscience 6:243-244.

Allen-Diaz, B., S.K. McIlroy, L.M. Roche, K.W. Tate, and A.J. Lind. 2010. Determining the effects of livestock grazing on Yosemite toads (*Bufo canorus*) and their habitat: final report to Forest Service Region 5. U.S. Forest Service, Vallejo, California.

Andrews, K.M., J.W. Gibbons, and D.M. Jochimsen. 2008. Ecological effects of roads on amphibians and reptiles: A literature review. Pages 121-143 *in* Mitchell, J.C., Brown, R.E.J., B. Bartholomew (editors). Urban Herpetology. Society for the Study of Amphibians and Reptiles.

Armour, C.A., D.A. Duff, and W. Elmore. 1994. The effects of livestock grazing on western riparian and stream ecosystems. Fisheries 19:9-12.

Armstrong, T. W., and R. A. Knapp. 2004. Response by trout populations in alpine lakes to an experimental halt to stocking. Canadian Journal of Fisheries and Aquatic Sciences 61:2025-2037.

Bahls, P. 1992. The status of fish populations and management of high mountain lakes in the western United States. Northwest Science 66: 183-193.

Bartelt, P.E. 1998. *Bufo boreas* (Western Toad) Mortality. Herpetological Review 29: 96.

Beebee, T.J.C. 2013. Effects of Road Mortality and Mitigation Measures on Amphibian Populations. Conservation Biology 27: 657–668.

Belsky, A.J., A. Matzke, and S. Uselman. 1999. Survey of livestock influences on stream and riparian ecosystems in the western United States. Journal of Soil and Water Conservation. 54: 419–431.

Berger, L., R. Speare, Daszak, D.E. Green, A.A., Cunningham, C.L. Goggin, R. Slocombe, M.A. Ragan, A.D. Hyatt, K.R. McDonald, H.B. Hines, L.R. Lips, G. Marantelli, and H. Parkes. 1998. *Chytridiomycosis* causes amphibian mortality associated with population declines in the rain forests of Australia and Central America. Proceedings of the National Academy of Sciences 95: 9031-9036.

Biek, R., C. Funk, B.A. Maxell, and L.S. Mills. 2002. What is missing in amphibian decline research: insights from ecological sensitivity analysis. Conservation Biology 16: 728–734.

Blair, W.F. 1964. Evidence bearing on the relationships of the *Bufo boreas* group of toads. Texas Journal of Science 16: 181–192.

_____ 1972. Evolution in the genus *Bufo*. University of Texas Press, Austin, Texas.

Blaustein, A.R., Walls, S.C., Bancroft, B.A., Lawler, J.J., Searle, C.L. and S.S. Gervasi. 2010. Direct and indirect effects of climate change on amphibian populations. Diversity 2: 281-313.

Boyle, S.A., and F.B. Samson. 1985. Effects of non-consumptive recreation on wildlife. A review. Wildlife Society Bulletin 13: 110-116.

Bradford, D.F. 1983. Winterkill, oxygen relations, and energy metabolism of a submerged dormant amphibian, *Rana muscosa*. Ecology 64: 1171-1183.

_____ 1984. Temperature modulation in a high elevation amphibian, *Rana muscosa*. Copeia 1984(4): 966–976.

_____ 1989. Allotopic distribution of native frogs and introduced fishes in high Sierra Nevada lakes of California: implication of the negative effect of fish introductions. Copeia 1989: 775-778.

_____ 1991. Mass mortality and extinction in a high-elevation population of *Rana muscosa*. Journal of Herpetology 25: 174-177.

Bradford, D.F., D.M. Graber, and F. Tabatabai. 1994. Population declines of the native frog, *Rana muscosa*, in Sequoia and Kings Canyon National Parks, California. Southwestern Naturalist 39: 323-327.

Bradford, D.F., S.D. Cooper, T.M. Jenkins, K. Kratz, O. Sarnelle, and A.D. Brown. 1998. Influences of natural acidity and introduced fish on faunal assemblages in California alpine lakes. Canadian Journal of Fisheries and Aquatic Sciences 55(11): 2478-2491.

Bradford, D.F., R.A. Knapp, D.W. Sparling, M.S. Nash, K.A. Stanley, N.G. Tallent-Halsell, L.L. McConnell, and S.M. Simonich. 2011. Pesticide distributions and population declines of California, USA alpine frogs, *Rana muscosa* and *Rana sierrae*. Environmental Toxicology and Chemistry 30: 682-691.

Bradford, D.F., F. Tabatabai, and D.M. Graber. 1993. Isolation of remaining populations of the native frog, *Rana muscosa*, by introduced fishes in Sequoia and Kings Canyon National Parks, California. Conservation Biology 7: 882-888.

Briggs, C.J., Knapp, R.A., and V.T. Vredenburg. 2010. Enzootic and epizootic dynamics of the chytrid fungal pathogen of amphibians. Proceedings of the National Academy of Science 107: 9695–9700.

Brown, C., Hayes, M., Green, G., and D. Macfarlane. 2009. Yosemite Toad Conservation Assessment. DRAFT. U. S. Forest Service, Vallejo, California. 30 September, 2009

_____ 2014. Mountain Yellow-legged Frog Conservation Assessment for the Sierra Nevada. Mountains of California, USA. R5-TP-038. U.S. Forest Service, Vallejo, California. July 2014.

Brown, C., K. Kiehl, and L. Wilkinson. 2012. Advantages of long-term, multi-scale monitoring: assessing the current status of the Yosemite toad (*Anaxyrus* [*Bufo*] *canorus*) in the Sierra Nevada, California, USA. Herpetological Conservation and Biology 7(2): 115–131.

Brown, C., L. Wilkinson, and K. Kiehl. 2011. Status and trend of the mountain yellow- legged Frog, Yosemite toad and Pacific chorus frog in the Sierra Nevada, CA: Results from the First Monitoring Cycle of the USDA Forest Service Sierra Nevada Amphibian Monitoring Program DRAFT. Pinole, California.

Brown, C., Wilkinson, L., and K. Kiehl. 2014. Comparing the Status of two Sympatric Amphibians in the Sierra Nevada, California: Insights on Ecological Risk and Monitoring Common Species. Journal of Herpetology 48: 74-83.

Bull, E.L., and M.P. Hayes. 2000. Effects of livestock on reproduction of the Columbia spotted frog. Journal of Range Management 53: 291–294.

Burton, E.C., Gray, M.J., Schmutzer, A.C. and D.L. Miller. 2009. Differential responses of postmetamorphic amphibians to cattle grazing in wetlands. Journal of Wildlife Management 73: 269–277.

California Climate Action Team. 2006. Climate Action Team Report to Governor Schwarzenegger and the Legislature. California Environmental Protection Agency, Sacramento, California.

California Department of Fish and Wildlife. 2011. A status review of the mountain yellow-legged frog (*Rana sierrae* and *Rana muscosa*). Report to the Fish and Game Commission. California Department of Fish and Wildlife, Sacramento, California.

_____ 2014a. California Natural Diversity Data Base RAREFIND. Natural Heritage Division, Sacramento, California.

_____ 2014b. BIOSIS. Natural Heritage Division, Sacramento, California.

California State Lands Commission. 1993. California's rivers: A public trust report. Sacramento, California.

Camp, C.L. 1916. Description of *Bufo canorus*, a new toad from Yosemite National Park. University of California Publications in Zoology 17: 59–62.

Chapman, D.W. 1988. Critical review of variables used to define effects of fines in redds of large salmonids. Transactions of the American Fisheries Society 117: 1-21.

Chaney, E., W. Elmore, and W.S. Platts. 1990. Livestock grazing on western riparian areas. U.S. Environmental Protection Agency and the Northwest Resource Information Center. Eagle, Idaho.

_____ 1917. Notes on the systematic status of the toads and frogs of California. University of California Publications in Zoology 17: 115-125.

Cole, D.N. 1986. Recreational impacts on backcountry campsites in Grand Canyon National Park, Arizona, USA. Environmental Management 10: 651-659.

Cole, D.N., and J.L. Marion. 1988. Recreation impacts in some riparian forests of the Eastern United States. Environmental Management 12: 99-107.

Cole, D.N., and R.K. Fichtler. 1983. Campsite impact on three western wilderness areas. Environmental Management 7: 275-288.

Cole, D.N., J.W. Van Wagtendonk, M.P. McClaran, P.E. Moore, and N. McDougald. 2004. Response of mountain meadows to grazing by recreational pack stock. Journal of Range Management 57: 153-160.

Davidson, C. and Fellers, G.M. 2005. *Bufo canorus* Camp 1916, Yosemite Toad. Pages 400-401 *in*: Lannoo, M. (editor). Amphibian Declines: The Conservation Status of United States Species. University of California Press, Berkeley, California.

Davidson, C., H.B. Shaffer, and M.R. Jennings. 2002. Spatial tests of the pesticide drift, habitat destruction, UV-B, and climate-change hypotheses for California amphibian declines. Conservation Biology 16: 1588-1601

Derlet, R.W. and J.R. Carlson. 2006. Coliform bacteria in Sierra Nevada wilderness lakes and streams: what is the impact of backpackers, pack animals, and cattle? Wilderness and Environmental Medicine 17: 15-20.

Derlet, R.W., K.A. Ger, J.R. Richards, and J.R. Carlson. 2008. Risk factors for coliform bacteria in backcountry lakes and streams in the Sierra Nevada mountains: a 5-year study. Wilderness and Environmental Medicine 19: 82-90.

Derlet, R.W., S.R. Goldman, and M.J. Connor. 2010. Reducing the impact of summer cattle grazing on water quality in the Sierra Nevada mountains of California: a proposal. Journal of Water and Health 2010.

Dodd, C.K. 2013a. Frogs of the United States and Canada. Volume 1. John Hopkins University Press. Baltimore, Maryland.

_____ 2013b. Frogs of the United States and Canada. Volume 2. John Hopkins University Press. Baltimore, Maryland.

Dodge, C.M. and V.T. Vredenburg. 2012. The sad song of the Yosemite toad: The role of the amphibian chytrid fungus in an enigmatic decline. Presentation Abstract. Disease and Epidemiology I: The Preliminary Program for 97th ESA Annual Meeting (August 5–10, 2012).

Drost, C.A. and G. Fellers. 1996. Collapse of a regional frog fauna in the Yosemite area of the California Sierra Nevada, USA. Conservation Biology 10: 414-425.

Feder, J.H. 1977. Genetic variation and biochemical systematics in western *Bufo*. Masters thesis, University of California, Berkeley, California.

Feldman, C.R., and J.A. Wilkinson. 2000. *Rana muscosa* (mountain yellow-legged frog). Predation. Herpetological Review 31: 102.

Fellers, G. M., D. F. Bradford, D. Platt, and L.L. Wood. 2007. Demise of repatriated populations of mountain yellow-legged frogs (*Rana muscosa*) in the Sierra Nevada of California. Herpetological Conservation and Biology 2: 5-21.

Finlay, J.C., and V.T. Vredenburg. 2007. Introduced trout sever trophic connections in watersheds: consequences for a declining amphibian. Ecology 88(9): 2187–2198.

Ford, L.D., P.A. Van Hoorn, D.R. Rao, N.J. Scott, P.C. Trenham, and J.W. Bartolome. 2013. Managing Rangelands to Benefit California Red-legged Frogs and California Tiger Salamanders. Alameda County Resource Conservation District, Livermore, California.

Garton, E.O., T.C. Foin, C. W. Bowen, J.M. Everingham, R. O. Schultz, and B. Holton, Jr. 1977. Quantitative studies of visitor impacts on environments of Yosemite National Park, California, USA and their implications for Park management policy. Journal of Environmental Management 5: 1-22.

Grasso, R.L.. R.M. Coleman, C. Davidson. 2010. Palatability and antipredator response of Yosemite toads (*Anaxyrus canorus*) to nonnative brook trout (*Salvelinus fontinalis*) in the Sierra Nevada mountains of California. Copeia 2010: 457–462.

Green, D.E., and C. Kagarise Sherman. 2001. Diagnostic histological findings in Yosemite Toads (*Bufo canorus*) from a die-off in the 1970s. Journal of Herpetology 35:92-103.

Green, D.M., L.A. Weir, G.S. Casey, and M.J. Lannoo. 2014. North American amphibians distribution and diversity. University of California, Berkeley, California.

Grinnell, J. and T.I. Storer. 1924. Animal life in Yosemite: an account of the mammals, birds, reptiles, and amphibians in a cross-section of the Sierra Nevada. University of California Press. Berkeley, California.

Harvey, B.C., and T.E. Lisle. 1998. Effects of suction gold dredging on streams: A review and evaluation strategy. Fisheries 23: 8-17.

Haugen G., D. Duff. 1982. The best management practices for the management and protection of western riparian ecosystems. Riparian Habitat Committee, Western Division American Fisheries Society.

Hayes, M. P., and M. R. Jennings. 1986. Decline of ranid frog species in western North America: are bullfrogs (*Rana catesbeiana*) responsible? Journal of Herpetology 20: 490-509.

Heller, C.L. 1960. The Sierra yellow-legged frog. Yosemite Nature Notes 39(5): 126–128.

Hopkinson, P., M. Hammond, J. Bartolome, M. Brooks, E.L. Berlow, R. Klinger, J.R. Matchet, P. Moore, S. Ostoja, C. Soulard, R. Williams, O. Alvarez, Q. Guo, S. Haultain, E. Frenzel, and D. Saah 2013. A natural resource condition assessment for Sequoia and Kings Canyon National Parks: Appendix 13 – meadows. Natural Resource Report NPS/SEKI/NRR—2013/665.14. National Park Service, Fort Collins, Colorado.

Hossack, B. R., and D. S. Pilliod. 2011. Amphibian responses to wildfire in the western United States- Emerging patterns from short-term studies. Fire Ecology 7(2): 129-144.

Hossack, B.R., W.H. Lowe, and P.S. Corn. 2012. Rapid increases and time-lagged declines in amphibian occupancy after wildfire. Conservation Biology 27: 219–228.

Hossack, B.R., L.A. Eby, C.G. Guscio, and P.S. Corn. 2009. Thermal characteristics of amphibian microhabitats in a fire-disturbed landscape. Forest Ecology and Management 258: 1414–1421.

Hurteau, M.D., A.L. Westerling, C. Wiedinmyer, and B. P. Bryant. 2014. Projected effects of climate and development on California wildfire emissions through 2100. Environmental Science and Technology 48(4): 2298-2304.

Jennings, M.R. and M.P. Hayes. 1994. Amphibian and reptile species of special concern in California. California Department of Fish and Game. Rancho Cordova, California

Jansen, A., and M. Healey. 2003. Frog communities and wetland condition: relationships with grazing by domestic livestock along an Australian floodplain river. Biological Conservation 109: 207–219.

Jenkins, T.M. 1994. Aquatic biota in the Sierra Nevada: current status and potential effects of acid deposition on populations. Final Report Contract A932-138. California Air Resources Board, Sacramento.

Park Superintendent – Sequoia and Kings Canyon National Parks 46

Kadir, T., L. Mazur, C. Milanes, and K. Randles. 2013. Indicators of Climate Change in California. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Sacramento, California.

Kagarise, Sherman, C. 1980. A comparison of the natural history and mating system of two anurans: Yosemite toads (*Bufo canorus*) and black toads (*Bufo exsul*). PhD dissertation, University of Michigan, Ann Arbor, Michigan.

Kagarise, Sherman, C.K.; Morton, M.L. 1984. The toad that stays on its toes. Natural History. 93: 72-78.

_____ 1993. Population declines of Yosemite toads in the eastern Sierra Nevada of California. Journal of Herpetology 27: 186–198.

Karlstrom, E.L. 1962. The toad genus *Bufo* in the Sierra Nevada of California: ecological and systematic relationships. University of California Publications in Zoology 62: 1–104.

Karlstrom, E.L., and R.L. Livezey. 1955. The eggs and larvae of the Yosemite toad *Bufo canorus* Camp. Herpetologica 11: 221-227.

Kattelmann, R. 1996. Hydrology and water resources. Volume II chapter 30 *in*: Sierra Nevada Ecosystem Project: Final report to Congress. Centers for Water and Wildland Resources, University of California, Davis, California.

Kattelmann, R., and M. Embury. 1996. Riparian Areas and Wetlands. In: Sierra Nevada ecosystem project, final report to Congress. University of California, Davis, Calfornia.

Kauffman, J.B., and W.C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications a review. Journal of Range Management 37(5): 430–437.

Kauffman, J.B., W.C. Krueger, and M. Vavra. 1983. Impacts of cattle on streambanks in Northeastern Oregon. Journal of Range Management 36(6): 683–685.

Klinger, R.C., A.P. Few, K.A. Knox, B.E. Hatfield, J. Clark, D.W. German, and T.R. Stephenson. in press. Evaluating potential overlap between packstock and Sierra Nevada Bighorn Sheep in Sequoia-Kings Canyon National Parks.

Knapp R.A. 2005a. Results of amphibian resurveys in Sequoia-Kings Canyon National Park. Unpublished Interim Report. Sierra Nevada Aquatic Research Laboratory, Mammoth Lakes, California.

_____ 2005b. Effects of nonnative fish and habitat characteristics on lentic herpetofauna in Yosemite National Park, USA. Biological Conservation 121: 265-279

Knapp, R.A., D.M. Boiano, and V.T. Vredenburg. 2007. Removal of nonnative fish results in population expansion of a declining amphibian (mountain yellow-legged frog, *Rana muscosa*). Biological Conservation 135: 11-20

Knapp, R.A., and K.R. Matthews. 2000a. Non-native fish introductions and the decline of the mountain yellow-legged frog from within protected areas. Conservation Biology 14: 428-438.

_____ 2000b. Effects of non-ative fishes on wilderness lake ecosystems in the Sierra Nevada and recommendations for reducing impacts. USDA Forest Service Proceedings RMRS-P-15-Vol-5.

Knapp, R.A., K.R. Matthews, and O. Sarnelle. 2001. Resistance and resilience of alpine lake fauna to fish introductions. Ecological Monographs 71: 401–421.

Knapp, R.A., K.R. Matthews, H.K. Preisler, and R. Jellison. 2003. Developing probabilistic models to predict amphibian site occupancy in a patchy landscape. Ecological Applications 13: 1069–1082.

Knight, R.L., and D.N. Cole. 1991. Effects of recreational activity on wildlife in wildlands. Transactions of the 56th North American Wildlife and Natural Resources Conference 56: 238-247.

Knutsen, M.G., W.B. Richardson, and D.M. Reineke. 2004. Agricultural Ponds Support Amphibian Populations. Ecological Applications 14: 669–684.

Kondolf, G. M., R. Kattelmann, M. Embury, and D. C. Erman. 1996. Status of riparian habitat. *In* Sierra Nevada Ecosystem Project, final report to congress. Volume II, Chapter 36. Assessments and scientific basis for management options. Centers for Water and Wildland Resources, University of California, Davis, California.

Lacan, I., K. Matthews, and K. Feldman. 2008. Interaction of an introduced predator with future effects of climate change in the recruitment dynamics of the imperiled Sierra Nevada yellow-legged frog (*Rana sierrae*). Herpetological Conservation and Biology 3: 211–223.

Lannoo, M.J. (Editor). 2005. Amphibian declines the status and conservation of United States species. University of California Press, Berkeley, California.

Larson, D.J. 1996. Historical water-use priorities and public policies. Pages 163-185 *in* Sierra Nevada Ecosystem Project: Final report to Congress Volume II. Centers for Water and Wildland Resources Report. University of California, Davis, California.

Lee, S.R. 2013. Contemporary pack stock effects on subalpine meadow plant communities in Sequoia and Yosemite National Parks. Masters thesis, University Of California, Merced, California.

Lefcort, H., K.A. Hancock, K.M. Maur, and D.C. Rostal. 1997. The effects of used motor oil, silt and the water mold *Saprolegnia parasitica* on the growth and survival of mole salamanders (genus *Ambystoma*). Archives of Environmental Contamination and Toxicology 32: 383-388.

Liang, C.T. 2010. Habitat modeling and movements of the Yosemite toad (*Anaxyrus* (= *Bufo*) *canorus*) in the Sierra Nevada, California. PhD dissertation. University of California, Davis California.

Liang, C.T., S.L. Barnes, H. Eddinger, and A.J. Lind. 2010. Species distribution model of the Yosemite toad in the Sierra National Forest, California. USDA Forest Service, Pacific Southwest Research Station, Sierra Nevada Research Center, Davis, California. Report to U.S. Fish and Wildlife Service. Sacramento, California.

Liang, C.T., and T.J. Stohlgren. 2011. Habitat suitability of patch types: A case study of the Yosemite toad. Frontiers in Earth Sciences 5: 217-228.

Lind, A., R. Grasso, J. Nelson, K. Vincent, C. Liang, K. Tate, L. Roche, B. Allen-Diaz, and S. Mcilroy. 2011. Determining the Effects of Livestock Grazing on Yosemite Toads (*Anaxyrus* [*Bufo*] *canorus*) and Their Habitat: An Adaptive Management Study. Pacific Southwest Research Station, Sierra Nevada Research Center, Davis, California.

Livezey, R.L., and A.H. Wright. 1945. Descriptions of four salientian eggs. American Midland Naturalist 34: 701–706.

Longcore, J. E., A.P. Pessier, and D.K. Nichols. 1999. *Batrachochytrium dendrobatidis gen. et sp. nov.*, a chytrid pathogenic to amphibians. Mycologia 91: 219–227.

Macey, J.R., J. Strasburg, J. Brisson, V.T. Vrendenburg, M. Jennings, and A. Larson. 2001. Molecular phylogenetics of western North American frogs of the *Rana boylii* species group. Molecular Phylogenetics and Evolution 18: 131-143.

Mahaney, P.A. 1994. The effects of freshwater petroleum contamination on amphibian hatching and metamorphosis. Environmental Toxicology 13: 259-265.

Mao, J., D.E. Green, G. Fellers, and V.G. Chinchat. 1999. Molecular characterization of iridioviruses isolated from sympatric amphibians and fish. Virus Research 63: 45-52.

Marlow, C.B. and T.M. Pogacnik. 1985. Time of grazing and cattle-induced damage to streambanks. Paper presented at the North American Riparian Conference. University of Arizona, Tucson, Arizona.

Martin, D.L. 1992. Sierra Nevada anuran survey: an investigation of amphibian population abundance in the national forests of the Sierra Nevada of California. Report to U.S. Forest Service. Canorus Ltd., Sacramento, California.

_____ 2008. Decline, movement, and habitat utilization of the Yosemite toad (*Bufo canorus*): An endangered anuran endemic to the Sierra Nevada of California. PhD dissertation. University of California, Santa Barbara, California.

Matthews, K.R., and H.K. Preisler. 2010. Site fidelity of the declining amphibian *Rana sierrae* (Sierra Nevada yellow-legged frog). Canadian Journal of Fisheries and Aquatic Science 67: 243-255.

Mazerolle, M.J., M. Huot, and M. Gravel. 2005. Behavior of amphibians on the road in response to car traffic. Herpetologica 61: 380-388.

McClaran, M. 2000. Improving Livestock Management in Wilderness. USDA Forest Service Proceedings RMRS-P-15-VOL-5. 2000.

McIlroy, Susan K., A. Lind, B. Allen-Diaz, L. Roche, W. Frost, R. Grasso, and K. Tate. 2013. Determining the effects of cattle grazing treatments on Yosemite toads (*Anaxyrus* [=Bufo] *canorus*) in montane meadows. PLoS ONE 8(11): 79263.

McMenamin, S.K., E.A. Hadlya, and C.K. Wright. 2008. Climatic change and wetland desiccation cause amphibian decline in Yellowstone National Park. Proceedings of the National Academy of Sciences 105: 16988–16993.

Meehan, W.R. and W.S. Platts. 1978. Livestock grazing and the aquatic environment. Journal of Soil and Water Conservation 6: 274–278.

Melillo, J.M., T. Richmond, and G.W. Yohe. 2014. Climate change impacts in the United States: The Third National Climate Assessment. U.S. Global Change Research Program, Washington, D.C.

Menke, J.W, C. Davis, and P. Beesley. 1996. Rangeland assessment. *In:* Sierra Nevada ecosystem project, final report.

Monastersky, R. 2013. Global carbon dioxide levels near worrisome milestone. Nature 497: 14.

Moore, P.E., D.N. Cole, J.W. Wagtendonk, M.P. McClaran, and N. McDougald. 2000. Meadow response to pack stock grazing in the Yosemite wilderness: integrating research and management. In: Wilderness ecosystem, threats, and management, Volume 5. RMRS-P-15-VOL-5; Proceedings of the Wilderness science in a time of change conference, 23-27 May 1999. Missoula, Montana. USDA Forest Service, Rocky Mountain Research Station: 160–164.

Morton, M.L., and M.E. Pereyra. 2010. Habitat use by Yosemite toads: life history traits and implications for conservation. Herpetological Conservation and Biology 5: 388-394.

Morton, M.L., and K.N. Sokolski. 1978. Sympatry in *Bufo boreas* and *Bufo canorus* and evidence of natural hybridization. Bulletin of the Southern California Academy of Science 77: 52–55.

Moyle, P.B., R.M. Yoshiyama, and R.A. Knapp. 1996. Status of fish and fisheries. Pages 953-973 *in* Sierra Nevada Ecosystem Project: final report to Congress. Volume II. Centers for Water and Wildland Resources, University of California, Davis, California.

Mullally, D.P. 1953. Observations on the ecology of the toad *Bufo canorus.* Copeia 1953: 182-183.

_____ 1956. The relationships of the Yosemite and western toads. Herpetologica 12: 133–135.

Park Superintendent – Sequoia and Kings Canyon National Parks 50

Mullally, D.P., and J.D. Cunningham. 1956. Ecological relations of *Rana muscosa* at high elevations in the Sierra Nevada. Herpetologica 12: 189–198.

National Park Service. 2013. Mountain Yellow-legged Frog Restoration Project: 2012 Field Season Summary. Sequoia and Kings Canyon National Park, Three Rivers, California.

_____ 2014. Wilderness Stewardship Plan/Draft Environmental Impact Statement. Sequoia and Kings Canyon National Park, Three Rivers, California.

Nelson, R.L., M.L. McHenry, and W.S. Platts. 1991. Mining. Pages 425-457 *in* W.R. Meehan (Editor). Influences of Forest and Rangeland Management on Salmonid Fishes and their Habitats. American Fisheries Society Special Publication 19: 425-457.

Newcombe, C.P., and D.D. MacDonald. 1991. Effects of suspended sediments on aquatic ecosystems. North American Journal of Fisheries Management 11: 72-84.

Obedzinski, R.A., C.G. Shaw III, and D.G. Neary. 2001. Declining woody vegetation in riparian ecosystems of the western United States. Western Journal of Applied Forestry 16: 169–180.

Olson, D.H. 1989. Predation on breeding western toads (*Bufo boreas*). Copeia 1989: 391–397.

Olson-Rutz, K.M., C.B. Marlow, K. Hansen, L.C. Gagnon, and R.J. Rossi. 1996a. Packhorse grazing behavior and immediate impact on a timberline meadow. Journal of Range Management 49(6): 546-550.

_____ 1996b. Recovery of a high elevation plant community after packhorse grazing. Journal of Range Management 49(6): 541-545.

Ott, A.G. 1985. Fish Protection and Placer Mining. Alaska Fish and Game March-April 1985.

Point Reyes Bird Observatory. 2011. Projected effects of climate change in California: Ecoregional summaries emphasizing consequences for wildlife. Point Reyes Bird Observatory Conservation Science, Petaluma, California.

Pope, K. 1999. *Rana muscosa* (mountain yellow-legged frog): Diet. Herpetological Review 30(3): 163–164.

Pope, K.L., and K.R. Matthews. 2001. Movement ecology and seasonal distribution of mountain yellow-legged frogs, *Rana muscosa*, in a high-elevation Sierra Nevada basin. Copeia 2001:787-793.

Power, M. E. 1990. The importance of sediment in the grazing ecology and size class interactions of an armored catfish, *Aneistrus spinosus*. Environmental Biology of Fish 10: 173-181.

Rachowicz, L.J., R.A. Knapp, and J.A.T. Morgan. 2006. Emerging infectious disease as a proximate cause of amphibian mass mortality. Ecology 87: 1671–1683.

Ratliff, R.D. 1985. Meadows on the Sierra Nevada of California: state of knowledge. General Technical Report. PSW-84, Pacific Southwest Forest and Range Experiment Station. U.S. Forest Service, Pinole, California.

Roche, L.M., B. Allen-Diaz, D.J. Eastburn, and K.W. Tate. 2012a. Cattle grazing and Yosemite toad (*Bufo canorus* Camp) breeding habitat in Sierra Nevada meadows. Rangeland Ecology and Management 65: 56–65.

Roche, L.M., A.M. Latimer, D.J. Eastburn, and K.W. Tate. 2012b. Cattle grazing and conservation of a meadow-dependent amphibian species in the Sierra Nevada. PLoS ONE 7: 35734.

Rodríguez-Prieto, I., and E. Fernández-Juricic. 2005. Effects of direct human disturbance on the endemic Iberian frog *Rana iberica* at individual and population levels. Biological Conservation 123: 1–9.

Sadinski, W.J. 2004. Amphibian declines: Causes. Final report to The Yosemite Fund.

Schiermeier, Q. 2012. Hot Air Commitments made under the Kyoto Climate Treaty expire at the end of 2012, but emissions are rising faster than ever. Nature 491: 656-658.

Schlumpf, M., B. Cotton, M. Conscience, V. Haller, B. Steinmann, and W. Lichtensteiger. 2001. In vitro and in vivo estrogenicity of UV screens. Environmental Health Perspectives 109: 239-244.

Shaffer M.L. 1981. Minimum population sizes for species conservation. Bioscience 31: 131–134.

Shaffer, H.B., G.M. Fellers, A. Magee, and R. Voss. 2000. The genetics of amphibian declines: population substructure and molecular differentiation in the Yosemite toad, *Bufo canorus*, (Anura, Bufonidae) based on single strand conformation polymorphism analysis (SSCP) and mitochondrial DNA sequence data. Molecular Ecology 9: 245–257.

Skerratt, L.F., L. Berger, R. Speare, S. Cashins, K.R. McDonald, A.D. Phillott, H.B. Hines, and N.Kenyon. 2007. Spread of chytridiomycosis has caused the rapid global decline and extinction of frogs. EcoHealth 4: 125–134.

Stebbins, R.C. 1951. Amphibians of western North America. University of California Press. Berkeley, California.

_____ 2003. A field guide to western reptiles and amphibians. Houghton Mifflin. Boston, Massachusetts.

Stebbins, R.C. and N.W. Cohen. 1995. A natural history of amphibians. Princeton University Press, Princeton, New Jersey.

Stebbins, R.C. and S.M. McGinnis. 2012. Field guide to amphibians and reptiles of California. University of California Press. Berkeley, California.

Stephens, M.R. 2001. Phylogeography of the *Bufo boreas* (Anura, Bufonidae) species complex and the biogeography of California. Master thesis, Sonoma State University, Santa Rosa, California.

Stice, M.J., and C.J. Briggs. 2010. Immunization is ineffective at preventing infection and mortality due to the amphibian chytrid fungus *Batrachochytrium dendrobatidis*. Journal of Wildlife Diseases 46: 70-77.

Stohlgren, T.J., and D.J. Parsons. 1986. Vegetation and soil recovery in wilderness campsites closed to visitor use. Environmental Management 10: 375-380.

Storer, T.I. 1925. A synopsis of the Amphibia of California. University of California Publications in Zoology 27.

Stuart, J.M., M.L. Watson, T.L. Brown, and C. Eustice. 2001. Plastic netting: an entanglement hazard to snakes and other wildlife. Herpetological Review 32(3): 162-164.

Tollefson, J. ,and R. Monastersky. 2012. Awash in carbon more than ever, nations are powering themselves from abundant supplies of fossil fuels. Nature 491: 654-655.

U.S. Fish and Wildlife Service. 2014a. Endangered and threatened wildlife and plants; Endangered status for the Sierra Nevada yellow-legged frog and the northern district population segment of the mountain yellow-legged frog, and threatened status for the Yosemite toad. **Federal Register** 79: 24256-245310.

_____ 2014b. Programmatic Biological Opinion on Nine Forest Programs on Nine National Forests in the Sierra Nevada of California for the Endangered Sierra Nevada Yellow-legged Frog, Endangered Northern Distinct Population Segment of the Mountain Yellow-legged Frog, and Yosemite Toad. Service file FF08ESMF00-2014-F-0557. December 9, 2014. Sacramento Field Office, Sacramento, California.

U.S. Forest Service (USFS). 2001a. Fisheries Programmatic Biological Evaluation for Selected Mining Related Activities and Westslope Cutthroat Trout. Helena, Lincoln, and Townsend Ranger Districts.

_____ 2001b. Sierra Nevada Forest Plan Amendment, Final Environmental Impact Statement.

_____ 2004. Sierra Nevada Forest Plan Amendment, Final Supplemental Environmental Impact Statement, Volume 1. U.S. Forest Service.

_____ 2012. Aquatic Species Biological Assessment and Biological Evaluation for the Kaiser Range Grazing Allotment. High Sierra Ranger District, Sierra National Forest, Fresno County, California.

_____ 2013a. Aquatic Species Biological Assessment and Biological Evaluation for the Bald Mountain Project (Ecological Restoration and Fuels Reduction). High Sierra Ranger District, Sierra National Forest, Fresno County, California.

_____ 2013b. Lake Tahoe Basin Management Unit Biological Assessment: Land and Resource Management Plan Revision Final Environmental Impact Statement.

_____ 2014. BEH Rangeland Allotments, Draft Environmental Impact Statement, R5-MB-245. Stanislaus National Forest, Sonora, California.

_____ 2014. Natural Resource Information System. Vallejo, California.

U. S. Forest Service (USFS), California Department of Fish and Game, National Park Service, U.S. Fish and Wildlife Service, and U.S. Geological Survey. 2009. Yosemite Toad Conservation Assessment Draft. Pinole, California.

U.S. Global Change Research Program. 2013. Federal Advisory Committee draft climate assessment report. Washington, D.C.

Vale, T.R. 1987. Vegetation change and Park purposes in the high elevations of Yosemite National Park, California. Annals of the Association of American Geographers 77(1): 1-18.

Vankat, J.L., and J. Major. 1978. Vegetation changes in Sequoia National Park, California. Journal of Biogeography 5: 377-402.

Voyles J., L. Berger, S. Young, R. Speare, and R. Webb. 2007. Electrolyte depletion and osmotic imbalance in amphibians with chytridiomycosis. Diseases of Aquatic Organisms 77: 113-118.

Voyles, J., S. Young, L. Berger, C. Campbell, and W.F. Voyles. 2009. Pathogenesis of chytridiomycosis, a cause of catastrophic amphibian declines. Science 326:5 82-585.

Vredenburg, V. T. 2000. Natural history notes: *Rana muscosa* (mountain yellow-legged frog), conspecific egg predation. Herpetological Review 31: 170-171.

_____ 2004. Reversing introduced species effects: experimental removal of introduced fish leads to rapid recovery of a declining frog. Proceedings of the National Academy of Sciences 101: 7646–7650.

Vredenburg, V.T., R. Bingham, R. Knapp, J.A.T. Morgan, C. Moritz, and D. Wake. 2007. Concordant molecular and phenotypic data delineate new taxonomy and conservation priorities for the endangered mountain yellow-legged frog. Journal of Zoology 271: 361–374.

Vredenburg, V.T., G. Fellers, and C. Davidson. 2005. The mountain yellow-legged frog *Rana muscosa* (Camp 1917). Pages 563-566 *in* Lannoo, M. (editor). Status and conservation of US amphibians. University of California Press, Berkeley, California.

Vredenburg, V.T., R. Knapp, T.S. Tunstall, and C. Briggs. 2010. Dynamics of an emerging disease drive large-scale amphibian population extinctions.

Vredenburg, V., T. Tunstall, R. Bingham, J. Yeh, S. Schoville, C. Briggs, and C. Moritz. 2004. Patterns of habitat use and movement of *Rana muscosa* in the northern Sierra Nevada with comparisons to populations in the southern Sierra Nevada, with additional information on the biogeography of the species. Final Report for California Department of Fish and Game, Habitat Conservation Planning Group and the USDA Forest Service.

Wagoner, L. 1886. Report on forests of the counties of Amador, Calaveras, Tuolumne, and Mariposa. First biennial report of the California State Board of Forestry for the years 1885-1886. State Board of Forestry, Sacramento, California.

Walls, S.C., W.J. Barichivich, and M.E. Brown. 2013. Drought, Deluge and Declines: The Impact of Precipitation Extremes on Amphibians in a Changing Climate. Biology 2: 399-418.

Wang, I.J. 2012. Environmental and topographic variables shape genetic structure and effective population sizes in the endangered Yosemite toad. Diversity and Distributions 18: 1033–1041.

Weixelman, D. A., B. Hill, D.J. Cooper, E.L. Berlow, J.H. Viers, S.E. Purdy, A.G. Merrill, and S.E. Gross. 2011. A Field Key to Meadow Hydrogeomorphic Types for the Sierra Nevada and Southern Cascade Ranges in California. General Technical Report R5-TP-034.

Wengert, G. 2008. Habitat Use, home range, and movements of mountain yellow-legged frogs (*Rana muscosa*) in Bean and Spanish Creeks on the Plumas National Forest. Final Report to the Sacramento Fish and Wildlife Office, U.S. Fish and Wildlife Service. Sacramento, California.

Wright, A.H., and A.A. Wright. 1949. Handbook of frogs and toads. Comstock Publishing, Ithaca, New York.

Wright, A.N., R.J. Hijmans, M.W. Schwartz, and H.B. Shaffer. 2013. California amphibian and reptile species of future concern: conservation and climate change. Final report to the California Department of Fish and Wildlife, Sacramento, California.

Zeiner, D. C., W.F. Laudenslayer, and K.E. Mayer. 1988. California's wildlife. Volume I: amphibians and reptiles. California Department of Fish and Game, Sacramento, California.

Zweifel, R.G. 1955. Ecology, distribution, and systematics of frogs of the *Rana boylei* group. University of California Publications in Zoology 54: 207-292.



Appendix S

Consultation with The California State Historic Preservation Office

ON THE PREVIOUS PAGE
Vidette Meadow
NPS Photo

APPENDIX S:

CONSULTATION WITH THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICE

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STATE OF CALIFORNIA – THE NATURAL RESOURCES AGENCY EDMUND G. BROWN, JR., *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
1725 23rd Street, Suite 100
SACRAMENTO, CA 95816-7100
(916) 445-7000 Fax: (916) 445-7053
calshpo@parks.ca.gov
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March 6, 2015 In reply refer to: NPS_2014_1211_001

Woody Smeck
Superintendent
Sequoia and Kings Canyon National Parks
47050 Generals Highway
Three Rivers, CA 93271

Re: Wilderness Stewardship Plan, Sequoia and Kings Canyon National Parks

Dear Mr. Smeck:

Thank you for your December 3, 2014, letter initiating consultation with regard to the proposed undertaking at Sequoia and Kings Canyon National Parks. The National Park Service (NPS) is consulting with the State Historic Preservation Officer (SHPO) in order to comply with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f), as amended, and its implementing regulation at 36 CFR Part 800. Several enclosures were also submitted, as was a draft Wilderness Stewardship Plan and Draft Environmental Impact Statement, dated June 2014. Subsequent correspondence between NPS and SHPO staff has resulted in modified versions of the enclosures related to the Section 106 consultation for the plan.

The proposed undertaking, as described, is the creation and implementation of a plan to manage visitor use and administrative activities within wilderness areas in the Parks, which encompass approximately 97% of the Parks' total areas. The primary actions associated with the plan with the potential to affect historic properties is the implementation of a Trails Management Plan, management of visitor use and access to wilderness areas, and management of existing front- and back-country facilities such as ranger stations and camp areas.

NPS has identified an Area of Potential Effect (APE) that includes the entire area of both Sequoia and Kings Canyon National Parks. NPS has surveyed approximately 7 % of the area in the Parks, and intends to conduct ongoing identification and evaluation efforts as funding becomes available and as the Wilderness Stewardship Plan is implemented. NPS has identified a single resource that may be eligible for listing in the National Register of Historic Places (NRHP), the Bearpaw Meadow Ranger Station, and a determination of eligibility will be submitted to the SHPO for this property.

The Wilderness Stewardship Plan will create a program for managing wilderness areas that will be implemented over a number of years. Because incomplete identification efforts prevent a full assessment of adverse effects, NPS proposes to consult with the SHPO, Advisory Council on Historic Preservation, Native American Tribes, and other interested parties to develop a Programmatic Agreement to conclude the Section 106 consultation for the Plan.

After reviewing the information submitted, the SHPO offers the following comments:

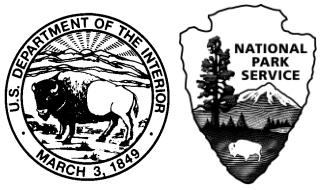
- The SHPO concurs that developing and implementing the Wilderness Stewardship Plan constitutes an undertaking.
- The APE appears to be sufficient to take both direct and indirect effects into account.
- The SHPO agrees that a Programmatic Agreement is an appropriate method to take effects of the undertaking into account and complete the Section 106 process.

The SHPO looks forward to continuing consultation on the Programmatic Agreement. Thank you for seeking SHPO comments and considering historic properties as part of your project planning. If you have any questions or concerns, please contact Mark Beason, Project Review Unit Historian, at (916) 445-4047 or mark.beason@parks.ca.gov.

Sincerely,

Carol Roland-Nawi, Ph.D.

Carol Roland-Nawi, Ph.D.
State Historic Preservation Officer



As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historic places, and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

(2015)